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aus dem Entomologischen Museum
Dr. Ulf Eitschberger

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The Palaearctic "Elfin" Butterflies (Lycaenidae, Theclinae)

by

KURT JOHNSON [1]

Contents

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Abstract

Tailless, crypticly marked "elfin" butterflies (tribe Eumaeini) occurring in the Palaearctic Realm are treated as three monophyletic genera, including *Ahlbergia* BRYK and two new genera, *Cissatsuma* and *Novosatsuma*. *Ahlbergia* comprises of eighteen species characterized by complex morphological features much like those of the angiosperm-feeding species historically associated with Nearctic *Incisalia* SCUDDER. *Ahlbergia* includes type species *A. ferrea* (BUTLER) along with *A. pluto* (LEECH), *A. frivaldszkyi* (LEDERER), *A. circe* (LEECH), *A. leechii* (DE NICÉVILLE), *A. nicevillei* (LEECH) *A. chalybeia* (LEECH) and *A. haradai* IGARASHI; new species *A. bimaculata*, *A. korea*, *A. leei*, *A. arquata*, *A. aleucopuncta*, *A. unicolora*, *A. pictila*, *A. caerulea*, *A. prodiga*, *A. caesius*, *A. lynda*; and new subspecies *A. pluto cyanus*, *A. p. clarofacia*, *A. frivaldszkyi tricaudata*, *A. f. aquilonaria* and *A. circe montivaga*. *Cissatsuma* and *Novosatsuma* are comprised of species exhibiting comparatively simple morphological structures much like those of the conifer-feeding taxa associated with the type species of Nearctic *Incisalia* (*I. niphon* HÜBNER) and its relatives. *Cissatsuma* includes type species *C. albilinea* (RILEY), new combination, and new species *C. kansuensis*, *C. halosa*, *C. tuba*, *C. crenata* and *C. contexta*. *Novosatsuma* includes type species *N. monstrabila*, new species, *N. pratti* (LEECH), new combination, and new species *N. matusiki*, *N. magnasuffusa*, *N. plumbagina*, *N. oppocoenosa*, *N. magnapurpurea*, and *N. cibdela*. Based on the morphology and current knowledge of larval foodplants, it is suggested that New World *Incisalia* are not monophyletic but comprise of two groups, each with a sister group in the Palaearctic. Appendices include preliminary cladistic considerations and a synonymic list of worldwide callophryine elfins. The latter proposes a new Holarctic elfin nomenclature with new genera *Deciduphagus* (type species *Thecla augustinus* WESTWOOD) as the sister group of *Ahlbergia*, and *Cisincisalia* (type species *C. moecki*, new species) including certain Central American elfins sharing primitive characters of the worldwide Callophryina.

Zusammenfassung

Die sich durch eine Verbergetracht auszeichnenden schwanzlosen Zipfelfalter der Tribus Eumaeini der Paläarktis werden als monophyletische Gruppe mit drei Gattungen behandelt: Die bekannte Gattung *Ahlbergia* BRYK sowie zwei neue Gattungen, nämlich *Cissatsuma* und *Novosatsuma*. Die achtzehn Arten der Gattung *Ahlbergia* werden durch komplexe morphologische Eigenschaften ähnlich denen der an Angiospermen lebenden Arten, die früher der nearktischen Gattung *Incisalia* SCUDDER zugeordnet wurden, ausgezeichnet. *Ahlbergia* enthält neben der Typusart *A. ferrea* (BUTLER) noch *A. pluto* (LEECH), *A. frivaldszkyi* (LEDERER), *A. circe* (LEECH), *A. leechii* (DE NICÉVILLE), *A. nicevillei* (LEECH), *A. chalybeia* (LEECH) und *A. haradai* IGARASHI, die neuen Arten *A. bimaculata*, *A. korea*, *A. leei*, *A. arquata*, *A. aleucopuncta*, *A. unicolora*, *A. pictila*, *A. caerulea*, *A. prodiga*, *A. caesius* und *A. lynda* sowie die neuen Unterarten *A. pluto cyanus*, *A. p. clarofacia*, *A. frivaldszkyi tricaudata*, *A. f. aquilonaria* und *A. circe montivaga*. Die Arten der Gattungen *Cissatsuma* und *Novosatsuma* zeichnen sich durch relativ einfache morphologische Strukturen aus, ähnlich denen der Koniferen-fressenden Arten um die Typusart der neuweltlichen Gattung *Incisalia* (*I. niphon* HÜBNER). *Cissatsuma* umfaßt die Typusart *C. albilinea* (RILEY) comb. nov. sowie die neuen Arten *C. kansuensis*, *C. halosa*, *C. tuba*, *C. crenata* und *C. contexta*. *Novosatsuma* mit der Typusart *N. monstrabila* spec. nov. schließt noch die Art *N. pratti* (LEECH) comb. nov. und die neuen Arten *N. matusiki*, *N. magnasuffusa*, *N. plumbagina*, *N. oppocoenosa*, *N. magnapurpurea* und *N. cibdela* ein. Aufgrund ihrer Morphologie und unseres derzeitigen Wisensstandes um die larvalen Futterpflanzen wird angenommen, daß die neuweltliche Gattung *Incisalia* nicht monophyletischen Ursprungs ist, sondern sich aus zwei Gruppen zusammensetzt, von denen jede eine Schwestergruppe in der Paläarktis hat. Die Anhänge zu dieser Arbeit beinhalten vorläufige kladistische Betrachtungen und eine synonymische Liste der Callophryina der Welt. Es wird dabei für die Holarktis eine

neue Nomenklatur eingeführt: *Deciduphagus* gen. nov. mit der Typusart *Thecla augustinus* WESTWOOD wird als die Schwestergruppe von *Ahlbergia* betrachtet und *Cisincisalia* gen. nov. mit der Typusart *C. moecki* spec. nov. schließt einige zentralamerikanische Zipfelfalter mit ein, mit denen sie die selben primitiven Merkmale teilt.

Introduction

For over fifteen years I have studied the many tailless, crypticly marked, butterflies of the lycaenid tribe Eumaeini (ELIOT, 1973) commonly referred to as "elfin butterflies" Because these butterflies occur in both the Old and New World, there have been considerable questions about their taxonomic relations and affinities. In 1981, I presented a preliminary study of some of these species as part of my doctoral dissertation at the City University of New York (JOHNSON, 1981, unpublished for nomenclatural purposes). Subsequently, I published a nomenclature for the elfin butterflies occurring in the high Andes of South America (*Penaincisalia*, JOHNSON, 1990a). I have since delineated the remaining New World elfins (JOHNSON, in press), adding seventeen new genera to the Neotropical fauna including over one hundred species distributed from Mexico south to Patagonia.

As noted in previous works, elfinlike butterflies mostly occur in two large clades of the Eumaeini respectively, "Callophryina" butterflies (JOHNSON, 1991, 1990a) and their sister group "Thecloxurina" butterflies (JOHNSON, in press). Elfinlike butterflies in both these clades have non-elfinlike sister taxa, commonly called "hairstreak" butterflies. These latter have one or two hairlike hindwing tails and often colorful undersurfaces displayed in banded or lunulate patterns. As a result, the so-called "elfins" of the Lycaenidae are not themselves a monophyletic group. Rather, elfinlike butterflies have arisen in different groups of the Eumaeini, much as crypticly colored species have arisen in many families of butterflies.

Various elfinlike lycaenid butterflies have been attributed to the fauna of the Palaearctic Realm. These have been noted to occur principally in the vast montane regions extending from the Himalayan region east and northward through China. Previously, the only general treatment of the callophryine-like elfin species was LEECH's (1893-94) classic work on Chinese butterflies and a short commentary by GILLHAM (1956). However, these works included only seven elfin species, all assigned to the old callophryine genus *Satsuma* MURRAY. There are actually many more, numerous specimens of which have remained unidentified in collections. D'ABRERA (1986) omitted treatment of callophryine elfins in his "Oriental Region" photo folio, although some taxa included in his text overlap those of elfins treated in the present paper.

In 1976 I began assembling series of Palaearctic elfins from many worldwide depositories. Many of these specimens were from unincorporated or unidentified materials stored in these museums. Astonishingly, large numbers of undescribed taxa were apparent – many from series collected in the 19th and early 20th Century from poorly known montane regions including historical "Turkestan", "Tibet", "China", "Mongolia", "Manchuria", "Siberia", northern Burma and the generalized Himalayan region. In this old material entire assemblages of butterflies appeared undescribed. These included some species with brilliant blue males (previously unknown in Palaearctic "*Satsuma*") and others with structurally primitive characters similar only to primitive lycaenids of the New World. As a result of these discoveries, full treatment of Palaearctic elfin butterflies requires an extensively revised nomenclature – *Satsuma* MURRAY (invalid homonym of Molluscan genus *Satsuma* [ADAMS, 1868, Ann. Mag. nat. Hist. 4(1):463]) requires replacement by a more recently available name *Ahlbergia* BRYK, 1946 and two new genera must be described to include the diverse taxa not assignable to the genus *Ahlbergia*.

There are numerous reasons for this separate publication on the Palaearctic elfin butterflies. Recently, there has been renewed interest in delineating the historical Chinese fauna (EITSCHBERGER & HOU, 1991) and, following on my work on historical types in the Muséum National d'Histoire Naturelle (Paris) (JOHNSON, 1991c), finalizing the status of Palaearctic types in LEECH's historical collection at the Natural History Museum (London) (P. ACKERY, pers. comm.). The latter will be important, along with the many new species, for any future photo folio work done at the NHM. Assembling and sorting historical samples at many museums indicated that specimens from early collections, like those of A. E. PRATT and the KELLEY-ROOSEVELT Expeditions of 1928-1929, had been sold off in small lots with individuals ultimately arriving at various institutions. Such circumstances suggested that publication of a basic taxonomy for Old World elfin butterflies would contribute to the eventual location and identification of these far-flung

samples. Undoubtedly, there are numerous small series of Old World elfins scattered about the world's many museums. In addition, I lived in Korea and Japan from time to time between 1975 and 1980. This gave me a chance not only to collect there but also to visit the institutions relevant to viewing historical specimens and reviewing little-known Korean and Japanese language publications concerning these butterflies. Unfortunately, during those years I never had a similar opportunity regarding mainland China.
Further remarks on Palaearctic elfins, and their affinitities, will be included in future studies of the worldwide Callophryina butterflies, particularly when finally rooted trees derived from numerical cladistic analysis can be determined from full data concerning both Callophryina and Thecloxurina lycaenids.

Methods

Systematics

Characters of wing and genitalic morphology in Palaearctic elfin butterflies (common name from usage of BROWN, 1942; PYLE, 1981) were included in a data matrix for PAUP (SWOFFORD, 1985, see below and Appendix 1) for comparison with characters of Nearctic and Neotropical species of the large eumaeine clades Callophryina (JOHNSON, 1981, 1990a) and Thecloxurina (JOHNSON, in press). Consistent with JOHNSON (1981, unpublished for nomenclatural purposes), JOHNSON & QUINTER (1983), JOHNSON (1990a) and certain nomen nudum index citations from BRIDGES (1988a), taxa of Palaearctic elfin butterflies are grouped herein into three monophyletic genera (two of which described as new). As noted in JOHNSON (1981) and JOHNSON & QUINTER (1983) one of these groups (species attributable to *Ahlbergia* BRYK) exhibits numerous apomorphies suggested as shared with the Nearctic forb-feeding members of *Incisalia* HÜBNER (e.g. *augustinus* WESTWOOD, *fotis* STRECKER, *mossii* H. EDWARDS, *henrici* GROTE & ROBINSON, *irus* GODART, *polios* COOK & WATSON). The two other genera appear structurally more primitive and share some unique characters with the coniferous-feeding members currently included in *Incisalia* (*eryphon* BOISDUVAL, *niphon* HÜBNER and *lanoraeensis* SHEPPARD). Thus, based on wing and structural characteristics, I do not consider Nearctic *Incisalia* monophyletic and propose a new Holarctic nomenclature for these groups in Appendix 2, Table I (based on characters summarized in Appendix 1). It will be important for biological studies to clarify whether the Palaearctic groups structurally suggested as the respective sister groups of Nearctic forb- and conifer-feeding *Incisalia* are indeed distinguished by similar foodplant preferences. Since Nearctic elfins have not been recently revised, there has previously been no published nomenclature denoting more than one genus for North American elfinlike butterflies, though this appears preferable.
Based on characters of a monophyletic group established by parsimonious distributions derived from PAUP (SWOFFORD, 1985, see below and Appendix 1), taxa of Palaearctic elfin butterflies are organized into three genera. Species criteria are derived from standard taxonomic procedures involving consistent differences in characters of the wings and genitalic morphology. Generic categories are based on monophyletic groups established for cladistic studies of worldwide callophryines and thecloruxines. Some of these groupings have been summarized (JOHNSON & QUINTER, 1983; JOHNSON, 1990a) and some of these will be published subsequently in connection with numerical cladistic studies of the New and Old World Callophryina butterflies which are still in progress. The latter require elucidation of numerous outgroups for the rooting of numerical cladistic hypotheses. Because many New World Eumaeini are poorly known, numerous outgroups still require elucidation.

Materials

Specimens were studied from the Academy of Natural Sciences (Philadelphia) (PAS), Allyn Museum of Entomology, Florida Museum of Natural History (AME), American Museum of Natural History (AMNH), Natural History Museum (London) (NHM), Carnegie Museum of Natural History (CMNH), Field Museum of Natural History (FMNH), Milwaukee Public Museum (MPM), Muséum National d'Histoire Naturelle (MNHN), National Museum of Natural History (Smithsonian Institution) (NMNH), and Zoologisches Museum der Humboldt Universität zu Berlin (ZMN).

Presentation

Standard diagnostic format is used including sections for Diagnosis, Description, Types, Remarks and Etymology. Concerning synonymic literature, I cite only those which pertain to the geographic region included in the distributions of these butterflies. This problem arises because of omnibus usage of the genus *Callophrys* BILLBERG (ZIEGLER, 1961 and some subsequent authors) to include many worldwide Lycaenidae as subgenera (JOHNSON, 1990a). It serves no purpose here to include all the worldwide usages of *Callophrys* simply because of the transfer of that genus to omnibus status by some authors. Indeed, the morphology of Nearctic and Palaearctic *Callophrys* s.str. (of common usage) differs so dramatically as to question whether this genus could be considered Holarctic. Accordingly, in species level synonymies I include citations of Palaearctic elfins to *Callophrys* only for specific taxa listed therein by BRIDGES (1988a) BRIDGES made this adjustment to accommodate species I had removed from *Ahlbergia* in my 1981 doctoral dissertation (which was, at the time of BRIDGES' 1988 list, unpublished for nomenclatural purposes). I also consider lectotypes originally mentioned in JOHNSON (1981) as finally designated herein.

Based on literature cited, and compatible with elements figured and captioned in figs. 1-3, certain abbreviations and descriptive phrases are employed in text and keys. Label data from specimens is recorded "as is", as read by me. For historical names from the Chinese or Japanese languages I give the usage as transliterated by the respective Library of Congress and "Harvard" methods (where available) as well as these names can be surmised from current gazetteers (BARTHOLOMEW, 1958; U.S.B.G.N. 1968, 1970). When more than one historical name has applied to a locality, these are listed parenthetically, in series joined by ='s sign, after the initial use of the current applicable name. For some localities in the U.S.R. (formerly U.S.S.R. or "Soviet Union") I use data as translated from certain labels by G. BERNARDI (MNHN). Given the ambiguity of some historical label data, it is probable that errors have arisen in the process of discerning transliterations of certain locality names; the author would appreciate any of these being called to his attention. Mapped localities have relied on BARTHOLOMEW (1958) which uses the Chinese Post Office system for China and the U.S.B.G.N. system for Mongolia. On the map figures (figs. 92-97) some symbols are closely clustered due to duplicate locality labels in some of the early historical samples; in these cases, if more than one symbol required placement at a locale, I have tried to group these as closely as possible. Photographs for this monograph were made at various times since 1976 using polaroid temporary-use prints; because of loan return requirements (or inavailability of loans for some species) specimens have sometimes not been available for replacement photographs aged beyond publishable use. As a result, some figures in the present text vary in size, have been transposed to black and white from color, or have been replaced (in a few cases) by photographs of drawings. My aim, for identification purposes, has been to illustrate each species.

Abbreviations used throughout the text include:

Concerning characters of the wings (Fig. 1) - pattern and venation terms follow CLENCH (1964, 1975) except to add the CuA (cubitus anterior) notation for phylogenetic consistency (fig. 1); generalized wing pattern terminology follows that adopted for elfins by JOHNSON (1990a) and reviewed in fig. 1D. The term "scent brand" is used for the androconial scent patch of males

(sensu ELIOT, 1973), distinguishing between "centralized" brands (where androconial scales are densely clustered into a patch) and "diffuse" brands (where androconial scales may be scattered along various wing veins); "*Thecla*-spot" (sensu NICOLAY, 1971) refers to an orbicular marking (usually red to yellow) occurring marginad in hindwing cell CuA1 in many members of the genus *Thecla* and in the New World Eumaeini. In photograph captions, to conserve space, I refer to the wing upper surfaces as "DS" (dorsal surface) and under surfaces as "VS" (ventral surface). Since elfins are crypticly colored and photographs herein are not in color, I use numbered arrows in the figures cross-referenced to specific color notes in the captions.

Concerning morphological characters (Fig. 2) – morphological terminology generally follows that summarized in JOHNSON (1988, 1989, 1990a, 1991a, b); specialized tergal sclerotization is referred to as the "subchordate incised posterior cavity" (abbreviated "sipc") as defined in JOHNSON (1991a, b); genitalic terminology follows KLOTS (1972) and additional designations employed by JOHNSON (1988, 1989, 1990a, 1991a, b) particularly those for respective "bilobes" and "caudal extensions" of the valvae of males and the ductus bursae "lamellae" and cervix bursae "hood" of females; I refer to the bilobed areas of many taxa as "clear" to distinguish the transparence of these from opague or heavily spined structures appearing some other worldwide Theclinae; because relative complexification of sclerotized structures in Palaearctic elfins is an important aspect of their genitalic differentiation, I use the term "sclerotinal sculpturing" to refer to various deposits of sclerotin on the genital structures which form elaborate shapes or additional components in some species of the group; the term "brush organ" is used consistent with ELIOT (1973) to refer to bundles of elongate microtrichia which cleave to the vinculum dorsum of many eumaeines when genitalia are removed by dissection.

Concerning general discussion – I often use the terms "apotypic" and "plesiotypic" to refer to taxa with generally more derived and primitive characters, respectively. This is because only characters are derived or primitive, not taxa. However, in discussing the relative position of taxa in cladistic diagrams it is sometimes useful to describe those at the respective primitive and derived ends of a cladograms "plesiotypic" and "apotypic" I also employ certain geographic terms from historical literature, including (in relation to distributions) "nuclear Chinese" (referring to the Peoples Republic of China exclusive of autonomous regions like Mongolia and Tibet) and "trans-Baikal" (for the biogeographic region surrounding Lake Baikal in the U.S.R.). Otherwise, geographic names (particularly for mountain ranges) follow BARTHOLOMEW (1958). Label data listed in "Additional Localities" for each species is recorded for localities "as is" and as read by me. Therefore, some archaic transliterative spellings result; where label data was in a foreign language, such instances are noted and a translation given if available from a reliable ["pers. comm." cited] source. The various transliterative or historical alternatives for names listed in "Additional Localities" can be located in specific "Types" sections of the paper. To summarize geographic regions recognized within China I use terminology by SPENCER (1972) since this publication probably has the widest circulation; I also place such terms in quotations marks to distinguish them. I use the notation "ICZN Code" to refer the International Code of Zoological Nomenclature (INTERNATIONAL TRUST FOR ZOOLOGICAL NOMENCLATURE, 1985), and as amended thereafter from time to time.

Taxonomy

Study group, historical overview

Since some of the taxa treated herein have been familiar to lepidopterists as members of species groups of DRAUDT (1919), SEITZ (1921) or other authors and many are similar to taxa familiar to New World workers as elfins of the genus *Incisalia* SCUDDER, the following overview is helpful:

Ahlbergia includes all the previously known Palaearctic elfins except *Satsuma albilinea* (RILEY, 1939) and *Thecla pratti* (LEECH, 1889). Species of *Ahlbergia* are generally small (FW alar expanse [hereafter, simply "FW"] generally 11-14 mm) with mostly brown males and females often with some iridescent blue or purple in the medial and/or basal areas of the wings. A few species with more prominently iridescent blue females are known. As noted in the subsequent key, genitalia evidence rather complex configurations, similar to those of forb-feeders historically placed with Nearctic *Incisalia* SCUDDER.

Novosatsuma includes *Thecla pratti* (LEECH, 1889) and numerous undescribed relatives. These taxa are relatively large for elfins (FW generally 15-16 mm) with males of many species brilliant blue on the wing upper surfaces (many such specimens historically misdiagnosed as females) and females also brilliant blue. Genitalia are distinct as noted in the subsequent key, with simple features similar to conifer-feeding taxa historically associated with Nearctic *Incisalia* SCUDDER.

Cissatsuma includes *Satsuma albilinea* (RILEY, 1939) and numerous undescribed relatives. Like *Novosatsuma* species, these taxa are generally large (FW generally 15 or more mm) but have both sexes generally brown and genitalia, compared to worldwide Eumaeini, even more "primitive" than those of either genus cited above.

Generic keys[2]

Male Genitalia:

1a. Valvae robust and unsculptured (e.g. caudal extension generally exceeding one and one-half times breadth of bilobed configuration) (fig. 2DE) 2

b. Valvae sculptured and generally non-robust (e.g. caudal extension generally exceeding one and one-half times caudal length of bilobed configuration) (fig. 2C) *Ahlbergia*

2a. Caudal extensions immediately tapered in a gradual slope from bilobed area to pointed termini (fig. 2E) *Cissatsuma*

b. Caudal extension maintaining width at juncture with bilobed configuration for at least half of terminal length, then various sloping abruptly to blunt termini (fig. 2D) *Novosatsuma*

Female Genitalia:

1a. Ductus bursae at base of lamellae "robust" (e.g. distal expansion of lamellae from plane of ductus bursae lateral margin less than maximal width of ductus bursae) (see figs. 3B, C definitions/measures "x" and "y") 2

b. Ductus bursae at base of lamellae "diminutive" (e.g. distal expansion of lamellae from plane of ductus bursae lateral margin generally equal to or exceeding (often greatly), maximal width of ductus bursae) (see fig. 3A definitions/measures "x" and "y") *Ahlbergia*

2a. Ductus bursae of generally even width throughout (e.g. unconstricted and/or unsculptured) fig. 3C) *Cissatsuma*

b. Ductus bursae constricted in posterior one-third, creating a fluted "antrum" before terminal lamellae (fig. 3B) *Novosatsuma*

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2 Because of structural diversity in these groups, measure definitions are somewhat generalized in an attempt to fit all species; though generally stated, they should be applicable to nearly all dissections, particularly once a worker is familiar with the salient differences between the "robust" and non-robust configurations that typify various of these taxa.

Nomenclature

Genus *Ahlbergia* BRYK
Figs. 4-35, 59-76

Lycaena (in part) [not FABRICIUS, 1807, p.286]: BUTLER, 1866, p.27. DE NICÉVILLE, 1894, p.353.

Thecla (in part) [not FABRICIUS, 1807, p.286]: LEDERER, 1855, p.100. ELWES, 1884, p.887. KIRBY, 1871, p.398. PRATT, 1892, p.254. PRYER, 1946, p.16.

Satsuma [not MURRAY, 1874, p.168]: ELWES, 1881, p.865. ELIOT, 1973, p.440.

Satsuma (in part) [not MURRAY, 1874, p.168]: LEECH, 1894, p.353. SOUTH, 1902, p.140. SEITZ, 1921, p.264. OKAMOTO, 1923, p.68. MATSUMURA, 1929, p.23. DOI, I931, p.46. NAKAYAMA, 1932, p.32. UCHIDA, 1932, p.989. SEOK & TAKACUKA, 1932, p.316. SEOK, 1933, p.70; 1934, p.763; 1935, p.99; 1936, p.64. MORI, DOI & CHO, 1934, p.27. SEOK & NISHIMOTO, 1935, p.97. HAKU, 1936, p.117. ESAKI, 1939, p.219. SEOK, 1939, p.216. SIBATANI, 1946, p.64. SCHWANSWITSCH, 1948, p.256. MIYAJIMA, undated, p.175.

Callophrys [not BILLBERG, 1820, p.80]: SWINHOE, 1910-1911, p.257 (*Callophrys* = *Satsuma*, synonymy in error).

Ginzia OKANO,1941 ["1941", 1946, see comment under *Ahlbergia* below], p.239. OKANO, Ibid., op. cit.

Ginsia [sic] [= *Ginzia* OKANO 1941 ["1941", 1946, see below], p.239]: KORSCHUNOV, 1972, p.359.

Incisalia (in part) [not SCUDDER, 1872, p.52]: F. BROWN, 1942, p.21 (included worldwide phenetic group under *Incisalia*, in error). GILLHAM, 1956, p.149 (*Incisalia* = *Satsuma*, in error).

Callophrys (*Incisalia*) [not SCUDDER, 1872, p.52]: ZIEGLER, 1960, p.21 (placed *Incisalia* s.l., of authors, as subgenus).

Ahlbergia BRYK, 1946, p.50 (in part). BRYK, Ibid., op. cit. (replaced *Satsuma*). KUROKE, 1957, p.98. SHIROZU & HARA, 1962, p.94. IGARASHI, 1973, p.68.

[Note: C. BRIDGES, pers. comm., 1988, and in BRIDGES (1988a, b) determined that although OKANO's description of *Ginzia* is sometimes dated "1941" (see HEMMING, 1957:33) it was not, in fact, published until after World War II – at a later date than BRYK, 1946. I concur with BRIDGES that *Ahlbergia* therefore has priority (see Remarks and BRIDGES, 1988a, b)].

Diagnosis

Ahlbergia includes the most familiar Palaearctic "elfins" In contrast to *Cissatsuma* and *Novosatsuma*, most *Ahlbergia* species are small (FW base/apex usually 11.0-14.0 mm with one or two species reaching 15.0 mm). Wing upper surfaces of males are generally brown (occasionally with basal blue or purple structural color), females often with more extensive structural color (but usually not exceeding medial areas of the wing and with dull purple being the most common color). Wing under surfaces show patterns generally less banded than in species of *Cissatsuma* and *Novosatsuma* and, instead, comprised of mottled or patchlike markings occurring across the basal disc and/or distally in the submarginal or limbal areas (fig. 1). Morphologically, *Ahlbergia* taxa show diverse sclerotal innovations compared to species of *Cissatsuma* and *Novosatsuma*. Male genitalia are less robust than in these latter genera, with structures of the vinculum and valvae diversely sculptured (fig. 2). *Ahlbergia* female genitalia are likewise complex, departing radically from the simple tubelike forms of *Cissatsuma* and *Novosatsuma* and exhibiting, instead, diverse sclerotal sculpturing of the lamellal and ductus bursae structures along with the occurrence of additional sclerotized components (fig. 3).

Because of such diversity, it is difficult to morphologically summarize this genus. However, identification will pose few problems because of the distinctness of each of the species.

Description

Adult (figs. 59-76): Head with frons and eye-lining fuscous; thorax and abdomen profusely haired at juncture, species with upper surface structural color on wings often with iridescent blue color along adjacent tagmata. Palpi profusely scaled, in some taxa terminal segment extremely shortened compared to taxa of subsequent generic entries. Wings of most species with forewing discal cell arched, radial veins spaced closely, radiating at regular intervals along costa of discal cell and with vein M1 (contrasting *Novosatsuma* and *Cissatsuma*) directed generally straight from cell apex to the wing margin (fig. 1). Some plesiotypic taxa (see *chalybeia* Group and Appendix 1) with vein six somewhat arched caudad from its abutment on discal cell more as in *Novosatsuma* and *Cissatsuma* (fig. 1). Male forewing of most species with prominent scent brand (generally ellipsoid and extending along distal one-fifth to one-fourth of discal cell's costal vein, sometimes continuing diffusely into the interspaces of veins six through eight or nine). Wing expanse generally smaller than genera of subsequent entries (forewing base/apex most often 11.0-13.0 mm, less often to 14.0 mm), hindwings always without tails but often with somewhat produced (1-2 mm) anal lobe. Wing upper surface ground colors generally brown, iridescent structural color, if occurring, usually restricted to basal suffusion in males, baso-medial suffusion (or occasional patches) in females (a few species show extensive upper surface structural color in the females). Wing under surfaces exhibiting hoary and mottled brown and/or gray patterns usually restricted to markings in the basal disc and companion lineal or lunular markings in the submarginal or marginal regions. No species shows the prominently concentric, jagged, markings typifying many species of *Cissatsuma* or *Novosatsuma*.

Male Tergal Morphology and Genitalia (figs. 4-35, as indicated). Compared to other Eumaeini, terminal tergites normal (lacking unusual sclerotal components, e.g. the "subcordate incised posterior cavity" of FIELD (1967a, b) abbreviated herein "sipc" sensu JOHNSON (1990a, 1991a, b); ventrum of eighth tergite with thin bundles of brush organs loosely abutting the septa along the vincular dorsum of the genitalia, brush length rarely exceeding base of labides (most often notably shorter). Genitalia, compared to other Palaearctic elfins, with

(1) valvae typified by sclerotinal sculpturing of both the bilobes and caudal extensions and caudal extensions (a) generally exceeding by one and one-half times caudal lengths of adjacent basal bilobes, though usually not the caudal articulation of the falces, and (b) tapered very narrowly along the posterior terminus;
(2) terminus of aedeagus with two thin and serrate cornuti.

In contrast, taxa of *Cissatsuma* and *Novosatsuma* show

(1) little sclerotinal sculpturing of the bilobes or caudal extensions and terminal tapering of the valvae remaining robust until an abrupt angle near the posterior terminus, and
(2) terminus of aedeagus with broad spatulate cornuti.

Female Tergal Morphology and Genitalia (figs. 4-35, as indicated). Compared to other Eumaeini, terminal tergites normal (lacking unusual sclerotal components, e.g. "sipc" sensu JOHNSON, 1990a, 1991a, b); compared to other Palaearctic elfins, genitalia with

(1) ductus bursae narrow relative to broadly expansive terminal lamellae (but with little or no tapering [the "antrum" sensu KLOTS, 1970] between) and
(2) ductus bursae and/or the ventrum of the lamellae with a high frequency of innovative sculptured components.

In contrast, the ductus bursae in taxa of *Cissatsuma* and *Novosatsuma* occur as a wide, simple, tube terminating with rather diminutive lamellae not widely expanded out of the plane of the ductal tube. Details of *Ahlbergia* female genitalia further include (3) signa showing transformation from somewhat bifurcate spines to reduction or complete loss; (4) ductus seminalis attached along the dorsoterminal edge of the cervix bursae, latter variously modified to a small

sclerotized "hood" or "shield" along the distal edge of the corpus bursae; (5) papillae anales profusely spined at terminus, abutting dorsum of the posterior lamellae and with the apophyses extending cephalad at least one-third to one-half the length of the ductus bursae (latter anales structures are less robust in *Ahlbergia* than *Cissatsuma* and *Novosatsuma*).

Biology

Early Stages and Foodplants: Prior to a recent paper by IGARASHI (1973) only the life history of *A. ferrea* ("*A. frivaldkyi*", misidentified by SHIROZU & HARA, 1962:94 [see synonymic discussion under *A. frivaldszkyi*]) had been recorded. Larvae were reported to feed on blossoms but the hostplant was not identified with a Latin name. Thus, this Japanese study initially appeared to obviate conifers as the larval substrate (an observation consistent with remarks of recent workers who have collected *A. ferrea* or *A. frivaldszkyi* in the U.S.R. Amur River region, A. SURAKOV, pers. com.). IGARASHI's (1973) study details the life history of *A. haradai* (of the *circe* species Group herein) and documents the foodplant as the fruit of "Prickly Ash" (*Xanthoxylum oxyphyllum* EDGEWORTH; Rutaceae). Such angiosperm blossom- and fruit-feeding is compatible with the view herein that *Ahlbergia* is the sister group of the Nearctic forb-feeding elfins traditionally attributed to *Incisalia* HÜBNER (see Appendix 1). Another clade of Nearctic *Incisalia* (including the type species) feeds on gymnosperms.

Type species

Lycaena ferrea BUTLER, by ICZN Code replacement rule; BRYK originally chose *Thecla frivaldskyi* LEDERER – of which he considered *ferrea* a subspecies. This view was incorrect but is irrelevant vis-a-vis the ICZN Code. *Lycaena ferrea* also was chosen type species of generic synonyms *Satsuma* MURRAY and *Ginzia* OKANO in their original descriptions.

Distribution

Spatial (Figs. 92-95): Species of this genus occur from the rim of the Himalaya mountains (western Tibet east to Szechwan Province, China) eastward across southern China to Hong Kong; only two species occur south of this region (in northeast India or along the southern flanks of the Himalayas). Northward, species of *Ahlbergia* occur across China and Mongolia, and from the trans-Baikal of the U.S.R. eastward to the Kamchatka peninsula of Siberia (generally following the Amur River drainage). Eastward, distributions also include the Korean Peninsula and the entire Japanese archipelago. Specific comments on the geographic distributions of *Ahlbergia* "Species Groups" defined herein are made in each group's individual entry.
Temporal: Dates of capture indicate flight periods variously from February through July.
Endemism: *Ahlbergia* has the widest distribution of the three Palaearctic genera treated herein. From the available historical data, two species groups occur exclusively in the northern "Amur" region (fig. 98a) and four others occur in the southern "nuclear" China region (fig. 98b-e). The "Yunnan Plateau" area of endemism shows the highest number of endemics (five, including two species ranging somewhat westward into Tibet); three other species occur only on the "Yunnan Plateau" and eastward into the "Central Mountain Belt" Two *Albergia* species, *pluto* and *aleucopuncta* have relatively wide distributions.

Remarks

The genus *Ahlbergia* includes the majority of taxa characterized in common usage as Palaearctic "elfin" butterflies. Hitherto, western Lepidopterists have been familiar with some half dozen taxa. During this study I have been able to study far more material than was available to previous workers. This has resulted in differentiation of two new genera for suites of species with relatively primitive morphological characters: *Cissatsuma* and *Novosatsuma*. Typical of the species richness noted in the new genera, diversity in *Ahlbergia* also vastly exceeds earlier estimates. The great increase in known taxa results from accumulation and study of numerous scattered early samples, many of which date from late 19th and early 20th Century collections. Since some Palaearctic elfin taxa may now be extinct, it has been important to record the deposition of as much of the early material as possible. Some interesting discoveries have occurred in this process, not the least of which is the suggestion that LEECH (in his classic

work, 1893-1894) was unaware that some materials at the NHM (London) had not yet been prepared and incorporated. Such material (which I was able to examine in 1980, 1981, 1983, 1985, 1989 and early 1992), supplemented by historical samples in the MNHN (Paris) (and lesser extents at AMNH, AME, CMNH and FMNH) included many outstanding undescribed taxa. These showed an unexpected diversity in pattern and morphology. The majority of the new species derived from early collections in montane western China and Tibet. However, some new taxa came from collections as far south as Burma.

Ahlbergia BRYK has been recognized as having priority over both *Satsuma* MURRAY (a homonym) and *Ginzia* OKANO (by chronology) according to BRIDGES (1988a, b, and pers. comm., 1988), the oft-cited "1941" date on OKANO's printed cover page (HEMMING, 1967) not representing the actual date of publication. ELIOT (1973) used *Ahlbergia* as the valid available name but without explanation; IGARASHI (1973) used the genus to describe his little-known elfin from Nepal.

The diversity of species historically associated with *Satsuma* and *Ginzia* (now *Ahlbergia*) has been polyphyletic (sensu NELSON & PLATNICK, 1981) since some of the previous described entities belong in the primitive genera *Cissatsuma* and *Novosatsuma* described herein. Salient characters traditionally used in identifying *Ahlbergia* taxa have been limited to emphasis on the hoary and mottled under surface colorations and the lack of hindwing tails. However, these wing characters occur across a structurally diverse group of worldwide callophryine Theclinae and, as most apparent in parsimonious distributions of structural characters, are widely homoplasic in callophryine assemblages ranging across the Holarctic Realm and southward into Central America (Appendix 1). Tailless species with hoary and mottled under surfaces also occur in the high Andes of South America (*Penaincisalia* JOHNSON, 1990) as well as other groups of Neotropical "*Thecla*" Since cryptic patterns and tailless hindwing conditions are not themselves indicative of a phylogenetic relationship, morphological and biological characters are important. It is not surprising, therefore, that each of Old and New World callophryines elfin assemblages (historical *Incisalia* and historical *Ahlbergia*) appear to have conifer- and forb-feeding sister groups.

Earlier (GILLHAM, 1956), a short study of Palaearctic elfins considered all the Old World taxa as congeneric with Nearctic *Incisalia*. This study was flawed, however, because it included only a few taxa and no examination of types. I will comment on this work in more detail under the several species GILLHAM examined. Critical problems stemmed from his neglect of types, consideration of only a few known taxa, and misidentification of two major subject taxa, *ferrea* and *frivaldszkyi*. With these handicaps and lack of reference to the many additional undescribed species, GILLHAM's data led to some erroneous conclusions. Indeed, most of the previous taxonomic problems with Palaearctic elfins stem from an assumption that only a few species were involved and a consequent effort to cluster a small number of taxa into conspecific groups. The problem was compounded by the general lack of historical work on Asian butterflies and the fact that field collections were very limited in eastern Asia during this ecologically critical time. As a result (1) many outstanding new species of Old World elfins described in the present revision are represented by only small samples and (2) it is uncertain how readily any of these taxa may again be collected.

Regarding synonymies, because several authors have referred generically to groups of Palaearctic elfins without listing included taxa (BROWN, 1942; BRYK, 1941; OKANO, 1941; GILLHAM, 1956), I consider as "new combinations" only those taxa not formally described, or previously listed in historical "*Satsuma*", before BRYK (1946) proposed *Ahlbergia* as the valid replacement name. Consistently, I do not consider generic references to some taxa by BROWN (1942) and GILLHAM (1956) in their discussions of "*Satsuma*" and the Nearctic genus *Incisalia* to have constituted formal new combinations. By this decision, synonymies are most consistent with the usages subsequently recognized by BRIDGES (1988a). Similarly, and for reasons noted heretofore, I limit citations of elfins to the genus *Callophrys* to those included in the BRIDGES list. It is possible that some recent literature on Old World elfins has not been included in the synonymies herein; this is because, aside from major taxonomic and regional works, nomenclatural

synonymies of the paper have not been substantially updated since the 1981 dissertation version of the study.

Species groups

The genus is divided into six species groups readily identified by superficial characters. The composition and sequence of groups is based on apparent relative apomorphy (Appendix I) and proceeds from those assessed as most plesiotypic to those considered most apotypic in character.

The *chalybeia* Species Group

Species comprising this group are large, broad-winged and generally without structural color. Genitalia appear primitive – robust and with generally unsculptured structures in both females and males. Geographic distributions are compatible with a view that the group is plesiotypic. Contrasting nearly all the other elfin groups (except the *pluto* Group, see below) distributions span the area from the "Yunnan Plateau" east through the "Central Mountain Belt" (fig. 98).

Ahlbergia chalybeia (LEECH)
Figs. 4, 5, 59

> *Satsuma chalybeia* LEECH, 1893-94, p.355.
> *Satsuma chalybeia* var. *pluto*: LEECH, 1893-94, p.355 (misidentification).
> *Satsuma* taxon *pluto*: SOUTH, 1902, p.140 (misidentification).
> *Ahlbergia chalybeia*: BRIDGES, 1988a, p. II:4, I:77, III:82.

Diagnosis
Readily recognized by contrasting under surface ground colors alternating concentrically from the basal disc through postmedial, submarginal and marginal areas – brown on basal disc (with thin black postbasal lines), olive drab across postmedian area, drab brown (as crescents) along submargins and olivaceous at margin (hence species' name). Contrasting other *Ahlbergia* species, there is no prominent white outer margin on the basal disc. Such wing characters and relatively large size (FW 15.0 mm) readily distinguish *chalybeia* from the other *Ahlbergia*. The concentric olivaceous tones also distinguish *A. chalybeia* readily from large, but brown-banded, species of *Cissatsuma* and *Novosatsuma*. On the upper surfaces, females of *A. chalybeia* show more silvery-blue iridescence above, males mostly brown with hues or flecks of blue across basal areas. Male genitalia of *A. chalybeia* and congener *A. bimaculata* are more robust than other *Ahlbergia* species, bilobed valval areas are rounded in *A. chalybeia*, prominently shouldered in *A. bimaculata*; female genitalia in both species are also robust with the lamellae outstandingly lobate in *A. chalybeia* (with protruding ductus bursae terminus), rather square in *A. bimaculata* with robust antevaginal lobes.

Description
Male: head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color dark olivaceous brown except for slight basal suffusion of bluish scales. Forewing with small ellipsoidal scent brand located distally in the discal cell. Hindwing margins less crenate than, marked with faint blue marginal flecks or line (sometimes also occurring along extreme margin of forewing); wing fringes black. Under Surface of the Wings: ground color olive brown to drab brown. Forewing with wing base mottled olivaceous brown, discal cell with light distal marking, postmedial area with thin dark brown band, submargin with

obsolescent wavy brown line followed immediately distad by marginal olivaceous blotches. Hindwing basal disc warm brown with two to four black postbasal lines (paralleling each other in two rows across discal cell); margin of disc dark, without prominent whitish edging typical of most Palaearctic elfins. Distad of basal disc, postmedial area broadly olivaceous until joining a brown submarginal band of crescent-like markings. Margin strongly crenate with prominent olivaceous band mottled brown and olive along its distal edge. Length of Forewing: NHM specimen, 15.0 mm.

Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Apex and submargin of forewing, and broad terminal area of hindwing, deep brown with olivaceous hue in basal area suffused with fine iridescent blue scales. Areas of hindwing blue and brown grounds adjoining along a smoothly rounded border; margin with a thin blue line occasionally extending to the M3 cell of the forewing. Hindwing margin strongly crenate; fringe checkered black and white. Under Surface of Wings: marked much like the males but with colored areas broader. Length of Forewing: 15.0 mm (lectotype).

Male Genitalia (Fig. 4): Valvae with bilobed areas broadly ovate, caudal extensions robust and tapered, slightly "funnel"-shaped in the lateral view. Saccus parabolic, tapering to an elongate tip. Cornuti moderately wide and spatulate compared to congeners.

Female Genitalia (Fig. 5): Ductus bursae elongate (length nines times width) with terminal lamellae ovate, comprised of prominent lamella postvaginalis and ventrally declined lamella antevaginalis. Lamella postvaginalis with ventral margins convoluted; lamella antevaginallis curved ventrally around caudal tip of ductus bursae with caudal one-tenth of ductus bursae protruding terminally beyond the juncture of the lamellal lips. Corpus bursae small, length less than one-half the length of the ductus bursae; signa robust and bifurcate.

Types

LEECH's syntype series included three specimens, two males and one female. These were found in the type collection and regular collection of the NHM, SOUTH having designated specimens labelled "a" and "c" as "male"- and "female type"[s], respectively, with the remaining syntype specimen labelled "b" (SOUTH, 1902). Specimen "c", with LEECH's labels affixed and listed as a female by SOUTH, was located in the general collection. The specimen is not a female, however, and represents instead a male of a *Novosatsuma* species described herein (see Remarks, below). In addition, the abdomen of male specimen "a" had been affixed with glue and dissection revealed an erroneous association (see Remarks, below). Accordingly, I have designated the female "b" as the lectotype; this specimen was also figured by SEITZ (1919, pl. 72, fig. g [herein refigured as 59AB]). I have designated the male specimen "a" as a paralectotype. Labels have been affixed clearly marking these specimens. Type Locality: Changyang (= Changyang) in Hupeh Province, east central China, altitude circa 2000m.

Distribution

Spatial (Fig. 92): Specimens are known from Changyang, Hupeh Province, and Ta-Tsien-Lou (= Tatsienlu = Kangting), western Szechwan Province.

Temporal: None of the specimens is dated.

Remarks

LEECH's sole male syntype was the only male of *A. chalybeia* originally available for examination by me until a specimen was located at the MNHN in 1983. The abdomen of LEECH's specimen had been affixed by glue and represented genitalia of the family Pieridae. As a result, the male genitalia of this long-described species are known only from a specimen not included in the original description. Certain comments are relevant concerning the lectotype female. The peculiar form of the lamella antevaginalis of this specimen (showing marked protrusion of the ductus bursae beyond the juncture of the lamella) are of interest since this character distinguishes taxa of the brown Neotropical *Cyanophrys* s.l. (e.g. *Thecla fusius* GODMAN & SALVIN and relatives). Unfortunately, additional females of *A. chalybeia* have not been located. LEECH's syntype "c", historically identified as a female, is a male of a noncongener. In this revision it has

been made the holotype of *Novosatsuma cibdela* (see subsequent entries). The male of this species uncannily resembles the female of *A. chalybeia*. Why LEECH, and others, failed to recognize the prominent male scent brands on this specimen is difficult to understand. Indeed, they also did not recognize many such large blue males associated with in this revision with the genus *Novosatsuma*. Instead, they identified these as females of "*Satsuma*"
Also notable concerning *A. chalybeia* is its representation by only a few historical specimens, all of which date from the early 20th Century. Because of this rarity I here reproduce SEITZ's (1921) figure of the NHM lectotype and provide the dorsal photo of the MNHN male (fig. 59C). Numerous of the Palaearctic elfins described by LEECH were known from few specimens and this is consistent with the circumstances surrounding numerous of the new taxa described in the present work. It is likely that additional collections of old material have representatives of these eastern Palaearctic elfins. It is less certain how many of these taxa may be collected today.

Additional localities (aside from types listed above)
China: Tatsienlu (NHM); Vrlanatong [meaning uncertain] (MNHN).

Ahlbergia **b i m a c u l a t a** spec. nov.
Figs. 6, 7, 60

Diagnosis
Medium-sized (FW 12.5-13.0 mm), both sexes readily recognized by brown upper surface wing coloration and under surface pattern divided into two contrasting ground colors: dark brown across basal disc (without marked postbasal or discal elements); light buff-brown distally to the margins. This simple pattern, to which is added only the the brown forewing postmedian line typifying the genus, makes *A. bimaculata* one of the easiest *Ahlbergia* species to recognize. Male genitalia are prominently shouldered in the valvae; female genitalia have robust, rectangular-shaped, lamellae on which (in contrast to *A. chalybeia*), the lamella antevaginalis are prominent.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color entirely warm brown, occasionally mottled in distal areas with lighter brown hues. Prominent ellipsoidal scent brand located distally in discal cell. Hindwing margin moderately crenate and with heavy brown fringe; slight grayish marginal line or blotches from from vein 3A to CuA2. Under Surface of the Wings: Forewing ground color light buff with vague postmedial line, appearing red-brown to about vein CuA2 (basad this line with some suffusion of red-brown scaling). Hindwing with basal disc uniformly dark sepia, vaguely hoary and with only slightest blackened postbasal lines between the anal margin and vein CuA2. Length of Forewing: 13.0 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons typical of genus. Upper Surface of the Wings: Marked similar to male but with wings appearing broader in shape and with more curvate margins. Under Surface of the Wings: Marked similar to males. Length of Forewing: 13.5 mm (allotype).
Male Genitalia (Fig. 6): Valval bilobed area extremely wide-rimmed and shouldered, with shouldered areas extremely wide; valval caudal extension tapered very steeply to pointed tips; valvae laterally with slight "funnel"-shape; saccus elongate and relatively thin compared to congeners; cornuti moderately thin, serrate along the outer margin.
Female Genitalia (Fig. 7): Lamellae robust and rather rectangular, both lamella antevaginalis and lamella postvaginalis outstanding; ductus bursae length about two-times the caudal expanse of lamellae. Each signum broadly based and with a widely bifurcate, inwardly directed, spine.

Types
Holotype male (Fig. 60), Tsekou (= Tzeku), Szechwan Province, west China, 1900, R. P. J. DUBERNARD, deposited NHM. Allotype female, Loutsechiang (= Lutien), Yunnan Province, China, no other data, deposited MNHN.
Paratypes (9). MNHN: same data as allotype (one female); Tsekou (= Tzeku), Szechwan Province, China, leg. J. A. SOULE, 1907 (one male); FMNH: District Yunnanfou, W China, no other data (one male), Yunnan, China, 1918, leg. G. FORREST (two males), Li-kiang, Prov. Yunnan, China, 1 April 1935, leg. H. HÖNE (two males), Yunnan-fu, Yunnan Province, China, 23 April 1928, leg. J. GRAHAM (one male); AMNH: [labels in Russian] untranslated data (one male).

Distribution
Spatial (Fig. 92): Known from a number of localities in montane Szechwan and Yunnan provinces, western China.
Temporal: Historically known from early to late April.

Remarks
Historical specimen acquisition in this species is instructive regarding all the Palaearctic elfins. The species was first known from the male holotype and two paratype males (JOHNSON, 1981). Subsequently, at diverse locations, six additional specimens (including the allotype female) were located. With regard to little-known Palaearctic elfins in general, it appears that location of historical material more often corroborates the validity of taxa initially represented by only a few specimens than suggests such individuals are chance aberrations.
All the types of *A. bimaculata* were dissected for genitalia, with samples of legs and palpi taken from the original (1981) sample.

Etymology
The name refers to the under surface coloration of the species which appears divided as darker basal and lighter distal patterns.

The *ferrea* Species Group

This group includes the types species and relatives. Previously, type species *A. ferrea* has been considered by some authors to be conspecific with *A. frivaldszkyi* LEDERER. This view, based on small samples and an incorrect assessment of species diversity in the entire genus, is quickly set aside by morphological study. Because of the diversity of Palaearctic elfins, however, there remains the problem of the status of Japanese *A. ferrea* in relation to similarly-marked elfins on the mainland. Prior to the present study, few such mainland specimens had been reported. Most authors who recognized them speculated that *A. ferrea* had a mainland "subspecies" (see papers of SEOK & SEOK et al.). The problem with this view is that morphological study of mainland versus Japanese specimens indicates all the mainland entities share a number of characters distinctive from Japanese *A. ferrea*. In a cladistic context (Appendix I), characters of mainland taxa appear to be apomorphic, suggesting that Japanese populations are the plesiotype of the group representing an early vicariance from an ancestral mainland assemblage. If true, *A. ferrea* in Japan must be considered a distinct species and the various relatives on the mainland a complex of species and the sister group. All the mainland taxa share, among other characters, the convoluted under surface of the female lamellae. Thus, I include four species in this group: *A. ferrea*, *A. korea* new species (which superficially resembles it) and two divergent, but previously unknown, species. One of the latter taxa occurs far to the west in the U.S.R. Compared to all the other elfin groups, the *ferrea* Group (and *frivaldszkyi* species complex, see below) show geographic limitation to the northern region of the "Manchurian Highlands" and Amur River Basin. From this nuclear distribution, some populations extend eastward to Japan or westward through the trans-Baikal to Uzbekistan in the U.S.R. See additional comment in Remarks under *A. ferrea*.

Ahlbergia ferrea (BUTLER)
Figs. 8, 9, 61

Lycaena ferrea BUTLER, 1866, p.27. DE NICÉVILLE, 1891, p.374.
Lycaena ferrea = *Thecla caerulescens* MOTSCHULSKY 1866: BRIDGES, 1988a, p. I:65, II:4. KIRBY, 1871, p.398. HUANG, 1943, p.67.
Lycaena ferrea = *Thecla coerulescens* [sic] (referring to *caerulescens* MOTSCHULSKY): SEITZ, 1921, p.264.
Satsuma ferrea: MURRAY, 1874, p.168 (as type of *Satsuma* MURRAY, 1874).
Satsuma frivaldskyi [sic] = *ferrea*: LEECH, 1894, p.353 (synonymy in error).
Satsuma frivaldskyi [sic] [not *frivaldszkyi* LEDERER, 1855] (in part): MATSUMURA, 1929, p.23 (misidentification).
Satsuma frivaldszkyi [sic] [not *frivaldszkyi* LEDERER, 1855] (in part): SEOK, 1939, p.216 (spelling appears attributed to SEITZ, "1911", but evidently in error). COURVOISIER, 1920, p.230.
Satsuma frivaldskyi [sic] *ferrea* (in part): SEITZ, 1921, p.264, pl. 72, fig. f. OKAMOTO, 1923, p.68. DOI, 1931, p.46. UCHIDA, 1932, p.989. NAKAYAMA, 1932, p.381. SEOK & TAKACUKA, 1932, p.316. SEOK, 1933, p.70; 1934, p.763; 1935, p.99; 1936, p.64. MORI, DOI & CHO, 1934, p.44, pl. 27, fig. 4. SEOK & NISHIMOTO, 1935, p.97. HAKU, 1936, p.117 ESAKI, 1939, p.219, pl. 103, fig. 398.
Satsuma ferrea (in part): NAKAYAMA, 1932, p.381. MORI, DOI & CHO, 1934, p.27 SEOK, 1939, p.216. SIBATANI, 1946, p.64. MIYAHIMA, undated, p.175.
[*Ginzia*] *frivaldskyi* [sic] *ferrea* (included *Satsuma* species): OKANO, 1941.
[*Ahlbergia*] *frivaldskyi* [sic] [not *frivaldszkyi* LEDERER, 1855] (in part) (included *Satsuma* species): BRYK, 1946, p.50.
Incisalia frivaldskyi [sic] *ferrea*: GILLHAM, 1956, p.149.
Callophrys (*Incisalia*) [*frivaldskyi* (sic) *ferrea*] (included all *Incisalia* species): ZIEGLER, 1960, p.21.
Incisalia [*frivaldskyi* (sic) *ferrea*]: included all *Satsuma* species): F. BROWN, 1942, p.21.
Thecla frivaldskyi [sic] = *Thecla coerulescens* A. BANG-HAAS = *Lycaena ferrea*: DE NICÉVILLE, 1891, p.374 (synonymies in error; attribution of *coerulescens* in error.)
Ginsia [sic] *ferrea* (in part): KORSCHUNOV, 1972, p.359.
Ginzia ferrea (in part): KORSCHUNOV, 1972, p.359.
Ahlbergia ferrea: KIM, 1961, p.278. SHIROZU & HARA, 1962, p.94. BRIDGES, 1988a, p. I:33, II:4, III:11.

Diagnosis
Endemic to Japan and the only elfin occurring there. Most closely resembling *A. korea* of the Korean peninsula, which might be considered a subspecies from superficial wing resemblance were not the morphological features of apparent cladistic significance given the cluster of sister taxa on the mainland (see Species Group and Remarks, below). *A. ferrea* is readily recognized by its upper surface blackish ground color (hued, especially basally, blue or blue-green) and the under surface's prominently red-brown or brownish black basal disc, which is white-edged and followed distally in the postmedial regions by suffusions of gray. *A. korea* is similar but the under surface less lavishly marked (little, if any, white around the basal disc and without the distal gray suffusions) (see Remarks).

Description
Male. Head, thorax, abdomen, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color very black, basally suffused steely blue or blue-green (especially on the forewing) in fresh specimens. Forewing with prominent ellipsoidal scent brand located distally

in discal cell. In fresh specimens, wing margins checkered in appearance by alternating black and white on the respective veins and cells; wing margins only slightly crenate. Under Surface of the Wings: Ground color on both wings varying from yellow-brown to dark red-brown and often suffused with darker brown. Forewing with postmedial line from costa to cell CuA1, continuous but displaced distally in cell M3 (basally red-brown, distally white or cream); distal end of discal cell crossed by a dashlike brown marking. Distal ground often heavily overscaled with black. Hindwing with basal disc dark brown to red-brown, often lightly suffused with black or white overscaling; postbasal area of disc with two dots or slashes (or vague evidence of these), each outlined distally black and basally white; margin of disc colored lighter (beige to reddish) and followed distally by an arc of submarginal black or brown blotches, sometimes crescent-like in shape. Ground color distad of basal disc suffused gray to whitish from cells RS to CuA1; margin suffused red brown. Length of Forewing: mean of twenty specimens (AMNH, NHM), 13.5 mm, range 12.0 to 14.5 mm.

Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color bright sky to silvery blue except for fuscous apices and submargins. Hindwings with blue marginal line from vein 2A to cell CuA1 or M3. Under Surface of the Wings: Marked similar to males. Length of Forewing: mean of twenty specimens (AMNH, NHM), 14.0 mm, range 12.5 mm to 15.0 mm.

Male Genitalia (Fig. 8): Valvae more robust than in other group members – bilobed configuration somewhat shouldered but with remaining caudal extension tapered robustly caudad and, in the lateral view, somewhat "funnel"-shaped. Saccus robust, tapered or slightly "funnel"-shaped; cornuti relatively broad and spatulate (typifying the group compared to more apotypic *Ahlbergia*).

Female Genitalia (Fig. 9): Lamellae hemispherical, lacking ventral convolutions prominent in other group members. Breadth of lamellae two-thirds or less the length of the ductus bursae; lamella postvaginalis hemispherical in shape. Signa widely bifurcate spines.

Biology

Early Stages: See Remarks below.

Foodplant: Treated by SHIROZU & HARA (1962) but Latinized names not included. Their notation that larvae feed on blossoms appears to indicate angiosperm usage (see Remarks).

Type

Holotype male, NHM. Type Locality: Japan.

Distribution

Spatial (Fig. 92): Japan, from Hokkaido south to Kyushu, in montane areas.

Temporal: Dates on specimens range from March to early June.

Remarks

A. korea is not treated here as a subspecies of *A. ferrea* for two reasons: (a) morphological differences and (b) its sharing of these differences with other mainland *Ahlbergia* of the *A. ferrea* species group clade. The identity of this cluster as a clade in *Ahlbergia* is apparent and the basis for my subsequent noting of *A. frivaldszkyi* as "marginally sympatric" with *A. ferrea*, the species with which it has historically been confused. *Ahlbergia frivaldszkyi* is actually sympatric with *A. korea*, a vicariant sister of *A. ferrea*. *A. ferrea* is probably the plesiotype of the species group, breaking off first from the ancestral population when the Japanese archipelago detached as an island arc. Similar character differences are not apparent in Palaearctic callophryines for which northernmost Japanese archipelago occurrences (e.g. Sakhalin Island) are best considered (by morphological analysis) as subspecies (e.g. *Callophrys rubi sachalinensis* MATSUMURA). *A. ferrea* has, to date, not been reported from Sakhalin Island though, as noted above, a subspecies of *C. rubi* (not reported from Japan) occurs there. This appears to bolster my view that the Japanese *A. ferrea* populations represent an old vicariance from the mainland ancestral pool of the *ferrea* species group. It is also compatible with the tectonic view (summarized by BURK 1975, among others) that detachment of the Japanese

island arc could have begun as early as the Mesozoic/Cenozoic margin (large scale volcanism subsequently occurring in the archipalego during the Cenozoic) with Sakhalin following in its slight detachment along the edge of the Sea of Okhotsk as late as the Pliocene. If true, Sakhalin would appear a likely candidate for populations conspecific with the nearby mainland fauna while populations isolated from Hokkaido southward would have long been detached from mainland gene pools. The differential occurrence of *Callophrys* and *Ahlbergia* between the mainland and Japanese island arc appears to reflect this phenomenon.

Compared to other group members with variously more sculptured valval shapes, and considering overall polarity in callophryines (Appendix 1), genitalic structures in *A. ferrea* males appear to be relatively primitive. The simple, evenly tapered, valvae in *A. ferrea* contrast generally more scuptured valval termini in all the mainland group members. The latter complexification typifies apomorphy throughout the group and other Theclinae (see ELIOT, 1973). In females, robust and relatively simple structures occurring in the female of *A. ferrea* can be similarly construed as primitive compared to mainland group members sharing more complex terminal genital structures (most notably the ventrally convoluted lamella postvaginalis in all the mainland group members).

The possible conspecificity of *A. ferrea* with *Thecla frivaldszkyi* LEDERER has been discussed ever since the early works of LEECH (1893-94) and DE NICÉVILLE (1891) but opinions expressed have always been without reference to the types or large series from both the mainland and the adjoining Japanese island arc. Confusion on this issue pervades the generalized faunal compilations (SEITZ, 1921), regional research (GILLHAM, 1956) and popular guides published throughout Asia (see the synonymy and bibliographical citations). LEECH, who thought *A. ferrea* and *A. frivaldszkyi* were distinct species, had examined both sexes of each taxon, the type of *Lycaena ferrea* and LEDERER's original engraving of *T. frivaldszkyi* (LEECH, 1893-94). LEECH had not, however, dissected representative genitalia. In contrast, DE NICÉVILLE (1891) viewed the taxa as conspecific. He also wanted to synonymize the entire "*Satsuma*" genus with *Thecla* FABRICIUS (the diverse omnibus genus historically misused for all Neotropical Theclinae). Later, GILLHAM (1956) also expressed the conspecific view of *ferrea* and *frivaldszkyi* and sought to synonymize "*Satsuma*" with Nearctic *Incisalia*. GILLHAM, however, dissected only a limited number of specimens and all of these were based on his own identifications, not types. GILLHAM reported that he included examples of all "*Satsuma*" taxa when, actually, he omitted any species that had been described after LEECH (1893-94). Along with these problems, GILLHAM's genitalic drawings are too crude to associate with characters of the various species. His drawing reputed to be "*frivaldskyi*" from Korea appears to be what is herein described as *Ahlbergia korea*, the mainland allopatric population superficially resembling Japanese *A. ferrea* (s.str.). If this assessment is true, it is obvious why GILLHAM assumed that "*frivaldskyi*" and *A. ferrea* were the same species. Without obvious *frivaldszkyi* from the Amur River region as a reference for accurately identifying *frivaldszkyi*, it would be easy to construe a somewhat divergent Korean member of the *ferrea* Group as "*frivaldskyi*", then dissect the specimen and confirm an erroneous relationship. *Ahlbergia frivaldszkyi* from the Amur River region is represented by comparatively large samples in world museums and these specimens are quite different genitalically from all of the *ferrea* Group taxa. Indeed, they most resemble an assemblage of populations occurring westward to the Tien Shan of the U.S.R. and western China. Without reference to types, actual species diversities and accurate identifications, GILLHAM's work was extremely handicapped. His species level results and his synonymizing of "*Satsuma*" with *Incisalia* cannot be considered credible given what is now known about Palaearctic elfins. It is easy to understand, however, that if one construed Palaearctic elfins as containing only the half dozen species of LEECH, a desire to further simplify their taxonomy might be compelling and result in erroneous synonymies. Particularly, under surface mottled patterns in worldwide elfins are basically similar and this has caused workers to synonynize not only the Palaearctic and Nearctic forms but also Neotropical ones as well (JOHNSON, 1990a). JOHNSON (1990a) showed that the high Andean *Penaincisalia* elfins are most closely related to other, subparamo, South American Eumaeini, not Palaearctic or Nearctic elfins. As early as the nineteen

forties, workers like BROWN (1942) proposed broad synonymies between the Neotropical elfins, somewhat similarly Neotropical elfins and Nearctic *Incisalia*. These studies, however, did not include any morphological analysis.
Sixty-three specimens of *A. ferrea* were examined, including thirteen females and seventeen males dissected for genitalia, legs and palpi. I figure males and females from Kyoto, Yokahama and nr. Fukushima (MNHN, AMNH). My only experience with this species in northwest of Fukushima, Honshu, 4,200 ft, in non-coniferous montane valley biome, on flowers at mixed forest margin of ash, maple, birch and poplar in early June 1978 (specimen AMNH).

Additional localities (aside from type locality listed above)
Japan: Hokkaido, Hakodate, Kyoto, Kobe, Mejiro, Miyakima, Mt. Machikane, Mt. Takao, Nikko, Oyama, Sagami, Tokyo, Xone-Mzuzu, Yesso, Yokahama (NHM); nr. Fukushima, Yokahama, Kyoto (AMNH); Hokkaido, Kyoto, Kobe, Tokyo (MNHN).

Ahlbergia **k o r e a** spec. nov.
Figs. 10, 11, 62

Thecla frivaldskyi [sic] [not *frivaldszkyi* LEDERER,1855]: ELWES, 1884, p.887. PRYER, 1946, p.16 (all in part).
Thecla trivaldskyi [sic]: KIRBY, 1871, p.398 (in part).
Thecla fridvalskyi [sic]: ELWES, 1881, p.865 (in part).
Satsuma frivaldskyi [sic] [not *frivaldszkyi* LEDERER, 1855]: DE NICÉVILLE, 1891, p.375. SEITZ, 1921, p.264, pl. 72, fig. f. GILLHAM, 1956, p.149. ELWES, 1881, p.865. MATSUMURA, 1929, p.23 (all in part).
Satsuma frivaldszkyi [sic] [not *frivaldszkyi* LEDERER, 1855] (in part): SEOK, 1939, p.216 spelling appears attributed to SEITZ, "1911", but evidently in error).
Satsuma frivaldskyi [sic] *ferrea*: SEITZ, 1906-54, p.264, pl. 72, fig. f. OKAMOTO, 1923, p.68. DOI, 1931, p.46. UCHIDA, 1932, p.989. NAKAYAMA, 1932, p.381. SEOK & TAKACUKA, 1932, p.316. SEOK, 1933, p.70; 1934, p.763; 1935, p.99; 1939, p.64. MORI, DOI & CHO, 1934, p.44, pl. 27, fig. 4. SEOK & NISHIMOTO, 1935, p.97. HAKU, 1936, p.117. ESAKI, 1939, p.219, pl. 103, fig. 398 (all in part).
Satsuma ferrea [not *ferrea* BUTLER, 1866]: MURRAY, 1874, p.168. NAKAYAMA, 1932, p.381. MORI, DOI & CHO, 1934, p.27. SEOK, 1939, p.216. SIBATANI, 1946, p.64. MIYAJIMA, undated, p.175 (all in part).
Satsuma ferrea frivaldskyi [sic] [not *frivaldszkyi* LEDERER, 1855]: LEECH 1894, p.353.
[*Ginzia*] *frivaldskyi* [sic] [not *frivaldszkyi* LEDERER, 1855] (included *Satsuma* species): OKANO, p.239 (in part).
Ginzia ferrea [not *ferrea* BUTLER, 1866]: KORSCHUNOV, 1972, p.359 (in part).
Ginsia [sic] *ferrea* (in part): KORSCHUNOV, 1972, p.359.
[*Ahlbergia*] *frivaldskyi* [sic] [not *frivaldszkyi* LEDERER, 1855] (included *Satsuma* species): BRYK, 1946, p.50 (in part).
Incisalia frivaldskyi [sic] [not *frivaldszkyi* LEDERER, 1855]: GILLHAM, 1956, p.149 (in part).
Incisalia frivaldskyi ferrea: GILLHAM, 1956, p.149 (in part).
Callophrys (*Incisalia*) [*frivaldskyi* (sic)] (included all *Incisalia* species): ZIEGLER, 1960, p.21 (and other authors).
Callophrys ferrea: KAWAZOE & WAKABAYACHI, 1977, p.118 (in part).
Incisalia [*frivaldskyi* (sic)] (included all *Satsuma* species): F. BROWN, 1947, p.21 (in part).

Diagnosis
Superficially similar to *A. ferrea* but occurring on the mainland of Asia and there sharing with *A. leei* and *A. arquata* characters of the genitalia, including convoluted ventrum of the lamella postvaginalis in females and less robust and more sculptured valvae and vincula in males. Distinctive in the wings by under surface of hindwings being duller brown than in *A. ferrea*, with little light edging around the basal disc and little or no gray suffusion in the postmedial area. Male genitalia with bilobed areas and caudal extensions each more elongate than in *A. ferrea* with former more parabolic and thinly rimmed (as on mainland group members); female genitalia with breadth of lamellae nearly equalling length of the ductus bursae and with lamella postvaginalis deeply convoluted.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color dark brown, suffused distally with light steel blue or blue-green somewhat brighter silvery blue toward the wing bases, especially on the forewings. Distal areas of discal cells with ellipsoid scent brand. Wing margins often checkered white and black by alternate coloration of the marginal cells and veins; on hindwings, margins slightly crenate. Under Surface of the Wings: Ground color basad of postmedian forewing line and hindwing basal disc dismal dull brown, flecked with darker browns and black. Distad of forewing postmedian line and hindwing basal disc ground color beige to drab. Distal areas generally drab, not suffused with bright gray overscaling as in *A. ferrea*, and margins of basal disc only slightly edged with white, if at all. Prominent white on hindwing limited to between veins SC+R1 and RS. Length of Forewing: 13.0 mm (holotype).
Female. Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color save apices and submarginal areas of the forewings, and submarginal areas of the hindwind, dusted bright shiny silvery blue. No scent brand distally in discal area. Hindwing with marginal blue line from vein 2A to CuA1 or M3. Under Surface of the Wings: As on male. Length of Forewing: 15.1 mm (allotype).
Male Genitalia (Fig. 10): Valval bilobes clear, of moderate width and somewhat shouldered; caudal extension elongate and gradually tapered (but not as thinly as in *A. leei* and *A. arquata*). In lateral view valvae only slightly "funnel"-shaped. Saccus "funnel"-shaped; cornuti relatively wide and disclike compared to congeners.
Female Genitalia (Fig. 11): Breadth of lamellae nearly equalling length of ductus bursae and with prominent convolutions on the ventrum of the lamella postvaginalis. Bifurcate signa, each joined to a broadly sclerotized base.

Types
Holotype male (Fig. 62A), South Korea, 20 May 1936. Allotype female (Fig. 62B) South Korea, 2 May 1936, both leg. D. M. SEOK, both deposited AMNH.
Paratypes (6). NHM: Pt. Sajan, = Najin (Port), North Korea (three specimens) (gender not stated because the specificity of this taxon was not expected at the time of examination and complete data not noted). MNHN: E. Siberia, Amur (one female), Khanka Mountains, E. Siberia (one female). AME: Seoul, Korea (one male).

Distribution
Spatial (Fig. 92): From data on specimens listed, and the literature, apparently distributed from Korea northward to Amur River Basin of eastern Siberia in the U.S.R., westward along Amur tributaries and perhaps southwestward in montane regions of northern Manchuria (a specimen with typical male genitalia, from the Little Chingan Mountains in NHM). See Material Examined.
Temporal: Known specimen dates range from May into June.

Remarks
As noted previously, if not for certain morphological characters, this taxon might be considered a subspecies of the Japanese *A. ferrea*. However, shared characteristics with the mainland group members suggest that all continental representatives form a sister group apotypic to

A. ferrea. The possibility exists that all of these entities form a "superspecies", in the sense used by BURNS (1964). However, given the probable cladistic position of *A. ferrea* and its genetic isolation, such usage appears less appropriate than in other assemblages of completely mainland *Ahlbergia* recognized here. The degree of morphological extremes and wing character divergence (see for instance *A. arquata*) suggests it is prudent to recognize four species within this far-flung assemblage. Particularly, it seems likely that the lineage represented by westward occurring *A. arquata* is also a reproductive isolate. Thus, the *ferrea* assemblage appears more divergent than many of the purely mainland groups of *Ahlbergia* (see particularly superspecies *A. frivaldszkyi* and the *pluto* and *circe* Species Groups). In the latter two groups, recognition of subspecies has appeared prudent in some wide-ranging taxa. *A. korea* is sympatric with *A. frivaldszyki* in the Khanka Mountains of southeast Siberia. My impression from historical records and personal experience is that *A. korea* is less commonly collected than *A. ferrea* of Japan. I spent numerous occasions collecting in spring in Korea, particularly in the mountains near the historical parks of Kwongju; however, I never encountered the species. By contrast, in Japan I collected in early summer only once, north of Nagoya, and found *A. ferrea* there.

Etymology
Named for the Korean region, from which the majority of specimens derive.

Additional localities (aside from types listed above)
China: Little Chingan Mountains (NHM).
Korea: Seishin [identity uncertain] (MNHN).
U.S.R. Amour, Amourland (NHM, MNHN [data notation deemed too general for inclusion in type series]).

Ahlbergia **l e e i** spec. nov.
Figs. 12, 13, 63

Diagnosis
Wing under surfaces uniform chocolate brown with three postbasal markings in the discal cell and a white slash along the base of the anal lobe. Wing upper surfaces deep chocolate brown with steel gray basal hue and vivid blue marginal line in males, brightly hued blue-gray with very wide fuscous margins in females (latter trait unique). Male genitalia relatively robust as in *A. ferrea* but with valval bilobed area shouldered and caudal extension steeply tapered; female genitalia with convolutions on the lamallae ventrum like *A. arquata* but lacking that species' distinctive short ductus bursae and prominent terminal lamellae.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color very dark chocolate brown with steel gray basal hue. Distal area of discal cell with ellipsoid scent brand. Hindwing with vivid marginal crenate blue line. Forewing fringe black-brown, margin hardly crenate; hindwing fringe black with some basal white in cells; margins heavily crenate. Under Surface of the Wings: Ground colors uniformly deep chocolate, slightly lighter distad of the forewing and hindwing postmedial line. Hindwing basal disc slightly darkened by heavy blackish suffusions and with mottled postbasal markings – two typically postbasal and another prominent in the discal cell just basad of the disc margins. Distally, ground colors only slightly lighter, with a crescent line forming a jagged deep brown line and arching across the wing. Crescent line slightly covered with blue-gray suffusions, margins otherwise blackish. Length of Forewing: 14.0 mm (holotype), 11.0 mm (paratype).
Female: Head, thorax, abdomen, legs, palpi and frons as typical of the genus. Upper Surface of the Wings: Apices and submargins of forewings, submargins and margins of hindwings widely fuscous; rest of wing surface bright silver blue in hue. Hindwing with blue marginal line and

between vein 2A and M1 a series of black blotch-like markings. Under Surface of the Wings: Similar to males. Length of Forewing: 13.0 mm (allotype).
Male Genitalia (Fig. 12): Similar to *A. ferrea* in robust features but, like *A. korea*, with elongate valval caudal extensions and shouldered bilobed configuration. Valvae in lateral view robust and "funnel"-shaped. Saccus generally broad for group, joined thickly to vinculum. Cornuti at aedeagus terminus relatively more disclike than in other group members with terminal cornutus appearing serrate along two parallel edges.
Female Genitalia (Fig. 13): Terminal lamellae less prominent than in other mainland members, showing ventral convolutions; ductus bursae consequently appearing more thinly elongate. Signa thin spines without a terminal furcation (diminution of signa is often autapomorphic in Callophryina, consistent here with other peculiar traits of this taxon).

Types
Holotype male (Fig. 63), Chine (= China), R. P ARMAND DAVID. Allotype female, Amorland (= Amur regions). Holotype deposited in NHM, allotype in AMNH.
Paratypes (7). NHM: same data as holotype, but with a notation "region du Nord, N W Islafrontiere" which is of uncertain meaning; it may refer to the islands around the mouth of the Amur River northwest of the upper Japanese island of Sakhalin (= Sachalin). It is in this area that the Amur River curves widely along the borders of Manchuria (China) and the U.S.R. (one male). MNHN: Regional Baikal d'Irkoutsk, Chaffanjon, "174-96" (two males); Siberia, J. B. JOANNIS (one male); Minousinsk, Sayan Mts. [Mountains], 11 May 1921, KORSCHUNOV (one male). AME: no data (one female). CMNH: Djalantun, Greater Chingan Mountains, Manchuria, WEYMAR, 2-7 June 19 "__" [sic, meaning uncertain] (one female).

Distribution
Spatial (Fig. 92): Specimens with adequate data indicate the species occurs in the northwest Amur River basin areas of China and the U.S.R. and west in the trans-Baikal to the Sayan Mountains.
Temporal: Only known data included 11 May and 2-7 June.

Remarks
I suspect that specimens representing this population have been widely misidentified as "*Thecla frivaldskyi*" by early authors and that this contributed to the historical confusion about this name. In collections in which *A. ferrea* and *A. frivaldszkyi* have been separately curated (e.g. NHM), samples of *A. leei* have usually been included the *Thecla frivaldszkyi* though stand out by their larger size and much darker upper and under surfaces. Though the type of *T. frivaldszkyi* is apparently not extant, the smaller gray-suffused specimens characterizing northern "Amur" ranges are those closely matching LEDERER's original figure. Because of this, and their preponderance in collections, it can be construed that these specimens are typical *T. frivaldszkyi*. Many historical problems involving the identity of this name appear to have resulted mostly from the early workers' misidentifications. With only poorly labelled small samples and no access to the few extant types, early workers had to guess. In most cases, mainland specimens of the *A. ferrea* complex were identified as "*frivaldskyi*" and problems followed from there. The large samples of typical *A. frivaldszkyi* at the NHM have been particularly helpful in determining this species. They also probably explain LEECH's view that this species and *Lycaena ferrea* were distinct. Since this view is apparently correct, the occurrence of additional taxa in the complex is not surprising. I dissected all of type material of *A. leei*.

Etymology
Patronym for GEORGE K. C. LEE, also using the anglisized derivation of the surname to refer to the westward distribution of this species compared to the coastal and island sister species.

Ahlbergia **arquata** spec. nov.
Figs. 14, 15, 64

Diagnosis
Most similar to sister species *A. leei* but very large (FW circa 13.0 mm), with upper surface iridescent blue brighter than on any other congener and under surface ground coloration extremely light, alternating white and gray, causing hindwing banded elements to be extremely outstanding. Known distribution restricted far westward from congeners – in the Tadzhik, Kirghiz and Tien Shan mountain regions. Male genitalia with extremely shouldered bilobes and a long, abruptly tapered caudal extension; female genitalia with ductus bursae extremely short (expanse nearly equal to the lamellal breadth) and widely convoluted ventral surfaces on the lamella postvaginalis.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground colors fuscous but suffused brightly with blue nearly to the postmedial areas. Forewing with scent brand in distal area of discal cell. Margins generally gray and slightly crenate with hindwing anal lobe pronounced. Under Surface of the Wings: Ground colors of forewings generally dark brown with somewhat lighter brown distad of a pronounced black postmedian line. Hindwings with basal disc blackish brown, vividly contrasting a lighter auburn brown ground in medial to postmedial areas and with emphatic gray-white basad of the basal disc and in the distal postmedial areas. Because of the light gray grounds, the dark brown mottled crescent-like bands of the distal hindwing areas are emphatic. The anal lobe is fringed with a bright gray hue and a prominent white marking between veins SC+R1 and RS. Length of Forewing: 12.8 mm (holotype).
Female: Head, thorax, legs, abdomen, palpi and frons typical of the genus. Upper Surface of the Wings: Area from wing bases to submargins bright light blue with brown marginal borders (1-2 mm). No scent brand distal in discal area. Marginal line obscured by the dark fuscous suffusion. Under Surface of the Wings: As on males but with gray suffusion basal in the basal disc and in the postmedial areas more intense and with profuse gray fringe along anal area. Length of Forewing: 13.0 mm (allotype).
Male Genitalia (Fig. 14): Valvae caudad of the saccus clear, of moderate width and widely shouldered; consequent caudal extension very elongate (at least twice caudal expanse of the bilobed area) and irregularly edged. Valvae, in lateral views, narrowly tapered and with a rounded bilobed area. Cornuti wide and disclike, sharply serrate at terminal edge.
Female Genitalia (Fig. 15): Breadth of the lamellae equalling or exceeding length of ductus bursae; lamella postvaginalis convoluted into three marked layers along ventrum. Signa broad-based with one robust and elongate spine aside a shorter diminutive one.

Types
Holotype male (Fig. 64C), Andijan, E. Turkestan [now Uzbekistan, see Remarks], U.S.R., allotype female, Rietshensk [= mountain area of northern Tien Shan], U.S.R., both deposited MNHN.
Paratypes (6): MNHN (figs. 64AB: same data as allotype (two females), Turkestan, J. SCHLUMBERGER, "97-10" (one male); NHM: Turkestan (one male), E. Turkestan (two females).

Distribution
Spatial (Fig. 92): Presently known from apparently early samples indicating the Tien Shan mountain segregation south of Lake Balkash in the U.S.R. (and probably adjacent China).
Temporal: Unknown.

Remarks
This species is represented by old samples and has not been mentioned in any of early literature or recent studies of the Soviet fauna. The species became apparent from an aggregate sample principally deriving from specimens in the STEMPFFER collection which became

available in 1983 at the MNHN. These MNHN specimens, along with the group from the NHM labelled simply Turkestan and E. Turkestan (and therefore formerly somewhat suspect as to veracity), now appear to indicate a vicariant taxon of the *A. ferrea* Group from the montane Uzbek S.R. region. ANDRE SURAKOV (Univ. of Florida, pers. comm.) has recently collected in the Andijan region of Uzbek S.R. and, from his firsthand experience with *A. frivaldszyki* in the U.S.R., reports that the montane habitat is typical of that expected for a Palaearctic elfin. The genitalia of Tien Shan specimens (especially in males) are remarkably more distinctive than other differentiates of the species group, a fact supporting species recognition of this taxon. Biogeography supports this since SURAKOV (pers. comm.) reports the montane areas of Uzbek S.R. and Turkmen S.R. as the only far western areas with ecologies that would typify spring elfins. A sister taxon, *A. leei*, occurs in the western Amur Region and trans-Baikal (with a single specimen known from the Sayan Mountains).

Etymology
The Latin name refers to the bright gray under surface marks characterizing the species.

The *pluto* Species Group

This group contains the familiar species *A. pluto* (LEECH) and a number of previously unknown sister species, particularly from Tibet. The species included are generally brown to slightly bluish on upper surfaces (though one new species from Tibet is brilliant blue); they stand out from other *Ahlbergia* on the under surfaces by a tendency to have bright gray or blue-gray suffusions covering certain areas of the hindwing.
The *A. pluto* complex itself includes a higher diversity of localized forms than formerly recognized. All of these share (along with genitalic characters) gray and/or blue-gray suffusive patterns marking the hindwing limbal area. Adopting a conservative approach to this complex, I have taken three "species" from the 1981 dissertation version of this study and included them as subspecies of *A. pluto*. Along with the genitalic and hindwing limbal characters, these taxa show elongate male scent brands when compared to other members of the species group.
Remaining species of the *pluto* Group exhibit under surface patterns departing from the basal disc/limbal area emphasis of *A. pluto*. In these species, distal markings across the entire postmedial or submarginal areas of the wings become prominent; suffusive elements become less a pattern emphasis. Male scent brands are compact. Because these latter taxa are distinctive in genitalia and wings [especially when seen in color], and are either widely sympatric with the *pluto* complex or from far outlying areas of the Palaearctic Realm, it appears an alpha taxonomy must recognize them as species. Members of the *pluto* Group show the widest distributions of Palaearctic elfins. Although most species occur west of the "Central Mountain Belt" (fig. 98), two species (*A. pluto* and *A. aleucopuncta*) are recorded widely eastward, the former from the Jehol Mountains [Tientsin] and the latter from the Little Khingan Mountains [U.S.R.]. Some of the newly described species from Tibet are poorly known.
Compared to other *Ahlbergia*, female genitalia of the *pluto* Group show a distinctive ground plan. The ductus bursae is robust (length usually one and one-half to two times lamellal breadth) and the lamellae are mostly hemispherical in the postvaginal aspect with thin to variously indented antevaginal elements. In some species ventral convolutions occur on the lamella postvaginalis but these are not pronounced. This contrasts very triangular and greatly convoluted structures in the *frivaldszkyi* Group and ellipsoidal ductal shapes in the *circe* Group.
I treat the *A. pluto* species complex first and then the respective brown and blue new species.

Ahlbergia pluto (LEECH)
Figs. 16, 17, 65

Satsuma chalybeia var. *pluto* LEECH, 1893, p.355 (misidentified in part).
Satsuma chalybeia var. *pluto* LEECH, 1893, p.355. SEITZ, 1909, p.264, pl. 72, fig. g. (misidentified).
Satsuma taxon *pluto*: SOUTH, 1902, p.140 (misidentified in part).
[*Ginzia*] *pluto* (included *Satsuma* species): OKANO, 1941, p.239.
[*Ahlbergia*] *pluto* (included *Satsuma* species): BRYK, 1946, p.50.
[*Incisalia*] *pluto* (included *Satsuma* species): GILLHAM, 1956, p.145.
Ahlbergia pluto: BRIDGES, 1988a, I:277, II:4, III:33.

Diagnosis
A. pluto can generally be recognized by its relatively large size (FW 13.5-15.0 mm), brown upper surface in males (basally blue in females), pronounced anal lobe and rich white and blue-gray suffusions that overcast the mottled brown under surfaces, especially in the limbal area of the hindwings. Also, there is no distinct white marking connecting the anal region to vein 3A or in the cell between veins SC+R1 and R2. The females vary in iridescent blue; male scent brands, compared to other species of group, are elongate (invading the radial veins for one-third to one-half their length). Male genitalia feature a robust valvae and saccus, with the bilobed area of the valvae variously bulbous and ovate; female genitalia are robust with a generally hemispherical lamellae (sometimes convoluted ventrally, greatly in western montane populations). For degrees of variation included in the taxon see Diagnoses under Subspecific Taxonomy.

Description
Male. Head, thorax, abdomen, legs palpi and frons typical of the genus. Upper Surface of the Wings: Ground color generally warm and somewhat darker brown. Distal area of discal cell with elongate ellipsoidal scent brand, one-third to one-half of length invading the radial veins. Wing margins moderately crenate, slightly blue marginal line sometimes present on hindwings from anal margin to vein CuA2. Fringes brown to blackish, sometimes white between the veins. Under Surface of the Wings: Basic ground color warm brown, ranging from beige, yellowish or cinnamon in hue, richly flecked and mottled with white and gray-blue suffusion most prominent in the limbal area. Forewing pattern elements rich cinnamon to reddish brown, in the post-medial band and slight evidence of darker spot distad in discal cells – basally dark, distally white. Emphatic gray suffusion in terminal areas contrasts a submarginal brown crescent line skirting the wing apex. The hindwing exhibits a brown basal disc framing rich brown to reddish postbasal spots sometimes suffused with black; marginal edge of disc is dark brown to blackish vaguely edged by distal white. There are no white markings from anal margin to vein 3A or in cells between SC+R1 and RS as in some *Ahlbergia*. Ground color distad of basal disc lighter brown with pronounced bright brown to black submarginal crescent line. Distad of crescent line deep brown along the margin moderately to heavily suffused white and gray-blue. Limbal areas surrounding *Thecla*-spot variously suffused depending on the subspecies. Length of Forewing: mean of 14 males (NHM), 14.0 mm, range 13.5 mm-15.5 mm.
Female: Head, thorax, abdomen, legs and palpi typical of genus. Upper Surface of the Wings: Ground colors on both wings with various degrees of structural color, depending on the subspecies (blue varying from nearly lacking to prominent from base to medial area or nearly over entire surface of both wings). Under Surface of the Wings: Similar to males with degrees of under surface white or gray-blue suffusion varying in the subspecific entities. Length of Forewing: mean of 14 females (NHM), 14.0 mm, range 13.5 mm-15.0 mm.
Male Genitalia (Fig. 16): Valval bilobes clear, of moderate to wide width and variously round to ovate in the bilobed configuration depending on the subspecies; valvae in lateral view usually rounded, only slightly "funnel"-shaped, if at all. Caudal extensions of valvae generally robust,

slightly to moderately shouldered near the termini, depending on the subspecies; saccus parabolic to broadly parabolic; cornuti disclike, terminally serrate.
Female Genitalia (Fig. 17): Lamella postvaginalis generally entire along ventrum, though slightly convoluted distad particularly in western montane subspecies; lamella antevaginalis square-angled with terminal margins widely indented caudad of the lamellal juncture. Signa broad-based, basally slightly bifurcate.

Types
The syntype series is in the NHM. LEECH's (1894) syntype series includes: two males from Chow-pin-sa (= Chao, and Pincha), two adjoining cities in Yunnan Province, China [LEECH specimens, lettered "a" and "b"]; one male from Pu-tsu-fong (= possibly, Pishichai) Yunnan Province, China [LEECH specimen "c"]; and two males and two females from Wa-suu-kou (W [sic] Yunnan Province, China [LEECH specimens, lettered "d" to "g"] (see also SOUTH, 1902). All of these specimens bearing LEECH's catalogue numbers "a" to "g" are extant and have been examined by me. SOUTH designated one male [LEECH letter "d"] from Wa-suu-kow as a "type" and one female [LEECH letter "f"] from Wa-suu-kou as a "type." In the type collection of the NHM two such specimens were located but bore no labels indicating who placed them there or further distinguishing them from the other Wa-suu-kou syntypes (except by the association with LEECH's letters). Further, the remaining male syntype in the NHM collection is actually a male of another species (see *A. aleucopuncta*, new species). To compound matters, the NHM type collection also includes a specimen which is identified as that figured by SEITZ (1909), as "*pluto*" It does not bear any special label indicating it is a type and there is not any mention of this specimen in SOUTH (1902). The specimen is not a syntype and is not conspecific with LEECH's syntypes. Considering all of the above problems, I have designated the LEECH specimen lettered "d" as lectotype of *Satsuma chalybeia* var. *pluto*, affixing a label clearly marking it so. I have designated all the remaining syntypes, except the one lettered "e" as paralectotypes. I have made the specimen lettered "e" a paratype of *A. aleucopuncta*. The specimen figured in SEITZ (1909) and located in the type collection at NHM becomes the holotype of *Novosatsuma magnasuffusa*. Type locality of *A. pluto*: Wa-suu-kou, Yunnan Province, China.

Distribution
Spatial (Fig. 93): Specimens known from the eastern edge of the Tibetan plateau (Chamdo-Yunnan) northeastward to Mongolia and eastward to Yupeh Province in central China.
Temporal: None of the many specimens bears a date.

Remarks
This species is somewhat variable, particularly in the degree of under surface white and gray-blue suffusion occurring on the hindwing under surfaces' limbal area. In addition, western montane segregates differ some in genitalic character, suggesting a need for subspecific designation. The western montane populations, if seen only from isolated specimens would appear to be a different species. Therefore, to prevent confusion I identify the following subspecies within the *A. pluto* complex.
Considering nominate *A. pluto*, I dissected seventeen males and eleven females for genitalia (including the type series). Eight males and seven females were dissected for legs and palpi.

Subspecific taxonomy

Nominate *A. pluto pluto*

The nominate taxon (fig. 65ABC) is described amply above and constitutes the nuclear Chinese range of the species. I figure specimens from Yunnan typical of the nuclear Chinese distribution, marked with lavish suffusion across the hindwing's under surface limbal area. Genitalia are figured in figs. 16A, 17A. In western China there occurs a lowland form that is very blue on the upper surfaces and particularly hoary on the under surfaces. It is replaced in montane areas

and adjacent Tibet by a form that is brown above and below with very little under surface suffusion of white and gray-blue. Both these western subspecies show sculptural differences in the male valvae and larger convolutions on the ventral surfaces of the lamella postvaginalis in females. Since these modifications usually indicate autapomorphy in the Callophryina, I treat each of the western populations as separate subspecies.

Additional localities (aside from types listed above)
China: Yunnan (AMNH); Chipa, Rinthau, Siao-Lou, Taiho, Ta-ho, Yare Gong (NHM); Vallee du Tong Ho (MNHN).

Ahlbergia pluto **c y a n u s** subspec. nov.
Figs. 16B, 17B, 65EF

Diagnosis
Distinctive from both the nominate and *A. p. clarofacia* below by outstanding iridescent blue on the wing upper surfaces (base to medial regions in males, base to postmedial regions in females) and under surface of hindwing with pattern elements of basal disc and submarginal bands mottled. Male genitalia more robust than in the nominate; female genitalia with ventrum of lamella postvaginalis convoluted along the distal edges. Genitalic characters shared to a great degree with *A. p. clarofacia*, but males saccus and valvae, and females lateral lamellal structures less robust.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Ground color dark browns with faint blue suffusion, particularly basad. Distal areas of discal cell with ellipsoid androconial scent brand. Wing margins moderately crenate. Under Surface of the Wings: Ground color dull gray-brown ranging to cinnamon and occasionally beige. Forewing with hoary postmedial red-brown band marked gray along distal edge. Hindwing basal disc mottled brown with black to reddish overtones; two postbasal spots vaguely edged distally gray. Distad of the basal disc, ground color drab brown with submarginal crescent band a shade darker to reddish, not particularly prominent but mottled. Length of Forewing: 13.0 mm (holotype); mean of three paratypes, 13.3 mm, range of paratypes 13.0 mm-14.0 mm.
Female: Head, thorax, abdomen, legs and palpi typical of the species. Upper Surface of the Wings: Ground color bright purplish blue from bases to the postmedial areas, rest of wings brown. Remaining facies of wings similar to males. Under Surface of the Wings: As on males. Wing margins slightly more crenate. Length of Forewing: 14.0 mm (allotype).
Male Genitalia (Fig. 16B): Valvae with bilobed area wide and ovate, caudal extension thickly tapered to fingerlike termini. Lateral view of valvae more robust and "funnel"-shaped than in nominate but not robust as in subsequent subspecies. Saccus parabolic, more diminutive than nominate and subsequent subspecies.
Female Genitalia (Fig. 17B): Distal edges of lamella postvaginalis ventrum with slight convolutions as in subsequent subspecies. Differing from this latter taxon by a generally more robust genital plate, ductus bursae and signa.

Types
Holotype male (Fig. 65E), Loutsechiang (= Lutien), Yunnan Province, China; allotype female (Fig. 65F), same data as primary type, both deposited NHM.
Paratypes (4). NHM: same data as primary type, four males.

Distribution
Spatial (Fig. 93): Presently typical of *A. pluto* populations found in areas of Yunnan province which are relatively more upland than in the nuclear range of the species but disjunct from the high montane populations characterized immediately below.

Remarks
This taxon was originally characterized as a species in the dissertation version of this work. I reduce the status here after considering more specimens and the degree of variation within the *A. pluto* complex. In addition, the occurrence of the apparently autapomorphic convolution of the lamella postvaginalis ventrum in this and the following subspecies is taken as less significant than in the *ferrea* Group for both cladistic and biogeographic reasons. In the *ferrea* Group the convoluted postvaginal surface is more emphatic and shared by an entire suite of widespread populations limited to the mainland and separated from the plesiotypic sister species found in Japan. If the *ferrea* Group was comprised only of a Japanese and mainland sister pair, it would be prudent to treat the couplet as sister subspecies. Existence of additional members of the group distributed far westward suggest the *ferrea* Group is much older than the *A. pluto* complex, which though including widespread Chinese species, has no representative in Japan. Populations of *A. pluto* are less widespread and allopatric than mainland members of the *A. ferrea* complex and the occurrence of some autapomorphy in the female lamellae appears to result from the isolation of western montane populations.

Ahlbergia pluto **c l a r o f a c i a** subspec. nov.
Figs. 16C, 17C, 65D

Diagnosis
Differs from the nominate and *A. p. cyanus* by lacking the under surface blue and gray suffusions, particularly in the limbal regions of the hindwing. Consequently, generally brown appearance more resembles other members of species group, *A. aleucopuncta* and *A. unicolora*. The genitalia, however, typify *A. pluto* (though structures in both sexes of *A. p. clarofacia* appear more robust).

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Ground color warm brown, distally lighter. Ellipsoid scent brand located distally in discal area and colored slightly yellow-brown. Ground with only vague flecking of iridescent blue, if at all. Wing margins crenate, edges faintly gray with adjoining fringe brown. Under Surface of the Wings: Forewing ground cinnamon throughout with faint dark postmedial line from costa to vein CuA2; region distally along the margin flecked gray. Hindwings with postbasal disc mottled dull dark brownish, and with blackish distal margin bordered on the outside by vague flecks of white. Markings from anal margin to vein 3A extremely vague, if present at all. Ground color distad the basal disc brown sometimes heavily flecked with black. Submarginal cresent line pronounced, followed distally by duller brown ground color and brown at margins flecked with gray. Length of Forewing: 13.0 mm (holotype); two paratypes, 13.0 mm.
Female: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Ground color completely dark brown with only a faint basal blue hue suffused on both wings. Under Surface of the Wings: As on male, but with less dark suffusion of the ground color. Length of Forewing: 13.0 mm (allotype).
Male Genitalia (Fig. 16C): Similar to nominate but valval bilobes greatly robust and more ovate, with this tendency exceeding that in *A. p. cyanus*. Valvae, in lateral view also robust and more "funnel"-shaped than in the other subspecies. Valvae caudal extension tapered abruptly toward the terminus. Cornuti typical of the species.
Female Genitalia (Fig. 17C): Similar to *A. p. cyanus* with ventrum of lamella postvaginalis more convoluted than in *A. p. pluto*, but with a square distal margin and deeply cleft lamella antevaginalis. Signa broadly based spines bifurcate at the termini.

Types
Holotype male (Fig. 65D), allotype female, Ta-sien-lu (= Kangting), Szechwan Province, China. Holotype deposited AMNH; allotype, NHM.
Paratypes (5). NHM: Tse Kou (= Tzeku), Yunnan Province, China, 1902 (one male); same data 1900 (one male); same data, 1895 (one female, one male). AMNH: same data as holotype (one male).

Distribution
Spatial (Fig. 93) From montane western Yunnan Province, China, in the panhandle between Szechwan and Kaichow provinces, westward to the eastern Tibetan plateau region of China. Tzeku is in extreme northwest Yunnan and was connected by a trail northeastward to Kanting in the western Szechwan Province near the turn of the Century. The altitude range for the areas is 1500-3000 meters.
Temporal: Unknown.

Remarks
The subspecies subsumes an entity described in the 1981 dissertation and places it under *A. pluto*. The decision to reduce these taxa to subspecies was discussed under previous Remarks.

Etymology
The species name is taken from the Latin *clarus* for "clear" and refers to the general lack of under surface suffusions which typify the taxon.

Ahlbergia **a l e u c o p u n c t a** spec. nov.
Figs. 18, 19, 66

Diagnosis
A small species 11.0-12.5mm, distinguished by (1) deep brown upper surface with steel-blue overcast and (2) white-highlighted under surface showing distinctive lineal and crescent-like markings from the anal angle to vein 3A and the cell between SC+R1 and R2. Male scent brands are oblongate but compact, only slightly invading the radial veins. Male genitalia with diminutive bilobed area marked by thin outlying rims (not widely rimmed in a bulbously ovate to shouldered condition as typical of the *A. pluto* complex); female genitalia also diminutive with lamella antevaginalis narrow and slightly recurved along the distal edges (with no terminal indentation caudad of the antrum as typical of the *A. pluto* complex).

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color very dark brown and overcast with suffusion of faint steel blue. Scent brand located distally in discal area. Margins moderately crenate; slight blue marginal line from anal margin to vein 2A; fringes brown. Under Surface of the Wings: Ground color warm brown with yellowish cast; forewing with slightly darkened slash located distally in discal cell; submargin with a dark brown band (basally dark brown, distally white) extending from costa to vein CuA2 or 2A; marginal area heavily suffused with light gray. Hindwing basal disc very dark brown (toward sepia) with two faint postbasal spots blackened basally with white and distally with black. Margins of discs darker brown to blackish with a distal white line prominent from veins SC+R1 and RS to margin and from the anal margin to vein 3A. Distad of basal disc margin, suffusions of gray and white pronounced, especially in a broad crescent-shaped arc along anal margins and the white markings adjacent vein 3A. Postmedial areas with brown crescent line flecked heavily with gray followed by a marginal brown band. Length of Forewing: 12.5 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons as typical of the genus. Upper Surface of the Wings: Both wings, distad of the medial areas, dark brown; remaining basal areas light

blue. Under Surface of the Wings: Marked similar to males. Length of Forewings: 11.0 mm (allotype).
Male Genitalia (Fig. 18): Valvae bilobed area narrow-rimmed and only slightly shouldered; valvae in lateral view tapered, not prominently "funnel"-shaped with bilobed areas appearing relatively thin; caudal extensions of valvae tapered. Saccus relatively small for genus, parabolic to pointed; cornuti spatulate with termini emphatically spined.
Female Genitalia (Fig. 19): Similar to congeners but with lamella antevaginalis narrow, not indented caudad the lamellal configuration and with distal ends of lamellae recurved cephalically. Ventrum of lamella postvaginalis not convoluted; signa broadly based with two, thin, inwardly directed spines.

Types
Holotype male (Fig. 66A), "Qua-Se, Yu-tong, Kitchang-Kou", Tibet, May-June 1892, native collectors; allotype female (Fig. 66B) with same data, both deposited NHM.
Paratypes (2). NHM: Wa-ssu-kow (= Weisheichou = Weishi) Yunnan Province, China [northwest of type locality, circa 100 km NW on same trail] (one male). "Ta-Tong-Kido" (= Ta Tong, = Kiao, = Victoria [e.g. bay or shore of Victoria i.e. Hong Kong]), 1894 (one female). The type locality is actually montane western Yunnan Province, China, Kitchang-Kou (= Kienchwan-chau = Kienchwan), Yu-tong (= Yungtung = Yunglung), these labels indicating connections on a trail.

Distribution
Spatial (Fig. 93): Overall, samples of the species indicate a western montane distribution from Szechwan Province, westward on the Tibetan plateau and northeastward to Manchuria (see below); I suspect that the Hong Kong record represents a location of purchase.
Temporal: Dates on specimens indicate May, June and July.

Remarks
An additional specimen, not included in the type series, is labelled "Pompejekka" (= Pomiyevka = Pompeyevka), "Little Chingan Mountains" (= "Little Khinghan Mountains"), Manchuria, May 1910, one male. I have not included it in the paratypes because of its disjunct distribution. The genitalia and markings of this specimen are indistinguishable from those of the type series. As noted above, I think that the specimen with data indicating Hong Kong represents a place of purchase. As apparent from the type data, this species is sympatric with *A. pluto*, another reason for recognizing it at the species level. The species appear to be sister taxa speciated from the ancestral *pluto* Group.

Etymology
The Latin name refers to the white under surface pattern outstanding on this species.

Ahlbergia **u n i c o l o r a** spec. nov.
Figs. 20, 21, 67

Diagnosis
Also a small species (FW to 13 mm), but uniquely marked by a nearly unicolorus, dull-brown, under surface on which only the hindwing basal disc appears somewhat more darkly colored. Male scent brands are small and ovate. Male genitalia with robust vinculum and pointed saccus, valvae extremely shouldered in the bilobed area and tapered to thin caudal extensions; female genitalia more robust than in other group member, with a lobate and widely indented lamella antevaginalis and a short, thick, ductus bursae.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color warm brown throughout, no noticeable difference in coloration of margin

or fringe; wing margin obviously crenate only after vein M2. Scent brand small and ovate, located distally in discal area. Under Surface of the Wings: Ground colors very dull beige brown to yellow brown. Forewing noticably darkened distad the discal cell and with a vague irregular postmedial line from the costa to vein CuA2 or to the cell adjacent. Hindwing with basal disc hardly lighter than distal ground but with postbasal markings emphatic and disc margin darkly suffused. Postmedial crescent lines vague to absent; limbal areas marked with bright red-brown suffusion. Margins with dark blackish line, fringes brown flecked with gray. Length of Forewing: 13.0 mm (holotype; paratype).
Female: Head, thorax, adomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Similar to male but with faint basal blue both on forewings and hindwings and without scent brand. Under Surface of the Wings: As on males. Length of Forewing: 13.0 mm (allotype).
Male Genitalia (Fig. 20): Typical of the species group but with bilobed areas thinly rimmed and tapering gradually into the robust caudal extensions with the lateral view appearing slightly "funnel"-shaped. Saccus thickened along margin with vinculum, parabolic to pointed along the terminus; cornuti with terminal edge serrate, otherwise generally disclike in shape.
Female Genitalia (Fig. 21): Ductus bursae shorter than other species relative to the lamellal breadth and with distal lobes of lamella antevaginalis widely separated by and steep declination to the ductal terminus. Signa stoutbased, slightly bifurcate at their termini.

Types
Holotype male (Fig. 67A), Loutsechiang (= Lutien), Yunnan Province, China, no other data; deposited AMNH. Allotype female (Fig. 67B), "eastern frontier of Tibet" (translated French), "native collectors for P. DUJEANS, 1905"; deposited NHM.
Paratypes (5). NHM: same data as allotype (one male, one female). AMNH: Loutsechiang (= Lutien), Yunnan Province, China (one male); FMNH: Chauloo, Tibet, 4450m, 30 May (one male), Zambu ku, Tibet, 4350m 1 June (one male).

Distribution
Spatial (Fig. 93): Lutien is in eastern Yunnan Province, in the "panhandle" between the Szechwan and Kaichow provinces. The "eastern frontier of Tibet" is considered to be an area indicated by all such labels in NHM, e.g. mountains of the extreme eastern Tibetan plateau now included in China and including the oft-listed localities Tzeku, Tatsienlu and other listed previously herein on trails in the immediate regions. Of particular interest here are the high altitudes noted on the FMNH Tibetan specimens.

Remarks
This species and *A. aleucopuncta* stand out from the subspecies complex of *A. pluto* both in wing and genitalic characters and are variously sympatric with *A. pluto* populations. This, and the occurrence of the markedly salient sister species described immediately below, convincingly indicate a large species group of which only the commonly collected species, *A. pluto* had formerly been described (see Remarks under *A. pluto*). The entire type series was dissected for genitalia, legs and palpi.

Etymology
The name is a euphonious combination referring to the simple coloration pattern characterizing the wing under surfaces of this species.

Ahlbergia **p i c t i l a** spec. nov.
Figs. 22, 68

Diagnosis
A north Tibetan species completely brown on the wing upper surfaces with slight white marginal markings between the cells adjacent the margins of the hindwing. On the wing under surfaces, the species is marked with a vague forewing postmedian line (costa to vein M2) and a

slightly darkened hindwing basal disc outlined by jagged black edges, a vague brown submarginal band and white markings in cells 3A and CuA2 near the anal lobe. Male scent brands are prominent and ovate. Male genitalia exhibit a diminutive bilobed configuration (recalling *A. aleucopuncta*) but with very elongate, tapered caudal extensions complemented by heavy concentrations of microtrichia along their margins.

Description

Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color warm brown throughout, with cells along hindwing margins suffused brightly with white. Scent brand prominent and ovate, located distally in forewing discal area. Under Surface of the Wings: Ground color dull beige brown; forewing with marking limited to vague, darker brown, postmedial line extending from costa to vein M2. Hindwing with basal disc suffused slightly darker brown than surrounding ground and with distal margin suffused black along a jagged edge. Submarginal area with vague arc of dark brown dashes; cells along the margin from cells CuA2 to 3A suffused markedly white adjacent the anal lobe and with gray suffused between the anal lobe and the basal arc of the disc margin.
Male Genitalia (Fig. 22): Bilobed configuration thin-rimmed and more parabolic than in congeners with caudal extensions directly and steeply tapered caudad. Valvae, in lateral view, tapered caudally, not appearing "funnel"-shaped as in some other congeners; saccus parabolic, rather thinly junctured to the adjoining vincular surfaces. Aedeagus terminus quite ovate in ventral view with cornuti extremely serrate along the terminal edges.
Female: Unknown.

Type

Holotype male (Fig. 68), Kopadi, Tibet, 9150 ft to 10,250 ft to 11,200 ft, 11 April; deposited FMNH.

Remarks

This unusual species from northern Tibet further indicates that the *pluto* Group comprises a significantly larger number of taxa than considered by early workers. Aside from the type, nothing else is known regarding this species. It appears that there are few samples in western museums from the immediate area of the types. These faunas should be considered of great interest to further work on the region, since comparatively large samples have been assembled from the northerly regions extending from western Manchuria to the Tien Shan of the U.S.R. Undescribed Theclinae from this study suggest other groups may have unknown members in the region.

Etymology

This species name is Latin for "embroidered" and refers to the vaguely brown-striped appearance of the wing under surfaces.

Ahlbergia **caerulea** spec. nov.
Figs. 23, 69

Diagnosis

A distinctive species from the Nan Shan mountains of northern China with wing upper surface completely bright iridescent silvery blue in females. Under surface ground gray-brown, forewing with a dark discal spot and dark postmedial line; hindwing simply patterned with dark brown basal disc, lighter gray-brown distal ground colors and a faint red-brown dusting across the limbal area. These simple under surface markings distinguish *A. caerulea* from the other *Ahlbergia* showing bright silvery blue on wing upper surface of females (see *A. caesius* and *A. prodiga*). These latter species have complex under surface patterns and genitalia typifying the *circe* Species Group of *Ahlbergia* (e.g., ellipsoidal in the ductus bursae with a prominent constriction before the terminal lamellae).

Description
Male: Unknown.
Female: Head, thorax, abdomen, legs, palpi and frons typical of genus, except for thorax and cephalic portion of abdomen being heavily suffused with iridescent blue. Upper Surface of the Wings: Apical and submarginal areas of forewings, and marginal areas of hindwings, dark brown. Rest of upper surface bright silvery iridescent blue, broken by black on the wing veins. Scent brand small and ovate. Hindwing margin nearly entire, only with slightly crenate interspaces nearer the anal lobe; fringe light, silverish. Under Surface of the Wings: Ground color, both wings, dull gray-brown. Forewing with dark spot at distal ends of discal cell and emphatic postmedially oriented band broken radically into three lines, each edged distad with white, located quite proxad of veins R1 and M2, again distad in cell M3, and again proxad in cell CuA1; no submarginal line is present. Hindwing with unevenly suffused basal disc colored rather chocolate brown, occasionally mottled in appearance toward the margins. Distad of basal disc, ground colors much lighter buff though still suffused with chocolate brown. Terminal markings scaled darker, sometimes forming brown crescent line, but with obvious gray scaling obscuring presences of this line. Limbal areas with traces of red-brown suffusion. Length of Forewing: 13.0 mm (holotype).
Male Genitalia: Unknown.
Female Genitalia (Fig. 23): Typical of *pluto* Group, most similar to *A. pluto*, but extremely robust with ductus bursae length only about one-sixth longer than the lamellal breadth and with both lamella postvaginalis, lamella antevaginalis and terminus of ductus bursae stout. Signa with prominently elongate central spine, slight bifurcation apparent only at the base.

Types
Holotype female (Fig. 69), Saio-Hou (= Siho, with suffix, or Suio-ho) Kansu Province, China, 1900; deposited NHM.
Paratype (1): CMNH, no data (one female) [interesting here that some CMNH Palaearctic elfin specimens are from collector ARMAND DAVID in northern China and marked simply "N. China"].

Distribution
Spatial (Fig. 93): Known only from type locality and one specimen without data.
Temporal: Unknown.

Remarks
The holotype and paratype females are markedly different from all other specimens in the group. If not for the genitalia associating it clearly with the the *pluto* Group, the species would be more superficially suggestive of taxa of the *circe* Group (see subsequent entries). It is noteworthy that the type locality is the same as the extremely distinctive *Novosatsuma* species *collosa* also described herein.

Etymology
Latin for "sky blue" refers to the upper surface of the wings.

The *frivaldszkyi* Species Complex

This group contains three taxa which generally replace each other over the vast region stretching from the Amur Basin westward to the Tien Shan of the U.S.R. and adjacent China. Only one of the populations had been previously characterized. Though there are some significant morphological differences between these populations, their overall character homogeneity and geographic contiguity suggest prudence of a conservative taxonomy including one species complex with three subspecies. Also suggestive of this view is the degree of local variation in the titular species along the Amur River's northward drainage and tributaries. Contrasting the situation in the *ferrea* Group, where the titular taxon appears to be a vicariant plesiotype, nominate *A. frivaldszkyi* is mostly like a postglacial northward extension of the

montane entities characterized here as subspecies. I characterize each of the entities in detail since it is possible that future biological research will indicate that more than one species is actually involved (see Remarks under nominate). Compared to the *pluto* Group, female genitalia of the *frivaldszkyi* species complex have highly convoluted lamellae which terminate in a typically triangular shape. The diverse *circe* Group, on the other hand, shows this ground plan modified into a centrally ellipsoidal ductus bursae with a marked constriction prior to the the terminal lamellae.

Ahlbergia frivaldszkyi (LEDERER) stat. rev.
Figs. 24, 25, 70

Thecla frivaldszkyi LEDERER, 1855, p.100. ELWES, 1884, p.887. PRYER, 1946, p.16.
Thecla trivaldskyi [sic]: KIRBY, 1871, p.398.
Thecla fridvalskyi [sic]: ELWES, 1881, p.865.
Thecla frivaldskyi [sic] = *T. coerulescens* A. BANG-HAAS = *Lycaena ferrea*: DE NICÉVILLE, 1891, p.374 (synonymies in error; attribution of *coerulescens* in error [refers to *caerulescens* MOTSCHULSKY, 1866]).
Satsuma frivaldskyi [sic]: DE NICÉVILLE, 1891, p.375. SEITZ, 1921, p.264, pl. 72, fig. f. GILLHAM, 1956, p.149. ELWES, 1881, p.865 (in part).
Lycaena ferrea [not *Lycaena ferrea* BUTLER, 1868]: LEECH, 1894, p.353 (placed as synonym of *frivaldszkyi* in error).
Satsuma frivaldskyi [sic] (in part): MATSUMURA, 1929, p.23.
Satsuma frivaldszkyi (in part): SEOK, 1939, p.216 (appears to attribute *frivaldszkyi* to LEECH).
Satsuma frivaldskyi [sic] *ferrea* (in part): SEITZ, 1921, p.264, pl. 72, fig. f. OKAMOTO, 1923, p.68. DOI, 1931, p.46. UCHIDA, 1932, p.989. NAKAYAMA, 1932, p.381. SEOK & TAKACUKA, 1932, p.316. SEOK, 1933, p.70; 1934, p.763; 1935, p.99; 1936, p.64. MORI, DOI & CHO, 1934, p.44, pl. 27, fig. 4, SEOK & NISHIMOTO, 1935, p.97. HAKU, 1936, p.117. ESAKI, 1939, p.219, pl. 103, fig. 398 (all place *A. ferrea* as subspecies of *A. frivaldszkyi* in error).
Satsuma ferrea [not *Lycaena ferrea* BUTLER, 1868] (in part): MURRAY, 1874, p.168. NAKAYAMA, 1932, p.381. MORI, DOI & CHO, 1934, p.27. SEOK, 1939, p.216. SIBATANI, 1946, p.64. MIYAJIMA, undated, p.175 (misidentify *A. frivaldszkyi* as *A. ferrea*).
Satsuma ferrea frivaldskyi [sic]: LEECH, 1894 (placed as subspecies of *A. ferrea* in error).
[*Ginzia*] *frivaldskyi* [sic] (included *Satsuma* species): OKANO, "1941", p.239.
Ginsia [sic] *ferrea* (in part): KORSCHUNOV, 1972, p.359 (misidentifies *A. frivaldszkyi* as *A. ferrea*).
Ginzia ferrea (in part): KORSCHUNOV, 1972, p.359 (misidentifies *A. frivaldszkyi* as *A. ferrea*).
Incisalia frivaldskyi [sic]: GILLHAM, 1956, p.149.
Incisalia frivaldskyi [sic] *ferrea*: GILLHAM, 1956, p.149 (places *A. ferrea* as subspecies of *A. frivaldszkyi* in error).
[*Incisalia*] *frivaldszkyi* (included all *Satsuma* species): F.BROWN, 1947, p.21.
Callophrys (*Incisalia*) [*frivaldszkyi*] (included all *Incisalia* species): ZIEGLER, 1960, p.21 (and subsequent authors following ZIEGLER in Nearctic usages of *Callophrys*).
Callophrys ferrea [not *Lycaena ferrea* BUTLER, 1868] (in part): KAWAZOE & WAKABAYACHI, 1977, p.118 (misidentify *A. frivaldszkyi* as *A. ferrea*).
Ahlbergia ferrea [not *Lycaena ferrea* BUTLER, 1868] (in part): KIM, 1961, p.278. SHIROZU & HARA, 1962, p.94 (misidentify *A. frivaldszkyi* as *A. ferrea*).

[*Ahlbergia*] *frivaldszkyi* (included *Satsuma* species): BRYK, 1946, p.50.
Ahlbergia frivaldszkyi: BRIDGES, 1988a, p. I:138, II:4, III:82.

Diagnosis
This species has been historically confused with *A. ferrea*, a taxon with which it is marginally sympatric (see Remarks) and from which it is very distinct. These historical misidentifications stemmed from misdiagnosis of the home ranges of the respective species. Subspecies of *A. frivaldszkyi* can be separated from *A. ferrea*, and the *ferrea* Group (specifically sympatric *A. korea*), by several salient features of the wings: (1) structural color on the upper surface of *A. frivaldszkyi* is generally a moderate to bright silver-blue overcast (brighter in the females); that of *A. ferrea* is flecked and blends with the ground color forming a steel blue or greenish-black hue (bright iridescent blue appearing only towards the wing bases); (2) few, if any, populations of *A. ferrea* or *A. korea* show brilliantly iridescent blue outside the wing base area (particularly in male specimens); *A. frivaldszkyi* populations (see particularly *A. f. aquilonaria* males and females) often have extensive iridescent silvery blue on the wings with some iridescent blue dense enough to show mottled patterns in the cells of the hindwing; (3) the under surface of *A. frivaldszkyi* is covered with generally hoary brown or gray-brown suffusion in postbasal, medial, postmedial and submarginal patterns (on *A. ferrea* and *A. korea* the under surface ground is rather solid brown or red-brown with pattern consisting mostly of darker basal disc [with one or more postbasal spots or slashes] and blue-gray suffusion generally confined to the limbal area).
Once one is familiar with the generally different upper and under surface patterns characterizing *A. frivaldszkyi* and members of the *ferrea* Group, confusing specimens or specimens with confusing, old or incomplete collection data can be distinguished readily. In addition, dissection affords easy identification since the ground plan of the morphologies of the two groups is very different (contrast figures 24-25 with 8-15).

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground color in nominate brownish black with steel blue or green ranging to bright blue in one subspecies. Generally, more suffused and iridescent than the dull steel blue characterizing taxa of the *ferrea* Group. Ellipsoid scent brand in distal area of discal cell. Wing margins often checkered white and black by differential color between veins and cells. Wing margins variously crenate, more entire in nominate, extremely incised along hindwing limbal margin in one subspecies. Under Surface of the Wings: Pattern dominated by a combination of brown and gray suffused grounds, and markings in the postbasal, medial, postmedial and submarginal areas in a characteristic pattern – forewing with basal to medial ground dark, followed by a postmedial spot line from costa to at least vein CuA1 (lunular with white-edged spots, usually a bit irregular between veins M3 and CuA1) and with distal ground suffusive or hoary gray and brown between the cells along the margin. Hindwing with basal disc typically suffused darker brown or gray-brown than the rest of surface; postbasal markings variously emphatic depending on degree of suffusion; margin of basal disc generally crenate to incised. Ground colors distad basal disc mottled with suffusive lighter gray and brown, producing a darker (brown to black) crescent line along the postmedial-submarginal area and/or concentric blocks of lighter ground in the cells along the margin. Nominate typified by appearance of hindwing markings in a rather concentric pattern; subspecies typified by various extremes of color contrast and individual emphasis of certain pattern elements, most distinct in the ground colors and pattern elements of the distal areas of the wing (see subsequent subspecies entries). Length of Forewing (nominate): mean of 15 specimens (NHM) 13.2 mm, range 12.5 mm to 14.5 mm.
Female: Head, thorax abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Margins and apices brown to black with expanse of dark borders varying with the subspecies, nominate with dark border extending to the submargins. Rest of forewing suffused

bright silvery-blue, hindwing more intense silvery-blue with blackened veins along the margins often separating ground color into blue marginal patches or these and a blue marginal line (nominal subspecies with such patches distinct but not as emphatic as in other taxa, as with marginal lines). No scent brand. Under Surface of the Wings: Marked similar to males but with more pronounced under surface mottling in many specimens. Length of Forewing: mean of 15 specimens (NHM), 14.2 mm, range 13.0 mm to 15.0 mm.
Male Genitalia (Fig. 24): Vincular apparatus robust with adjoining saccus parabolic to more "funnel"-shaped (nominate). Valvae generally robust, bilobed configuration ovate (nominate) to slightly shouldered or parabolic; caudal extensions robust and thickly tapered to blunt termini. Cornuti generally disclike, serrate along the terminal edge.
Female Genitalia (Fig. 25): Generally rather "spade"-shaped with ductus bursae length generally exceeding breadth of lamellae by only one-sixth to one-seventh, if at all, and lamellae tapered caudally toward a pointed or lobate end. Lamella postvaginalis with prominent ventral convolutions. Signa short, usually greatly bifurcate spines. Nominate with the most steeply tapered lamellal terminus and least apparent ventral convolution.

Types
The original description mentions fifteen specimens from mountain regions in the vicinity of Ust-Buchtarminsk (see below) from 2 June. Information available on LEDERER's life (KRATTZ, 1870; STRECKER, 1878; REBEL, 1901) indicates that his extensive notebook and acquisitions, originally from the Zoologisch-Botanischen Verein in Vienna, might be at the Naturhistorische Museum in that city. However, Dr. V. LUKHTANOV (St. Petersburg University, Russia) informed me during review of this paper the the type series has been located at the ZMH (Berlin), along with many other specimens of LEDERER, and that these also clarify the type locality. In this study I assumed the identity of the nominate from topotypical material, construed from the original description (fig. 70); this diagnosis, according to Dr. LUKHTANOV, is in agreement with the types.
Type locality: According to LUKHTANOV the exact type locality from LEDERER's material is Ust-Buchtarminskoe, now: Kasakhstan, 80 km SE Ust-Kamenogorsk. In his original description, LEDERER recorded the types were from mountains in the vicinity of Ust-Bushtarminsk (= Est Bukhtarminskoye), a peninsula extending out into Lake Zaysan just west of the border between Mongolia and extreme eastern Kazakstan in the U.S.R. Notes above from Dr. LUKHTANOV have been added to the manuscript at proof.

Distribution
Spatial (Fig. 94): The species occurs from the Amur River basin south through the Kamchatka Peninsula, into Manchuria and possibly in Korea (specimens reported by GILLHAM from Korea may not represent the taxon due to misidentification); it extends westward across northeast Mongolia (in montane areas) to the trans-Baikal region east of Irkutsk. This range typifies the nominate. Westward, populations treated here as subspecies extend to the Altai and the Sayan mountains of the U.S.R. and adjacent China and Manchuria, and the Tunkinsk (Tunkinskye Gol'tsy') mountain regions south of the southern tip of Lake Baikal.
Temporal: Dates on specimens range from May into mid-June.

Remarks
See Remarks under *A. ferrea* concerning the history of controversy surrounding the relation of *A. ferrea* and *A. frivaldszkyi*. To summarize, SEITZ (1921, pl. 72, fig. f) is not *A. frivaldszkyi* but *A. ferrea*. Also, identifications of *A. frivaldszkyi* by GILLHAM (1956) were also incorrect and were, instead, *A. korea* (the sister species of *A. ferrea* with which *A. frivaldszkyi* is marginally sympatric in Manchuria). To a large degree, *A. ferrea* and *A. frivaldszkyi* have been historically confused because (1) workers assumed that either or both names were available for widely sympatric populations occurring westward from Japan across the mainland Amur region and (2) historical material had not been identified with reference to types.
Following on the proper identification of *A. frivaldszkyi* herein, and to take a conservative taxonomic approach, I have reduced three *frivaldszkyi*-related "species" treated in the dissertation

version of the study to three subspecies. This is after further consideration of character variation and the adjacent geographic ranges of the forms. There is, however, some breadth in the wing characters embraced by this view and this requires care in separating the bluer marked subspecies (*A. f. aquilonaria*) from the other species of *Ahlbergia* which are prominently blue above. At present my concept of the "*frivaldszkyi* Species Complex" is somewhat like that expressed for "superspecies" in *Erynnis* (Hesperiidae) by BURNS (1964) it is quite possible there is an as yet unstudied insular population of this complex morphologically worthy of species status; it is also possible that future biological study may differentiate species within the complex. I examined 38 specimens of nominate *A. f. frivaldszkyi*, of which genitalia, leg and palpi preparations were made for 12 specimens spanning the distribution of the nominate. These and specimens of the subspecies described below indicated a cline.

Subspecific taxonomy

Nominate *A. frivaldszkyi frivaldszkyi*

The nominate taxon (fig. 70AB) is described amply above and constitutes the dominant range of the species along the tributaries of the Amur River basin and adjacent regions. Nominate genitalia are figured in figs. 24AB, 25AB. Two additional subspecies are described below. They include populations in the montane regions which feed the Amur drainage. I suspect that the nominate evolved as a northeastward manifestation of populations isolated to the south during the Pleistocene. The nominate does not have the supralimital wing characters apparent in the adjacent populations, though there is general homogeneity in the structural characters. *A. frivaldszkyi*'s hindwing margin is crenate but not so extreme as to appear tailed as the blackish subspecies *A. f. tricaudata*; similarly, the nominate lacks the brilliant upper surface blue and brown under surface markings occurring on *A. f. aquilonaria*. In the genitalia, degrees of variation shown in the nominate (figs. 24-25) strongly suggest the facies displayed in the southern populations warrant only subspecific status. These entities are characterized as follows.

Additional localities (aside from type locality listed above)
U.S.R. Amur, Amourland (NHM, MNHN); Apfelgebirge, E. Amourland, E. Siberia, Kamchatka, Khanka, Lang, Little Chingan Mountains, Nikolajewsk, Pivan, Sutschan, Vladivostok (NHM); Pompejetka (CMNH); Little Chingan Mountains (A. SURAKOV Collection).

Ahlbergia frivaldszkyi **t r i c a u d a t a** subspec. nov.
Figs. 24C, 25C, 70FG

Diagnosis
Recognized by deeply crenate hindwings which form, at the end of veins CuA1, CuA2, 2A and the anal lobes, projections which suggest broad tails. In addition, the margin of the basal disc is similarly angled along these veins paralleling the odd marginal angles. The male upper surfaces are brownish-black not somewhat dusted blue as in the nominate or brightly blue as in *A. f. aquilonaria*. Females are brighter blue but fuscous margins are much wider than in the other two subspecies. Male genitalia are thinner in the bilobed area than in other subspecies and the female exhibits robust lamellae, wide in the antevaginalis and deeply convoluted in the postvaginalis.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Ground brownish-black, heavily suffused with sheen of deep blue-green. Scent brand in distal area of discal cell. Wing margins extremely crenate on hindwing with veins CuA1, CuA2,

2A and the anal lobe greatly pronounced and taillike. In hindwing submargins between veins 2A and CuA2 is a prominent blue spot; at vein ends the fringe is boldly checkered white and black. Under Surface of the Wings: Ground color of forewing basad of the postmedial line dark brown to umber, distad of postmedial line redder, toward sepia. Discal cells with a chevron-shaped brown marking; postmedial lines (costa to vein CuA2) basally black, distally white. Sepia colored distal grounds often suffused heavily with gray. Hindwing basal disc dark sepia, greatly contrasting light gray-suffused distal ground. Basal discs with two prominent postbasal markings, each marked basally white and distally black. Basal disc margin bold, marked basally black, distally white and greatly displaced distally along vein CuA1 to M2 paralleling the distally distended margin produced by the tails. Distad of the boldly displaced margin of basal disc, on light gray grounds, postmedial areas with brown colored arc of chevrons; marginal areas heavily suffused gray, including the fringe. Length of Forewing: 12.0 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Marked similar to males except basad of wide fuscous borders ground color much brighter hued silvery-blue. Margins of hindwing slightly less crenate than in males, reducing the taillike appearance along the margins near the limbal areas. No scent brand in discal area. Under Surface of the Wings: Marked as in males. Length of Forewing: 12.5 mm (allotype).
Male Genitalia (Fig. 24C): Valvae thinner in bilobed area than other subspecies, caudal extensions thickly tapered to blunt ends terminating at about the tips of the falces. Saccus and adjoining vinculum slightly less robust than the other subspecies; junctures of valval bilobed area and caudal extension with notable microtrichia; cornuti typical of the species.
Female Genitalia (Fig. 25C): The ductus bursae and lamellae appear more robust than in other subspecies with length of ductus bursae and breadth of lamellae consequently shorter. Lamella antevaginalis prominent; lamella postvaginalis with prominent ventral convolution.

Types
Holotype male (Fig. 70FG), China, May 28, A. AVINOFF; allotype female, Tunkinsk, Weissgbg. [sic], southwest Irkutsk, July, AVINOFF. Deposited at AMNH.
Paratypes (14). CMNH: data as on allotype (ten males, two females), data indiscernable (one female). MNHN: Minousinsk, Sayan Mountains, U.S.R., 14 May 1921, KORSCHUNOV (one female).

Distribution
Spatial (Fig. 94): This subspecies occurs from the areas west of the southern end of Lake Baikal westward to the Sayan Mountains region where it abutts the range of *A. f. aquilonaria*. The Tunkinsk mountain region (Tunkinskye Gol'tsy') is located in the Baikal region, southwest of the city of Irkutsk and slightly eastward of the Sayans. Given this range, the populations probably also extend into adjacent China, as indicated by data on the holotype (see Remarks).
Temporal: Apparently from at least mid-May extending into July.

Remarks
The association of the males and females is by their collection data and nearly identical characters of the under surface. The holotype is maintained from the original dissertation version of this paper with subsequently located material designated as paratypes. This results from timing of the preparation of typescript for the publication.

Etymology
The Latin name refers to the three taillike projections along the limbal margin of the hindwing. Their salience is further exaggerated by the displaced margin of the basal disc which borders on prominent gray suffusion in the distal area of the wing.

Ahlbergia frivaldszkyi **aquilonaria** subspec. nov.
Figs. 24D, 25D, 70CDE

Diagnosis
Both sexes brighter iridescent blue above than other subspecies and with an under surface pattern composed of boldly contrasting gray and brown medial and postmedial color. The disc of the hindwing under surface is dappled deep brown and its prominent black margin broken by white and gray suffusions often extending basally into the disc. The distal area is brightly contrasted between gray suffusions and a prominent brown arc of crescents. Male genitalia exhibit a wider bilobed area than other subspecies with caudal extension consequently appearing thinner. Female genitalia, as in the subspecies treated directly above, are more robust than the nominate but the ventrum of the postvaginal lamellae is more complexly convoluted than in either the nominate or *A. f. tricaudata*.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Forewing with apex and submargins dark fuscous, along with margin and limbal submargins of the hindwing. Rest of wing rather bright iridescent silvery-blue. Scent brand located distally in discal area. Under Surface of the Wings: Ground color light buff to warmer brown with basal disc and adjoining anal area of hindwing much darker. Basal disc suffused reddish toward sepia with one to two lighter markings in the postbasal area. Disc margin basally brown, centered with black and white along the distal edge. Ground colors distad of the basal disc much lighter and greatly suffused with gray, this ground greatly contrasting a bright brown arc of crescents in the postmedial area. Margin again suffused dark sepia. Forewing similarly marked with more contrasting grounds and crossed from costa to vein CuA2 with broken postmedial line colored basally sepia to black and distally white. Hindwing margins crenate but without the notable taillike extensions. Length of Forewing: 14.0 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Marked similar to males but with upper surface iridescent blue brighter. No scent brand in distal area of discal cell. Under Surface of the Wings: Marked similar to males, undersurface grounds showing more contrast among the pattern elements marking the hindwing. Length of Forewing: 14.0 mm (allotype).
Male Genitalia (Fig. 24D): Bilobed area of valvae more wide-rimmed than in other subspecies with caudal extension appearing thinner. Vinculum and saccus robust, approaching configurations apparent in some specimens of nominate. Cornuti typical of the species.
Female Genitalia (Fig. 25D): All elements appearing more sculptured than in other subspecies, particularly along the ventral surface of the lamella postvaginalis and adjoining portions of the ductus bursae. Overall shape of terminal element more hemi-rectangular than in either the nominate or *A. f. tricaudata*.

Types
Holotype male (Fig. 70CE), Manchuria, no other data; deposited AMNH. Allotype female (Fig. 70D), North of Peking, A. DAVID, 1865, deposited MNHN.
Paratypes (5). MNHN: same data as allotype (one male). NHM: Mt. Sayan, U.S.R. (two females). CMNH: "Amourlands", no other data (one male), Manchuria, no other data (one male).

Distribution
Spatial (Fig. 94): Known from the Altai and Sayan montane regions of the U.S.R. and adjacent northeastern China and Manchuria. Abutting the distributions of *A. f. tricaudata* in the regions bordering the Sayan range.
Temporal: None of the specimens indicates a collection date.

Etymology
The Latin names means "of the north" and refers to the occurrence of this subspecies along the northern edge of the nuclear Chinese region.

The *circe* Species Group

This species group contains *A. circe*, three previously undescribed relatives and *A. haradai* (known to me only from the original description). Of these, *A. circe* has been among the most often collected of the Palaearctic elfins and only a north Tibetan subspecies is added here. Taxa of the group share a typically ellipsoidal ductus bursae and convoluted hemispherical lamellae in females and basally ovate valvae with comparatively small caudal extensions. These characters relate the group closely to congeners of the *leechii* Group which are isolated south of the Himalayan rim in regions of northeast India. The new species of the *circe* Group all exhibit extreme innovations of upper surface iridescent coloration, as well as autapomorphies of the genitalia. Such taxa and members of the *leechii* Group appear to be the most advanced members of the Old World elfins. Contrasting other Palaearctic elfins, members of the *circe* and *leechi* groups all occur west of the "Central Mountain Belt" in China; also, the groups contain the largest assemblage of species extending westward across the "Tibetan Plateau" to Nepal and Assam, India.

Ahlbergia circe (LEECH)
Figs. 26, 27, 71

Satsuma circe LEECH, 1893-94, p.354. SEITZ, 1921, p.264, pl. 72, figs. f, g.
Satsuma taxon *circe*: SOUTH, 1902, p.140.
[*Ginzia*] *circe* (included *Satsuma* species): OKANO, 1941, p.239.
[*Ahlbergia*] *circe* (included *Satsuma* species): BRYK, 1941, p.50.
[*Incisalia*] *circe* (included *Satsuma* species): GILLHAM, 1956, p.145.
Ahlbergia circe: BRIDGES, 1988a, I:81, II:4, III:83.

Diagnosis
Easily recognized by a characteristic wing shape and the simple under surface pattern. Outer margin of the hindwing not crenate and anal lobe protruding caudally (not recurved inwardly toward abdomen as in other species) resembling the wing shape familiar in Old and New World hairstreaks of the genus *Callophrys*. Hindwing under surface patterned by simple contrast between deep brown in the basal disc and light brown in distal areas (coloration in neither sector notably mottled). Further, margin of the basal disc distended distally in rather square fashion between veins M2 and CuA1 and with postmedial markings on the hindwing limited to small blotches (contrasting the arcs of chevron-like markings on most other elfins). Upper surface differing from new species of the group by a general lack of upper surface iridescent blue, occurring only at the wing base on female (other *circe* Group species are brilliantly blue or purple above). Genitalia distinctive among congeners, males by robust valvae basally wide-rimmed and with more elongate caudal extensions, females by more elongate ductus bursae and more hemispherical lamellae. The northern Tibetan subspecies of *A. circe* described subsequently differs from the nominate in being larger and very yellow on the under surface. Its genitalia are more robust on the under surface making the female genitalia, in particular, appear more elongate.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wing: Ground completely dark brown with scent brand ellipsoid and usually appearing gray or

more yellow over the brown ground. Margins hardly crenate but heavily fringed. Hindwing with anal lobes extending caudally, not recurved inward toward the abdomen. Under Surface of the Wings: Ground color variously hued brown from chocolate to slightly yellowish depending on regional variation. Basal regions of forewing and basal disc of hindwing always of darker hue than distal areas. Ground colors often flecked with darker brown but not suffused heavily enough to appear mottled. Forewing with postmedial line entire from costa to cell CuA2 or base of wing, varying from continuous line to discontinuous blotches or obsolescence. No marking in discal cell. Hindwing with basal disc of solid ground color, always substantially darker than distally grounded hues. Margin of disc displaced distally between veins CuA1 and M2 and margin without a distinctive line or band along its edge. Lighter distal grounds vary from beige to gray or yellow brown with postmedial line of browner dashes or blotches followed by a darker ground along the margin and with lighter, gray or yellowish, fringe. Specimens from high altitudes are more grizzled beneath with brown or gray suffusion (altitudes 3-4000m are known). Occasionally in such specimens, pattern is obsolescent. Length of Forewing: mean of 12 specimens (NHM) 14.0 mm, range 13.0 mm to 15.5 mm.
Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Generally similar to male but with bases marked with iridescent blue. No scent brand in distal area of discal cell. Under Surface of the Wings: Similar to males. Length of Forewing: mean of 12 specimens (NHM) 14.5 mm, range 13.0 mm to 15.5 mm.
Male Genitalia (Fig. 26): Bilobed areas of valvae generally robust and ovate with nominate less angled than western upland subspecies. Caudal extensions robust and tapered, configuration less elongate and thickly tapered in nominate. Valvae in their lateral view more "funnel"-shaped in the nominate; saccus parabolic; cornuti serrate along their terminal edges and spatulate in shape (though not more laterally expansive than typical of the genus).
Female Genitalia (Fig. 27): Nominate with ductus bursae tapering gradually caudally from corpus bursae to spatulate terminal lamellae. As typical of group, corpus bursae generally constricted before lamellae, lamella postvaginalis convoluted beneath. Signa two widely bifurcate spines. Western upland subspecies with the ductus bursae configuration more elongate and terminal lamellae relatively smaller.

Types
Syntype series in NHM: LEECH specimens from Ta-chien-lu (= Ta-tsienlu = Tatsienlu [*or* ou], = Kangting), western Szechwan Province, China, labelled "a" through "k", none with dates, all listed by SOUTH (1902) and all located by me. SOUTH designated specimen "a" as the "male type", specimen "j" as the "female type" I have designated specimen "a" as the lectotype and clearly marked it so. Also, I have designated the other specimens of this series "b" through "k" as paralectotypes, and labelled them as such. Type Locality: Tatsienlu, west Szechwan Province, China, altitude circa 3000 meters.

Distribution
Spatial (Fig. 95): Nominate widely distributed along the eastern edges of the Tibetan Plateau in the western mountains of Yunnan and Szechwan provinces of China. Tatsienlu is on a mountainous trail in western Szechwan Province north of the western panhandle region of Yunnan Province; it connects on this trail to Tseku (another common NHM locality). The high montane subspecies *A. c. montivaga* is found westward in the Kunlan Shan region along the northern edge of the Tibetan plateau.
Temporal: Specimen data indicates dates ranging from May to June.

Remarks
Thirty-four specimens of nominate *A. c. circe* were examined and twelve of these were dissected for genitalia (six also for legs and palpi). Eight specimens of the western subspecies *A. c. montivaga* were examined and each dissected.

Subspecific taxonomy

Nominate *A. circe circe*

The nominate taxon (fig. 71ABC) is described amply above and constitutes the widespread western Chinese range of the taxon. I figure topotypes (since the type locality is well-represented in collections) along with a disjunct from central Szechwan to show variation. Nominate genitalia are figured in figs. 26A, 27A. An additional subspecies is described below, which was originally treated as a species in the dissertation version of this study. Consistent with reassessments of status in the present version, the north Tibetan populations described below are construed as a western upland manifestation of the nominate. They differ from the nominate *A. circe* primarily in ventral wing ground color and a bolder pattern, which is probably attributable to climatic factors.

Additional localities (aside from types listed above)
Kangting (AMNH); Changyang, Eastern Frontier of Tibet, Frontier of Tibet, Tzeku, Yatsu to Yalung River (NHM); Frontiere d'Tibet [these and some specimens labeled also "Le Tibet, encaisseur indigene" are taken to mean western China, consistent with notes heretofore in this study and companion MNHN specimens from the type locality].

Ahlbergia circe **m o n t i v a g a** subspec. nov.
Figs. 26B, 27B, 71DE

Diagnosis
Resembling nominate in general appearance but larger and with warm yellow-brown under surface showing pattern typifying the species but much more mottled throughout and particularly bold at the distal edge of the basal disc. Male genitalia are more robust in the valval bilobes with caudal extensions appearing slightly longer than the nominate and with the rims of bilobes more angled; female genitalia exhibit a less prominent lamellal configuration and a more elongate ductus bursae.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the species. Upper Surface of the Wings: Entire surface warm brown, androconial patch located distally in discal cell. Margins and fringes along wing slightly darker than rest of ground; hindwing margin vaguely crenate. Under Surface of the Wings: Entire ground except postbasal discs yellowish brown; basal disc mottled dark brown, hued yellowish beneath. Forewing postmedial line slightly curvate distally at vein M3; remaining ground color slightly darker basad this band. Basal disc with two blackish postbasal slashes, each faintly edged basally with white. Margins of postbasal disc edged basally black and, in some specimens, distally white. In the postmedial area is a band of yellow-brown color followed by a darker brown crescent line fusing into darker brown ground in the marginal area; fringes dark brown basally, lighter distally. Length of Forewing: 14.0 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons typical of species. Upper Surface of the Wings: Markings similar to male but lacking forewing androconial patch and with bases of both wings marked bright violet. Under Surface of the Wings: Marked similar to male. Length of Forewing: 14.0 mm (allotype).
Male Genitalia (Fig. 26B): Resembling nominate but with rims of the bilobed areas more angled and caudal extensions more robust and elongate. Valvae laterally less "funnel"-shaped and saccus relatively longer than in the nominate.
Female Genitalia (Fig. 27B): Similar to nominate but with ductus bursae longer (two times width of lamellae, nominate less than one and one-half times) and with such lamellae appearing

consequently smaller, and more prominently convoluted, along the ventrum. Signa deeply bifurcate spines.

Types
Holotype male (Fig. 71DE), "Camp I, 11,200 ft. to Kopadi [Tibet], 10,250 ft. to Camp II, 9150 ft." Allotype female, "Lakashili to Aowak", 15 March, both deposited NHM.
Paratypes (6). NHM: same data as in holotype (one male), Yatsu to Yalung River, 30 April 1929 (one male, one female [undated]); near Zambu ku, 11,600 ft. to Trazyeah, 12,100 ft. to Hadia Tungoo, 13,000 ft., 1 June (one male). FMNH: Mahai, Tibet, circa 3,000m, 5 April (one male); Mangyai, Tibet 10 March (one male).

Distribution
Spatial (Fig. 95): Specimens are from the "Kunlan Shan" region of high mountains ringing the northern plateaus of Tibet and bordering Chinese (East) Turkestan. This area is also known as "Kokoshili" or "Shili" eastward of the Tibetan Plateau and as the "Tagh" northward. The specimens span this distribution. Extremely high altitudes indicated on some specimen labels is noteworthy.
Temporal: The dates on specimens range from 15 May to 1 June.

Remarks
The collecting localities of the primary type specimens include two high mountain trails. The holotype data evidently refers to Kopa (Kapa on some maps) with suffixes [as in "Kopadi"] being typical of those common to transliterations on many NHM specimens. Kopa is just west of the trail including the locality of the allotype. This latter locality appears to refer to "Shili" (located eastward on the plateau) and its surrounding region "Aowak" (referring to a lake just to the north, "Ayak", and thus explaining the prefix "Laka" on the label).

Etymology
The Latin name is from a Latin colloquial meaning "mountain roamer", referring to taxon's upland distribution.

Ahlbergia haradai IGARASHI
Fig. 71F

Ahlbergia haradai IGARASHI 1973, p.68.
[*Callophrys*] *haradai*: BRIDGES, 1988, p. I:152, II:19, IV:51 (removed from *Ahlbergia* because not listed therein s.str. by JOHNSON, 1981).

Diagnosis
Known to me only from the original description and placed here based thereon. Appearing much like *A. circe* on the under surface but with the upper surface nearly completely bright gray-blue. Differing from *A. circe* on the under surface by additional dark markings from anal margin to cell CuA1 basad the anal lobe. Lacking the basal disc colors and distinctive disc margins which characterize Indian congener *A. leechii* (of the *leechii* Group, see below). Genitalia unknown (see Remarks).

Types
Holotype "female" (Fig. 71f), FW 12.0 mm (see Remarks) National Science Museum, Tokyo. Type locality: Mt. Godavari, near Kathmandu, Nepal, at 2400m.

Distribution
Spatial: Fig. 95.
Temporal: Known from specimen reared from larvae collected in mid-June.

Remarks
I have been unable to study this species but, based on the original description and figures, it does not appear to be readily synonymized with any known Palaearctic elfin of more typical distribution. The type was evidently not dissected and, as apparent from scent brands notable on the color figure of the type, may actually be a male. As noted under various entries herein, nongenital sex diagnoses in Palaearctic elfins have historically been confused by assumptions that females were mostly blue (see, for instance, entries under *Novosatsuma* and *Ahlbergia chalybeia*). As described, *A. haradai* does not appear to share the advanced characters typifying taxa of the *leechii* Species Group below, in which occurs the sole Indian member of *Ahlbergia*. Study of the genitalia might further corroborate my placement of *A. haradai* in the *circe* Group. Igarashi's detailed life history work is important to our understanding of the biology of *Ahlbergia* (see generic entry) and confirms my suspicion that, as indicated in the morphology, taxa of this genus are angiosperm feeders. HARADA's elfin is apparently generally unknown to other Nepalese collections - specimens do not appear in the extensive BAILEY material from Nepal currently available at the NHM and AMNH and it has been unrecorded in the recent field work reported by SHIELDS (1982, 1984) and in SMITH's (1989) book on Nepalese butterflies. Circumstances surrounding apparent rarity of this species typify that oft-noted by me for many of the new northern Palaearctic elfins described herein.

Ahlbergia **p r o d i g a** spec nov.
Figs. 28, 29, 72

Diagnosis
Easily distinguished by bright prodigious upper surface iridescent blue in both sexes, severely crenate hindwings (also appearing frilly or ragged) and by under surface patterns resembling noncongeners of the *Novosatsuma "pratti* Group" Contrasting other *Ahlbergia*, *prodiga* has upper surface iridescent blue encompassing the discal and basal areas of both wings in both sexes, not just areas basad as in most other *circe* Group members. *A. caesius*, the only other member of the *circe* Group primarily blue on the upper surface, has under surface patterns typical of the *circe* Group (see Remarks regarding resemblance to *N. pratti*). Genitalia are typical of the *circe* Group but distinctive by parabolic bilobes and diminutive caudal extensions in males and a similarly diminutive ground plan in females in which the ductus bursae is short and straight and the lamellae tapered and rather conical.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Base of wings brown but forewing proxad of scent brand and distad to submargin bright silvery blue; hindwing completely shiny blue with hindwing margin greatly crenate. Under Surface of the Wings: Forewing brown with darker spots occurring distally amid the discal cell; distal area of wing with two parallel, submarginal and postmedial, lines, each regular but undulate and colored rich red-brown to chocolate. Ground distad these lines suffused reddish-brown to chocolate brown. Hindwing basal disc mottled deep brown with dark distal edging and accented by prominent white distal markings between veins SC+R1 and RS, CuA2 and the inner margin, and proxad a single postbasal spot. Distad of the basal disc ground beige brown heavily mottled with duller dark brown. Length of Forewing: 12.0 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Base of wings dull beige brown with entire distal area, except forewing apex and submargins of both wings, bright shiney sky blue. Margin of hindwing serrate and heavily fringed. Under Surface of Wings: As on male. Length of Forewing: 15.0 mm (allotype).
Male Genitalia (Fig. 28): Similar to *A. circe* but with caudal extension of valvae shorter and less shouldered and bilobed area more parabolic. Valvae laterally somewhat "funnel"-shaped; saccus parabolic; cornuti blunt-ended and serrate along terminal margins.

Female Genitalia (Fig. 29): Generally typical of the group but with more diminutive ground plan; ductus bursae short (length only about one and one-half lamellal breadth); not as constricted toward lamellae as in most group members and with lamellae a conical shape. Signa single-pointed elongate spines.

Types
Holotype male (Fig. 72A), Bahand (= Wui-si = Weisi), Yunnan Province, China, January, 1917, CUVRAD. Allotype female (Fig. 72B), same data; both deposited NHM.

Distribution
Spatial (Fig. 95): Known only from the type locality.
Temporal: Known only from "January"

Remarks
The sexes of this species are associated by their near duplicate label data and under surface pattern. The date indicated for capture may be inaccurate, or refer to a date of purchase. Under surface markings in *A. prodiga* resembling *N. pratti* differ by highlighting of the dark basal disc with a prominent white mark at cell SC+R1 in the medial band.

Etymology
The Latin name means "extravagent" and refers to the prolific blue coloration which distinguishes the upper surface of both sexes in this species.

Ahlbergia **caesius** spec. nov.
Figs. 30, 73

Diagnosis
Extremely distinct - female resembling *A. chalybeia* above (grounds iridescent gray-blue except for forewing apex and submargins and hindwing margin respectively fuscous and black) but *A. pluto* below (with brown, irregularly bordered, basal disc and the limbal area suffused brown and bluish). Genitalia typical of *circe* Group, appearing somewhat like *A. prodiga* but with cephalic end of ductus bursae produced and terminal lamellae very conical and not convoluted beneath. To date the male is unknown.

Description
Male: Unknown.
Female: Head, thorax, abdomen, legs, palpi and frons typical for the genus. Upper Surface of the Wings: Apical and submarginal area of forewing dark fuscous; rest of forewing and entire hindwing (except chevron-shaped patches along hindwing margin) bright iridescent gray-blue. Hindwing with a wide marginal blue line bordering nearly black or charcoal-gray outer margin. Margins delicately crenate and fringed brown and white. Under Surface of the Wings: Forewing proxad of postmedian line warm brown with darker spots edged distally with white at distal end of the discal cell. Postmedian lines basally dark brown, centrally black and distally white broken into two planes - veins R2 to M3 and then distally veins M3 to CuA2. Distad this line the ground color is warmer brown with a broad terminal gray suffusion, first lighter, then darker toward a brown-fringed margin. Hindwing basal disc warm brown with sepia-hued postbasal and medial markings outstanding over the ground, latter forming darkened edge to basal disc followed distally with black and then a broader white band. Distad in postmedial areas ground lighter buff brown, suffused with darker browns and gray. Submargin showing broad terminal dark suffusion and gray overscaling along the entire margin and, proxad these, dark brown blotches in cells SC+R1 and M2 becoming larger and red-brown across the limbal area. Outer margins along limbal area moderately crenate; fringes brown. Length of Forewing: 15.0 mm (holotype); 12.0 mm (paratype).
Male Genitalia: Unknown.

Female Genitalia (Fig. 30): Generally typical of the group but, like *A. prodiga* with ductus bursae more diminutive; *A. caesius* with cephalic end of the ductus bursae somewhat produced and terminal lamellae more distinctly conical and lacking under surface convolutions; signa extremely small, slightly bifurcate spines.

Types
Holotype female (Fig. 73), Eastern Frontier of Tibet, 1906, P. DE JEAN.
Paratype. Tatsienlou (= Kangting), Szechwan Province, China 1910 (female); both deposited NHM.

Distribution
Spatial (Fig. 95): Presently known from extreme eastern Tibet and western Szechwan Province, China.
Temporal: Unknown.

Remarks
The odd combination of characters in this species further indicate the unexpected species diversity of Palaearctic *Ahlbergia*.

Etymology
The Latin name *caesius* means "blue-gray" and refers to the notable iridescent upper wing surfaces in this species.

Ahlbergia **l y n d a** spec. nov.
Figs. 31, 74

Diagnosis
A small species with unique characters of the wing and female genitalia. Single known specimen brown on wing upper surfaces with extensive violet iridescence along wingbase. On under surface, differing from the rest of the *circe* Group by hoary brown basal and postbasal patterns being more angulate, white suffusion bordering the entire crescent line and, in the limbal area, extensive mottled gray and blue-gray (like species of *pluto* Group) and with a *Thecla*-spot submarginad in cell CuA1. Female genitalia, though generally typifying *circe* Group, showing robust taper in both the anterior and posterior of ductus bursae, anterior with produced juncture to cervix bursae, posterior with very conical lamellae. Lamella postvaginalis complexly convoluted along outer edges, margin of the lamellae and ductus bursae showing a cephalic recurvature occurring only in certain distantly related Callophryina (for instance, Nearctic *Mitoura hesseli* RAWSON & ZIEGLER).

Description
Male: Unknown.
Female: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Margins and apices of warm brown suffused with sepia overcast; bases of wings suffused iridescent blue-violet. Margins of both wings crenate to serrate; anal lobe of hindwing prominent and markedly red-brown. Under Surface of the Wings: Ground color warm brown. Forewing with postmedian line from costa to vein CuA2, a bit displaced distally in cell M3, marked basally black to brown, distally suffused with blue. Ground color distad of postmedian line broadly suffused bluish. Hindwing ground color similar to forewing but lighter distad basal disc. Basal disc with two postbasal slashes, each distally brown and basally suffused with blue. Margin of basal disc very angulate and irregular, basally brown, distally suffused with blue and white scales. Submargins with a jagged arc of brown marks across the wing, each centrally brown, suffused distalled with blue and prominent white. Limbal area suffused brightly with blue and gray, submargin of cell CuA1 marked with notable *Thecla*-spot. Margin with wavy dark brown and black line; fringe brown.

Male Genitalia: Unknown.
Female Genitalia (Fig. 31): Generally typifying the *circe* Group but exhibiting some notable differences. Lamella postvaginalis hemispherical with slight caudal "knob" and concentric ventral fold beneath along out margin. Thickened ductus bursae caudally producing prominent antrum which extends to wide lips of the lamella antevaginalis. Ductus bursae flared caudally at antrum and with distal edges of lamellae somewhat recurved in a cephalic direction. Signa each short, nonfurcated spines.

Types
Holotype female (Fig. 74), Ta-tsien-Lou [= Kangting], Szechwan Province, China, 1910. Deposited NHM.

Distribution
Spatial (Fig. 95): The type locality is in extreme montane western Szechwan Province of China where it borders westward on Tibet.
Temporal: Unknown.

Remarks
A. lynda, like *A. prodiga* and *A. caesius*, is extremely distinctive, further attesting to the diversity of Palaearctic elfins.

Etymology
Patronym for LYNDA BECKER.

The *leechii* Species Group

This group includes two distinctive species of *Ahlbergia*, one of which is found south of the Himalayan rim in the Khasia Hills of Assam Province in northern India. The two are apparent sister species whose distribution has probably vicariated due to the Himalayan uplift. Among species in *Ahlbergia*, these two and the little known *A. haradai* of the *circe* Group appear to represent the only ancestral populations distributed southward enough to have a taxon now occurring south of the Himalayan rim. The *leechii* Group is undoubtedly the sister group of the highly derived *circe* Group; it retains recognizable aspects of the ground plan of *circe* Group taxa in the structural characters of both sexes. The remarkably blue upper surfaces, combined with the simple under surface *circe*-like pattern, make specimens of these two species easily recognizable. Compared to the often mottled under surface brown ground of the *circe* Group, brown coloration in the *leechii* Group is much denser and bolder with markings along the edges of the basal disc consequently appearing more bold and bandlike. Given the modern ecological transformation of the Assam region it is possible that *A. leechii* is now extinct or extremely limited in occurrence. The Khasia Hills region has long been noted for insular taxa in numerous insect groups.
In the dissertation version of this study I discussed the possible affinity of the *leechii* Group of *Ahlbergia* and the South American *Thecla* "*culminicola* Group" of DRAUDT (1919) (since described as the genus *Penaincisalia* by JOHNSON, 1990a). The latter is a high Andean elfin group often cited for its superficial resemblance to Nearctic and Palaearctic elfins. Morphological studies in the *Penaincisalia* revision, however, indicate that this is not the case. The sister group of *Penaincisalia* is other South American Eumaeini occurring at lower altitudes. The tailless and dully colored facies typifying elfins worldwide appear to be homoplesious.

Ahlbergia leechii (DE NICÉVILLE)
Figs. 32, 33, 75

Satsuma leechii DE NICÉVILLE, 1893, p.335 [described and figured but without name, DE NICÉVILLE, 1891]. EVANS, 1912, p. [3] 969.
Callophrys leechii: SWINHOE, 1910-1911, p.257.
[*Ginzia*] *leechii* (included *Satsuma* species): OKANO, 1941 [1946], p.239.
[*Ahlbergia*] *leechii* (included *Satsuma* species): BRYK, 1946, p.50.
[*Incisalia*] *leechii* (included *Satsuma* species): GILLHAM, 1956, p.145.
Ahlbergia leechii: BRIDGES, 1988a, I:193, II:4, III:23.

Diagnosis
Male and female both solid iridescent silvery blue on upper surface; under surface somewhat reminiscent of *A. circe* but, like group member *A. nicevillei* of China, with brown ground color much more solid, especially in the basal disc, and with surrounding margins of the disc bold and lineal. Compared to *A. nicevillei*, *A. leechii* shows a much darker basal disc (obscuring any postbasal markings), evidence of a white spot along the disc margin in cell SC+R1, and solid yellow-brown distal areas (not mottled as in *A. nicevillei*). Male genitalia widely ovate and thickly rimmed in the bilobed area, caudal extension lobate and somewhat recurved at the termini; female genitalia with rather straight, thin, ductus bursae terminated with trapezoidally shaped lamella postvaginalis lacking basal convolution.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Forewing apex, and submargins of hindwing, extremely dark black-brown contrasting bright, thickly scaled, iridescent silvery blue across rest of wing. Male androconial brand located distally in discal area. Under Surface of the Wings: Ground color yellow-brown somewhat suffused with darker brown. Forewing with postmedial line extending from costa to cell M3 or CuA1, colored basally dark brown, distally yellow and white. Hindwing with boldly colored, generally concolorous yellow-brown basal disc, no evidence of contrasting postbasal markings; disc margin with lineal marks of boldly contrasting brown, yellow and white, appearing bandlike against lighter distal ground and with SC+R1 spot often exaggerated. Distad ground of rather obsolescent light yellow-brown, with only a few darker brown mottled spots appearing across the limbal area. Length of Forewing: two specimens (NHM), 13.0 mm, 13.5 mm.
Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Similar to male but with iridescent blue more expansive and of darker hue and with brown submargin and apex of forewing more reduced. No scent brand. Hindwing with prominent black dashes surrounding margin and anal lobe and yellowish color framing a prominent central black dot in the anal lobe. Under Surface of the Wings: As on males. Length of Forewing: one specimen (NHM), 15.0 mm.
Male Genitalia (Fig. 32): Bilobed area of valvae ovate and thickly rimmed; caudal extensions lobate and uniquely recurvate in contrast to other group members. Saccus rather "funnel"-shaped; cornuti somewhat wider than in other group members.
Female Genitalia (Fig. 33): Lamella postvaginalis trapezoidal in shape, ductus bursae of rather even width until swollen just caudad of the cervix bursae; terminus of lamellae appearing somewhat caudally concave. Compared to somewhat similar *A. nicevillei*, length of ductus bursae nine times width, not six times as in latter taxon and with slight narrowing cephalad of the antrum; antrum widely flared from lamella antevaginalis. Signa nearly absent; present only as slight sclerotization on corpus bursae.

Types
The types are deposited in the NHM – one male and two females as syntypes from Jaintia Hills (= Khasia Hills) (SEITZ, 1906-1954) in Assam Province, north India, in 1901. I have designated

the specimen labelled "male type" as the lectotype, and the two other specimens as paralectotypes (NHM convention). Type Locality: The "Jaintia Hills" are located just south of Bhutan in the Indian state of Assam surrounding the town of Shillong.

Distribution
Spatial (Fig. 95): The only specimens known are labelled from the Jaintia Hills and Shillong, Assam Province, north India. No specimens are represented in the extensive BAILEY Collections from the Himalayas (NHM, AMNH). This may indicate the species is has a very limited range or that it is now extinct.

Remarks
I figure a Shillong (NHM) specimen (fig. 75B, under surface transposed from color slide) with upper surface (fig. 75A) adapted as a drawing from SEITZ (1921).

Ahlbergia nicevillei (LEECH)
Figs. 34, 35, 76

Satsuma nicevillei LEECH, 1893, p.355.
[*Ginzia*] *nicevillei* (included *Satsuma* species): OKANO, 1941 [1946], p.239.
[*Ahlbergia*] *nicevillei* (included *Satsuma* species): BRYK, 1946, p.50.
[*Incisalia*] *nicevillei* (included *Satsuma* species): GILLHAM, 1956, p.145.
Ahlbergia nicevillei: BRIDGES, 1988a, I:242, II:4, III:83.

Diagnosis
As noted above under *A. leechii*, it and the present species differ from *A. circe* in the solidness of under surface colors and the frequency of upper surface iridescent silvery blue. Compared to *A. leechii* on the upper surface, *A. nicevillei* has upper surface blue limited to patches. On the under surface, *A. nicevillei* displays mottled and contrasted under surface patterns – postbasal marks prominent in the basal disc, margin of the basal disc not boldly marked as a line and, in the distal area of the hindwing, an arc of dark brown blotches turning to generalized red-brown suffusion across the limbal area.

Description
Male: Head, thorax, abdomen, legs and palpi as typical of the genus. Upper Surface of the Wings: Wing above, except costa and submarginal area of forewing and submarginal and anal areas of the hindwing, bright silvery blue (heavy scales making blue colorations dense and lustrous). Obvious blue marginal line on hindwing, anal angle to vein CuA2. Male scent brand extensive. Wing margin nearly entire, boldly scaled white and black. Under Surface of the Wings: Ground color drab brown, sometimes with yellowish cast. Basal disc of hindwing darker, toward sepia; area above cephalic curvature of hindwing margin sometimes lighter. Forewing markings – postmedial line, costa to vein CuA2, faint to nearly absent, appearing as slightly deeper brown blotches; rest of wing nearly uniform brown. Hindwing with basal disc mottled deep brown, postbasal area with brownish black diagonal pastbasal slash proceeding from costa proxad to cell basad origin of vein M3; margin of basal disc faintly flecked black. Hindwing distal ground color mottled lighter, toward cinnamon, followed terminally by a jagged line of blotches and a crescent-line from vein RS to vein CuA1 followed in the limbal area by a generally redder-brown overcast forming a distinct drab brown limbal patch. Wing margin, vein CuA2 cephalad to base of forewing, alternating black and white on the veins and midveins respectively; white midveins become emphasized as crescents along the margin. Anal area basally red-brown; limbal coloration often suffused with gray. Length of Forewing: Three male specimens (NHM), mean 14.5 mm, range 14.0 mm to 15.0 mm.
Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: As on male, but with blue more extensive and submarginal brown more reduced;

lacking male scent brand distad in discal area. Under Surface of the Wings: As on male, but with blue more extensive and submarginal brown more reduced. Length of Forewing: Two female specimens (NHM), 15.0 mm, 15.5 mm.
Male Genitalia (Fig. 34): Caudal extension of valvae tapered; valval bilobes clear, of moderate width, oval and slightly indented; valvae in lateral view, "funnel"-shaped; saccus reduced and broadly parabolic, cornuti as illustrated.
Female Genitalia (Fig. 35): Lamella postvaginalis hemispherical; lamella antevaginalis narrow, without obvious convolutions or sclerotizations. Ductus bursae length six times width; signa very reduced, appearing as small singularly pointed spines.

Types
Two syntypes in NHM, both from Chang-yang (= Changyang), Hupeh Province, China, 6000 ft (= circa 2000m) by native collectors, 1888; other labels - LEECH collection, 1910-173; *Satsuma nicevillei* "a" and "b", one male and one female, respectively. I have designated the male (*Satsuma nicevillei* "a") as the lectotype (fig. 76AB) and the female (*Satsuma nicevillei* "b") as paralectotype, consistent with SOUTH's (1902) designation of these as "male" and "female" type, respectively, and have clearly labelled them as such.

Distribution
Spatial (Fig. 95): Known specimens represent two quite disjunct areas; Hupeh Provine in east central China and extreme western Yunnan Province (three specimens, Tzeku, NHM) montane west China.
Temporal: Unknown.

Remarks
I am considering the east central and western Chinese population, despite some wing pattern and genitalic differences to be conspecific, since the hiatus between these characters and those of *A. leechii* is quite distinctive. Four specimens of the six specimens in the NHM were dissected. Because of rarity, specimens were not available on loan for photographic purposes. I have photographed SEITZ's (1921) figure; it clearly shows the mottled patterns differentiating the species from *A. leechii*.

Additional localities (aside from types listed above)
China: Tzeku, Yunnan.

Novosatsuma gen. nov.
Figs. 36-47, 77-85

Lycaena (in part) [not FABRICIUS, 1807, p.285]: DE NICÉVILLE, 1891, p.374.
Thecla (in part) [not FABRICIUS, 1807, p.296]: PRATT, 1892, p.254. KIRBY, 1871, p.398.
Satsuma (in part) [not MURRAY, 1874, p.168]; MURRAY, 1874, p.168. SEITZ, 1921, p.263. OKAMOTO, 1923, p.68. MATSUMURA, 1929, p.23. SEOK, 1933, p.70; 1934, p.763; 1935, p.99; 1936, p.64. MORI, DOI & CHO, 1934, p.44. SEOK & NISHIMOTO, 1935, p.97. HAKU, 1936, p.117. ESAKI, 1939, p.219. SIBATANI, 1946, p.64. SCHWANWITSCH, 1948, p.256. MIYAHIMA, undated, p.175.
Callophrys (in part) [not BILLBERG, 1820, p.80]: SWINHOE, 1910-1911, p.257 (*Satsuma* = *Callophrys*, synonymy in error).
Ginzia (in part) [not OKANO, 1941, p.239]: OKANO, 1941, p.239. KORSCHUNOV, 1972, p.359.
Ginsia [sic] (in part) [= *Ginzia*, not OKANO, 1941,p.239]: KORSCHUNOV, 1972, p.359.
Ahlbergia (in part) [BRYK, 1946, p.50]: BRYK, 1946, p.50. KUROKO, 1957, p.98. KIM, 1961, p.278. SHIROZU & HARA, 1962, p.94.

Incisalia (in part) [not SCUDDER, 1872, p.52]: F. BROWN, 1947, p.21 (places all *Satsuma* s.l. with *Incisalia* in comment). GILLHAM, 1956, p.149 (*Satsuma* = *Incisalia*) (synonymies in error).

[*Novosatsuma*]: BRIDGES, 1988a, I:281 (non-binomial nomen nudum citation referring to JOHNSON, 1981 as published herein, in part).

Diagnosis

This includes a group of large taxa (FW 15.0-16.0 mm) readily distinguished in most species by bright blue wing upper surfaces in males (hitherto a character generally attributed to females of Palaearctic elfins, see Remarks). Under surfaces marked by concentrically jagged patterns of brown (quite like Nearctic *Incisalia*).

Structurally characterized by a combination of primitive configurations in the male and female genitalia marked by distinctive autapomorphies - robust male genitalia showing more structural innovation than those of plesiotypic taxa I place in *Cissatsuma* (see fig. 2 and generic key); female genitalia with robust, tubular, ductus bursae marked by a fluted terminal antrum usually showing a distinctive zone of transparent sclerotin (see fig. 3 and generic key). As noted below in Remarks, similarity of these configurations to those occurring in Nearctic *Incisalia* is compelling.

Description

Adult: Head with frons hairy but lacking scales of distinct coloration; compound eye lining white. Thorax and abdomen profusely hairy at junctures; taxa with iridescent upper wing surfaces often with these segments dully sheened silvery or dull blue. Palpi profusely scaled, with all segments robust, a few species with relative elongation of the second segment (as typifies more advanced genus *Ahlbergia*). Wings with forewing discal cell generally angulate, radial veins widely (sometimes irregularly) spaced along costal vein of discal cell and with vein M1 arched caudally toward wing margin from its abutment with discal cell apex (fig. 1). Male forewings with prominent scent brand (ellipsoid and generally elongate, extending along the distal one-fourth or one-fifth of the discal cell's costal vein and variously into the radials, depending on the species). Wing expanse large (forewing base/apex often exceeding 15 or 16 mm), hindwing always without tails and with the wing margins in many species markedly crenate. Wing upper surface ground colors in males of most species bright iridescent blue or violet, including the areas surrounding the forewing scent brand. Female upper surfaces variously blue, brown, or blue and brown. Wing under surfaces exhibiting concentric patterns of jagged bands (usually postbasal, medial, postmedial and/or submarginal), colored with hoary and mottled dark brown, red-brown or dark gray over white, gray or tawny grounds (see Remarks).

Male Tergal Morphology and Genitalia: Figs. 36-47 (as indicated). Compared to other Eumaeini, terminal tergites normal (lacking unusual sclerotal components, e.g. "sipc" sensu JOHNSON, 1990a, 1991a, b); ventrum of eighth tergite with thin bundles of brush organs loosely abutting the septa along the vincular dorsum of the genitalia, brush length rarely exceeding base of labides (most often shorter). Genitalia, compared to other Palaearctic elfins, typified by (1) valval bilobed configuration bulbously ovate, and often wide-rimmed, with thickly tapered caudal extensions and robust termini (similar to a condition described as "capped" [CLENCH, 1961] for Nearctic *Incisalia*); (2) aedeagus usually with length not much exceeding that of remaining genitalia (labides to saccus tip) by more than one-third, caecum generally comprising about two-fifths of aedeagal length, and terminal cornuti elongate and greatly serrate along their outer margins.

Female Tergal Morphology and Genitalia: Figs. 39-46B (as indicated). Compared to other Eumaeini, terminal tergites normal (lacking unusual sclerotal components, e.g. "sipc" sensu JOHNSON, 1990a, 1991a, b). Genitalia, compared to *Ahlbergia*, with ductus bursae robust but, differing from *Cissatsuma*, with terminus fluting to an antrumal configuration before the terminal lamellae (fig. 3). Depending on the species, antrum marked with a generally central zone of transparent sclerotin. Remaining genitalic details appearing autapomorphic with (1) signa of

corpus bursae often reduced to small broad-based spines; (2) ductus seminalis attached dorsally at cephalic base of ductus bursae through variously developed distal shields; (3) papillae anales located dorsad the lamella postvaginalis and, along terminal margin, profusely spined; cephalic apophyses usually extending at least one-half to one-third the length of ductus bursae.

Biology
Early Stages: Unknown.
Foodplants: Unknown but possibly coniferous (Pinaceae) usage (as in a morphologically similar Nearctic *Incisalia*).

Type species
Novosatsuma monstrabila, new species, designated because compelling wing and structural similarity to Nearctic *Incisalia eryphon* suggests it may most likely prove to be a Pinaceae feeder. I do not make the previously described congener, *Thecla pratti* LEECH, type because there is confusion in the literature concerning reported synonymy of this species (reported by two authors: HUANG 1943; CANTLIE 1963) with *Hypolycaena chandrana* MOORE, 1882 (Proc. zoo. Soc. London 1882:249, type deposition unreported). My reading of the original description of this latter species, and NHM historical identifications, do not support such synonymy, *H. chandrana* appearing clearly to belong to the non-callophryine genus *Sinthusa* (as also noted by BRIDGES, 1988a).

Distribution
Spatial (Fig. 96): Taxa of *Novosatsuma* are generally distributed across China (including central and eastern Tibet and Mongolia) to the Amur regions of the U.S.R. and northwest Korea (Manchuria). They seem to be absent from the lowlands of southeastern China and most taxa are from montane localities. Temporal: Known from May to July. Endemism: Except for *N. collosa*, distributed almost exclusively in the southwestern area of "nuclear" China and immediately adjoining areas (fig. 98). The "Yunnan Plateau" and its belt of coniferous forest extending somewhat northward includes four endemics (*N. magnasuffusa*, *magnapurpurea*, *oppocoenosa*, *cibdela*). A fifth species occurs only on the "Yunnan Plateau" and eastward to the "Central Mountain Belt" (*N. pratti*) and another (*N. plumbagina*) is known only from the coniferous forest area of the northern "Central Mountain Belt" Isolate endemics include *N. collosa* of the northern China Nan Shan mountains, *N. monstrabila* of the northern Chindwin River region of Burma, and *N. matusiki* of the Kun Lan Shan mountains of northern Tibet.

Remarks
Presence of concolorous blue upper surfaces in males of this genus sets it readily apart from other Palaearctic elfins. Most blue males of *Novosatsuma* have historically been identified as females of various "*Satsuma*" species based on traditional views of sexual dimorphism in the group (LEECH, 1893-94; GILLHAM, 1956).
Novosatsuma is a large group with diverse structural characters that are in some cases highly autapomorphic. As anticipated, the morphology of this group is complex compared to the relatively primitive structures in *Cissatsuma*. Compared to the latter genus, female genitalia of *Novosatsuma* have more sculptured ductal structures ductal tube more elongate, fluted variously to a terminal antrum, and with lamellae more prominent and distally expansive. This kind of overall female genital configuration resembles structures in conifer-feeding Nearctic *Incisalia*, species of which show a distinctively fluted antrumal configuration and varying degrees of transparent sclerotin separating the ductus and lamellae. Male genitalia in *Novosatsuma* are robust, as in *Cissatsuma*, but with particularly elements (like valvae and saccus) more elongate and structurally complex. The robust and elongate valval caudal extensions, tapering from robust (and often shouldered) bilobes, resemble conifer-feeding Nearctic *Incisalia*. Although *Novosatsuma* species are structurally innovative compared to the Palaearctic elfins described in the new genus *Cissatsuma* below, structural diversity in *Novosatsuma* in no way approachs that in *Ahlbergia*. This latter, greatly diverse, group of generally smaller elfins

(FW 11.0-15.0 mm) shows a myriad of variations in the ductul and lamellal structures of females and the sclerotal innovations and additional components of male valvae and vincula.
I was very surprised to discover the various species of *Novosatsuma*. They stood out easily by their brilliant blue upper surfaces and male forewing brands. It appeared peculiar that no one had noticed these taxa before, all specimens of which were identified as females. Several of the brightly blue males had been included as females in syntype series of previously described *Satsuma*. Even though their forewing androconial brands made them easily identifiable as males, the assumption by early workers that only females of the Old World elfins had upper surface blue must have been overwhelmingly compelling.
The new taxa described here in *Novosatsuma* derive mostly from uncurated and undetermined materials at the NHM, MNHN and FMNH. Some of this material appears to have originated from the same early collections with individual specimens subsequently sold off in smaller lots to various dealers and institutions. It is highly likely that additional material of these species will be found in other historical samples at institutions I have not visited.
The number of these new species of Palaearctic elfins will doubtlessly surprise most lepidopterists. Formerly, Palaearctic elfins have been considered a small group of taxa, scarcely as diverse as their Nearctic counterparts. Actually, the reverse appears to be true. Unfortunately, given the overwhelming ecological changes affecting western China over the last half-century, it appears uncertain how many of these species can now be collected in nature.
Diversity in Palaearctic elfins also comments on the relative amount of time these groups have been resident in eastern Asia. Though diversity of elfins within the "nuclear" Chinese region appears astounding, it is equally unusual that only a few species occur outside of this region, whether in "Near Eastern" regions of the U.S.R., west of the Tien Shan, or south of the Himalayan rim in India.
Since only one of nine *Novosatsuma* species has been previously described, the following diagnostic footnote may further facilitate recognition of this group (particularly since there may still be undescribed members) – any Palaearctic hairstreak with forewing expanse of 15 mm or more, with markedly mottled under surface pattern and males densely iridescent blue over most of the upper surface (including the area of the scent brands) is most likely a species of *Novosatsuma*. Further, females associable with these outstandingly handsome males are also most likely bright blue on the wing upper surfaces. Such specimens should be dissected with great interest to determine their species and generic affinities.

Etymology
The latin prefix *Novo*, meaning "most advanced", "newest" or "most recent" refers to the apomorphic nature of this genus and is attached to *Satsuma*. The latter, invalid, name was used for many years to refer to all the Old World elfins. The gender is considered feminine.

Species groups

The genus is readily divided into two groups of species relative to apomorphies. The first group, the "*pratti* Group", includes the taxa *N. collosa*, *N. matusiki*, *N. magnasuffusa* and *N. pratti*. These are the species which lack prominent upper surface structural colors. Species with marked upper surface iridescence comprise a second, "*monstrabila* Group", in which are included *N. oppocoenosa*, *N. magnapurpurea*, *N. cibdela* and *N. monstrabila*. In addition, the group position of *N. plumbagina* is deemed tentative and placed by structural affinity with *N. pratti* (see below). It should be mentioned that because taxa in *Novosatsuma* are sometimes represented by small samples, it is possible that some might be considered as subspecies. However, given the paucity in some distribution records, there are no objective criteria for determining such a status. In the Nearctic *Incisalia* such a status is often determined by evaluation of homogeneity of structural characters and allopatry. I have used these criteria in some of the taxa of Palaearctic *Ahlbergia* and also use it when treating Neotropical *Cyanophrys*.

The *pratti* Species Group

Members of this group lack prominent structural coloration (with one exception) and are morphologically primitive compared to members of the "*monstrabila* Group"

Novosatsuma **c o l l o s a** spec. nov.
Figs. 36, 77

Diagnosis
Larger than any other Palaearctic elfin - forewing base/apex 16.5 mm. Reminiscent of familiar species *N. pratti*, but instead of being black above (suffused with steel blue or green), fully auburn brown and lacking hindwing crenation along the anal angle. Under surface pattern heavily mottled dark brown over yellow-brown (*N. pratti* mottled blackish over gray) and with no white lines costad vein M3 on the forewing or caudad vein RS on the hindwing as typify the latter congener.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Light auburn brown throughout; scent brand located distally in discal cell. Forewing with margins moderately crenate but hindwing only slightly crenate after vein M3. Under Surface of the Wings: Forewings warm yellow-brown, increasingly yellowish distad the brown postmedial line connecting costa and vein CuA1. At wing base ground suffused darker brown to sepia; discal cell with prominent dark slash along distal edge. Margins suffused darkly, matching the darker hindwing ground. Hindwing entirely dark brown, suffused with black flecks. An outstanding white marking stretches across the cell between veins SC+R1 and RS and from the anal margins to vein 3A. Length of Forewing: 16.5 mm (holotype) [the hindwing is distinctively expansive, 16.0 mm from base of discal cell to distal end of vein CuA1].
Female: Unknown.
Male Genitalia (Fig. 36): Resembling *N. pratti* but margin of valval bilobes narrowly rimmed and ovate, not of moderate to wide width and shouldered. Caudal extension of valvae nearly straight, not shouldered as on *N. pratti*. Valvae, lateral view, with edge quite incised; saccus "funnel"-shaped; cornuti spatulate to moderately wide.
Female Genitalia: Unknown.

Type
Holotype male (Fig. 77), Saio-Hou (= Siho, with suffix, or Suio-ho) Kansu Province, China, by native collectors, 1896, deposited NHM (see Remarks).

Distribution
Spatial (Fig. 96): Known only from type locality.
Temporal: Unknown.

Remarks
As also noted under the unusual species *Cissatsuma kansuensis*, the type locality of this species is north of the Nan Shan mountain region in China opposite the southern border of Mongolia. The citation "ho" refers to "river" (SPENCER, 1972) and here represents a northern drainage out of the Nan Shan near what is modern day Yumen, China. This area characterizes an interdigiation of upland alpine flora and lowland swamp. This area is poorly known biologically (SPENCER, 1972) and quite disjunct from the areas of China attributed to most elfins. Some of the specimens from this region note collection near the Great Wall. The Great Wall reaches its northwest extreme, and terminates, along the Ochina Ho [River] east of Yumen. There is a six year difference between the collection dates of this species and those of *C. kansuensis*. It appears likely that these old specimens were collected by early visitors who penetrated the

region along the path afforded by the old wall and the remains of its associated roads and trails. I know of no modern specimens from the region.

Etymology
The Latin name (from *collos* meaning collosal) refers to the size of this species, the largest of the "elfins" from Asia.

Novosatsuma **matusiki** spec. nov.
Figs. 37, 78

Diagnosis
Large (forewings, base/apex 16.0 mm) with extremely prominent hindwing anal lobe. Brown on upper surface like *N. collosa* and *N. magnasuffusa*, sharing with the latter a warm mottled brown under surface habitus. Not boldly banded with patches of deep brown or grayish, however, as in *N. magnasuffusa* (see below); rather with distinctive patched pattern – hindwing with (1) brown medial band crossing basal disc, (2) large mottled brown costal patch from discal cell through cells RS and M1, and (3) prominent gray-white suffusion (to 2 mm wide) along anal margin (gray suffusion repeated along forewing costa). (*N. magnasuffusa* pattern is concentricly banded, most notably with three postbasal slashes crossing the postbasal area). Genitalia with distinctive conical shape along the valval caudal extensions and prominent microtrichia abutting the juncture of these with the valval bilobes.

Description
Male: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Ground color brown with no other marks apparent; scent brand in discal area of discal cell. Hindwings with margin not markedly crenate. Under Surface of Wings: Ground various shades of warm brown. Forewing with gray marginal hue and broken postmedian bands formed by a black mark near costa followed caudally by a lighter brown line to cell CuA1; apex suffused with gray-white. Hindwing pattern dominated by jagged brown medial band crossing the basal disc, dark brown crenate marginal blotches and, prominently, (a) mottled brown costal wing patch from discal cell through cells RS and M1 and (b) wide (to 2 mm) gray-white suffusion along anal margin and costad along limbal area. Length of Forewing: 16.0 mm (holotype).
Female: Unknown.
Male Genitalia (Fig. 37): Valval bilobes parabolic and of moderate width, bilobed configuration comprising less than a third of entire valval length. Juncture of bilobed configuration and caudal extensions with dense microtrichia and caudal extension distinctly conical; saccus slightly "funnel"-shaped. Aedeagus terminus with cornuti spatulate, serrate along their margins.
Female Genitalia: Unknown.

Type
Holotype male (Fig. 78), "Muli", "Tibet", taken as Mali (= Mahai) Tibet, 8850 ft. altitude, 7 April [no year provided] (see Remarks), deposited FMNH.

Distribution
Spatial (Fig. 96): Known only from a northern Tibetan locality construed by transliteration and the proximity of nearby locales represented in specimens by the same collectors (see Remarks).
Temporal: Known only from April type data.

Remarks
DAVID MATUSIK (FMNH) located small samples of Palaearctic elfins apparently representing a cluster of localities mutually traceable to north Tibet. Two new taxa were represented (see also *Ahlbergia pictila*) and additional specimens of a subspecies of *Ahlbergia circe* (LEECH)

(*A. c. montevaga*, see *Ahlbergia*), known previously from a small northern Tibetan sample at the NHM.

Etymology
The species is named for lepidopterist DAVID MATUSIK, who discovered the type in a search of Field Museum of Natural History material.

Novosatsuma **m a g n a s u f f u s a** spec. nov.
Figs. 38, 79

Diagnosis
Large (to 16.0 mm) with markedly dentate wing margins. Upper surface brown as in *N. colossa* and *N. matusiki* (*N. colossa* distinctive in under surface resemblance to *N. pratti*). Differing from *N. matusiki* in under surface wing pattern and genitalia as follows. Wing bands concentric with postbasal area showing an additional band formed by conjoined postbasal slashes (*N. matusiki* with postbasal area vacant and hindwing pattern dominated by a brown medial band, mottled costal patch and profuse gray along anal margin. Genital valvae with greatly shouldered caudal extension protruding from an ovate, wide-rimmed, bilobed area. Because of concentric under surface markings *N. magnasuffusa* requires distinction from a noncongener species of about equal size - *Cissatsuma halosa* (male, female FW lengths, 14.0-16.0 mm). Generic structural differences readily separate these species but so do general wing shapes (known specimens of *N. magnasuffusa* with ratio of wing length to wing width [distal end of margin caudad vein 2A to vein R4] = 1.36; similar ratio in three males of *C. halosa* = 1.63) giving *N. magnasuffusa* "broad-winged" appearance typical of other *Novosatsuma* taxa.

Description
Male: Head, thorax, adbomen, legs and palpi typical of the genus. Upper Surface of the Wings: Ground uniformly dark brown; forewing with scent brand in distal area of discal cell. Margins of the wings prominently crenate; fringes brown with slight grayish tints. Under Surface of the Wings: Forewing ground color heavily suffused warm brown on top of a paler basal ground and with a wavy postmedial line extending along apex from costa to cell CuA2 (basally deep brown to black, distally faintly white). Discal cell with light slash marking at its distal end and margins of wings with thin, slightly darker brown, band faintly edged with gray between the veins. Hindwing ground lighter beige brown, suffused brownish to black toward the base; margin of basal disc with prominent band, deep brown basally, faintly black centrally and white distally (especially toward anal margin to vein 2A). Basal disc with two prominent postbasal slashes broadly colored brown distally and flecked with white along the base; a third postbasal spot also present, lighter brown but flecked basally with white. The distal area of hindwing with lighter beige ground, crossed by a submarginal band of dark brown crescents offset by parallel dark brown crenate mark at the margin. Length of Forewing: 15 mm (holotype).
Female: Unknown.
Male Genitalia (Fig. 38): Most similar to *N. pratti* and *N. collosa* with valval bilobes extremely wide-rimmed and shouldered; valvae, in lateral view, "funnel"-shaped with a peculiar irregular shape between the dorsal and ventral articulation of valvae to vinculum; valvae with caudal extensions markedly shouldered; saccus "funnel"-shaped; cornuti spatulate with serrations along the terminal margins.
Female Genitalia: Unknown.

Types
Holotype male (Fig. 79), "Chow-pin-sa" [= two adjoining cities in Yunnan Province, China: Chao and Pincha], "M and J" (meaning unknown, possibly "May and June"); deposited NHM.
Paratypes (2). NHM, same data as primary type (two males).

Distribution
Spatial (Fig. 96): Known only from the type locality.
Temporal: Perhaps May and June (if part of label reading "M and J", in fact, indicates this).

Remarks
The female of *N. magnasuffusa* is unknown but would likely prove very useful in further separating it from *Cissatsuma* species *C. tuba* and *C. halosa*, both of which evidence a long, tubular ductus bursae. From the male genitalia of *N. magnasuffusa*, which place it in the *pratti* Group, one would expect its female genitalia to resemble other species of the group. However, given the species diversity of *Novosatsuma*, it is possible that these genital characteristics might be autapomorphic.

Etymology
The name is a combination of Latin roots referring to "large" (*magna*) and "brown" (*suffusa*) and indicates the broad-winged configuration and coloration typical of this species and the species group.

Novosatsuma **plumbagina** spec. nov.
Figs. 39, 80

Thecla pratti: LEECH, 1889, p.110 (in part, misidentification of syntype).
Satsuma pratti: LEECH, 1893-94, p.355. SOUTH, 1902: p.140 (in part, misidentification of syntype).

Diagnosis
Easily distinguished by the combination of upper surface and under surface fascies: latter similar to *N. pratti* (though with ground color graphite black and pattern elements cream) and upper surface bright silvery blue, not black (suffused steel blue or green) as in *N. pratti*. Additional details differing from *N. pratti* include: margins of upper surface silver blue meeting submarginal black on hindwing with smooth, entire, edge (deeply crenate in *pratti*); under surface pattern of deep charcoal or graphite-like black (warm brown in *pratti*). Female genitalia most similar to *N. pratti* but with (1) ductus bursae shorter (breadth of the lamellae nearly equalling length of ductus bursae from base of antrum (pratti ductus nearly twice as long) and (2) antrum widely flared to expansive lamella antevaginalis, latter with sclerotized plates covering the ventral surface (*pratti* lamella antevaginalis diminutive).

Description
Male: Unknown.
Female: Head, thorax, abdomen, legs, palpi and frons as typical of genus. Upper Surface of the Wings: Submarginal to apical areas of forewing, and slash at distal end of discal cell, black. Forewing discal and basal areas and all but terminal area of hindwing shiny iridescent silvery blue. Margins of hindwings deep charcoal to black, with juncture of iridescent blue and marginal black adrupt. Outer margin with a thin blue line from anal angle to vein M2 or M3; wing edges deeply crenate from vein CuA1 costad. Under Surface of the Wings: Ground color contrasted dark gray, charcoal and black. Hindwing basal disc and forewing area basad postmedial line darkest, with basal discs also heavily suffused with brown. Forewing postmedial line undulate from costa to vein CuA2, colored brownish basally, black centrally and white along distal edge. Discal cell with dark distal blackish brown spot. Hindwing with basal disc charcoal gray suffused heavily with dismal brown. Basal disc margins edged slightly white. Areas from anal margin to vein 2A, and from veins SC+R1 to RS, marked with prominent white to yellowish white line. Limbal areas mottled with alternating dismal brown and pale gray; wing margins and fringe black. Length of Forewing: 16.0 mm (holotype).
Male Genitalia: Unknown.

Female Genitalia (Fig. 39): Overall configuration unique; ductus bursae short (length nearly same as lamella breadth). Antrum extremely flared distally to prominent lamella antevaginalis. Ventral surface of lamella antevaginalis with large, distal sclerotized plates (generally autapomorphic for Callophryina); signa small and bifurcate.

Type
Holotype female (Fig. 80), "Chia-kou-ho" (= Chia Ho, river basin), northern Hupeh and southern Shensi provinces, China, 1700 ft., A. E. PRATT, collector, July, 1889 (label usage of "kou" typical of NHM as noted in entries above). Other labels: "cotype female LEECH; LEECH Collection 1901-173. *Satsuma pratti*" (see below in Remarks). Deposition NHM.

Distribution
Spatial: Fig. 96. Known only from the type locality.
Temporal: Known only from July.

Remarks
The holotype of this species was included by LEECH in his "cotype" series of *N. pratti*. It is among the specimens noted by him as taken in the "Kuikiang" region that looked "different" There is a large region, noted for gorges and lakes in northern Hupeh and southern Shensi provinces. Many geographic names in this region are based on the root "Kiang" (see the Remarks under *N. pratti*). All of LEECH's *N. pratti* specimens are from this region, except those mentioned from Foochow (= Fouchau), southern Manchuria; the type of *N. plumbagina* is from about 400 km northwest of the latter southern Manchurian locale.

Etymology
The species name (Latin, *plumba*) means "lead-like", referring to the dark charcoal and black colorations which characterize the under surface of the wings.

Novosatsuma pratti (LEECH) comb. nov.
Figs. 40, 41, 81

Thecla pratti LEECH, 1889, p.110, pl.7, f.4 (in part, see *N. plumbagina*).
Satsuma pratti: LEECH 1983-94, p.354 (in part, see above). SEITZ, 1921, p.264, pl. 72, fig.f.
Satsuma taxon *pratti*: SOUTH, 1902, p.140 (misidentified in part, see *N. plumbagina*).
[*Callophrys*] *pratti* (included *Satsuma* as synonym of *Callophrys*, in error): SWINHOE, 1910-11, p.257.
Thecla pratti: PRATT, 1892, p.254 (misidentified in part, see *N. plumbagina*).
[*Ginzia*] *pratti* (included *Satsuma* species): OKANO, 1941, p.239.
[*Ahlbergia*] *pratti* (included *Satsuma* species): BRYK, 1946, p.50.
[*Incisalia*] *pratti* (included *Satsuma* species): GILLHAM, 1956, p.145, 149.
[*Callophrys*] *pratti*: BRIDGES, 1988a, I:281, II:19, III:82 (removed from *Ahlbergia* because of inavailability of JOHNSON, 1981, generic names).
[*Novosatsuma*] *pratti*: BRIDGES, 1988a, I:281 (non-binomial nomen nudum citation of generic name, referring to JOHNSON, 1981, as published herein, in part) (see generic Type Species and Remarks hereunder regarding historical confusion with *Sinthusa chandrana* (MOORE)).

Diagnosis
Recognized by distinctive upper surface coloration – blackish (suffused or flecked steel blue to greenish in males, dull grayish blue in females) and an under surface mottled in deep brown and black with outstanding white hindwing lines from (1) anal margin to vein 2A and (2)

between veins SC+R1 to M1. In addition, white spots occur in and along the margin of the basal disc (varying in intensity between individual specimens).

Description

Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground colors blackish, flecked or hued dull steel blue or bluish-green. Distal areas of discal cells with scent brand. Margin of both wings notably crenate, heavy with black fringe. Margins with bright bluish outline along the outer angles of the hindwing from anal lobe to CuA2. Under Surface of the Wings: Forewing dark rich brown, heavily suffused with black toward the bases and occasionally lighter gray-brown distally (depending on individual specimens). Discal cell with prominent blackish brown distal blotch. Postmedial line from costa to vein CuA1 (or sometimes CuA2) wavy, deep brown basad, widely white distad. Distal areas of wings with ground color lighter brown to red-brown and suffused with gray along the subapex. Margin blackish, fringe suffused brownish and black. Hindwing with basal disc deep rich brown, heavily suffused with dark overscaling. Distal margin of basal disc lined with white, emphatic between the anal margin and vein 2A and between veins SC+R1 to M1 (sometimes to M2). Basal disc sometimes with white occurring centrally and along the outer edges. Ground color distad basal disc lighter brown, prominently mottled and with an exaggerated line of crescent markings along the margin heavily suffused with brown. Outer margin flecked with gray, particularly in the limbal area. Fringes black. Length of Forewing: mean of 9 specimens (NHM, AMNH) 15.5 mm, range 14.5 mm to 16.0 mm.

Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Apex and submarginal area of forewings, and submarginal area of hindwings, dark brownish-black. Remaining area of wing dull grayish-blue variously suffused with black. Under Surface of the Wings: similar to the male. Length of Forewing: mean of 6 specimens (NHM, AMNH, MNHN) 16.0 mm, range 15.0 mm to 16.5 mm.

Male Genitalia (Fig. 40): Valval bilobes of moderate width with a lateral shoulder and a basal indentation; valvae, in lateral view, somewhat "funnel"-shaped; valve caudal extensions shouldered; saccus broadly parabolic; cornuti spatulate, serrated along terminal edges.

Female Genitalia (Fig. 41): Ductus bursae moderately elongate (width of lamellae three-fourths length of ductus bursae); lamella postvaginalis convoluted on ventral surface with two to three folds; lamella antevaginalis narrow (some one-half width of ductus bursae), slightly flared cephalad from the antrum; signa small, not bifurcate.

Types

The "cotype" series of LEECH is in the NHM. Problems concerning it, however, were not resolved with the type list by SOUTH (1902). LEECH's description mentions a male and female specifically, along with four specimens from the same region, that looked "different" He also says that specimens were taken at another locality - "Foochow" All of these individuals would merit the status of syntypes. The last-mentioned specimens (Foochow = Fuchau) have not been located, though the remaining syntypes are all extant at the NHM. Unfortunately, it is not known if Fuchau specimens were given LEECH labels and letter designations when the original curations of syntype specimens were performed by NHM staff; if so, the specimens were not found by SOUTH when he published his list. The specimen chosen by SOUTH as "type male" of *S. pratti* (labelled but not specified "lectotype") is not the male of the two specimens listed specifically by LEECH (i.e. of Chang Yang, July 1888, labelled "b" later by NHM staff). Rather, it is a male from Ichang, June 1888, leg. Mrs. PRATT, that SOUTH placed in the type collection, along with the female from Chang Yang. The remaining four specimens LEECH listed were located at the NHM: three from Chang Yang (males), one from Chia-kou-ho (female). These all bear LEECH cotype labels. However, as noted under *N. plumbagina*, the latter female is not conspecific with the Chang Yang female specifically referred to by LEECH. It has been made the holotype of *N. plumbagina* (see Remarks under that species). To resolve the problems of the *S. pratti* syntypes, I have designated the one female specimen (labelled Chang Yang, A. E. PRATT Collection, July 1888, LEECH Collection, 1901-173, *Satsuma pratti* "b") as the lectotype

(fig. 81AB). It is a specimen specifically listed by LEECH, chosen by SOUTH, and also distinguishes the species from *N. plumbagina*. This specimen has been marked as the lectotype with a label referring to the present revision. It appears probable that this specimen was the one illustrated by SEITZ (1921); not only is there little difference in wing pattern, SEITZ' figure (departing from all his others) is a female. All remaining specimens, from Chang Yang and Ichang, have been designated paralectotypes and marked with a paralectotype label in the NHM collection. Type Locality: Chang Yang, Yunnan Province, China.

Distribution
Spatial (Fig. 96): The species appears widely distributed from eastern Chamdo and the eastern Tibetan plateau (Ta-tsien-lou; Frontier of Tibet; Yaan, China) northeastward through central China (Yunnan to Hupeh and Hunan Provinces) to [if LEECH's unlocated specimens were identified accurately by him] southern Manchuria in the region west of Korea. Authenticity of the latter specimens is important regarding summarizing the distribution of *Novosatsuma*. As typical of a plesiotypic group, members of this genus (contrasting most groups of *Ahlbergia*) occur not only on the "Yunnan" and "Tibetan" plateaus, but also extend eastward the the "Central Mountain Belt" of China (fig. 98). It appears likely that LEECH's unlocated material was authentic in locality data since *N. collosa* occurs at the extreme north of the "Montane Coniferous Forest" extending north from the "Yunnan Plateau" and *N. plumbagina* occurs in the Yunnan area of endemism.
Temporal: All known specimens are from July.

Remarks
Nearly all the specimens in the NHM were dissected, along with representatives from the AMNH and NMNH, totalling fourteen specimens. Compared to all other congeners, *N. pratti* is undoubtedly the most well represented in collections. Therefore, it is likely that the species occurs in collections not examined in this study. Such specimens should be identifiable with ease, since the species is very distinctive (fortunate because I have not had specimens in hand to upgrade deteriorated photographs). I figure the species based on SEITZ's (1921) illustration likely showing the NHM lectotype and a variation of this rendering depicting the darker wing pattern typifying many specimens of the species (emphasizing the bold hindwing SC+R1 and anal margin spots compared to the rest of the medial line). Considering that *N. pratti* is widespread in older samples, it is likely to be still collectable in contemporaneous China. As noted under the generic Type Species entry, some early writers confused this species with *Sinthusa chandrana* (MOORE) a non-callophryine.

Additional localities (aside from types listed above)
China: Frontier of Tibet, Loutsechiang, Tatsienlu, Yachow, Yunnan (NHM); Frontiere d'Tibet [these and some specimens labeled also "Le Tibet, encaisseur indigene" are taken to mean western China, as noted under *Ahlbergia circe*] (MNHN).

The *monstrabila* Species Group

Members of this species group exhibit prominent upper surface structural color and are construed as morphologically more derived than members of the *pratti* Group. In addition some species exhibit uncanny under surface similarity to species of Nearctic *Incisalia*. Females are known in more of the species and genitalia of both sexes suggest a sister group relationship between *Incisalia* and *Novosatsuma*. Four new species are included.

Novosatsuma **oppocoenosa** spec. nov.
Figs. 42, 43, 82

Diagnosis
Like other species in this species group, showing prominent upper surface structural color. Within group most similar to *N. magnapurpurea*, both having structural colors limited to distinctive basal and medial patches (in *N. oppocoenosa* deep azure blue confined to patches proxad cell CuA1 and cell CuA2 on the forewing and in discal and anal areas of the hindwing, in *N. magnapurpurea* generally distributed across basal and medial areas). Wing under surfaces of *N. oppocoenosa* with hindwing basal disc deep brown suffused with black, limbal area suffused red brown (*N. magnapurpurea* with basal disc and limbal area uniformly dull brown). In the genitalia, valval caudal extension in *N. oppocoenosa* is more elongately tapered and terminally pointed than in any other group member.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Forewing ground dull brown except for prominent azure blue proxad in cells CuA1 and CuA2. Hindwing dull brown with azure blue in the discal and anal areas. Forewing with scent brand in distal area of discal cell. Under Surface of the Wings: Both wings ground color dull cinnamon brown. Forewing with dark brown spot at distal end of discal cell and an irregular postmedial line of spots bent noticeably distad at cell M3 to vein CuA2. Submarginal line limited to obscure dusting of brown between the veins. Hindwing with basal disc mottled contrastingly dark brown and warmer cinnamon brown, becoming extremely dark and flecked with black along the inner margin and between the central postbasal area and the disc margin. Distal area of wing uniform dull brown but with limbal area reddish brown to sienna. Margins flecked blackish; fringe black. Length of Forewing: 15.0 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Similar to male but lacking scent brand. Under Surface of the Wings: Similar to males.
Male Genitalia (Fig. 42): Similar to *N. magnapurpurea* but bilobed areas ovate, not widely shouldered, and with caudal extension gradually tapered, not widely lobate and then steeply terminating as in former taxon. Valvae laterally tapered, not "funnel"-shaped as in *N. magnapurpurea*; aedeagus with cornuti less serrate than in latter species.
Female Genitalia (Fig. 43): Somewhat similar to the configurations in Nearctic *Incisalia lanoriaeensis* with lamella postvaginalis widely hemisperhical and distally expansive from ductus bursae terminus; lamella antevaginalis diminutive. Ductus bursae with somewhat transparent sclerotizations cephalad the antrum, invaded by darker sclerotization laterally along the edge of the ductal tube. Signa two pronged spines, one slightly shorter than the other.

Type
Holotype male (Fig. 82A), "Ta-Ho", "Tibet" [Ta-ho = Tae-Ho River and basin, today near the border of Szechwan and Tsinghai provinces, China] 1895, also with labels "to Printemps" "from native collectors"; deposited NHM. Allotype female (Fig. 82B), Tali Haut, Yunnan, China, deposited MNHN.
Paratype (1). MNHN: Tzeku, Yunnan (one male).

Distribution
Spatial (Fig. 96): Known from the contiguous Tibetan plateau region eastward to Yunnan Province, China.
Temporal: Unknown.

Remarks
The allotype was discovered in 1983; its genitalic similarity to Nearctic *Incisalia* further suggests the immediate sister group relationship between *Novosatsuma* and *Incisalia* discussed previously (generic Remarks under *Novosatsuma*). Both species also have under

surface patterns formed more by bands than patches. Structural color in other taxa of the group, *N. cibdela* and *N. monstrabila*, is generalized across the wings and silver blue.

Etymology
The name combines the Latin root *oppo*, meaning "opposing", and *coeno*, meaning "muddy", referring to the contrasting deep brown and lighter brown markings characterizing the under surface.

Novosatsuma **magnapurpurea** spec. nov.
Figs. 44, 45, 83

Diagnosis
As noted in the Diagnosis above, the male and female are both recognized by the deep purplish upper surface iridescence (occurring across the forewing basal area and hindwing basal and discal areas) and the dull brown under surface lacking contrasting markings and any pattern elements in the limbal area. Male genitalia with outstanding shouldered configuration to the bilobes followed by lobate caudal extensions abruptly tapered at their termini. Female genitalia similar to *N. oppocoenosa* and Nearctic *Incisalia* but differing by relatively shorter length of the ductus bursae.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Ground colors dull brown except for forewing basal area (including area immediately proxad scent brand) and hindwing basal to discal areas which are marked with dull purple iridescent coloration. Distal areas of discal cell with scent brand. Under Surface of the Wings: forewings entirely dull gray brown and without a postmedial line except for slightly dark brown slash at area of vein R2 and faint submarginal suffusion. Hindwing entirely dull brown except for light submarginal crescent line and darkening between the veins along the margin. Fringes dull brown. Length of Forewing: 15.0 mm (holotype).
Female: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of Wings: Marked similar to males, but without scent brand and with iridescent color duller. Under Surface of Wings: Marked similar to the males. Length of Forewing: 15.5 mm (allotype).
Male Genitalia (Fig. 44): Valval bilobes wide-rimmed, greatly shouldered along the lateral margin and basally indented; valvae, lateral view, "funnel"-shaped. Caudal extension extremely lobate near the bilobed area, then abruptly tapered at the terminus. Saccus, parabolic; cornuti rather wide and greatly serrate along the outer margins.
Female Genitalia (Fig. 45): Similar to *N. oppocoenosa* compared to other Palaearctic elfins but with ductus bursae relatively shorter and thinner and with lamellae widely opened terminally (in goblet-like fashion), extension of postvaginal lobes exceeding antevaginal rim by about two-thirds; antrum prominent, with transparent central area comprising about two-fifths of ductal length. Signa widely bifurcate spines.

Types
Holotype male (Fig. 83), "Yatsu to Yalung R." [river?], Szechwan Province, China, 30 April 1929, KELLEY-ROOSEVELT Expedition; deposited in NHM. Allotype female, same data as primary type, deposited MNHN.
Paratype (1). FMNH: same data as primary type (one male).

Distribution
Spatial (Fig. 96): Known only from the type specimens in montane regions of Szechwan Province, China.
Temporal: Known only from April.

Remarks
As noted in the Remarks under the generic entry, it is apparent from the data on the type series that specimens from the KELLEY-ROOSEVELT Expedition were sold off in small lots, some of which were eventually given to at least three museums - NHM, MNHN and FMNH. The allotype of this species was located in the MNHN Supplemental Collections (STEMPFFER Collection) (JOHNSON, 1991) in 1989. Thus, it is probable that further specimens of this species exist and may eventually be located.

Etymology
The name refers to the large size and purple iridescent color of the wing upper surfaces in this species.

Novosatsuma **c i b d e l a** spec. nov.
Figs. 46, 84

Satsuma chalybeia: LEECH, 1893-94, p.355. SOUTH, 1902, p.140 (both in part) (misidentification of syntype).

Diagnosis
Male with silver blue upper surface so bold as to be more confused only with larger species of *Ahlbergia* (specifically females of *Ahlbergia chalybeia* (LEECH) - with which the holotype male of *N. cibdela* was originally included as a syntype female). From *A. chalybeia*, *N. cibdela* is readily distinguished by the forewing scent brand in males. Among members of *Novosatsuma*, *N. cibdela* most resembles *N. monstrabila* but can be distinguished by its lack of the latter species' white and light gray under surface mottling and distinctive red-brown patches in the hindwing basoterminal areas (markings which also typify Nearctic species *Incisalia eryphon*, see Remarks).

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Apical and submarginal areas of forewing deep brownish black; discal and basal area of forewing and all but terminal areas of hindwing shiny silvery blue. Terminal region of hindwing blackish between the veins, broken in the cell by bright silvery blue. Margin of wings with black fringe dusted basally with silvery blue. Under Surface of the Wings: Medial areas of both wings colored warm sepia; forewing discal area with darker red-brown mark and distal areas of wing with irregular submarginal and postmedial line of much darker brown. Marginal ground lighter beige brown flecked with gray. Hindwing with jagged postbasal line and irregular medial line of dark brown over warm sepia ground color. Rest of wing distad medial lines much lighter brown, heavily suffused with gray. Submarginal area with prominent line of dark brown chevrons and with terminal areas darkened deep red-brown between the veins in an undulate pattern. Fringes red-brown, basally flecked with gray. Length of Forewing: 14.0 mm (holotype).
Female: Unknown.
Male Genitalia (Fig. 46): Valval bilobes wide-rimmed, oval, not indented; valvae, lateral view, "funnel"-shaped. Caudal extensions of valvae robust along margins with the bilobed areas showing slope of former and latter nearly in same plane. Caudal extensions comparatively short among congeners. Saccus triangular; cornuti disclike, serrate along the outer edges.
Female Genitalia: Unknown.

Type
Holotype male (Fig. 84), "Chang Yang" [= Chang-yang], Hupeh Province [the old labels use the archaic regional name "Yunnan"], China, May 1888, A.E. PRATT collector, deposited NHM.

Distribution
Spatial (Fig. 96): Known only from the type locality in montane western China (see Remarks).
Temporal: Known only from "May"

Remarks
As with the preceeding species, it is apparent that early series were sold in small lots. It is therefore possible that additional specimens exist, particularly because the type locality is one from which several museums have samples of *N. pratti* and species of *Ahlbergia*. *N. cibdela* is a distinctive elfin, undoubtedly belonging to *Novosatsuma* not only by structural characteristics but by the blue upper surfaces of males; however, it lacks the under surface markings which make some congeners appear much like Nearctic *Incisalia* species.

Etymology
The Latin name cibdela means "deceptive" and refers to the uncanny resemblance between males of this species and the female of *Ahlbergia chalybeia*.

Novosatsuma **monstrabila** spec. nov.
Figs. 47, 85

Diagnosis
On the under surface this species resembles the Nearctic species *Incisalia eryphon* but on the upper surface is bright silvery blue. On the under surface the pattern is mottled by concentric jagged patterns, but contrasting the red-brown and beige-brown of familiar *I. eryphon*, the color is contrasting sepia, brown and grayish white. The contrast between these colors makes the species unmistakable. To date, *N. monstrabila* is known only from montane northern Burma.

Description
Male: Head, thorax, abdomen, legs, palpi and frons typical of the genus. Upper Surface of the Wings: Apical and submarginal areas of forewing light brown with scent brand in distal areas of discal cell. Discal and basal area of forewing and all but cephalic, terminal and marginal areas of hindwing are shiny silvery blue. Marginal areas of hindwings dark brown with fringe marked bold, and broadly, white in the cells. Under Surface of the Wings: Forewing ground color light beige flecked with sepia in the discal and basal areas, heavily flecked with gray and white marginad and along the wing fringes. End of discal cell with light sepia mark, dark brown spots forming irregular submarginal and postmedial lines running from the costa to cell CuA2. Hindwing basal disc mottled deep sepia and lighter brown with faint whitish postbasal spots and a whitish spot at edge of disc between veins SC+R1 and RS. Hindwing distad basal disc colored gray with white suffusions, submarginal area with prominent crescent line of brown to chocolate patches in the basi-terminal area from vein CuA1 to inner margin. Outer margin with heavy fringe colored grayish white in the cells and sepia along the veins. Length of Forewing: 16 mm (holotype).
Female. Unknown.
Male Genitalia (Fig. 47): Valval bilobes wide-rimmed and ovate, but compared to similar structures in *N. oppocoenosa* with lateral margins notably shouldered. Caudal extensions elongately tapered as in *N. oppocoenosa*, but the saccal areas of vincular arc much more robust than in that species, saccus consequently "funnel"-shaped. Aedeagus with terminal cornuti spatulate, serrate along the outer margins.
Female Genitalia: Unknown.

Type
Holotype male (Fig. 85), Naoa Hills, Chindwin River, northern Burma, April 1896, W. H. EVANS collector; deposited NHM.

Distribution
Spatial (Fig. 96): Known only from the type locality in montane northern Burma.
Temporal: Known only from April.

Remarks
As noted, *Novosatsuma* taxa are the apparent sister group of the conifer-feeding Nearctic *Incisalia*. Of the known *Novosatsuma* congeners, *N. monstrabila* is most notably similar to *I. niphon* and *I. eryphon*, especially on the under surface. The brilliant silvery blue upper surface of *N. monstrabilia*, however, is more characteristic of Palaearctic elfins.
Also notable of *N. monstrabila* is its occurrence outside the nuclear distribution of known Callophryina. Only it, *A. leechii* (northeast India) and *A. haradai* (Nepal) occur southward from the traditionally acknowledged Eurasian range of the Palaearctic elfins.

Etymology
The Latin name *monstrabila* means "conspicuous" and refers to the outstanding pattern of this species.

C i s s a t s u m a gen. nov.
Figs. 48-58, 86-91

Satsuma (in part) [not MURRAY, 1874, p.168]: MURRAY, Ibid. op. cit., RILEY, 1939, p.359. SIBATANI, 1946, p.64. SCHWANSWITSCH, 1948, p.256. GILLHAM, 1956, p.149.
Callophrys (in part) [not BILLBERG, 1820, p.80]: SWINHOE, 1910-1911, p.257 (*Satsuma* = *Callophrys*) (synonymy in error).
Ginzia (in part) [not OKANO, 1941, p.239]: OKANO, Ibid., op. cit., KORSCHUNOV, 1972, p.359.
Ginsia [sic] (in part) [*Ginzia*, not OKANO, 1941, p.239]: KORSCHUNOV, 1972, p.359 (misspelling).
Ahlbergia (in part) [not BRYK, 1946, p.50]: BRYK, Ibid., op. cit., KUROKO, 1957, p.98. KIM, 1961, p.278. SHIROZU & HARA, 1962, p.94. ELIOT, 1973, p.440 (*Ahlbergia* = *Ginzia* = *Satsuma*).
Incisalia (in part) [not SCUDDER, 1872, p.52]: F. BROWN, 1942, p.21 (places all *Satsuma* s.l. taxa with *Incisalia* in comment). GILLHAM, 1956, p.149. (*Satsuma* = *Incisalia*) (synonymies in error).
[*Cissatsuma*]: BRIDGES, 1988a, I:11 (non-binomial nomen nudum citation referring to JOHNSON 1981 as published herein, in part).

Diagnosis
Generally large elfins (forewing, base/apex 15.0 mm or more) colored brown above and beneath in both sexes (males with prominent brands centralized distally in the forewing discal cell). Brown coloration of *Cissatsuma* taxa contrasts with that of often equally large *Novosatsuma* species (of previous entry) whose male and female upper surfaces are generally, often brilliantly, blue. Under surface pattern in *Cissatsuma* is typified by bold concentricly banded markings; these contrast with the jagged and mottled patterns of *Novosatsuma* (and some Nearctic *Incisalia*) and the simpler basal disc and distally lineal patterns of the diverse genus *Ahlbergia*.
Structurally, *Cissatsuma* appear very primitive, with robust basal palpi segments and genitalia typified in females by wide, tubular, ductus bursae lacking prominent lamellae (fig. 3) and, in males, by robust and simply shaped elements showing little sclerotal sculpturing or additional structural innovation (fig. 2 and description below).

Description

Adult: Head with frons hairy but without distinct pigmental or structural color; compound eye with white lining. Thorax and abdomen profusely hairy at junctures; taxa with wing iridescence often have tagmata powdered iridescent blue. Palpi with second segment short (in male, length generally less than four times width, in female circa five times width). Wings with forewing discal cell generally angulate, radial veins widely (sometimes irregularly) spaced along costal vein of discal cell and with vein M1 arched caudally toward wing margin from its abutment with discal cell apex (fig. 1). Male forewings with prominent scent brand (oblongate, but often broadly at the discal cross-vein, extending from apical one-fourth of the discal cell's costal vein and varying in invasion of the radial veins six to eight). Wing expanse large (forewing base/apex usually exceeding 15 mm), hindwings always without tails, wing margins of most species generally entire or with small anal lobe. Wing upper surface ground colors generally brown, only occassionally suffused with iridescent blue or purple in either or both sexes. Wing under surfaces colored hoary to mottled brown, occasionally with gray or yellowish pattern elements, these usually occurring in postbasal, medial, submarginal and/or marginal patterns. Limbal areas infrequently marked, but occassionally with a faint *Thecla*-spot (sensu NICOLAY, 1971).

Male Tergal Morphology and Genitalia: Figs. 48-58 (as indicated). Compared to other Eumaeini, terminal tergites normal (lacking unusual sclerotal components, e.g. "sipc" sensu JOHNSON, 1990a, 1991a, b); ventrum of eighth tergite with clustered bundles of brush organs loosely abutting the septa along the vincular dorsum of the genitalia, brush length usually extending to between the arch of the falces and the base of the labides. Genitalia, compared to other Palaearctic elfins (fig. 2), typified by (1) valval bilobed configuration shouldered, caudal extensions generally elongate but abruptly tapered at the termini (giving appearance of distinctive distal and terminal points); (2) bilobes generally narrowly rimmed (not widely rimmed as in many some taxa of other primitive callophryines, particularly some *Novosatsuma*).

Female Tergal Morphology and Genitalia: Figs. 49-57 (as indicated). Compared to other Eumaeini, terminal tergites normal (lacking unusual sclerotal components, e.g. "sipc" sensu JOHNSON, 1990, 1991a, b). Genitalia, compared to other Palaearctic elfins (fig. 3), with ductus bursae configuration primitive, width usually exceeding one-half breadth of terminal lamellae. Lamellae diminutive, usually only appearing as slight terminal and distal lobes. Ductus seminalis located dorsad cephalic base of the ductus bursae and surrounded by a moderately expansive, sclerotized, distal shield. Papillae anales lying dorsad the lamella postvaginalis with terminus profusely spined; apophyses of papillae anales extending at least one-half length of ductus bursae.

Biology

Early Stages: Unknown.

Foodplants: Unknown.

Type species

Satsuma albilinea RILEY (RILEY 1939, Novit. zool. 41:359) [becomes *Cissatsuma albilinea* (RILEY), new combination].

Distribution

Spatial (Fig. 97): Montane areas of western China, including eastern Tibet. Temporal: Known only from occasional dates cited on specimen labels, but appearing to include spring (April-May) and summer (June-July) broods. Endemism: All species, except *C. kansuensis*, appear to be endemic to the "Yunnan Plateau" region (fig. 98) and the coniferous forest belt extending immediately northward of it into Szechwan Province. One other species (*C. albilinea*) occurs on the "Yunnan Plateau" and somewhat westward into southern Tibet. *C. kansuensis* is known only from the Nan Shan mountain area of northern China (where endemics of *Ahlbergia* and *Novosatsuma* also occur).

Remarks

This genus is the third of three recognized for Palaearctic elfins in this study. *Cissatsuma* species typify the great diversity of Palaearctic elfins not apparent in the early literature (LEECH, 1893-94, BROWN, 1942, GILLHAM, 1956). Only *C. albilinea* was previously described and the rest of the genus includes new species primarily represented in old series located at the NHM. Discovery of these series poses the historical problem of whether LEECH ever saw the NHM material which represents *Novosatsuma* and *Cissatsuma*. In 1981 this material was readily located by me in the NHM curated holdings. The question is interesting since, considering the use LEECH made of wing characters, it appears puzzling that he would have overlooked either the remarkably large brown species that make up *Cissatsuma* or the brilliant blue males that characterize the genus *Novosatsuma*. However, this appears to be the case. LEECH, and subsequent curators, may have failed to notice these outstanding specimens because of an historical assumption that taxa of "*Satsuma*" have brown males and blue females. The majority of such overlooked species involved males misidentified as females. Evidence of this historical error appears in LEECH's having designated blue males (marked with obvious forewing scent brands) as syntype "females" of various "*Satsuma*"

I consider structural characters of *Cissatsuma* generally primitive. This is consistent with the general assessment of ELIOT (1973) that simple, morphologically non-complex, structures are generally primitive in Lycaenidae and complex structures (and/or those showing additional components) generally derived. This polarity is also consistent with comments concerning apomorphy in recently revised groups of Neotropical Theclinae (JOHNSON, 1989, 1990a, 1991a, b), including the view that a generally primitive condition in these butterflies is lack of structural color in the wings.

Morphologically, some *Cissatsuma* taxa (see figs. 48-58) show structural ground plans as simple as any apparent in groups of New World Eumaeini, a circumstance suggesting that structurally primitive members of this Tribe occur on all the continents over which the group is now distributed. To give a poignant example, genitalia of *Cissatsuma*, members of the "*argentinensis*" group of New World *Cyanophrys* CLENCH and New World *Callophrys* BILLBERG (s.str.) could be exchanged without much notice, though adults of these genera are readily separable by very different wing fascies, including traditional tailed "hairstreak butterfly" criteria in the Neotropical *Cyanophrys*. As noted by JOHNSON (1990a), such circumstances suggest that, contrary to earlier historical assessments (SEITZ, 1921; BROWN, 1942; GILLHAM, 1956) "elfin"-like callophryine butterflies are not in themselves monophyletic. Rather, it appears that ancestral groups of the Eumaeini included both "hairstreak"-like and "elfin"-like members. Indeed, some groups of Neotropical elfins (including those reviewed by JOHNSON, 1990a) have some tailed and some untailed members. The new Central American elfin genus *Cisincisalia* (reviewed herein Appendix 1) has tailed and tailless congeners. CLENCH (1944) noted the commoness of this phenomenon in Neotropical Theclinae.

Etymology

The generic name is consistent with JOHNSON (1981 [unpublished for nomenclatural purposes]) and cited nomen nudem by BRIDGES (1988a). BRIDGES used the generic name only as a non-binomial (in his species index, section I) and not formally in binomials of his taxa lists (section II). Therefore, I consider all combinations herein as new. The Latin prefix *cis* meaning "most primitive" or "ancestral" is added to the name formerly used for Palaearctic elfins, "*Satsuma*" The name refers to the generally primitive character of the genus and is considered feminine.

Species groups

For diagnostic purposes, I divide *Cissatsuma* into two groups based on general wing pattern: (1) those with no (or very little) upper surface structural color in either sex and (2) those with

some upper surface coloration in one, or both, sexes. Group 1 (the "*albilinea* Group") includes *C. albilinea*, *C. kansuensis* and *C. halosa*; Group 2 (the "*tuba* Group") includes *C. tuba*, *C. contexta* and *C. crenata*.

The *albilinea* Species Group

Other than slight basal suffusions as typical of females in many elfins, members of this group lack any significant upper surface structural color.

Cissatsuma albilinea (RILEY) comb. nov.
Figs. 48, 49, 86

Satsuma albilinea RILEY, 1939, p.359
[*Ginzia*] *albilinea* (included all *Satsuma* species of previous authors): OKANO, 1941, p.239.
[*Ahlbergia*] *albilinea* (included all *Satsuma* species usages of previous authors): BRYK, 1946, p.50. ELIOT, 1976, p.440.
[*Incisalia*] *albilinea* (included all *Satsuma* species usages of previous authors): GILLHAM, 1956, p.145, 149.
[*Callophrys*] *albilinea*: BRIDGES, 1988a, I:11, II:19, III:100 (removed from *Ahlbergia* because of inavailability of JOHNSON, 1981, generic names).
[*Cissatsuma*] *albilinea*: BRIDGES, 1988a, I:11 (non-binomial citation referring to JOHNSON, 1981, as published herein in part).

Diagnosis
Distinguishable from all Palaearctic elfins, (except *Cissatsuma kansuensis* of subsequent entry), by pronounced white lining of the hindwing basal disc and forewing discal cell and, on the hindwing, adjacent distal grounds of lighter brown to ochre. In addition, wing upper surfaces are brown on males, brown with blue or violet basal suffusions on females. *C. kansuensis* with white lining of hindwing basal disc occurring only as a spot in the cell adjoining the costa, no white along the distal edge of the forewing discal cell and female wing upper surfaces devoid of structural color. Genitalia distinctive as follows: male differing from all congeners by a remarkably short caudal extension on the valvae, length hardly surpassing that of the cephalic end of the falces (congener caudal extensions generally extend to or past the anterior end of the uncus lobes); female genitalia similar to long, tubular, configuration of *C. kansuensis*, *C. crenata* and *C. tuba* but much more robust, with lamellal lips not expansive (as typifies *C. kansuensis* and *C. tuba*) and no constriction between the lamellae and ductus bursae (as in *C. crenata*)

Description
Male: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Ground color completely dark brown. Androconial patch at distal end of discal cell usually light yellow. Hindwing with margin narrowly crenate, light ochraceous visible along the anal margin and fringe bright red-brown. Under Surface of the Wings: Forewing color light beige with dark distal brown patch in the discal cell (edged brightly white along its apex). Postmedial line, rather straight from costa to vein M3, or CuA1, basally darkened, distally flecked with white. Margins darker brown, vaguely crenate; fringes uniformly brown. Hindwing with basal disc bright chestnut brown, suffused with darker scales and with vague postbasal slashes of darker brown. Distal margins of disc edged with white, followed by wide postmedial colorations of light beige or ochre and postmedial cells marked with small brown crescents. Limbal area ochre, often bright, especially along the anal margin. Fringe darker brown, tending toward red-brown

along anal angle; margin moderately crenate. Length of Forewing: mean of 15 males (NHM) 15.5 mm, range 14.5 mm to 16.0 mm.
Female: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Forewing completely dark brown or sometimes suffused basally with dull blue or violet. Hindwings usually completely shiny blue or violet at base, distally brownish black. Area adjacent the anal angle often lighter brown and contrasted by bright red brown wing fringe. Margin of wing only moderately crenate on hindwing, generally straight on forewing. Under Surface of the Wings: Markings similar to males.
Male Genitalia (Fig. 48): Distinctive within the group of robust taxa (*C. tuba*, *C. contexta*, *C. halosa*, *C. kansuensis*) – caudal extension length in the valvae usually does not exceed the articulation of the falces to the vinculum and uncus. The bilobed bases of the valvae are thin-rimmed, parabolic and indented, contrasting wide-rimmed and broadly shouldered structures in these other species. In addition, the lateral surface of the valve has a steep terminal taper, not a robust "funnel"-shape. The saccus is parabolic, the cornuti of the aedeagus relatively wide and spatulate.
Female Genitalia (Fig. 49): Exhibiting the long, thick and tubular ductus bursae characteristic of the sister taxa mentioned above, but structure more robust, with distal extensions of lips along the lamella to the antrum less than the width of the ductus bursae (not one and one-half times as in *C. tuba*). Other congeners exhibit a more reduced ductus bursae. Corpus bursae with reduced signa occurring as single, nonfurcate spines. Signa in *C. tuba* and *C. halosa* are widely bifurcate.

Types
Holotype male, allotype female in NHM. Type Locality: Tatsienlu (= Kangting), western Szechwan Province, China.

Distribution
Spatial (Fig. 97): Generally distributed throughout southwestern China and the adjacent eastern Tibetan plateau. In addition to the type locality, *C. albilinea* is represented by NHM specimens from Weisi, in Yunnan Province (north of the type locality, western Szechwan Province) and from there westward (as indicated by labels "Frontier of Tibet"). A specimen from "Chauloo" may indicate Chayul in Tibet near Lhasa, since this name does not correspond closely to any other names in China or Tibet. There is also a NHM specimen labelled Hong Kong (= "Yaregong" or "Yarewonga" of older usages). However, it appears this may only indicate the locality of a specimen purchase.
Temporal: None of the many specimens bears a date.

Remarks
I figure an adult from Tatsienlu (fig. 86) recently acquired by the AMNH. The fact that this specimen was purchased from an old private collection (source RYAN & CHRISTIE; D. MATUSIK, pers. comm.) supports my suspicions that numerous Palararctic elfin specimens are scattered about in small numbers. The largest samples of *C. albilinea* are at the NHM – forty specimens identified as that species, including the types. However, several of these specimens represented other taxa confused with *C. albilinea*. Of the specimens ultimately identified as *C. albilinea*, three males and three females were dissected for genitalia, legs and palpi. RILEY's original description of *C. albilinea* is unfortunate since he compared his new taxon only to the most phenotypicly similar of the some half dozen species described at the time. Thus, his notes that *C. albilinea* appeared most related to *Satsuma circe* LEECH (refer to *Ahlbergia circe* (LEECH) herein) was incorrect. As noted in the treatment under *Ahlbergia*, species of this latter genus differ markedly in morphology from taxa of *Cissatsuma* and *Novosatsuma*. Superficial similarity between *C. albilinea* and *A. circe* amounts basically to wing shape, upper surface basal blue, and under surface arc-shaped rows of brown, crescent-like, markings.

Additional localities (aside from type listed above)
China: Frontier of Tibet, Hong Kong (see Remarks), Tzeku, Weisi, Wushi (NHM). China [Tibet]: Chauloo (see Remarks) (NHM).

Cissatsuma **k a n s u e n s i s** spec. nov.
Figs. 50, 51, 87

Diagnosis
Of the "brown" *Cissatsuma* similar only to *C. albilinea* because of white under surface pattern elements, but whereas, on *C. albilinea*, there is a pronounced white distal edge along the basal disc, only a single light spot occurs in the cell bordering the costa in *C. kansuensis* and there is gray suffusion across the anal area. In addition, unique additional pattern elements mark this species: the base of the extremely dark basal disc appears scalloped, caused by dark brown ground between the postbasal slashes contrasting lighter grounds basad and distad; there is strong orange marginad in cell CuA1, resembling a *Thecla*-spot within a strongly variegated brown limbal area. In the genitalia, males somewhat resemble *C. albilinea* but exhibit extremely robust valvae; in females the terminal lamellae are widely extended distad the plane of the ductus bursae.

Description
Male: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Ground color entirely rich brown, marginal fringes slightly checkered in fresher specimens. Ellipsoid scent brands at distal end of the discal cell. Limbal area of hindwing with large auburn or orange-brown suffused patches. Under Surface of the Wings: Forewing suffused dark brown distally to the medial area with lighter brown ground in postmedial and submarginal areas. Submargins with dashed line of pronounced brown markings from costa to cell CuA2 paralleled in the postmedial area by a similar band prominently white on distal edge, black to red-brown on the basal edge. Hindwing, postbasal disc rich uniform brown (near chestnut) suffused basally with brown and black. Postbasal areas basad two slashes much lighter in ground, matching ground distad the disc and causing disc to appear distinctly scalloped in shape. Edge of postbasal disc highly irregular and with a prominent white spot in the cell along the costal; anal area bordering basal disc variously suffused gray depending on the specimen. The limbal area is often extremely variegated with orange color in cell CuA1, appearing as a *Thecla*-spot within a dappled dark brown field. Hindwing margin crenate. Length of Forewing: 15.0 mm (holotype); mean of four paratypes 15.3 mm, range 14.6-15.5 mm.
Female: Head, thorax, abdomen, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Marked similar to males but with much broader, rounded, wings; suffusions of basal and limbal areas often bold. Length of Forewing: 15.3 mm (allotype); mean of five paratypes 15.1 mm, range 14.8-15.8 mm.
Male Genitalia (Fig. 50): Most like *C. albilinea*, but caudal extension of valvae exceeding relative length in former species by at least one-third. Junctures of caudal extension and bilobed areas hardly irregular compared to *C. albilinea* and *C. tuba* and saccus and vincular arc far more robust than in these species. Valvae, in lateral view robust and with blunt termini. Aedeagus moderate in length, its expanse exceeding rest of genitalia by about two-fifths; cornuti wide, disclike.
Female Genitalia (Fig. 51): Ductus bursae wide, elongate and tubular as generally typical of the congeners *C. albilinea*, *C. tuba* and *C. crenata*. However, terminal lamellae in *C. kansuensis* are expansive in the distal lips, not diminutive as in *C. albilinea*, and there is not a prominent constriction between the lamellae and the ductus bursae as seen in *C. crenata*. Though most resembling *C. albilinea* in general ductus bursae shape, the corpus bursae in *C. kansuensis* have prominent, spined, signa as in congener *C. tuba*.

Types
Holotype male, allotype female, Kansu [Kansu Province], near Labran, western China, v 1902; deposited NHM.
Paratypes (9). NHM: same data as primary types (four males [one as fig. 87], five females) (see Remarks).

Distribution
Spatial (Fig. 97): Known only from the type locality (see Remarks).
Temporal: Known only from the type data.

Remarks
This distinctive species was found in 1985 in a series of unincorporated materials at the NHM. The general location and dates are similar to those on the new species *Novosatsuma collosa* described herein (under *Novosatsuma*) but specimens had not been relabelled with NHM labels typical of the curated samples at that institution. Type localities of *C. kansuensis* and *N. collosa* appear to characterize the region of Kansu province that is isolated to the north by the Nan Shan mountain range opposite the southern border of Mongolia. There is a notation on some of the labels that specimens were collected near the Great Wall, which runs along the northern perimeter of the Nan Shan. Only the most southerly part of this region, near Lanchou abutts the southern coniferous forests that stretch north from the "Yunnan Plateau" and mostly represents a margin between grassland and alpine biomes (SPENCER, 1972).
Over the years, numerous specimens have been located at the NHM which were unincorporated but obviously part of collection lots apparently only partially prepared and curated (see JOHNSON, EISELE & MACPHERSON, 1988, 1990). This situation is similar to the AMNH where materials of HOFFMAN, BROWN and PALLISTER had been only partially prepared (apparently according to priority of various staffs at various times). The eventual location of additional specimens of these lots has, in many cases, facilitated the recognition of unknown males or females, discovery of additional taxa, or important additions to distributional data. In the cases of Chinese specimens, it can be suggested that many of the taxa apparent from early collections may be either difficult to locate today or possibly extinct. This may also account for the unexpected diversity that is apparent in these early collections and the fact that few new species have been described from recent collections. When studying old material one has no choice but to follow the diversity that is apparent, in spite of whatever assumptions about diversity have been popular among lepidopterists. Particularly after the paper by GILLHAM (1956), lepidopterists have assumed a small species diversity for Palaearctic elfin butterflies.
In all, primary types and two each of the male and female paratypes were examined for genitalia, legs and palpi. The photograph is transposed from a color slide and therefore somewhat darker than the actual specimen.

Etymology
The name is taken from the locality data of the types.

Cissatsuma **h a l o s a** spec. nov.
Figs. 52, 53, 88

Diagnosis
Distinguished by its simple under surface pattern – limited to a dark basal disc and a thin halo-like arc of brown crescents occurring in the submargin. Wing upper surfaces brown in both sexes, as only in congener *C. kansuensis* which is easily distinguished by its distinctive white hindwing markings (see Remarks). In the genitalia *C. halosa* typifies species of the genus with robust bilobed configurations of the valvae (*C. tuba*, *C. kansuensis*, *C. contexta*) but is distinctive with a combination of constricted caudal extension, shouldered bilobed area and broad saccus; likewise, female genitalia are distinctively short in the ductus bursae.

Description

Male: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Uniformly dark brown; androconial patch in distal area of discal cell. Hindwing with faint blue marginal line from from vein 3A to CuA2, sometimes enlarged basally into a blue spot. Margins strongly crenate, fringes brown with lighter gray in the cell interspaces. Under Surface of the Wings: Forewing drab brown overscaled with suffusions of warmer brown in the basal areas. Postmedial line basally brown to black extending in undulate fashion from the costa to cell CuA2, variously marked with distal white. Discal cell with emphatic brown spot at its distal end. Submargins with lighter brown ground bordered by brown suffusions forming a thin marginal band. Fringes darker brown. Hindwing with drab brown ground overscaled with warmer brown suffusion. Basal disc near sepia, with prominent darker brown distal edge paralleling deep brown postbasal slashes each lined basally with white. The postbasal marks form a parallel pattern with the edge of the basal disc and these are paralleled in the submargin by vivid brown crescents forming a submarginal arc. Such markings over the much lighter ground colors create the halolike pattern distinguishing the wings of this species. Length of Forewing: 16.0 mm (holotype); 14.0 mm, 15.0 mm (two additional paratypes).

Female: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Brown ground similar to male but lacking androconial patch. Under Surface of the Wings: Marked similar to male though wings broader and more rounded. Length of Forewing: 15.0 mm (allotype).

Male Genitalia (Fig. 52): Similar to congener *C. tuba*, but caudal extension of valvae abruptly tapered and base of valvae caudad the saccus shouldered (not ovate); valvae in the lateral view "funnel"-shaped; saccus broadly parabolic; aedeagus with cornuti moderately broad, disclike, and terminally serrated.

Female Genitalia (Fig. 53): Similar to *C. tuba* in general demeanor but with length of ductus bursae only four times width of lamella antevaginalis (as measured distad the antrum). As a result, the ductus bursae of *C. halosa* appears to be the most robust of congeners and very reminiscent of genitalic proportions in primitive taxa of the Nearctic *Callophrys* and *Arceuthobium*-feeding *Mitoura*.

Types

Holotype male (Fig. 88A), Ta-ho (= Tae-Ho River and basin), border of Szechwan and Tsinghai provinces, China, 1895, also with labels "to Printemps" "from native collectors" Allotype female (Fig. 88B), Tien-Tseun (= Tienshui) immediately east of Tae-Ho river along Wei-Ho River, Kansu Province, China, 1904, also with labels "native collectors to P. DUJEAN"; both deposited in NHM. Paratypes (5). NHM: same data as holotype (two males) Bahand, Yunnan (formerly a mission at Wui-si or Weisi), leg. PIERRE OUVRAD, January, 1917 (one male); Ta-tsien-lou (= Tatsienlu or Kangting) in western Szechwan Province, China, 1910, also with labels indicating "native collectors" (one male). MNHN: Tatsienlu, Szechwan, China, 1895, leg. Dr. OBERTHÜR (one female).

Distribution

Spatial (Fig. 97): Known from mountains of eastern Tibet and northern Yunnan Province, China, northward through the western Szechwan region and western Kansu and eastern Tainghai provinces.

Temporal: January, the only date indicated on specimen labels, may indicate only a date of purchase.

Remarks

The males and females were associated by their nearly identical wing patterns and same general area of capture. The under surface pattern of the species looks somewhat like that of *C. crenata* (which is silvery blue above), but far less lush, and similar because of its simplicity to *C. tuba*. The latter species is, however, unmistakable because of its upper surface structural color and under surface's pattern being thickly suffused with red-brown. In addition, *C. halosa*

is superficially similar to one species in the new genus *Novosatsuma*: *N. magnasuffusa*. This results because although most *Novosatsuma* have distinctly blue males, *N. magnasuffusa* and *N. collosa* are exceptions. As noted under *Novosatsuma*, *N. collosa* is easily recognized. However, *N. magnasuffusa* may prove more confusing from the wing characters alone. Along with the generic structural characters I have also noted the salient difference in wing shape between taxa of these two genera - ratio of forewing length [base to apex] to "wing breadth" [measured as distal end of margin caudad vein 2A to terminus of vein R4] = 1.36 for *N. magnasuffusa*, 1.63 for *C. halosa*). It is indeed remarkable how many species are represented in the genera *Novosatsuma* and *Cissatsuma* and yet so distinctive in wing and structural character combinations from the more familiar taxa of Palaearctic *Ahlbergia*.

Etymology
The name is taken from the Latin meaning "halo" and refers to the simple, concentric, patterns on the under surface of the hindwings.

The *tuba* Species Group

Members of this group have significant upper surface structural color in one or both sexes.

Cissatsuma **t u b a** spec. nov.
Figs. 54, 55, 89

Diagnosis
Distinguished by the under surface of both sexes - *C. tuba* lacking any white lining around the hindwing basal disc and with distal hindwing coloration brown suffused with dark gray (*C. albilinea*, somewhat similar structurally, has a pronounced white discal line and bright ochraceous distal ground color). Female unmistakable - distinctively lavender-blue across the entire discal and basal portions of the forewing with lighter lavender-blue on same areas of the hindwing and a lavender tinted patch in the distal area at cells CuA2 and 2A (*C. albilinea* blue, if at all, only at the hindwing base). Because of blue female, see Remarks below concerning differentiation from some species of *Ahlbergia*. Genitalia distinctly robust in both sexes; additionally, very elongate in the female.

Description
Male: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Ground color entirely dull brown, margins crenate and lightly fringed lighter brown. Androconial patch at distal end of the discal cell. Under Surface of the Wings: Forewing, bright brown with vague postmedial line of redder brown (near chocolate) descending from costa to vein CuA1. Apex of wing much lighter, yellowish, brown with faint gray suffusion between the veins and along the margin. Hindwing, postbasal disc rich uniform brown (near chestnut) suffused with scattered gray scales throughout. Edge of basal disc darker brown followed submarginad by a line of brown crescents and a brown marginal band suffused gray and ochre. Distal portion of submarginal crescent line obsolescent and blotchy after vein M2. Length of Forewing: 15.0 mm (holotype).
Female: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Forewings dark brown, appearing darker costad the distal ends of the discal cells. Discal cell, entire basal and medial areas of wing bright lavender-blue. Hindwings dark brown with faint lavender-blue in discal cell, along wing base and in anal area. Light, round-shaped, violet patch in cell CuA2. Under Surface of the Wings: Similar to males but with gray suffusions more pronounced.
Male Genitalia (Fig. 54): Most like *C. albilinea*, but caudal extension of valvae much longer, exceeding the uncus (on *C. albilinea* barely exceeding juncture of falces and vinculum). Valval

bilobes of moderate width and shouldered, only slightly indented; valvae, lateral view, round, "funnel"-shaped; valvae, caudad extension, tapered, with vague shoulder notably directed terminad; saccus parabolic; cornuti wide and disclike.
Female Genitalia (Fig. 55): Only *C. albilinea* is similar, but the broad ductus bursae of *C. tuba* is relatively longer (length seven times width) and saliently elongate in appearance due to terminal lamellal breadth exceeding one third the length of the ductus bursae. The signa in *C. tuba* are widely bifurcate (in *C. albilinea* small uniplanar spines).

Types
Holotype male (Fig. 89A), allotype female (Fig. 80B), Tse Kou (= Tzeku), Yunnan Province, China, 1895, leg. R. P. DUBERNARD, deposited NHM.
Paratype (1). NHM: same data as primary types (one female).

Distribution
Spatial (Fig. 97): Known only from type the locality.
Temporal: Unknown.

Remarks
The male and female are associated on the basis of the identical labels and wing under surfaces. Notable among *Cissatsuma*, upper surface patterns in *C. tuba* resemble some species of *Ahlbergia* (a generic diagnosis that might be made if specimens were not dissected). With a brown male and females marked with lavender-blue on the upper surface, *C. tuba* requires differentiation from similar species of *Ahlbergia*. These include new species *A. bimaculata* and *A. unicolora* (both lacking obvious markings distad the hindwing basal disc) and new species *A. lynda* and *A. pluto* (LEECH) (with deep brown patterns over lighter ground and devoid of heavy gray suffusion). See also, Remarks under *C. albilinea*, *C. crenata*.

Etymology
The Latin *tuba* (pipe) means "pipe", and refers to the characteristic shape of the ductus bursae in the female of this species.

Cissatsuma **c r e n a t a** spec. nov.
Figs. 56, 57, 90

Diagnosis
Easily distinguished from congeners by pronounced anal lobes adjoining crenate hindwing margins, silver-blue flecking or suffusion on upper surfaces (bright on female), oblongate androconial brand on the male forewings and, on wing under surfaces, light beige ground contrasting bright scattered dark brown markings in basal disc and along the crescent line. Hindwing otherwise marked with (1) white anal line, (2) marginal orange-brown in cell CuA1, resembling *Thecla*-spot (as in *C. kansuensis*). Genitalia typical of *Cissatsuma*, particularly with wide tubular ductus bursae terminating in very limited distal lips.

Description
Male: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Dull dark brown, suffused lightly with silvery blue; oblongate androconial brand occurring distally in discal cell, brown to blackish in color. Wing margins markedly crenate, on hindwing abutting prominent anal lobe; wing fringes brown, faintly colored white between the veins. Under Surface of the Wings: Ground color dull beige; forewing with dark brown postmedial band from costa to vein CuA2 (edged distally with gray except along vein M3 which is invaded by dull brown); apex dull brown. Hindwing with basal disc marked by bright splashes of dark brown over lighter beige ground; postbasal areas with two long brown undulate slashes suffused with white along their distal edges; anal area along disc punctuated with a white line. Areas of submargins dominated by contrast of light beige ground and broad brown crescents

(each colored basally blackish brown and suffused distally with rich red-brown extending almost to the margin). Crescent marginal in cell CuA1 pronounced and broad, resembling *Thecla*-spot as in *C. kansuensis*. Length of forewing: 14.0 mm (holotype).
Female: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Contrasting male with silvery blue structural colors dominating wing upper surfaces except for fuscous margins and apices. Margins deeply crenate, with fringes distinctly white between the veins. Under Surface of the Wings: Marked similar to males. Length of forewing: 14.2 mm (allotype).
Male Genitalia (Fig. 56): Valvae with bilobed areas clear, distal rim irregularly bevelled, bases parabolic and indented. Caudal extension of valvae gradually tapered from lobed area until abrupt, blunt, terminus. Saccus "funnel"-shaped. Cornuti of aedeagus moderately broad and spatulate.
Female Genitalia (Fig. 57): Ductus bursae typified by wide cylindrical shape, flaring caudally to narrow lamellae with thin distal rims. Lamella postvaginalis with ventral surface markedly invaginated by undulate ridges. Corpus bursae with two spinelike signa, each broadly bifurcate along the distal edges.

Types
Holotype male (Fig. 90A), allotype female (Fig. 90B), Lutien (= Loutsechiang), Yunnan Province, China, deposited NNHN.
Paratypes (5). NHM: Li-kiang, Nord Yunnann [sic], Yunnan Province, leg. H. HÖNE, 23 April 1935 (one male), 29 April 1935 (one male), 27 April 1935 (one male), 16 May 1935 (one female), 8 May 1935 (one female).

Distribution
Spatial (Fig. 97): Known from western Yunnan Province in China.
Temporal: Known only from April and May dates indicated on the NHM paratypes.

Remarks
The sexes are readily associated by the duplicate label data on both the MNHN and NHM specimens, similar wing patterns, and the structural characters typifying the genus. The species is another example of diversity in this new genus which, without morphological study, might be mistaken for the diverse species of *Ahlbergia*. It is noteworthy that most species of the Palaearctic elfins generally large (forewings, base/apex exceeding 14.0 mm and more likely equalling lengths of 15.0 or 16.0 mm) and typified by males, females, or both having extensive structural coloration on the upper surfaces, represent species of *Cissatsuma* or *Novosatsuma*.

Etymology
The name refers to the crenate hindwings marking this species.

Cissatsuma **c o n t e x t a** spec. nov.
Figs. 58, 91

Diagnosis
Readily identified by small size (FW 12 mm) and hindwing under surfaces with broad submarginal band connected to the basal disc by lines of dark coloration along the veins (giving the "webbed" appearance reflected in the species name). Wing upper surfaces are faintly blue, making the species appear on this surface like the common noncongener *Ahlbergia frivaldszkyi* (LEDERER) (see Remarks). Genitalia show a widely rimmed and ovate bilobed configuration tapered steeply to rather straight caudal extensions.

Description
Male: Head, thorax, abdomen, legs and palpi typical of the genus. Upper Surface of the Wings: Ground color dull brown with slightly lighter brown in basal and discal areas; discal cell of

hindwing with faint traces of light blue. Scent brand located distally in discal area of forewing. Outer margins of hindwing markedly serrate and with thin black line. Under Surface of the Wings: Forewing dull brown overlaid with warmer brown and marked with an obvious white slash at distal end of discal cell. Postmedial area with brown band from costa to cell CuA2, lined dark basally and faintly white distally; submargin of wing flecked with gray. Hindwing buff brown mottled with darker brown on the basal disc and along the anal angle. Postmedial area with band of mottled brown interconnected with disc by marked brown suffusion along the wing veins (giving a webbed appearance to the under surface pattern). Basal disc with white distal edging between veins SC+RI and RS. Length of Forewing: 12.0 mm (holotype).
Female. Unknown (it may be speculated from the generic habitus that female would resemble male on under surface but be more brightly blue above).
Male Genitalia (Fig. 58): Valval bilobes wide-rimmed and ovate; in lateral aspect round-tapered. Bilobed area tapered steeply from oval shape to rather straight caudal extensions. Saccus parabolic; cornuti moderately disclike for genus.
Female Genitalia: Unknown.

Types
Holotype male (Fig. 91), Bahand (= Wui-si = Weisi), Yunnan Province, China, January 1917, PERE OUVARD. Deposited NHM.

Distribution
Spatial (Fig. 97): Currently known only from the type locality.
Temporal: Known only from "January"

Remarks
Date indicated on the type's labels may refer only to a date of purchase.

Etymology
The Latin name means "interwoven" and refers to the dark vein suffusions connecting basal disc and postmedian markings on this species.

Concluding notes

Historical Factors and Taxonomy

It was surprising when initial examination of old collections of Palaearctic elfins disclosed such a large number of specimens not fitting the description of any known species. It was equally surprising when dissection of these many elfin specimens discovered a panoply of structural fascies. Prior to such a study, no type specimens (and indeed few representatives of any Asian elfins) had been dissected by any worker. Ongoing assembly of larger series of Palaearctic elfins documented a diverse, and structurally various, assemblage of elfins occurring (or once occurring) across vast regions of the Old World. Not only were further distinctive additions made to the genus *Ahlbergia* – large brown elfins of the genus *Cissatsuma* were discovered and the brilliant blue representatives of *Novosatsuma* distinguished for the first time. Palaearctic elfins, with few exceptions long-considered restricted to China and the Amur region of Siberia, were documented as occurring in northern Burma, widely across Tibet, and westward across southern Mongolia and past the trans-Baikal to the Tien Shan, Altai and Uzbek regions of the former Soviet Union. Although many of the species documented from these regions are unique, it remains to be seen how many can still be collected in nature.
As this study progressed, it appeared that several historical problems added to the need for a basic taxonomy for these insects. Primary specimen sources for LEECH had been early collectors (like A. E. PRATT). Also, there were early expeditions to western China like the KELLEY-ROOSEVELT Expeditions of 1928-1929. However, it appeared that specimens from both these sources had been sold off in many small lots, only some of which eventually reached the NHM.

Others eventually found their way to various other museums (CMNH, MNHN, FMNH). Consequently, LEECH had comparatively small samples when he did his work and he seems to have grouped his NHM specimens into "species" by very generalized wing patterns, without genital diagnosis of individual specimens as male or female or attention to the presence or absence of forewing brands. Thus, the initial work on these small samples was flawed, additional specimens and species being represented in collections LEECH was unable to consult. Indeed, when additional PRATT or KELLEY-ROOSEVELT Expedition material was located, companion males and/or females of many of the undescribed species in the NHM were located. What resulted was a far more diverse elfin fauna for the Palaearctic than anticipated. Since additional specimens from early collections are reported to be in various European museums not consulted in the present study, it is likely that additional series of many of the species described herein will be discovered. Additional undescribed species may also be located.
It is hoped that the taxonomy included in the present work, initiated in 1976, will provide further impetus for study of elfins in the Palaearctic Realm. Particularly in the montane regions of the east, these butterflies represent faunas and ecologies as vast and diverse as they are poorly known.

Areas of Endemism Apparent in Palaearctic Callophryina Elfins

I at first anticipated that no patterns of endemism would be apparent from the potpourri of elfin samples assembled in this study. However, a pattern is evident and can be characterized below (and in fig. 98). Two major regions of endemism are apparent, each with exclusive occupation by one or more genera or species groups.
Firstly, northward of a line generally extending from Korea westward through the trans-Baikal occur the *Ahlbergia* "*ferrea*" and "*frivaldszkyi*" species groups. The distributions of these groups center on the Amur River Basin (fig. 98a) and extend westward and eastward in disjuncts (including those in the Japanese archipelago). As noted in the text, I view the "*ferrea*" Group populations of Japan as the sister group of the combined "*ferrea*" Group members on the mainland. This entire northern region is widely characterized by coniferous forest interspersed with northern hardwood and mixed mesophytic vegetation communities (SPENCER, 1972). No members of *Novosatsuma* or *Cissatsuma* occur in this northern region.
Secondly, in the area southward of the Korea/trans-Baikal line occur a number of areas of regional endemism within the region of "nuclear" China and adjacent Tibet, India and Burma. Here occur the remaining species groups of *Ahlbergia* and the genera *Novosatsuma* and *Cissatsuma*. Within this southern region, several areas of high endemism are apparent and these correspond with major physiographic areas attributed to China and vegetation types originally attributed to the natural flora of China (SPENCER, 1972). Apparent areas of high endemism, as labelled in fig. 98 and in order of numbers of endemics include

b. The "Yunnan Plateau" Vegetation is primarily Coniferous Forest occurring in a wide north-south swath along the eastern edge of the Tibetan Plateau. These Coniferous Forest communities are bordered westward by Alpine flora of the Tibetan Plateau and Evergreen Oak flora eastward. This area includes the largest number of elfin endemics treated in the present study: twelve (plus two others occurring only here and somewhat westward into adjoining southern Tibet and three others occurring only here and eastward into the "Central Mountain Belt", subsequent entry). "Yunnan Plateau" endemics include *Cissatsuma crenata*, *contexta*, *tuba*, *halosa*; *Novosatsuma magnasuffusa*, *oppocoenosa*, *magnapurpurea*, *cibdela*; *Ahlbergia bimaculata*, *prodiga*, *caesius*, *lynda* (plus, westward into Tibet, *Cissatsuma albilinea*, *Ahlbergia unicolora*); eastward to the "Central Mountain Belt", see below).

c. The "Central Mountain Belt" (and adjoining Hunan Lake District eastward/Tapa Shan mountains northward). Vegetation is primarily Evergreen Oak community with disjunct Conifer Forest along the north. This area includes an endemic (*Novosatsuma plumbagina*) and also the

eastern extreme of distribution for other Palaearctic elfins occurring primarily to the west on the "Yunnan Plateau" (*Ahlbergia chalybeia*, *nicevillei*; *Novosatsuma pratti*).

d. The "Nan Shan" mountain margin with Mongolia. Vegetation is primarily Alpine with Coniferous Forest adjacent southeastward, extending north from the Yunnan Plateau. This area has several distinctive endemics but has been poorly sampled. The known apparent endemics include *Ahlbergia caerulea*, *Novosatsuma collosa* and *Cissatsuma kansuensis*.

e. The "Tibetan Plateau" Vegetation is primarily Alpine (alternatively Cold Dessert and Cold Grassland). Some widely disjunct elfin endemics occur, particularly in the Kun Lan Shan mountains to the north (*Novosatsuma matusiki*, *Ahlbergia pictila*) and the Nyenchen Thangiha mountains to the south (where *Cissatsuma albilinea* and *Ahlbergia unicolora* extend westward from the "Yunnan Plateau"). A subspecies of *Ahlbergia circe* occurs in both the Kun Lan Shan and the Nyenchen Thangiha and the Nepalese species *A. haradai* may be a vicariant population of this ancient assemblage.

Outlying Insular Endemics: Singleton endemics occur in Nepal (*Ahlbergia haradai*), Assam India (*A. leechii*) and the Chindwin River Basin of northern Burma (*Novosatsuma monstrabila*).

Obviously, there are numerous discoveries and clarifications still to be made concerning the diversity, distribution and affinities among the Palaearctic callophryine elfins. However, the above summary of apparent endemism serves to orientate future workers towards the range of questions and problems involved.

Palaearctic Elfins and the "Holarctic Imprint" on the New World Tropics

SHAPIRO (1991) has recently reemphasized this question and, in footnotes, called attention to my previously mentioned results concerning the purely South American affinities of the high Andean elfins (*Penaincisalia* JOHNSON, 1990a, Eumaeini infratribe Thecloxurina). It is apparent from the results of the present monograph on Palaearctic elfins, and the materials of Appendix 2 regarding Central American *Cisincisalia*, that the "Holarctic imprint" of Callophyrina elfins in the New World extends south only as far as Guatemala. In addition, as noted in JOHNSON (1990a, & in press) the South American Thecloxurina elfins ("*Thecla*" *loxurina* and *arria* Groups of common usage) show their trans-Andean affinities northward only to disjuncts in Costa Rica. The latter material is old and mostly from FASSL's original work around "Volcan Irazu" in the northern Cordillera de Talamanca and "Volcan Orosi" in the northern Cordillera Guanacaste/Central Cordillera. Thus, it appears now that among the two largest assemblages of New World elfin butterflies (elfin-like species of Eumaeini infratribes Callophryina and Thecloxurina) no immediate intrageneric or even sister-generic affinities between high Andean and Holarctic faunas are apparent. Instead, intrageneric affinities in Thecloxurina elfins occur between the high Andes and montane Costa Rica; sister-generic affinities in Callophryina elfins occur between montane central Mexico/Guatemala and the Holarctic.

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Literature cited

BARTHOLOMEW, J. (1958): The Times Atlas of the World. Vol. I. The World, Australasia and East Asia with an Index Gazetteer. – Boston, Houghton Miflin Col., xxvii, 24 pls, 34 pp [gazetteer].

BURK, C. A. (1975): Sea of Okhotsk thirteenth cruise of the Dmitry Mendeleev. Geology [special report] March, 1975:141-144.

BRIDGES, C. A. (1988a): Catalogue of Lycaenidae & Riodinidae (Lepidoptera: Rhopalocera). – Urbana, Illinois, published by the author, 811 pp.

BRIDGES, C. A. (1988b): Catalogue of Family-group and Genus-group names (Lepidoptera: Rhopalocera). – Urbana, Illinois, published by the author, 390 pp.

BROWN, F. M. (1942): Animals above timberline Colorado and Ecuador. – Colorado College General Series 233, Studies Series No. **33**, 29 pp.

BRYK, F. (1946): Type *Lycaena ferrea* for *Satsuma* MURRAY nec. ADAMS (trans.). – Ark. Zool. **38**:50.

BURNS, J. M. (1964): Evolution in skipper butterflies of the genus *Erynnis*. – Univ. of Calif. Publ. in Entomol. **37**, iv + 217 pp.

BUTLER, A. G. (1866): On butterflies of China and Japan. – Jour. Linn. Soc. **9**:57-61.

CANTLIE, K. (1963): Lycaenidae In [reissue of] "Brigadier EVANS' The Identification of Indian Butterflies" – privately printed, vi + 172 pp.

CLENCH, H. K. (1944): Notes on lycaenid butterflies. – Bull. Mus. Comp. Zool., Harvard **94**:217-245.

CLENCH, H. K. (1961): "Lycaenidae" in EHRLICH, P. R. & H. EHRLICH: How to know the butterflies. – Dubuque, Iowa, Wm. C. Brown Comp. Publ., 262 pp.

CLENCH, H. K. (1981): New *Callophrys* (Lycaenidae) from North and Middle America. – Bull. Allyn Museum **64**:1-31.

COURVOISER, L. G. (1920): Zur Synonymie des genus *Lycaena*. – Deut. ent. Zeit. [IRIS] **34**:230-262.

D'ABRERA, B. (1986): Butterflies of the Oriental Region. Part 3. Lycaenidae and Riodinidae. – Victoria, Australia, Hill House, xvi + 536-672pp.

DE NICÉVILLE, C. L. A. (1891): On new and little-known butterflies from the Indo-Malayan region. – Jour. Bomb. Nat. Hist. Soc. **6**:341-398.

DE NICÉVILLE, C. L. A. (1893): On new and little-known butterflies from the Indo-Malayan region. – Jour. Bomb. Nat. Hist. Soc. **7**:322-357.

DE NICÉVILLE, C. L. A. (1894): On new and little-known butterflies from the Indo-Malayan region. – Jour. Asiat. Soc. Bengal (II): **63**:1-59.

DESCIMON, H. (1986): Origins of Lepidoptera faunas in the high tropical Andes. pp. 500-532. In VUILLEUMIER, F. & M. MONASTERIO (eds.): High altitude tropical biogeography. – Oxford, Oxford University Press.

DOI, H. (1931): A list of Rhopalocera from Mt. Shouyou, Keidirdo, Korea. – Jour. Chosen Nat. Hist. **12**:42-47.

DOS PASSOS, C. F. (1964): A synonymic list of the Nearctic Rhopalocera. – Lepid. Soc. Mem. **1**, vi + 145 pp.

DOS PASSOS, C. F. (1970): A revised synonymic catalogue with taxonomic notes on some Nearctic Lycaenidae. – Jour. Lepid. Soc. **24**:23-28.

DRAUDT, M. (1919): *Thecla*. In: A. SEITZ, Macrolepidoptera of the World, pp. 795-811. Stuttgart: Kernen-Verlag, vol. 5 ("Vol. II"), pp. 593-1139, vol. 5 Plates ("Vol. II Plates"), pl. 1-194.

EITSCHBERGER, U. & TAO-QUIN HOU (1991): Announcement [of German-Chinese research association]. - Lepid. News **1991**(1):2.

ELIOT, J. N. (1973): The higher classification of the Lycaenidae (Lepidoptera): a tentative arrangement. - Bull. Br. Mus. Nat. Hist. Entomol. **28**:373-505.

ELWES, W. J. (1881): On the butterflies of Amurland, North China and Japan. - Proc. Zool. Soc. London **1881**:856-915.

ELWES, W. J. (1884): A catalogue of the Lepidoptera of Sikkim. - Trans. Ent. Soc. London, vol. "**3**":269-273.

ESAKI, T. (1939): Insectorum Japonicorum illustratio iconographica, coloribus ad naturum depicta. - Tokyo, privately printed [bound NHM Libr., total pagination not noted].

EVANS, W. H. (1912): A list of Indian butterflies. - J. Bombay nat. Hist. Soc. **21**:553-584.

FABRICIUS, J. C. (1807): Systema Glossatorium. In: ILLIGER, Die neueste Gattungs-Eintheilung der Schmetterlinge auf den Linnéischen Gattungen *Papilio* und *Sphinx*. Mag. f. Insektenk. **6**:279-289 [of 277-295 pp.].

FIELD, W. D. (1967a): Preliminary revision of butterflies of the genus *Calycopis* SCUDDER (Lycaenidae: Theclinae). - Proc. U.S. Natl. Mus. **119**(3552):1048.

FILED, W. D. (1967b): Butterflies of the new genus *Calystryma* (Lycaenidae; Strymonini). - Proc. U.S. Natl. Mus. **123**(3611):1-31.

GILLHAM, N. W. (1956): *Incisalia* SCUDDER, a Holarctic genus (Lepidoptera: Lycaenidae). - Psyche **62**:145-150.

HAKU, L. (1936): A list of insects collected from North Keisho-do, Korea. - Journ. Chos. Nat. Hist. **21**:117.

HEMMING, F. (1967): The generic names of the butterflies and their type-species (Lepidoptera, Rhopalocera). - Bull. Brit. Mus. (Nat. Hist.), supplement **9**, 509 pp.

HOWE, W. H. (ed). (1975): The butterflies of North America. - Garden City, Doubleday and Comp., 633 pp.

HUANG, S. M. Y. (1943): The Chinese Lycaenidae. - Notes ent. chin. **10**:67-213.

IGARASHI, S. (1973): *Ahlbergia haradai*, a new lycaenid butterfly from Nepal. - Tyo to Ga **23**:68-74.

INTERNATIONAL TRUST FOR ZOOLOGICAL NOMENCLATURE (1985): International Code of Zoological Nomenclature (3rd Edt.). xx + 338 pp.

JOHNSON, K. (1981): Revision of the Callophryina of the World with phylogenetic and biogeographic analyses. Ph.D. dissertation, City University of New York, 802 pp, unpublished.

JOHNSON, K. (1988): *Tergissima* and *Femniterga*, new sister genera of *Calycopis* SCUDDER and *Calystryma* FIELD from the south-central Andes. - Insecta Mundi **2**:28-42.

JOHNSON, K. (1989a): A revisionsary study of the Neotropical hairstreak butterfly genus *Noreena* and its new sister genus *Contrafacia*. - Jour. N. Y. Entomol. Soc. **97**:11-46.

JOHNSON, K. (1990a): *Penaincisalia*, a new genus of "elfin"-like butterflies from the high Andes (Lepidoptera: Lycaenidae). - Pan-Pacific Entomol. **66**:97-125.

JOHNSON, K. (1990b): The new hairstreak butterfly genus *Orcya*, a revision of the Neotropical "*Thecla*" *orcynia* assemblage (Lepidoptera: Lycaenidae). Jour. N. Y. Entomol. Soc. **98**:50-87.

JOHNSON, K. (1991a): Neotropical hairstreak butterflies: genera of the *Calycopis/Calystryma* grade of Eumaeini (Lepidoptera, Lycaenidae, Theclinae) and their diagnostics. - Rept. Mus. Nat. Hist. Univ. Wisconsin (Stevens Point) **21**:1-127.

JOHNSON, K. (1991b): Cladistics and the biogeography of two trans-Carribbean hairstreak butterfly genera: *Nesiostrymon* and *Terra* (Lepidoptera, Lycaenidae). Am. Mus. Novitates **3011**:1-43.

JOHNSON, K. (1991c): Types of Neotropical Theclinae (Lycaenidae) in the Museum National d'Histoire Naturelle, Paris. - J. Lepid. Soc. **45**:142-157.

JOHNSON, K. (in press): Genera and species of the Neotropical "elfin"-like hairstreak butterflies (Lepidoptera, Lycaenidae, Theclinae). - [in two volumes as one number], Reports, Mus. Nat. Hist., Univ. Wisconsin (Stevens Point). in press.

JOHNSON, K., EISELE, R. C. & B. MACPHERSON (1988): The "hairstreak butterflies" (Lycaenidae: Theclinae) of northwestern Argentina. I. Introduction, *Calycopis*, *Calystryma*, *Tergissima* and *Femniterga*. - Bull. Allyn Mus. **123**:1-49.

JOHNSON, K., EISELE, R. C. & B. MACPHERSON (1989): The "hairstreak butterflies" (Lycaenidae: Theclinae) of northwestern Argentina. II. *Strymon*, sensu stricto. - Bull. Allyn Mus. **130**:1-77.

JOHNSON, K. & E. L. QUINTER (1983): Commentary on MILLER and BROWN vs. EHRLICH and MURPHY et al.: pluralism in systematics and the worldwide nature of kinship groups. - Jour. Res. Lepid. **21**(1982):255-269.

KAWAZOE, A. & M. WAKABAYACHI (1977): The butterflies of Japan. Tokyo, Hoikusha Publ. Col. Ltd., 422 pp.

KIM, H. K. (1961): An analysis of the geographic distributions of Korean butterflies. - Jour. Kor. Colt. Res. Inst. II, **1**:235-294.

KIRBY, W. F. (1871): A synonymic catalogue of the diurnal Lepidoptera. - London, Van Voorst, vii + 690 pp.

KLOTS, A. B. (1951): A field guide to the butterflies of North America, east of the Great Plains. - Boston, Houghton Mifflin Comp., 349 pp.

KLOTS, A. B. (1970): Lepidoptera. pp. 115-130. In: S. L. TUXEN (Ed.), Taxonomist's glossary of genitalia of insects. - Copenhagen, Munksgaard, 359 pp.

KORCHUNOV, J. P. (1972): Annotated list of Rhopalocera of the U.S.S.R. - Review of the Ent. of the U.S.S.R. **51**:352 -368.

KRATTZ, G. (1870): JULIUS LEDERER, 1821-1870. - Berl. Ent. Ztschr. **14**:ix-x.

KUROKU, H. (1957): Ennumerato Insectorum Montis Hikosan. - Univ. Hyushuensis, Hiksson Lab. Biol. Publ., 106 pp.

LEDERER, J. (1853-55): Versuch die europäischen Spanner in möglichst natürliche Reihenfolge zu stellen. - Verhand. zool.-bot. Ges. Wien **3**(1853):165-270; **5**(1855):100 [of 65-126].

LEECH, J. H. (1889): On a collection of Lepidoptera from Kiukiang. - Trans. ent. Soc. Lond. **37**:99-148.

LEECH, J. H. (1893-94): Butterflies from Japan, China and Corea [herein cited as bound for NHM by R. H. PORTER, London, 681 pp.]. - Originally privately printed (see BRIDGES 1988 (IV: 59) for pagination [identical to above]).

MATSUMURA, S. (1929): Illustrated common insects of Japan. Vol. 1 "Butterflies" - Tokyo, Shonyodo [3 parts]: 45, 66, 37 [+3] pp.

MILLER, L. D. & F. M. BROWN (1981): A catalogue/checklist of the butterflies of America north of Mexico. - Lepid. Soc. Mem. **2**, vii + 280 pp.

MILLER, L. D. & F. M. BROWN (1983): Papilionoidea. pp 49-65. In: HODGES, R. W. (ed.), Check list of the Lepidoptera of America north of Mexico. London, E. W. Classey and Wedge Entomol. Res. Found., xxiv + 284 pp.

MIYAHIMA, H. (undated): Distributional listing of Japanese butterflies (trans.). - Separatum [NHM library], pp. 170-178.

MORI, T., DOI, H. & F. CHO. (1934): Colored butterflies from Korea. - Seoul, privately printed, 86 pp.

MOUTSCHULSKY, V. I. (1866): Catalogue des Insectes recus du Japon. - Bull. Soc. imp. nat. Moscou **39**:163-200.

MURRAY, A. (1875): *Lycaena ferrea* as type of *Satsuma*, new genus. - Ent. Month. Mag. **11**(1874):168.

NAKAYAMA, M. (1932): A guide to general information concerning Corean butterflies. - [unnumbered] Bull. Chosen Agric. Exp. Stat.:365-386.

NELSON, G. & N. I. PLATNICK (1981): Systematics and Biogeography, Cladistics and Vicariance. - New York, Colombia University Press, xi + 567 pp.

OKAMOTO, J. (1923): [title in Korean, untranslated], "Calalog of Specimens Exhibited at Chosen":68 [referring to specimens of *Satsuma*].

OKANO, K. (1941): [in Japanese] [Description of genus *Ginzia*]. - Tokyo, Igaku to Seihutugako **11**:239.

OPLER, P. R. & G. O. KRIZEK (1986): Butterflies east of the Great Plains, an illustrated natural history. - Baltimore, Johns Hopkins University Press, xvii + 294 pp.

PRATT, A. E. (1892): To the snows of Tibet through China. - London, Longmans, Green, and Co., 268 pp.

PRYER, H. J. S. (1946): A list of butterflies and associated insects donated to the British Museum by H. J. S. PRYER. - NHM library mimeograph, 28 pp.

PYLE, R. M. (1981): The Audubon field guide to North American butterflies. - New York, Alfred A. Knopf (Chanticleer), 916 pp.

REBEL, H. (1901): Über einige neue von Herrn MAX KORB in Westasien gesammelte Lepidopterenformen. - Annln naturh. Mus. Wien **16**:165-169.

RILEY, N. D. (1939): *Satsuma albilinea* sp. nov. from West China. - Novit. Zool. **41**:359.

SCHWANSWITSCH, B. N. (1948): Evolution of the wing pattern in the lycaenid Lepidoptera. - Proc. Zool. Soc. London 119: 189-263.

SCOTT, J. A. (1986): The butterflies of North America, a natural history and field guide. - Stanford, Stanford University Press, 583 pp.

SCUDDER, S. H. (1872): Notes. - In: Annual Report of the Trustees of the Peabody Museum. Peabody Acad. Sci. **1871**, 83 pp.

SEITZ, A. (1907-1921): [Palaearctic Theclinae] pp. 211-328. The Macrolepidoptera of the World. Vol. 1 ("Vol. I"). The palaearctic butterflies. - Stuttgart, Alfred Kernen Verlag, Vol. 1 ("Vol. I") pp. 1-379, vol. I plates ("Vol. I Plates") 89 pls.

SEOK, D. M. (1933): Concerning *Satsuma ferrea* at Songdo (trans.). Journ. Chos. Nat. Hist. **15**:70.

SEOK, D. M. (1934): Concerning *Satsuma ferrea* at Kyuzyo and Songdo (trans.). Bull. Kagoshima Coll. 25 Anniv. **1**: 763.

SEOK, D. M. (1936): Concerning *Satsuma ferrea* at Mt. Kongo (trans.). - Zephyrus **6**:99.

SEOK, D. M. (1939): A synonymic list of the butterflies of Korea. - Seoul, Royal Asiatic Society, xxxi + 391 pp.

SEOK, D. M. & S. NISHIMOTO (1935): Concerning *Satsuma ferrea* at Ranan (trans.). - Zephyrus **6**:97.

SEOK, D. M. & B. TAKACUKA (1932): Concerning *Satsuma ferrea* at Kyuzyo (trans.). - Zephyrus **4**:316.

SHAPIRO, A. M. (1991): The zoogeography and systematics of the Argentine Andean and Patagonian pierid fauna. - Jour. Res. Lepid. **28**(1989):137-238.

SHIELDS, O. (1982): International Nepal Himalaya expedition for Lepidoptera Palaearctica (INHELP) 1977, Report No. I: Introduction and Lycaenidae. - J. Res. Lepid. **20**:65-80.

SHIELDS, O. (1984): Oriental Lycaenidae, Riodinidae and Hesperiidae from the Central Nepal Himalayas. - J. Bombay Nat. Hist. Soc. **81**:546-550.

SHIROZU, T. & A. Hara (1962): Early stages of Japanese butterflies in color. Vol. 2. - Hoikushu, Osaka, 120 pls.

SMITH, C. (1989): Butterflies of Nepal (Central Himalaya...). Bangkok, Tecpress Service, 352 pp.

SOUTH, R. (1902): Catalogue of the collection of palaearctic butterflies formed by the late JOHN HENRY LEECH, and presented to the trustees of the British Museum by his mother Mrs. ELIZA LEECH. - London, British Museum, 228 pp.

SPENCER, J. E. (1972): [Contributions] In: China. - Encyclopaedia Britannica, **5**:559-565, London, William Benton, [vol. 5] 998 pp.

STRECKER, H. (1878): Lepidoptera, Rhopalocèra and Heteroceres, indigenous and exotic, with three supplements, and list of types in the collection of Lepidoptera of Dr. HERMAN STRECKER. - Reading, Pennsylvania. Owen's Steam Book and Job Printing Office. 143 pp., 14 pls., supps. 12 pp., 11 pp., 37 pp.

SWOFFORD, D. (1985): PAUP - Phylogenetic analysis using parsimony. (A phylogenetics computer program package distributed by the author). D. Swofford, Urbana, Illinois Nat. Hist. Sur.

UCHIDA, H. (1932): Concerning Satsuma ferrea in Korea (trans.). - Icon. Ins. Jap.:989.

U.S.B.G.N. [United States Board of Geographic Names] (1968): Mainland China (2nd Edt.). - Washington, Gov. Printing Office, 108,000 entries [2 vols.].

U.S.B.G.N. [United States Board of Geographic Names] (1970): U.S.S.R. (2nd Edt.). - Washington, Gov. Printing Office, 400,000 entries [7 vols.].

ZIEGLER, J. B. (1961): Preliminary contribution to a redefinition of the genera of North American hairstreaks (Lycaenidae) north of Mexico. - Jour. Lepid. Soc. **14**(1960):19-23.

Appendix 1

Worldwide Callophryina elfins and their taxonomic characters

Based on characters listed below, taxa of worldwide elfinlike hairstreak butterflies are distinguished in two clades of the Eumaeini, infratribes "Callophryina" and "Thecloruxina" and member taxa subsequently enumerated from the historical literature.

Characters - Major shared features of selected structures listed with states for (A) Callophryina and (B) Thecloxurina (callophryine states are generally illustrated herein; see JOHNSON, 1990a for additional citations of illustrations in the historical literature).

1. Male Genitalia, cephaloventral margins of valval lobes: (A) fully fused with opaque sclerotin; (B) separated by transparent sclerotin.

2. Male Genitalia, bilobed area of valvae: (A) transparent and flat or concave; (B) opaque and generally convex.

3. Male Genitalia, caecum of aedeagus: (A) comprising a fourth or less of aedeagus length and uniplanar [or contiguously bowed] with shaft; (B) comprising at least a third of aedeagus length and often ventrally declined.

4. Female Genitalia, ductus bursae and terminal lamellae: (A) terminal lamellae flared distally outside plane of ductus bursae tube, unconstricted in the cephalic one-half to one-third, and with dorsoterminal area either fused or with a transparent suture; (B) as one conjoined tubelike structure, various constricted in the cephalic one-half to one-third, and with aprominent dorsoterminal fissure.

5. Female Genitalia, cervix bursae: (A) diminutive, developed at most to a thin shield covering distal end of corpus bursae; (B) variously sclerotized into a major additional genital component.

Historical nomenclature

(A) Callophryine butterflies. - Of the Eumaeini genera listed by ELIOT (1973), groups included by BROWN (1942), GILLHAM (1956), CLENCH (1961), HOWE (1975), JOHNSON (1981), JOHNSON & QUINTER (1982) and DESCIMON (1986) include: (1) *Ahlbergia* BRYK, (2) *Callophrys* BILLBERG, (3) *Cyanophrys* CLENCH, (4) *Incisalia* SCUDDER, (5) *Mitoura* SCUDDER, (6) *Sandia* CLENCH, and (7) *Xamia* CLENCH. Authors have widely treated the New World members (2-7) as a monophyletic group, including all or most as either subgenera of *Callophrys* (CLENCH, 1961; DOS PASSOS, 1970; HOWE, 1975; SCOTT, 1986) or separate genera (KLOTS, 1951; DOS PASSOS, 1964; MILLER & BROWN, 1981, 1983; PYLE, 1981; JOHNSON & QUINTER, 1983; OPLER & KRIZEK, 1986).

(B) Thecloxurine butterflies. - Of the Eumaeini species groups listed by DRAUDT (1919), groups included by BROWN (1942), DESCIMON (1986) and JOHNSON (1981, 1990a) include: *Penaincisalia* (JOHNSON 1990a), "*Thecla*" *loxurina*-group, "*Thecla*" *arria*-group. JOHNSON (in press) has enumerated a taxonomy for members of the latter large assemblages; for brevity, generic names used therein are not enumerated here.

Character polarity

There are a number of character polarities readily recognized by synoptic morphological study and corroborated by delineation of polarity from rooted trees of highest consistency value (PAUP: SWOFFORD, 1985). Relative apomorphy in these characters is best understood expressed in nested series of states [P/ = generally primitive; A/ = relatively apomorphic (nested series A1, A2 etc.] as detailed below for taxa and distribution areas. For cross-reference purposes in the text, characters below are numbers 1-, at the left.

I. Characters generally separating continentally restricted clades of callophryine elfins (using generic groupings of the synonymic list presented in Appendix 2, Table I).

Male Genitalia

Condition of Valvae

(1) P/ contiguously tapered along the bilobes and caudal extensions (primitive Callophryina worldwide);

(2) A1: bilobed configuration shouldered, thereafter evenly tapered (Holarctic callophryine elfins – *Cissatsuma*, *Novosatsuma*, *Incisalia*, *Cisincisalia*);

(3) A2/ variously sculptured along the entire length (Palaearctic *Ahlbergia*; Nearctic *Deciduphagus*);

(4) A2(i)/ caudal extension variously sculptured but short (fitting characterization in fig. 2C herein) (Palaearctic *Ahlbergia*);

(5) A2(ii)/ caudal extension variously sculptured and elongate (generally fitting charactization in fig. 2D, E, herein) (Nearctic *Deciduphagus*).

Condition of Aedeagus

(6) P/ terminus with generally spatulate cornuti, variously dentate around terminus (Palaearctic *Cissatsuma*, *Novosatsuma*; New World *Cisincisalia*, *Incisalia*);

(7) A1/ terminus with generally tapered cornuti, variously dentate around terminus (Palaearctic *Ahlbergia*, Nearctic *Deciduphagus*). [Distinction here (6-7) may become weak in certain speciose subclades showing a highly autapotypic member(s) but appears generally valid).

Female Genitalia

Condition of Ductus Bursae

(8) P/ simple and tubular with negligible distal expansion of any terminal elements (primitive Callophryina worldwide);

(9) A1/ terminus with simple lamellae [generally limited to innovation of the dorsal ductal terminus] angled distally up to 95 degrees from the ductal plane (Holarctic callophyrine elfins – *Cissatsuma*, *Novosatsuma*, *Incisalia*, *Cisincisalia*) [see alternative characterization for this trait in Palaearctic taxa, fig. 2 herein];

(10) A1(i)/ lamellae ventrally striated or convoluted (Palaearctic *Novosatsuma* [retained in a few *Ahlbergia*]; New World *Incisalia*, *Cisincisalia*);

(11) A1(ii)/ terminus with elaborate lamellae [generally including innovation of the dorsal and ventral ductal terminus] angled greatly distad (over 95 degrees) from the ductal plane (Palaearctic *Ahlbergia*; Nearctic *Deciduphagus*) [see alternative characterization for this trait in Palaearctic taxa, fig. 2 herein];

(12) A2/ ductus bursae terminus basad of lamellae elaborated to a fluted antrum (Palaearctic *Novosatsuma*, Nearctic *Incisalia*, *Deciduphagus*). [For further innovation of this character, see A2(i) (P, A1) under entry II under "Specialization of Ductus Bursae" in certain continentally restricted groups].

Condition of Corpus Bursae

(13) P/ signa robust bifurcate spines (primitive in Callophryina worldwide, including *Cissatsuma*, *Novosatsuma*, *Incisalia*);

(14) A1/ signa thin spines vaguely bifurcate (New World *Deciduphagus*; *Cisincisalia*);

(15) A2/ signa of some taxa reduced to diminutive spines or absent (Palaearctic *Ahlbergia*).

Palpi

(16) P/ first segment short (usually less than half length of second segment), second segment short (not exceeding .75 entire length of second and third segments or four times maximal width of second) (primitive in worldwide Callophryina, including taxa of *Cissatsuma*, *Novosatsuma*, *Incisalia* plesiotype [considered by me as *I. lanoraeensis*, *Cisincisalia*);

(17) A1/ compared to above (P), with relative elongation of second and/or third segments (taxa of Palaearctic *Ahlbergia*; taxa of Nearctic *Deciduphagus*, *Incisalia* apotypes *eryphon* and *niphon*).

II. Following on character states above, characters distinguishing certain continentally sympatric groups, or continentally allopatric sister groups, of callophryine elfins

Male Genitalia

Condition of Valvae

(18) P/ shouldered bilobed area of valvae comprising more than three-eighths valval length (Palaearctic *Cissatsuma*) [see alternative characterization in fig. 2E herein];

(19) A1/ shouldered bilobed configuration representing less than three-eighths valval length (Palaearctic *Novosatsuma*; Nearctic *Incisalia*) [known specimens of New World *Cisincisalia* indicate a species in each category, see Descriptions in Appendix 2]).

Female Genitalia

Condition of Terminal Lamellae

(20) P/ simple lamellae [defined as in previous entry] (Palaearctic *Cissatsuma*);

(21) A1/ caudal expanse of dorsal lamellal innovation generally three times or more that of any ventral innovation (Palaearctic *Novosatsuma*; Nearctic *Incisalia*);

(22) A2/ lamellal innovation extreme in both surfaces with various sculpturing and/or additional components (Palaearctic *Ahlbergia*; Nearctic *Deciduphagus*) [autapotype *Novosatsuma plumbagina* shows additional components].

Specialization of Ductus Bursae

(23) P/ no specialized sclerotinal innovations along juncture of ductus bursae and terminal lamellae (primitive Callophryina worldwide including Palaearctic *Cissatsuma*, New World *Cisincisalia*);

(24) A1/ juncture of ductus bursae and terminal lamellae marked with antrumal configuration opaguely sclerotized along fluted distal margins and variously transparent within antrum center (Palaearctic *Novosatsuma*; Nearctic *Incisalia*);

(25) A2/ juncture of ductus bursae and terminal lamellae marked with sclerotized antrumal configuration separated completely from shaft of ductus bursae by intervening area of transparent sclerotin (Nearctic *Dedicuphagus* [apparently also independently derived in a few apotypic members of *Ahlbergia* "*circe*" Group and requiring some clarification as to homology of any independent occurrence in the *Incisalia* apotypes *I. niphon* and *I. eryphon*]).

Appendix 2

Synonymic list of worldwide Callophryina elfin butterflies

Based on data in Appendix 1, taxonomic revision of Palaearctic elfins herein, and characters polarized in Appendix 2, a new Worldwide synonymic list of elfinlike callophryine butterflies is enumerated below as Table I (with necessary new descriptions addended thereafter).

[Synonymic List attached as graphics table, pages 92-93]

Descriptions of New World genera

Description of **D e c i d u p h a g u s** gen. nov.

Characters
Biological: Larval foodplant various angiosperms (see citations, Appendix 1).
Morphological: see above, Appendix 1, entries 3, 5, 7, 11, 12, 14, 17, 22, 25 and genital descriptions below. Wings – Ventral hindwing pattern comprised of color encompassing basal disc, postbasal marks within latter, arc-shaped outline of basal disc, and suffusion in cells M3-CuA2 (CuA1 as *Thecla*-spot) of limbal area [contrasting concentric and often jagged banding of *Incisalia*]. Male Genitalia – valval ventrum not robust compared to *Incisalia*, bilobes rimmed comparatively thin, shouldered, and comprising generally .43-.52 valval length (.42 – generally much less for *Incisalia*); caudal extensions generally thinly tapered (robust in *Incisalia*); Female Genitalia – ductus bursae with fully transparent constricted area in caudal .32-.50 of length (laterally transparent in caudal .16-.30 of length in *Incisalia*) followed by robustly fluted antrum and hemispherical lamellae (former comprising .45-.50 of antrum/lamellae caudal extension) (antrum reduced, lamellae bilaterally lobated, often with great lateral expanse and former comprising .25-.30 of antrum/lamellae caudal extension in *Incisalia*).

Type Species: *Thecla augustinus* WESTWOOD.

Diversity
See Appendix 2, Table I (usages therein comprising new combinations).

Distribution
Pan-Nearctic from southern United States north to southern (non-panhandle) Alaska.

Etymology
Considered masculine; arbitrary euphonious Latinized combination refering to the usage of deciduous plant species by the larvae of the included species.

Description of **C i s i n c i s a l i a** gen. nov.

Characters
Biological: Unknown.
Morphological: see above, Appendix 1, entries 2, 6, 9, 10, 14, 16, 19, 23 and genitalic descriptions below. Wings – Upper surfaces with blue structural color; under surface hindwing pattern comprised of concentrically jagged bands variously from the postbasal to postmedial area; limbal area with *Thecla*-spot. Male Genitalia (fig. 99A) – most similar to Palaearctic *Cissatsuma*, valvae ventrum robust, bilobes comprising about .25-.30 of valval width; aedeagus terminus with robust cornuti. Female Genitalia (fig. 99B) most similar to Palaearctic *Cissatsuma*, ductus bursae robust terminating in more fluted, expansive and often convoluted, lamellae.

SYNONYMIC LIST OF WORLDWIDE CALLOPHRYINE ELFINS

OLD WORLD

Genus **Ahlbergia** BRYK
Satsuma MURRAY (unavailable homonym)
Ginzia OKANO (synonym)

1. **Ahlbergia chalybeia** (LEECH)
2. **Ahlbergia bimaculata** JOHNSON
3. **Ahlbergia ferrea** (BUTLER)
4. **Ahlbergia korea** JOHNSON
5. **Ahlbergia leei** JOHNSON
6. **Ahlbergia arquata** JOHNSON
7. **Ahlbergia pluto** (LEECH)
   7a. **A. p. pluto** (LEECH)
   7b. **A. p. cyanus** JOHNSON
   7c. **A. p. clarofacia** JOHNSON
8. **Ahlbergia aleucopuncta** JOHNSON
9. **Ahlbergia unicolora** JOHNSON
10. **Ahlbergia pictila** JOHNSON
11. **Ahlbergia caerulea** JOHNSON
12. **Ahlbergia frivaldszkyi** (LEDERER)
    12a. **A. f. frivaldszkyi** (LEDERER)
    12b. **A. f. tricaudata** JOHNSON
    12c. **A. f. aquilonaria** JOHNSON
13. **Ahlbergia circe** (LEECH)
    13a. **A. c. circe** (LEECH)
    13b. **A. c. montivaga** JOHNSON
14. **Ahlbergia prodiga** JOHNSON
15. **Ahlbergia caesius** JOHNSON
16. **Ahlbergia lynda** JOHNSON
17. **Ahlbergia haradai** IGARASHI
18. **Ahlbergia leechi** (DE NICÉVILLE)
19. **Ahlbergia nicevillei** (LEECH)

Genus **Novosatsuma** JOHNSON

1. **Novosatsuma collosa** JOHNSON
2. **Novosatsuma matusiki** JOHNSON
3. **Novosatsuma magnasuffusa** JOHNSON
4. **Novosatsuma plumbagina** JOHNSON
5. **Novosatsuma pratti** (LEECH)
6. **Novosatsuma oppocoenosa** JOHNSON
7. **Novosatsuma magnapurpurea** JOHNSON
8. **Novosatsuma cibdela** JOHNSON
9. **Novosatsuma monstrabila** JOHNSON

Genus **Cissatsuma** JOHNSON

1. **Cissatsuma albilinea** (RILEY)
2. **Cissatsuma kansuensis** JOHNSON
3. **Cissatsuma halosa** JOHNSON
4. **Cissatsuma tuba** JOHNSON
5. **Cissatsuma crenata** JOHNSON
6. **Cissatsuma contexta** JOHNSON

SYNONYMIC LIST OF WORLDWIDE CALLOPHRYINE ELFINS

NEW WORLD

Genus **Incisalia** SCUDDER

1. **Incisalia niphon** (HÜBNER)
   1a. **I. n. niphon** (HÜBNER)
   plautus (SCUDDER) (n.n.)
   1b. **I. n. clarki** T. FREEMAN
2. **Incisalia eryphon** (BOISDUVAL)
   2a. **I. e. eryphon** (BOISDUVAL)
   2b. **I. e. sheltonensis** CHERMOCK & FRECHIN
3. **Incisalia lanoraieensis** SHEPPARD

Genus **Deciduphagus** JOHNSON

1. **Deciduphagus augustinus** (WESTWOOD)
   augustus (KIRBY) (sec. homonym)
   "**augusta** KIRBY" (misspelling, of authors)
   1a. **D. a. augustinus** (WESTWOOD)
   1b. **D. a. helenae** (DOS PASSOS)
   1c. **D. a. croesoides** (SCUDDER)
   1d. **D. a. iroides** (BOISDUVAL)
   ab. **immaculata** (COCKLE)
   1e. **D. a. annetteae** (DOS PASSOS)
2. **Deciduphagus fotis** (STRECKER)
3. **Deciduphagus mossii** (HY. EDWARDS)
   3a. **D. m. mossii** (HY. EDWARDS)
   3b. **D. m. schryveri** (CROSS)
   3c. **D. m. bayensis** (R. BROWN)
   3d. **D. m. duodoroffi** (DOS PASSOS)
   3e. **D. m. windi** (CLENCH)
4. **Deciduphagus polios** (COOK & WATSON)
   4a. **D. p. polios** (COOK & WATSON)
   ab. **davisi** (WATSON & COMSTOCK)
   4b. **D. p. obscurus** (FERRIS & FISHER)
5. **Deciduphagus irus** (GODART)
   5a. **D. i. irus** (GODART)
   f. **balteata** (SCUDDER)
   5b. **D. i. arsace** (BOISDUVAL & LECONTE)
   5c. **D. i. hadros** (COOK & WATSON)
6. **Deciduphagus henrici** (GROTE & ROBINSON)
   6a. **D. h. henrici** (GROTE & ROBINSON)
   6b. **D. h. margaretae** (DOS PASSOS)
   6c. **D. h. solatus** (COOK & WATSON)
   6d. **D. h. turneri** (CLENCH)

Genus **Cisincisalia** JOHNSON

1. **Cisincisalia guatemalena** (CLENCH)
2. **Cisincisalia moecki** JOHNSON

Type Species: *Cisincisalia moecki*, new species (see below).

Diversity
See Appendix 2, Table I, usage of *C. guatemalena* (CLENCH) (1981) comprising a new combination.

Distribution
Montane central Mexico to montane Guatemala.

Etymology
Considered feminine; combining Latin suffix *cis* meaning "far off" [e.g. "primitive"] with the SCUDDER's taxonomic name for Nearctic conifer-feeding elfinlike butterflies.

Description of Type Species:

Cisincisalia **m o e c k i** spec. nov.

Diagnosis
Compared to congener lacking hindwing tails and with prominent anal lobe; forewing in female lacking bands, both sexes lacking discal mark; hindwing in both sexes with basal disc limited basally on wing, jagged bands occurring postbasally and along margin, limbal *Thecla*-spot limited to orange blotch. Genitalia distinctive as noted below.

Description
Wings summarized above (Fig. 81D).
Male genitalia (Fig. 99A): Differing from congener by more robust ventral vinculum and saccus, shorter bilobed area of valvae (comprising only about one-third valvae length, with caudal extension generally tapered), greatly elongate aedeagus (caecum length itself equalling rest of genitalia).
Female genitalia (Fig. 99B): Ductus bursae more robust than congener (overall ductal width equalling from .33-.50 that of terminal lamellae) with terminal lamellae simpler and less dorsally expansive; apophyses papillae anales elongate (length from anterior margin of anales equalling entire length of ductus bursae).

Types
Holotype male (Fig. 81D), Highway 190 on Continental Divide near Rio Frio at 10,500 ft. altitude on road from Mexico City to Puebla, 16 July 1952, leg. A. H. MOECK. Allotype female, same data as primary type but altitude 11,000 ft., 17 July 1937, leg. A. H. MOECK; deposited MPM.
Paratype (AMNH): same data as primary type.

Etymology
Patronym for Arthur H. MOECK.

Captions

Fig. 1. Wing Venation and Pattern in Palaearctic Elfin Genera. Representative taxa: A. *Ahlbergia ferrea* (with veins labelled as used in text). B. *Novosatsuma pratti*. C. *Cissatsuma albilinea*. D. Major pattern features typifying elfin butterflies as termed in text (all ventral except b). a. postmedial line or band; b. scent brand (dorsal); c. basal disc (large stipples) [c1, marginal band of disc; c2, postbasal marks, if present]; d. crescent line (if present); e. limbal area (light stipples) [e1, *Thecla*-spot, if present]; f. anal lobe.

Fig. 2. Schematic Male Genitalia. A. Lateral view of genitalia indicating terminology used for various structures. B. Generalized ventral view of valvae as used for illustrating each species in figures 4-. CDE. Valvae typifying three genera of Palaearctic elfins (X, 1X [= 1 times X] and 1.5X [= 1.5 times X] indicating measurements used in generally characterizing valval shapes for descriptive purposes in text and keys): C. Short, sculptured valvae typical of *Ahlbergia* species ("x" indicating caudal length of bilobed configuration; dashed lines indicating kinds of interspecific differences typifying genus). D. Robust valvae with abruptly tapered termini typifying *Novosatsuma* species ("x" indicating breadth of bilobed configuration). E. Robust valvae with gradually tapered termini typifying *Cissatsuma* species ("x" as in entry D).

Fig. 3. Schematic Female Genitalia, indicating terminology used for various structures. A-C. Female genital shapes typifying three genera of Palaearctic elfins (measurements used for generally characterizing genital shapes for descriptive purposes in text and keys – aside generalized right angle from lateral margin of ductus (dashed line and arrow), "x" = distal expansion of terminal lamellae, "y"= generalized width of ductus bursae). A. "Sculptured" ductus bursae and flared terminal lamellae typical of *Ahlbergia* species. B. "Robust" ductus bursae with terminal ductal antrum (often with central transparent areas) and flared lamellae typifying *Novosatsuma* species. C. "Robust" ductus bursae with diminutive terminal lamellae typifying *Cissatsuma* species.

Figs. 4-15. Genitalia of the *Ahlbergia* "*chalybeia*" Group and "*ferrea*" Group. "*chalybeia*" Group: 4. *A. chalybeia*, male, Tatsienlu, MNHN. 5. same, lectotype female. 6. *A. bimaculata*, holotype male. 7. same, allotype female. "*ferrea*" Group: 8. *A. ferrea*, holotype male. 9. same, female, Kyoto, AMNH. 10. *A. korea*, holotype male. 11. same, allotype female. 12. *A. leei*, holotype male. 13. same, allotype female. 14. *A. arquata*, holotype male. 15. same, allotype female.

Figs. 16-23. Genitalia of the *Ahlbergia* "*pluto*" Group. 16, A. *Ahlbergia pluto pluto*, lectotype male. B. *A. pluto cyanus*, holotype male. C. *A. pluto clarofacia*, holotype male. 17, A. *A. pluto pluto*, paralectotype female "f" B. *A. pluto cyanus*, allotype female. C. *A. pluto clarofacia*, allotype female. 18. *A. aleucopuncta*, holotype male. 19. same, allotype female. 20. *A. unicolora*, holotype male. 21. same, allotype female. 22. *A. pictila*, holotype male. 23. *A. caerulea*, holotype female.

Figs. 24-25. Genitalia of *Ahlbergia* "*frivaldszkyi*" Species Complex. 24, A. *Ahlbergia frivaldszkyi frivaldszkyi*, topotype male. B. *A. frivaldszkyi frivaldszkyi*, Little Chingan Mountains (NMH). C. *A. frivaldszkyi tricaudata*, holotype male. D. *A. frivaldszkyi aquilonaria*, holotype male. 25, A. *A. frivaldszkyi frivaldszkyi*, topotype female. B. *A. f. frivaldszkyi*, Little Chingan Mountains (NMH). C. *A. frivaldszkyi tricaudata*, allotype female. D. *A. frivaldszkyi aquilonaria*, allotype female.

Figs. 26-35. Genitalia of the *Ahlbergia* "*circe*" Group and "*leechii*" Group. "*circe*" Group: 26, A. *Ahlbergia circe circe*, lectotype male. B. *A. circe montivaga*, holotype male. 27, A. *Ahlbergia circe circe*, paralectotype female "j" B. *A. circe montivaga*, allotype female. 28. *Ahlbergia pro-*

diga, holotype male. 29. same, allotype female. 30. *Ahlbergia caesius*, holotype female. 31. *Ahlbergia lynda*, holotype female. "*leechii*" Group: 32. *Ahlbergia leechii*, lectotype male. 33. same, paralectotype female. 34. *Ahlbergia nicevillei*, lectotype male. 35. same, paralectotype female "b"

Figs. 36-42. Genitalia of *Novosatsuma* "*pratti*" Group and "*monstrabila*" Group. "*pratti*" Group: 36. *Novosatsuma collosa*, holotype male. 37. *Novosatsuma matusiki*, holotype male. 38. *Novosatsuma magnasuffusa*, holotype male. 39. *Novosatsuma plumbagina*, holotype female. 40. *Novosatsuma pratti*, paralectotype male. 41. same lectotype female. "*monstrabila*" Group: 42. *Novosatsuma oppocoenosa*, holotype male.

Figs. 43-47. Genitalia of *Novosatsuma* "*monstrabila*" Group. 43. *Novosatsuma oppocoenosa*, allotype female. 44. *Novosatsuma magnapurpurea*, holotype male. 45. same, allotype female. 46. *Novosatsuma cibdela*, holotype male. 47. *Novosatsuma monstrabila*, holotype male.

Figs. 48-58. Genitalia of *Cissatsuma* "*albilinea*" Group and "*tuba*" Group. "*albilinea*" Group: 48. *Cissatsuma albilinea*, holotype male. 49. same, allotype female. 50. *Cissatsuma kansuensis*, holotype male. 51. same, allotype female. 52. *Cissatsuma halosa*, holotype male. 53. same, allotype female. "*tuba*" Group: 54. *Cissatsuma tuba*, holotype male. 55. same, allotype female. 56. *Cissatsuma crenata*, holotype male. 57. same, allotype female. 58. *Cissatsuma contexta*, holotype male.

Figs. 59-61. Adults of *Ahlbergia* "*chalybeia*" Group and "*ferrea*" Groups. *chalybeia* Group: 59AB. *Ahlbergia chalybeia*, SEITZ (1921) figure of NHM specimen designated herein as lectotype female (DS (A), VS (B); a, DS silvery blue, b, VS concentric bands of brown and olive). 59C. *A. chalybeia*, male, "Vrlanatong" [sic] China (MNHN) (a, DS brown [contrast to reputed "female *chalybeia*" – holotype male of *Novosatsuma cibdela*, fig. 84, brilliant blue]). 60. *Ahlbergia bimaculata*, holotype male (DS left, a, brown ground; VS right, b, simple pattern – basal disc dark brown, distal area light buff). *ferrea* Group: 61A. *Ahlbergia ferrea*, male, Kyoto, Japan (MNHN) (DS, a, blackish ground flecked blue-green, particularly along limbal area). 61B. *A. ferrea*, left, female VS, Yokahama (MNHN); right, male VS, nr. Fukushima (AMNH) (b, prominent white band from SC+R1 to M1 or 2, c, grayish suffusion across limbal area).

Figs. 62-64. Adults of *Ahlbergia* "*ferrea*" Group, continued. 62AB. *Ahlbergia korea*, holotype male, VS (A), allotype female, VS (B) (a, hindwing grounds brown, disc margin ill-defined, limbal area lacking bold gray suffusion). 63. *Ahlbergia leei*, holotype male, DS left, VS right (a, blue marginal line; b, ground chocolate brown, postbasal disc with black postbasal stripe; c, white slash along anal lobe). 64AB. *Ahlbergia arquata*, paratype male, female respectively (a, DS blue-suffused to postmedial area, b DS bright light blue to submargin). 64C. *Ahlbergia arquata*, holotype male (a, VS ground contrasted bright gray and white forming vivid bands).

Fig. 65. Adults of the *Ahlbergia pluto* complex (as a group distinguished by hindwing ventral color concentrated in basal disc/limbal area, latter with lavish blue to blue-gray suffusions, brands elongate). 65A. *Ahlbergia p. pluto*, male, DS right, VS left, Vallee du Tong Ho (MNHN); 65BC. VS nominate females, same locality (a, DS brown; b, brand elongate; c, VS limbal area lavishly suffused with blue gray and brown). 65D. *Ahlbergia p. clarofacia*, holotype male, VS (DS brown, a, VS markings obsolescent, limbal area without suffusion). 65EF. *Ahlbergia p. cyanus*, DS right, VS left, holotype male (E), allotype female (F) (a, male DS with basal suffused blue, female suffused bright purplish blue to submargin; b, VS markings lavish; c, limbal area mottled mostly brown).

Figs. 66-68. Adults of other, Brown Members of *Ahlbergia "pluto"* Group (all DS, left, VS right, distinguished from *A. pluto* by uniformity of ventral hindwing pattern/color distribution – major markings continuing costad through postmedial and submarginal areas and hues invariably brown, brands short). 66. *Ahlbergia aleucopuncta*, holotype male (a, DS brand oblong; b, VS ground light yellow brown; c1, c2, white marks costad and anad basal disc; d, crescents costad). 67AB. *Ahlbergia unicolora*, holotype male (A), allotype female (B) (a, DS brand compact, ovate; b, VS unicolorous yellow brown, only basal disc and scalloped submargin, across entire wing, of darker hue). 68. *Ahlbergia pictila*, holotype male (a, DS brand ovate; b, VS outline of disc jagged and mottled, paralleled, c, by postmedial brown blotches across wing, d, submarginal white outlined from anal margin costad).

Figs. 69-70. Blue Members of *"pluto"* Group and Adults of the *Ahlbergia frivaldszyki* complex. 69. *Ahlbergia caerulea*, holotype male, DS left, VS right (a, DS bright silvery blue; b, scent brand small and ovate; c, VS diffuse gray-brown pattern centered on darker basal disc). 70AB. *Ahlbergia f. frivaldszkyi*, topotype male, DS left, VS right (a, DSFW suffused blue, rest of wing dark; b, VS slight discal mark; c, VS pattern mottled compared to *A. ferrea*, without bold white costad along basal disc margin and no prominent gray suffusion across limbal area). 70CDE. *Ahlbergia f. aquilonaria*, holotype male (CE), allotype female (D) (a, DS suffusive silvery blue; b, VS discal mark; c, basal disc mottled dark brown and black, distal area boldly contrasted brown and gray). 70FG. *Ahlbergia f. tricaudata*, holotype male, DS (F), VS (G) (a, HW deeply crenate; b, DS dark brown; c, VS brown basal disc contrasting light gray discal color, basal disc margin displaced distally along veins CuA1 and CuA2).

Fig. 71. Adults of *Ahlbergia "circe"* Group: *A. circe* complex and *A. haradai*. 71ABC. *Ahlbergia c. circe*, topotypical males [south Szechwan] (NHM) (A), DS, (B) VS, (C) female, Kangting [central Szechwan] (AMNH) (a, DS brown; b, VS brown with darker basal disc distended along veins CuA1, CuA2). 71DE. *Ahlbergia c. montivaga*, holotype male, DS (E), VS (D) (a, VS yellow brown, markings more mottled throughout). 71F. *Ahlbergia haradai*, holotype "female" [male? (see b)] (a, DS bright gray-blue; b, scent brand?; c, VS basal disc and anal marks russet over light gray).

Figs. 72-74. Adults of *Ahlbergia "circe"* Group, continued. 72AB. *Ahlbergia prodiga*, holotype (A), allotype (B), DS left, VS right (a, DS iridescent silvery blue basad wide dark margins; b, wing shape angled and crenate; c, VS basal disc suffused blackish and [as in *Novosatsuma pratti*] bright white slashes at costal and anal edge of disc margin). 73. *Ahlbergia caesius*, holotype (a,b, DS bright silvery blue basad black FW borders and HW dentate margin; c, VS lavish brown in disc, d, suffused widely brown and blue across limbal area). 74. *Ahlbergia lynda*, holotype (a, DS wing base violet; b, VS basal disc angulate, lined white marginally and anally, c, white suffusion along crescents; d, *Thecla*-spot; e, suffused blue-gray across limbal area).

Figs. 75-79. Adults of *Ahlbergia "leechii"* Group and Adults of *Novosatsuma*. 75AB. *Ahlbergia leechii*, A, DS rendering (a, DS bright silvery blue to margins), B, VS (transposed from color slide) (b, basal disc very dark, well defined with, c, white spot along costal edge; d, distal ground concolorous yellow-brown followed by red-brown in submargin). 76AB. *Ahlbergia niceville*i, SEITZ (1921) figure of NHM specimen designated herein as lectotype male) (A) DS, (B) VS (a, DS silvery blue baso-medial; b, VS basal disc mottled and with dark postbasal line;, c, limbal area with jagged crescent line and, d, drab brown patch). Adults of *Novosatsuma "pratti"* Group. 77 *Novosatsuma collosa*, holotype, DS left, VS right (a, DS ground auburn; b, VS yellow brown with, c, no white along FW line, d, white costal and anal spots). 78. *Novosatsuma matusiki*, holotype, DS left, VS right (a, anal lobe prominent; b, VS basal disc outer margin as wide brown band; c, costal brown patch; d, suffusive gray-white along anal margin. 79. *Novosatsuma magnasuffusa*, holotype male, DS left, VS right (a, dentate margins; b, basal disc

brown with internal postbasal line; c, disc paralleled by brown crescent line, d, white suffusion and line along anal margin).

Figs. 80-82. *Novosatsuma* continued; Adults of *Novosatsuma "pratti"* and *"monstrabila"* Groups. 80. *Novosatsuma plumbagina*, holotype male, DS left, VS right (a, DS bright silvery blue within crisp black borders; b, VS black; c, white costal and anal slashes). 81ABC. *Novosatsuma pratti*, SEITZ (1921) figure of NHM specimen designated herein as lectotype female, (A) DS, (B) VS (a, DS blackish, flecked steel blue; b, VS mottled deep brown; c, disc margin marked with white slashes, most prominent at costal and anal margins); (C) VS male, showing reduction of all spots except costal and anal, as in many specimens). 81D. Inserted here by format constraint - holotype male of *Cisincisalia moecki*, Central American elfin, DS left, VS right (see Appendix 1). Adults of *Novosatsuma "monstrabila"* Group. 82AB. *Novosatsuma oppocoenosa*, holotype (A), allotype (B), DS left, VS right (a, DS baso-medial deep azure blue; b, VS disc mottled black-brown; c, limbal area suffused bright red-brown).

Figs. 83-85. Adults of *Novosatsuma "monstrabila"* Group. 83. *Novosatsuma magnapurpurea*, holotype, DS left, VS right (a, DS, baso-medial purple; b, VS entirely grizzled dull brown; c, blackish crescent-line paralleling disc). 84. *Novosatsuma cibdela*, holotype, DS left, VS right (a, DS bright silvery blue; b, VS pattern concentric bands of dark sepia over red-brown). 85. *Novosatsuma monstrabila*, holotype, DS left, VS right (a, DS bright silvery blue; b, VS mottled concentric bands of sepia over gray-white, c, unique markings along anal margin).

Fig. 86-88. Adults of *Cissatsuma "albilinea"* Group. 86. *Cissatsuma albilinea*, male, Tatsienlu (AMNH), DS left, VS right (a, DS brown; b, pronounced anal lobe; c, VS with white lineal suffusion along postmedial areas). 87. *Cissatsuma kansuensis*, paratype male (photo dark, transposed from color slide) DS left, VS right (a, DS brown; b, VS HW disc and FW bases very dark mottled brown; c, white spot at costa; d, gray suffusion anal/postmedial area; e, limbal orange in cell CuA1 resembling "*Thecla*-spot"). 88AB. *Cissatsuma halosa*, holotype (A), allotype (B), DS left, VS right (a, DS brown; b, VS simple pattern brown disc paralleled by brown cresent line).

Figs. 89-91. Adults of *Cissatsuma "tuba"* Group. 89AB. *Cissatsuma tuba*, holotype (A), allotype (B), DS left, VS right (a, DS male brown, DS female baso-discally lavender; b, VS concentric bands of chestnut brown over lighter brown variously suffused with gray). 90. *Cissatsuma crenata*, holotype, DS left, VS right (a, anal lobes and crenate margins prominent; b, DS flecked to suffused bluish; c, VS ground light beige contrasted by greatly mottled darker brown in disc and crescent line; d, white anal line, e, orange brown resembling *Thecla*-spot). 91. *Cissatsuma contexta*, holotype, DS left, VS right (a, VS, margins of basal disc and crescent line interwoven along veins by black suffusion).

Fig. 92. Geographic distribution of *Ahlbergia "chalybeia"* Group and *"ferrea"* Group. Lower right: cladogram of *"ferrea"* Group showing Japanese endemic *A. ferrea* as vicariant plesiotype, mainland taxa as the sister group - A. *ferrea*, BCD. *korea*, *leei*, *arquata*. See *A. ferrea* Remarks for characters (JOHNSON, 1981, proposed additional characters differentiating taxa of the mainland triad; *A. ferrea* Remarks discusses polarity of the major morphological traits typifying *ferrea* versus the mainland triad).

Fig. 93. Geographic distribution of *Ahlbergia "pluto"* Group.

Fig. 94. Geographic distribution of *Ahlbergia frivaldszyki* Species Complex.

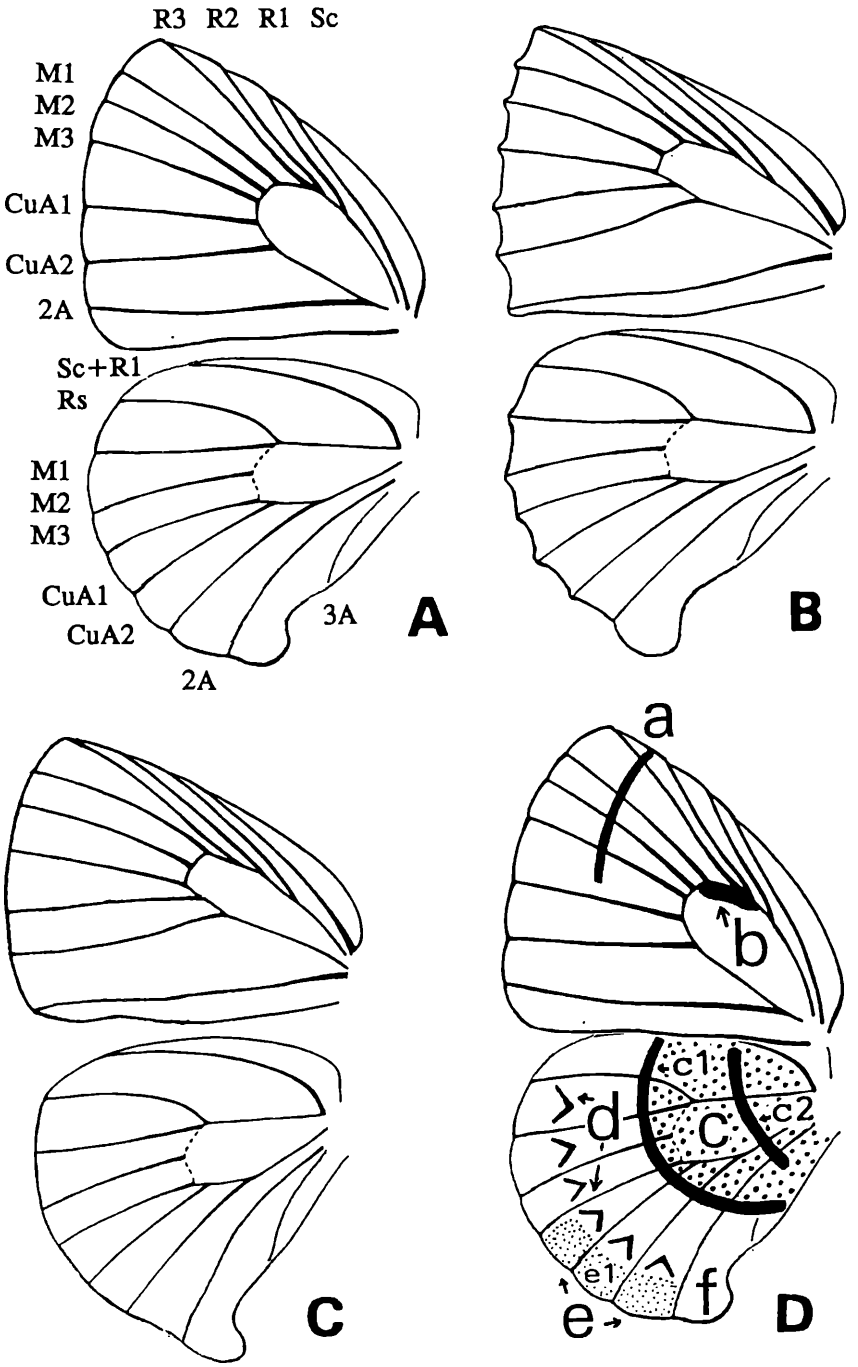
Fig. 95. Geographic distribution of *Ahlbergia "circe"* Group and *"leechii"* Group.

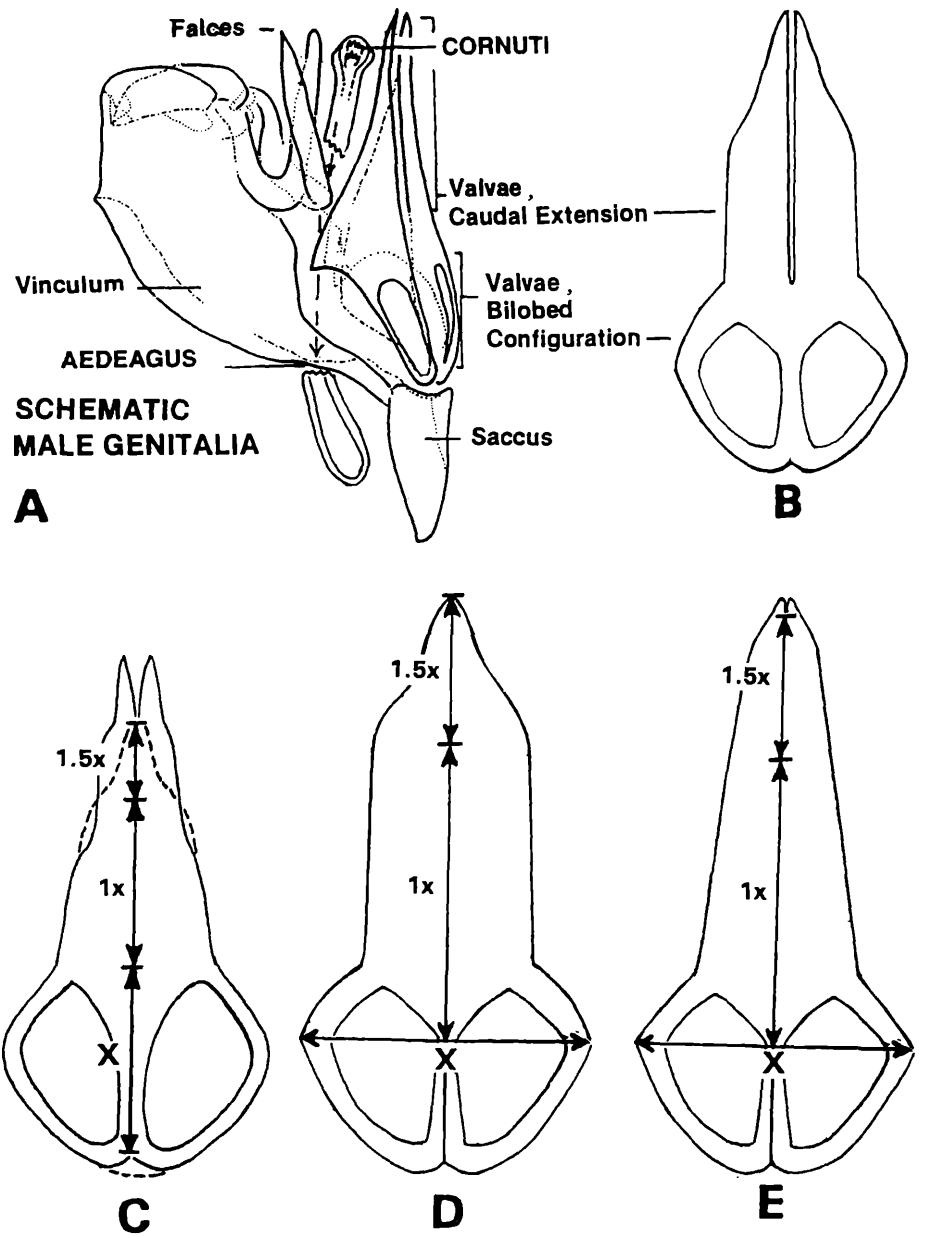
Fig. 96. Geographic distribution of *Novosatsuma*.

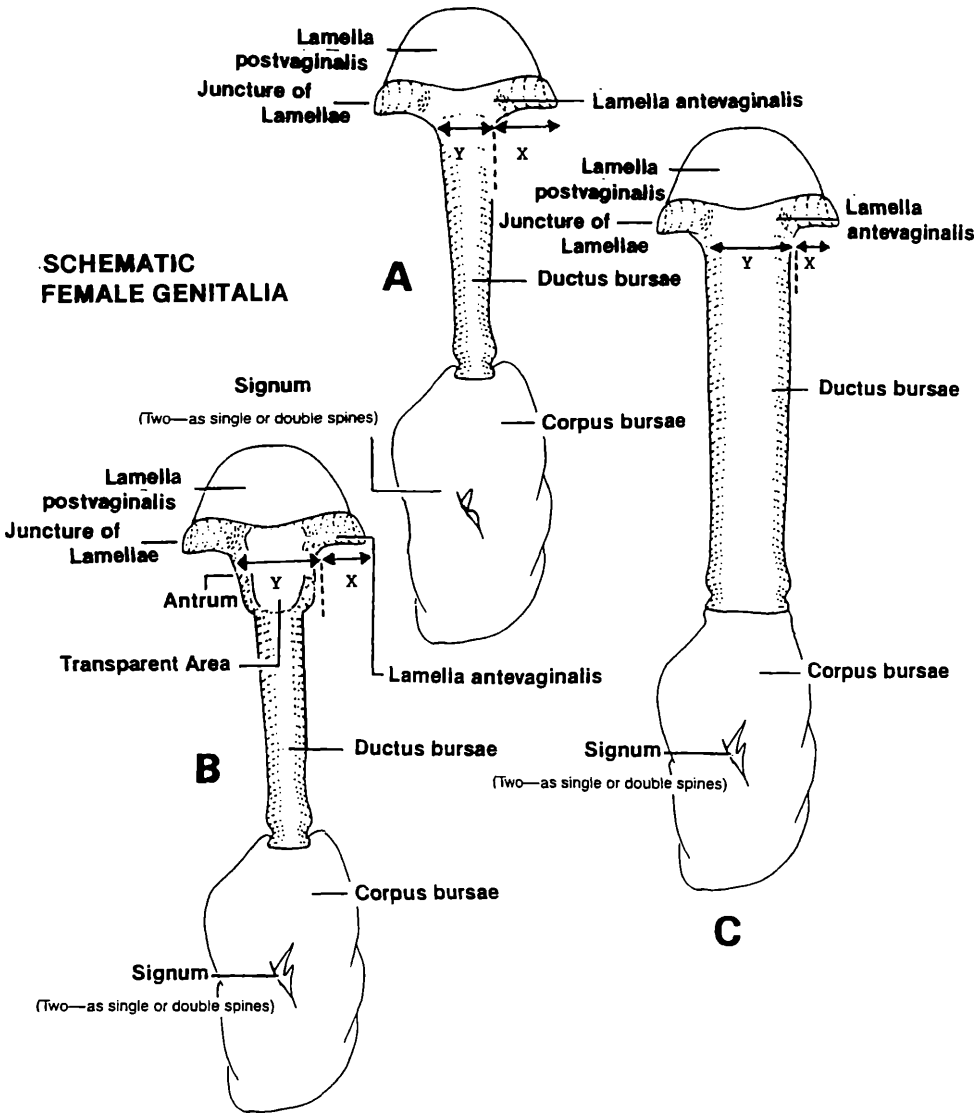
Fig. 97. Geographic distribution of *Cissatsuma*.

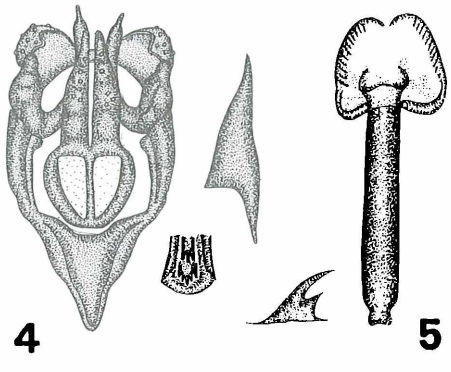
Fig. 98. Areas of endemism apparent in Palaearctic callophryine elfins. Major regions of endemism: I. north of solid black outline of northern China – region of distribution of the *Ahlbergia* "*ferrea*" and "*frivaldszkyi*" species groups (centered on coniferous forest communities occupying "a" [the Amur River Basin and vicinity] and extending westward and eastward as disjuncts indicated by arrows). II. south of line, areas of endemism in "nuclear" China – region of distribution of other *Ahlbergia* species groups, *Novosatsuma* and *Cissatsuma*. Names of major physiographic areas (marked "b"-"e") with apparently endemic species are named below according to SPENCER (1972), with general vegetation type [from same source] listed immediately after in parentheses. On map, at right (marked "a"-"e"), are numbers of apparent endemics in each region (see text "Concluding Notes" for species lists and bracketed numbers). Area names "b"-"e" are as follows: b. "Yunnan Plateau" (vegetation: Coniferous Forest (stipples) with Alpine communities westward and Evergreen Oak communities eastward). c. "Central Mountain Belt" (and adjoining Hunan Lake District eastward and Tapa Shan mountains northward) (vegetation: Evergreen Oak communities, stipples showing extent of Coniferous Forest). d. "Nan Shan" mountain margin with Mongolia (vegetation: Alpine with Coniferous Forest adjacent southeastward). e. "Tibetan Plateau" (vegetation: Alpine) not shown with a graphic circle because of widely disjunct occurrence of known Tibetan endemics.

Fig. 99. Morphology of Central American sister group *Cisincisalia*. A. *C. moecki* holotype male (format as in other figure entries except "x" = distinctive length of aedeagal caecum compared to rest of genitalia), B. *C. moecki* allotype female (format as in other figure entries except "y" = distinctive length of apophyses papillae anales). For *C. guatemalena* see CLENCH (1981). Note that in general fascies *Cisincisalia* appear more like Palaearctic plesiotypes *Cissatsuma* and *Novosatsuma* than the New World genera *Incisalia* and *Deciduphagus*.





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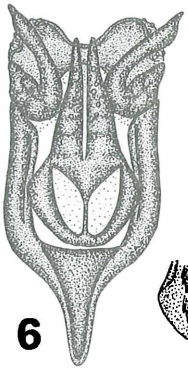
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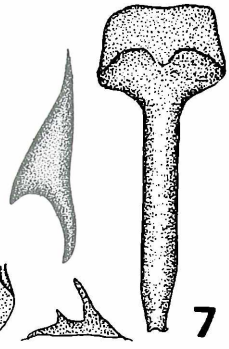
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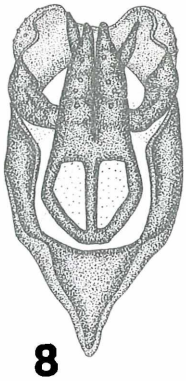
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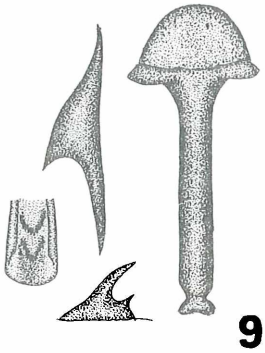
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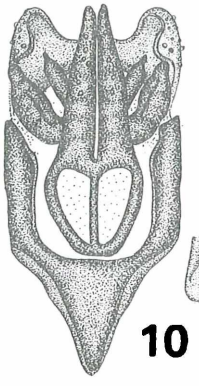
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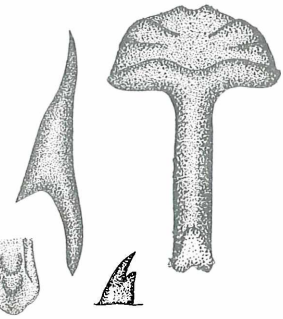
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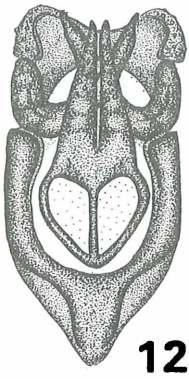
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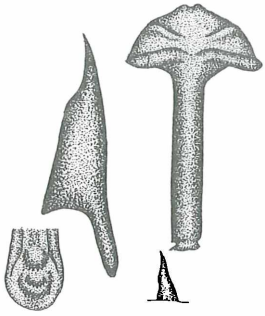
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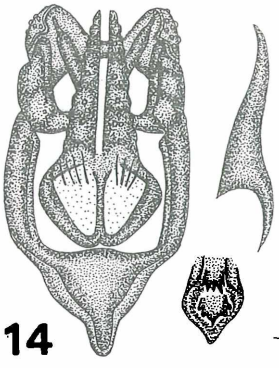
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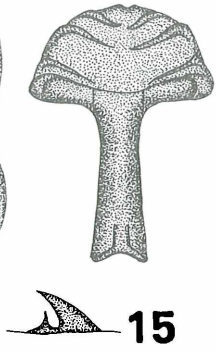
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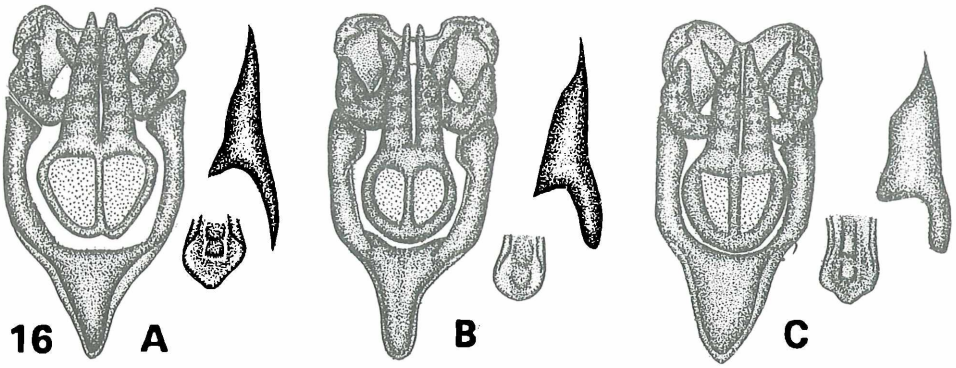

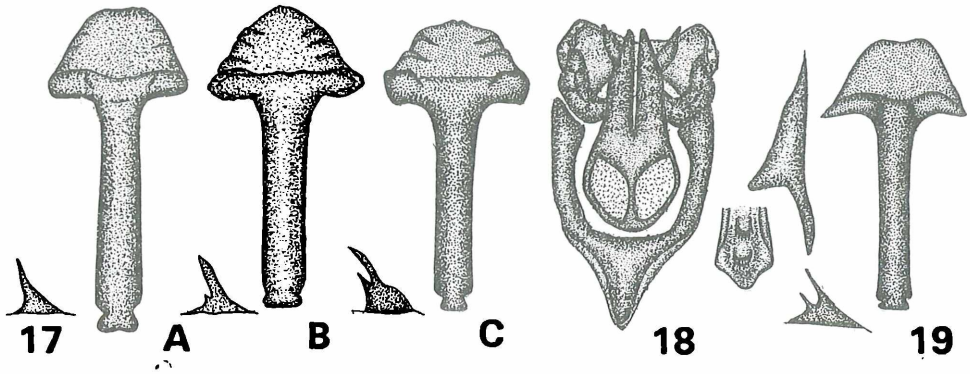

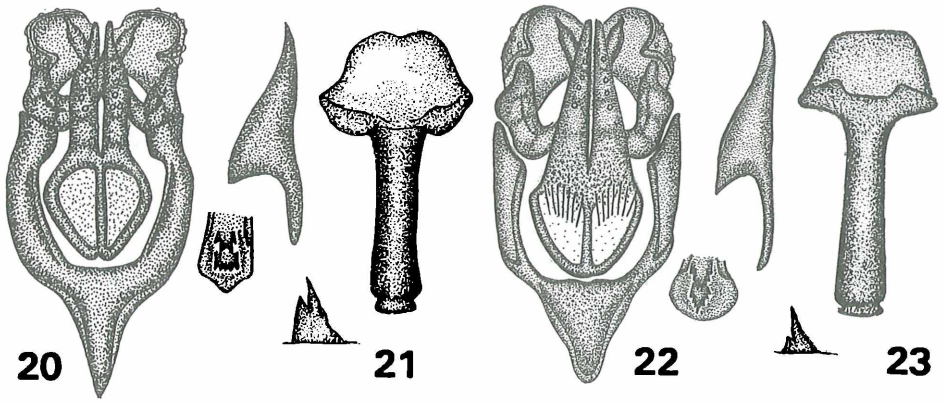

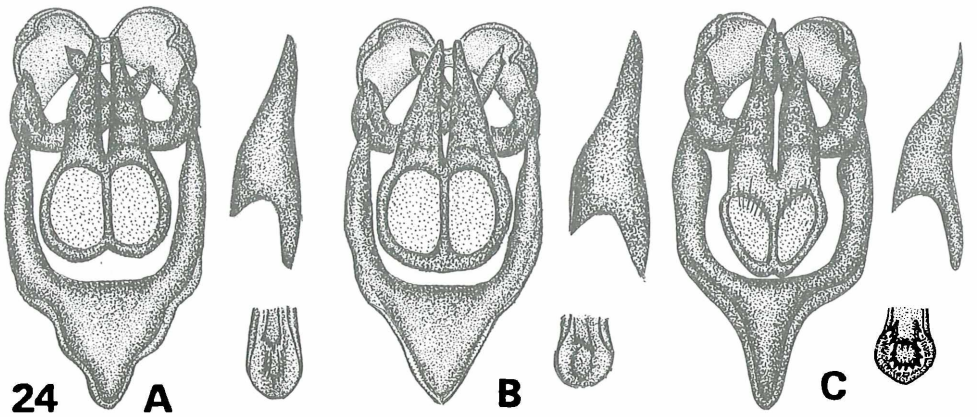

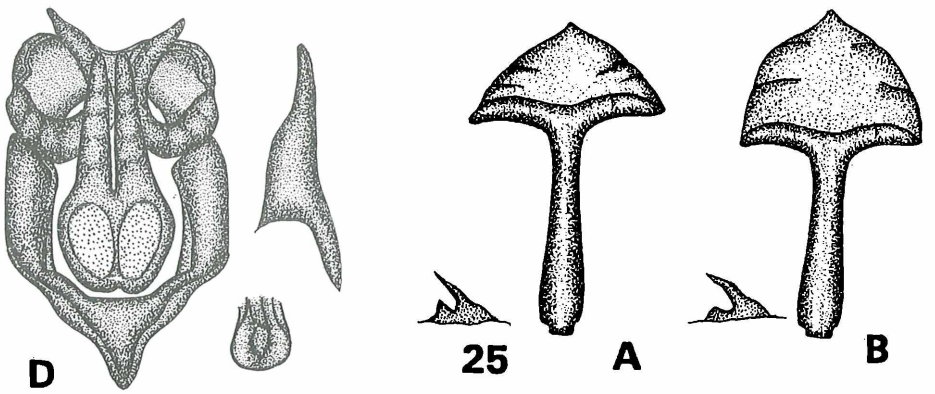

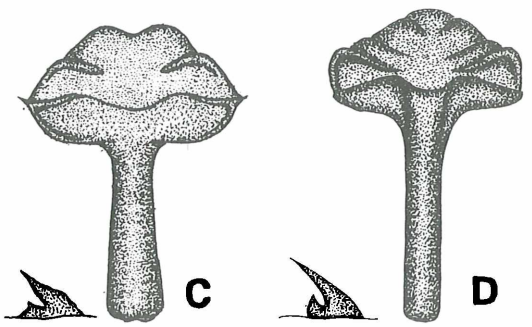

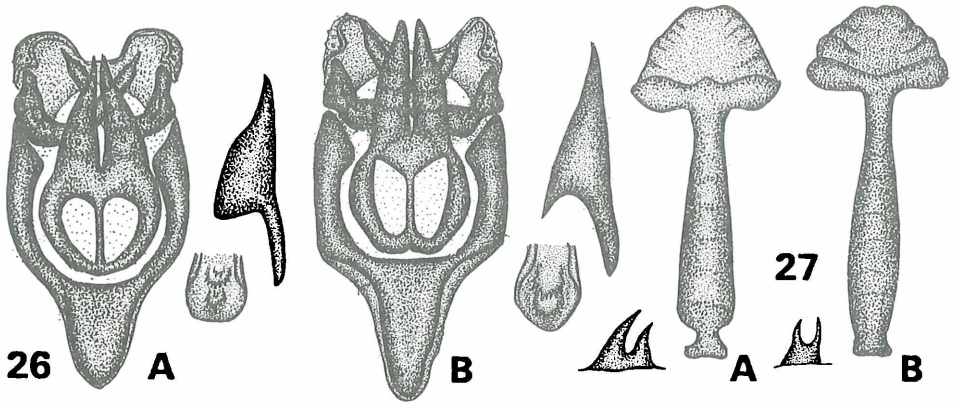

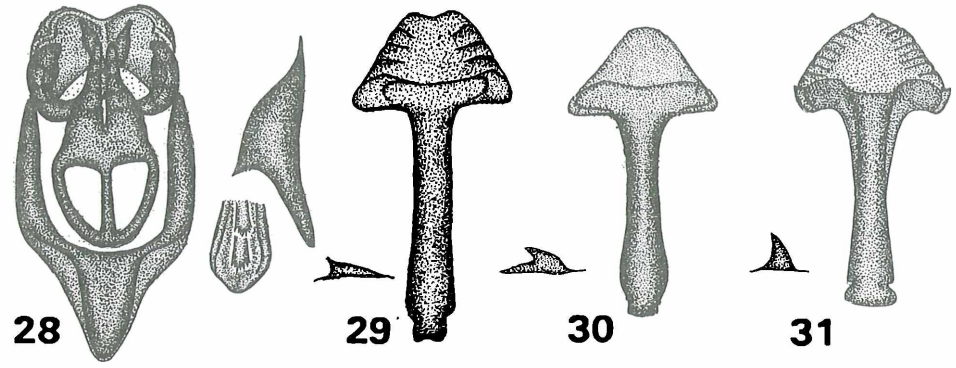

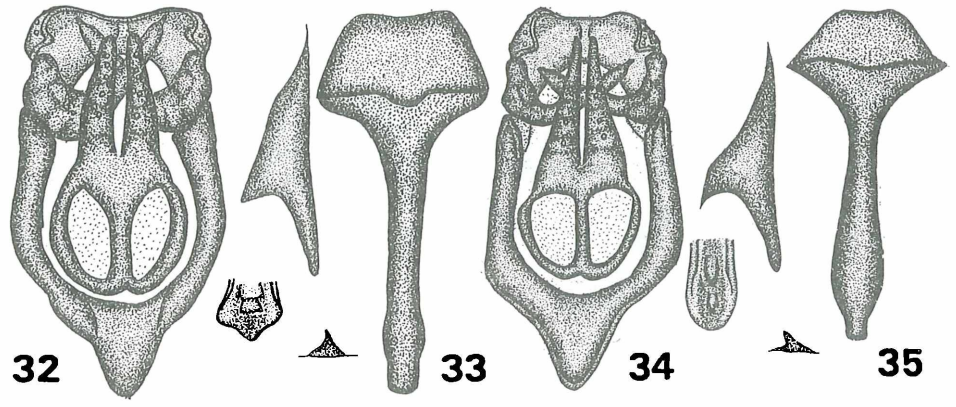

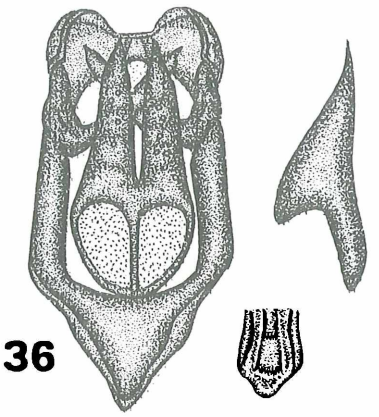

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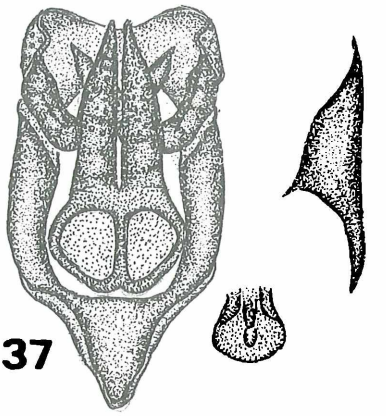

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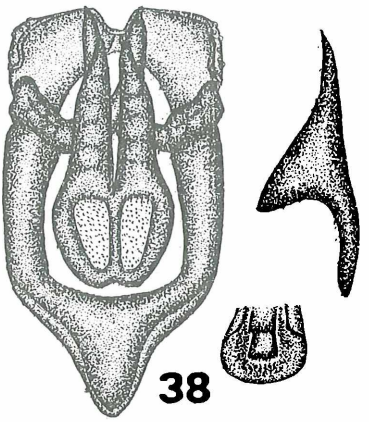

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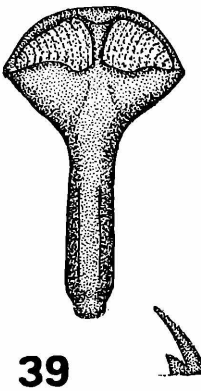

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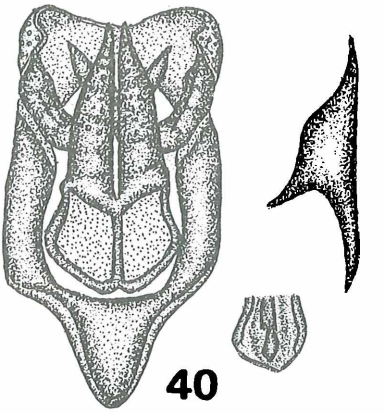

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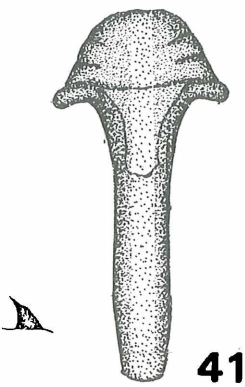

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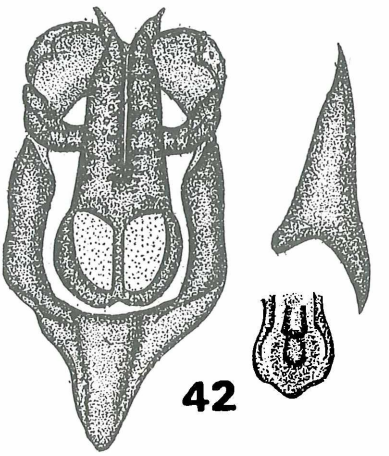

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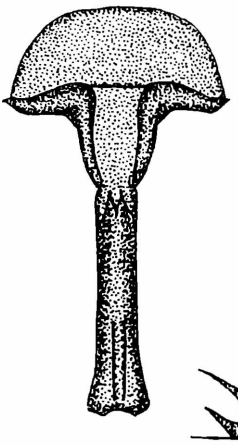

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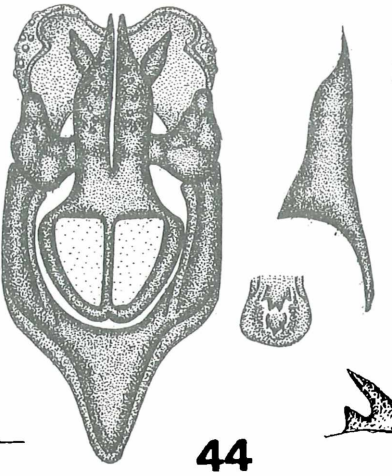

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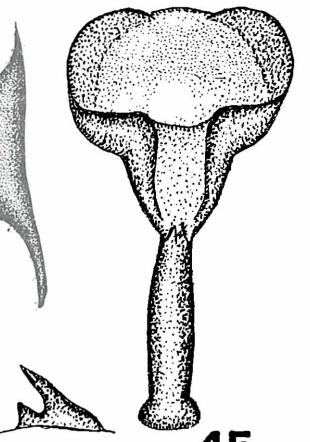

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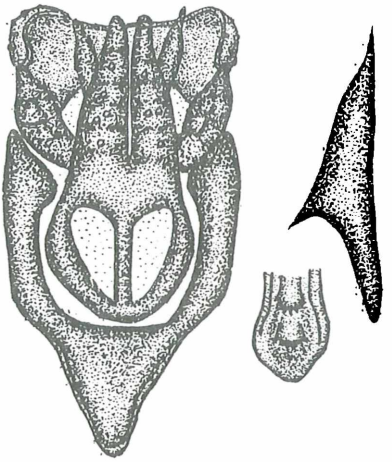

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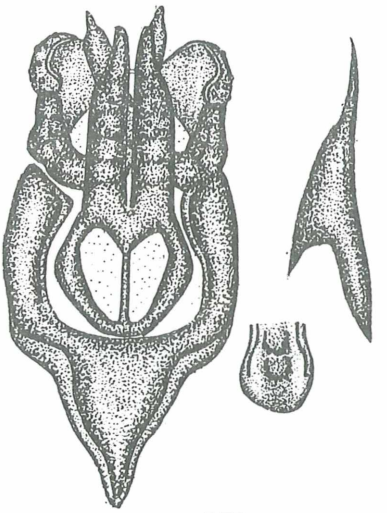

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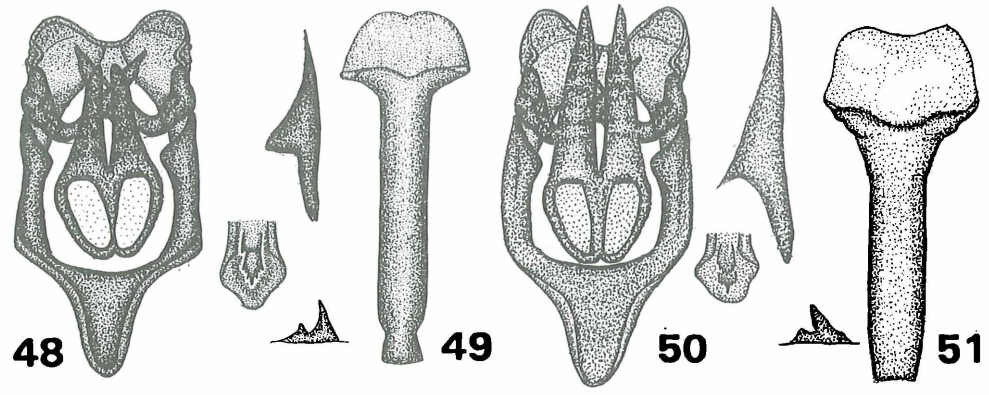
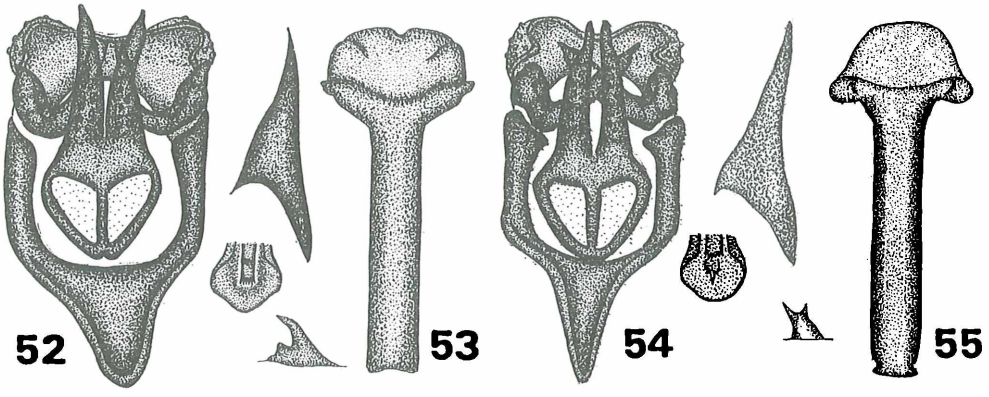
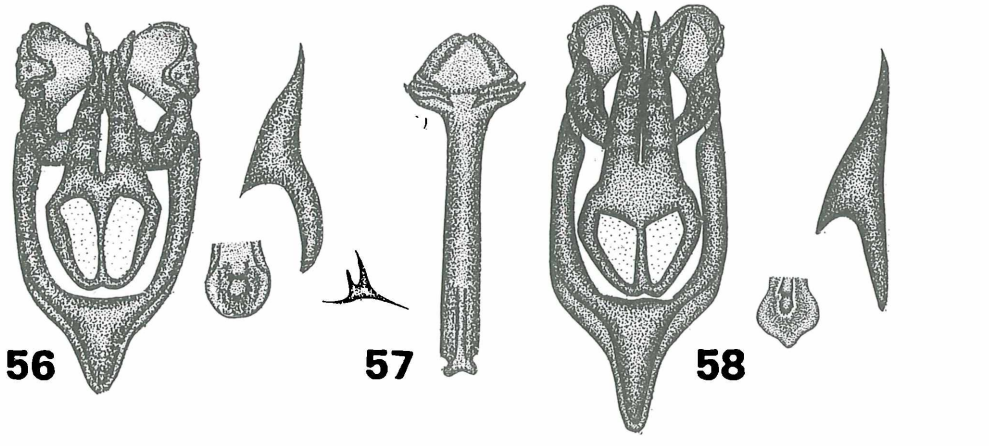
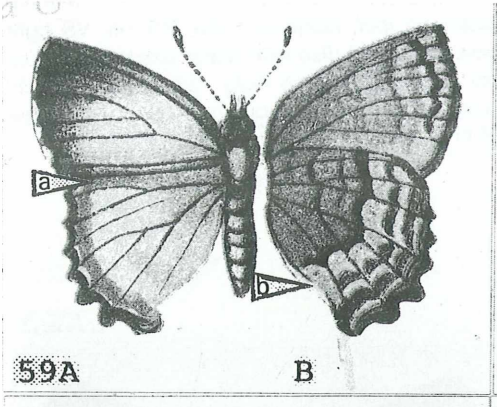


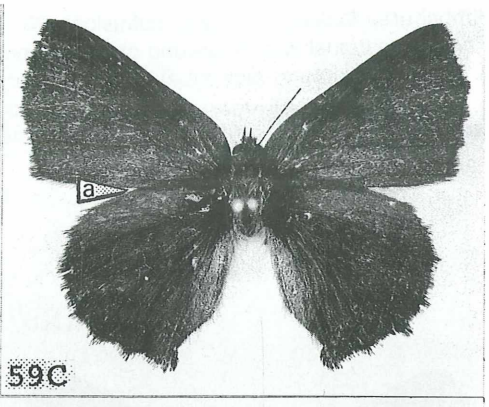




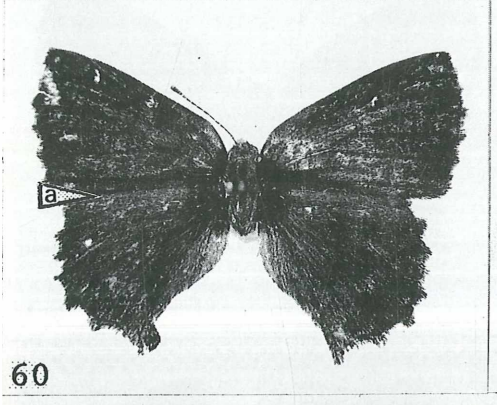
Figs. 59-61. Adults of *Ahlbergia* "*chalybeia*" Group and "*ferrea*" Groups. *chalybeia* Group: 59AB. *Ahlbergia chalybeia*, SEITZ (1921) figure of NHM specimen designated herein as lectotype female (DS (A), VS (B); a, DS silvery blue, b, VS concentric bands of brown and olive). 59C. *A. chalybeia*, male, "Vrlanatong" [sic] China (MNHN) (a, DS brown [contrast to reputed "female *chalybeia*" holotype male of *Novosatsuma cibdela*, fig. 84, brilliant blue]). 60. *Ahlbergia bimaculata*, holotype male (DS left, a, brown ground; VS right, b, simple pattern – basal disc dark brown, distal area light buff). *ferrea* Group: 61A. *Ahlbergia ferrea*, male, Kyoto, Japan (MNHN) (DS, a, blackish ground flecked blue-green, particularly along limbal area). 61B. *A. ferrea*, left, female VS, Yokahama (MNHN); right, male VS, nr. Fukushima (AMNH) (b, prominent white band from SC+R1 to M1 or 2, c, grayish suffusion across limbal area).



59A B



59C



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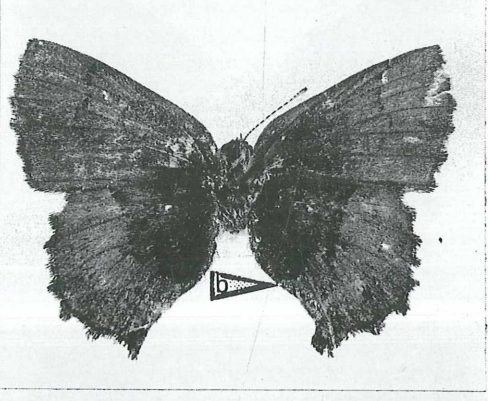
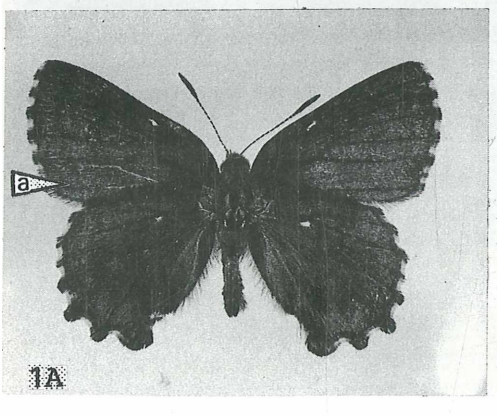
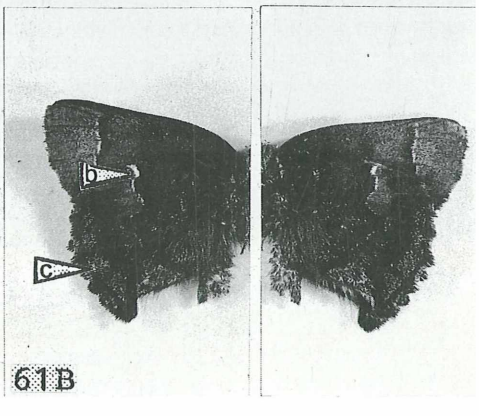


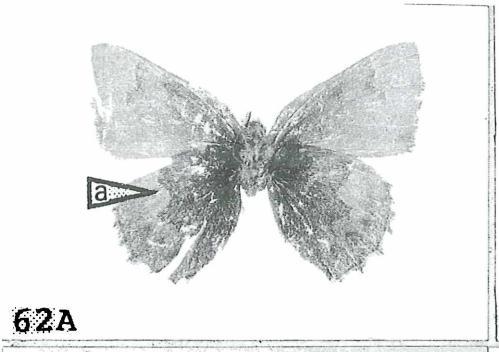


1A



61B

Figs. 62-64. Adults of *Ahlbergia "ferrea"* Group, continued. 62AB. *Ahlbergia korea*, holotype male, VS (A), allotype female, VS (B) (a, hindwing grounds brown, disc margin ill-defined, limbal area lacking bold gray suffusion). 63. *Ahlbergia leei*, holotype male, DS left, VS right (a, blue marginal line; b, ground chocolate brown, postbasal disc with black postbasal stripe; c, white slash along anal lobe). 64AB. *Ahlbergia arquata*, paratype male, female respectively (a, DS blue-suffused to postmedial area, b DS bright light blue to submargin). 64C. *Ahlbergia arquata*, holotype male (a, VS ground contrasted bright gray and white forming vivid bands).



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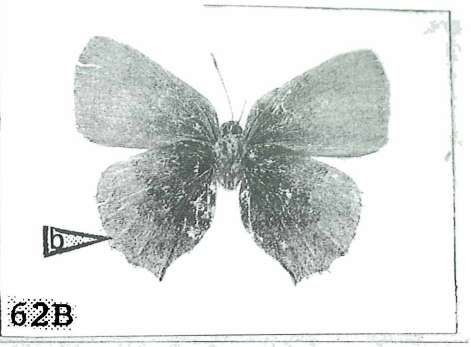
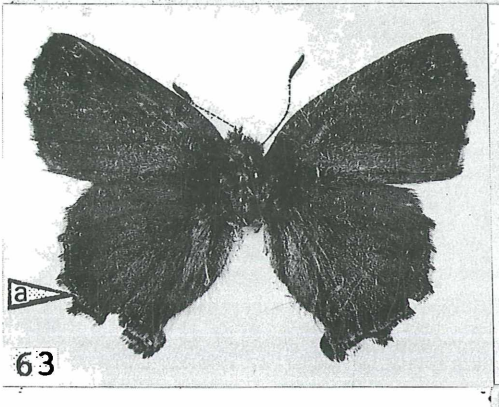


62B



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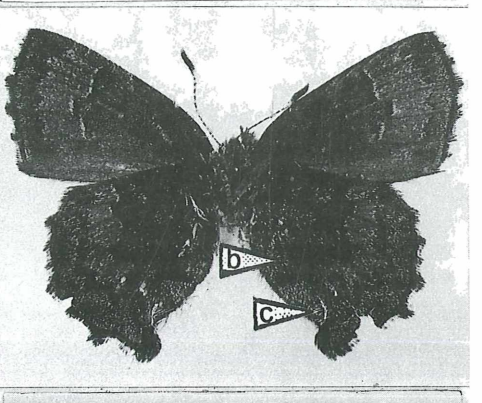
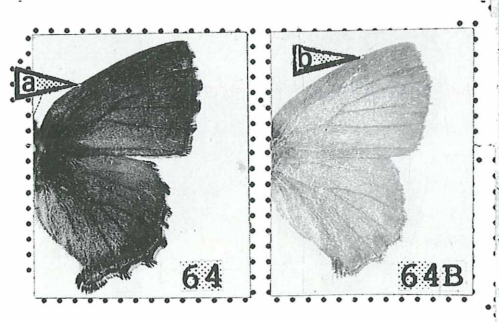




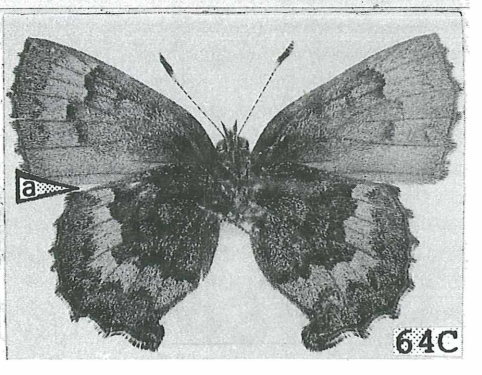
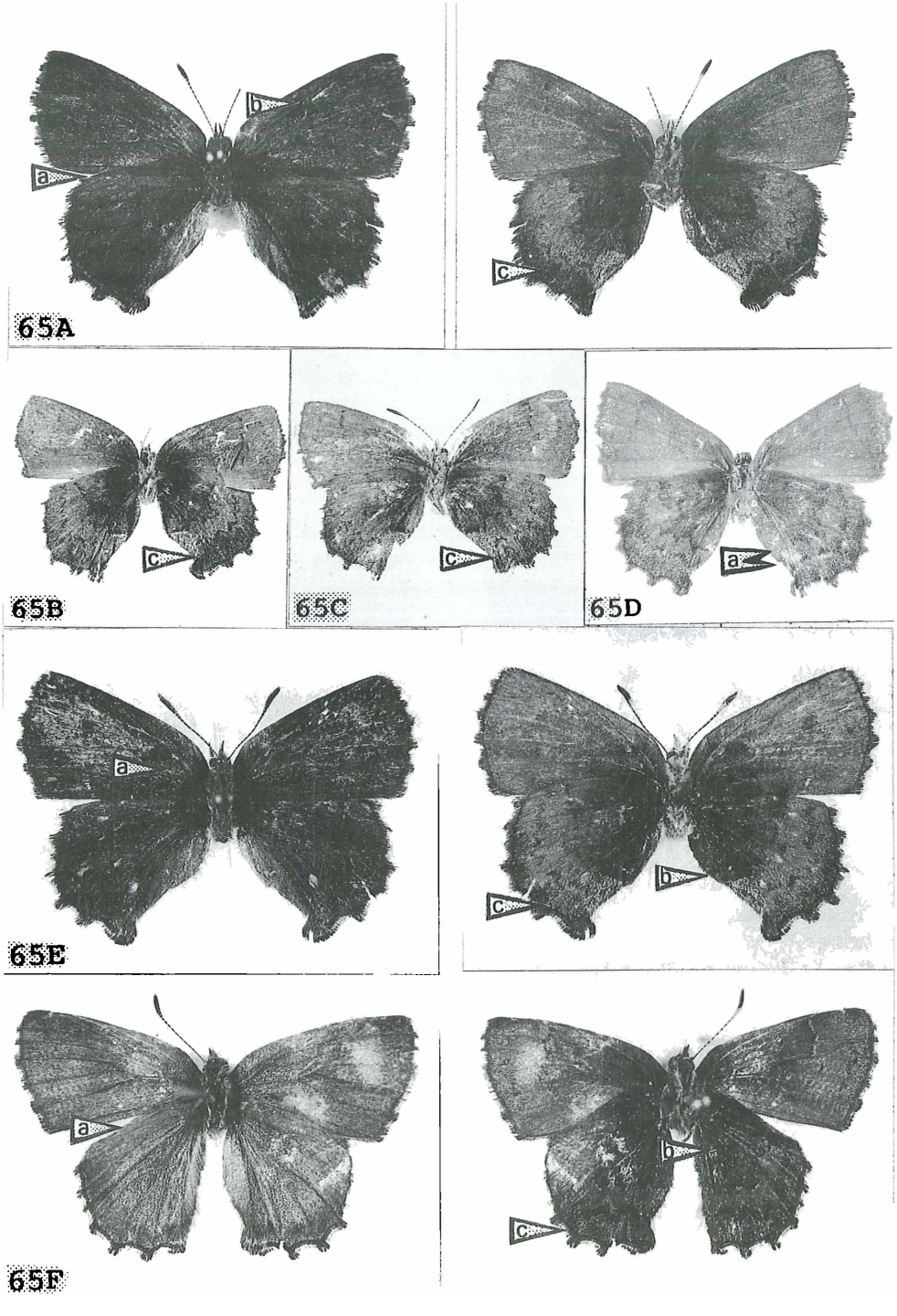
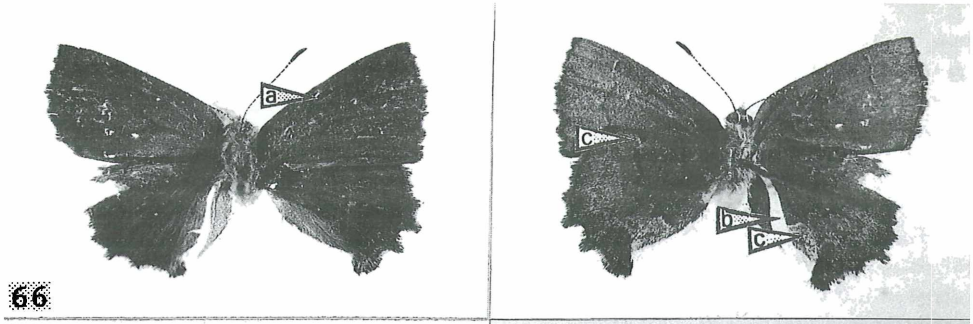


Fig. 65. Adults of the *Ahlbergia pluto* complex (as a group distinguished by hindwing ventral color concentrated in basal disc/limbal area, latter with lavish blue to blue-gray suffusions, brands elongate). 65A. *Ahlbergia p. pluto*, male, DS right, VS left, Vallee du Tong Ho (MNHN); 65BC. VS nominate females, same locality (a, DS brown; b, brand elongate; c, VS limbal area lavishly suffused with blue gray and brown). 65D. *Ahlbergia p. clarofacia*, holotype male, VS (DS brown, a, VS markings obsolescent, limbal area without suffusion). 65EF. *Ahlbergia p. cyanus*, DS right, VS left, holotype male (E), allotype female (F) (a, male DS with basal suffused blue, female suffused bright purplish blue to submargin; b, VS markings lavish; c, limbal area mottled mostly brown).



Figs. 66-68. Adults of other, Brown Members of *Ahlbergia* "*pluto*" Group (all DS, left, VS right, distinguished from *A. pluto* by uniformity of ventral hindwing pattern/color distribution major markings continuing costad through postmedial and submarginal areas and hues invariably brown, brands short). 66. *Ahlbergia aleucopuncta*, holotype male (a, DS brand oblong; b, VS ground light yellow brown; c1, c2, white marks costad and anad basal disc; d, crescents costad). 67AB. *Ahlbergia unicolora*, holotype male (A), allotype female (B) (a, DS brand compact, ovate; b, VS unicolorous yellow brown, only basal disc and scalloped submargin, across entire wing, of darker hue). 68. *Ahlbergia pictila*, holotype male (a, DS brand ovate; b, VS outline of disc jagged and mottled, paralleled, c, by postmedial brown blotches across wing, d, submarginal white outlined from anal margin costad).



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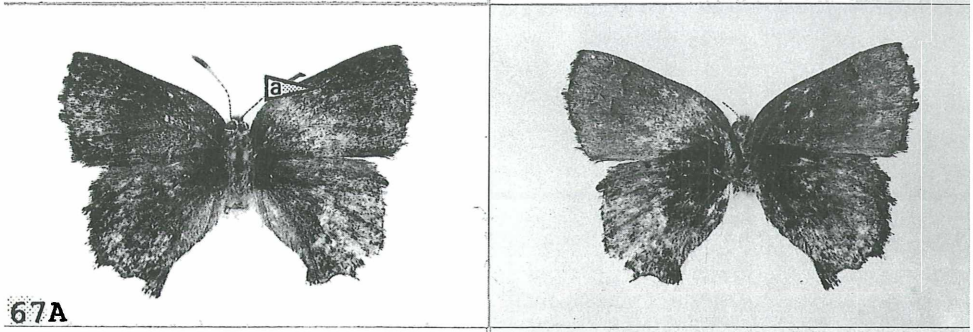
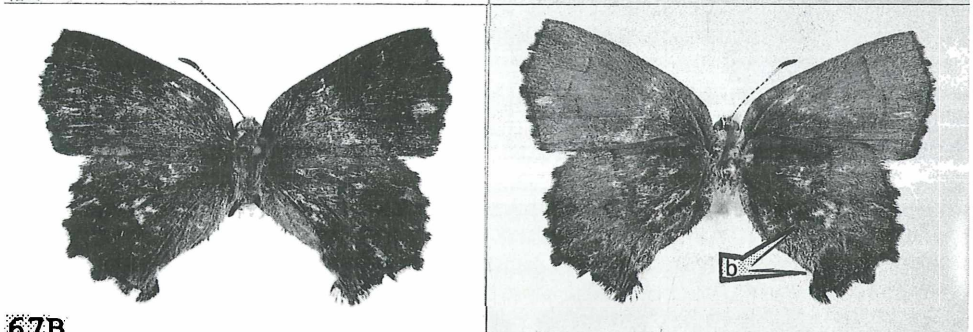
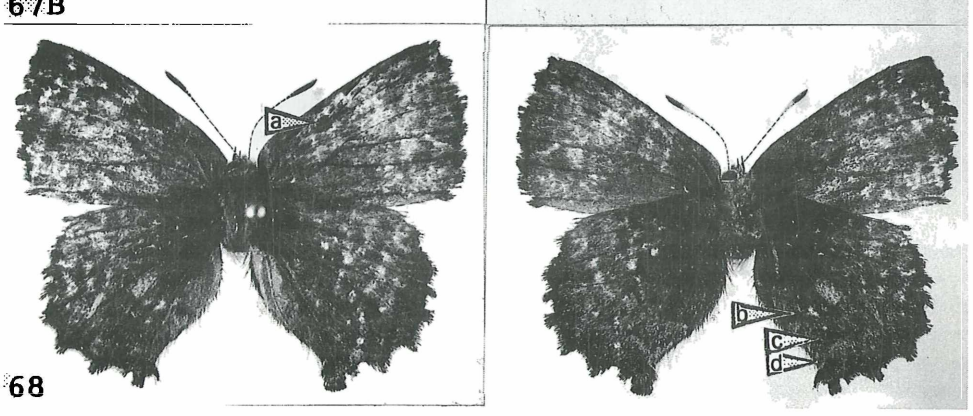


67A

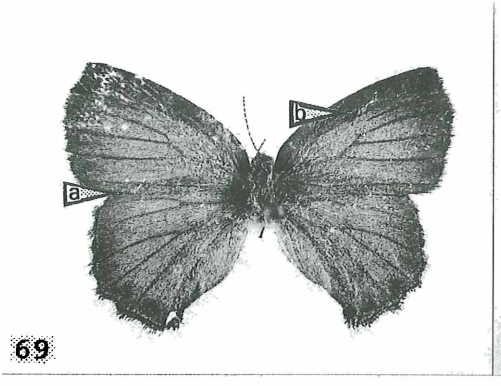


67B

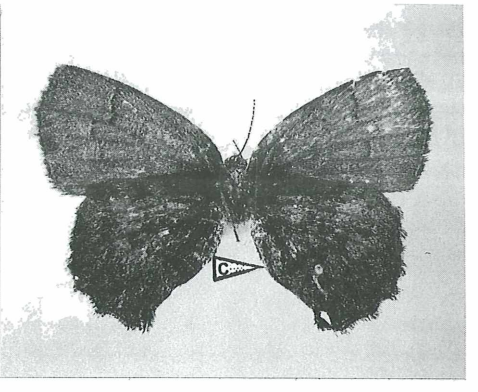


68

Figs. 69-70. Blue Members of "*pluto*" Group and Adults of the *Ahlbergia frivaldszyki* complex. 69. *Ahlbergia caerulea*, holotype male, DS left, VS right (a, DS bright silvery blue; b, scent brand small and ovate; c, VS diffuse gray-brown pattern centered on darker basal disc). 70AB. *Ahlbergia f. frivaldszkyi*, topotype male, DS left, VS right (a, DSFW suffused blue, rest of wing dark; b, VS slight discal mark; c, VS pattern mottled compared to *A. ferrea*, without bold white costad along basal disc margin and no prominent gray suffusion across limbal area). 70CDE. *Ahlbergia f. aquilonaria*, holotype male (CE), allotype female (D) (a, DS suffusive silvery blue; b, VS discal mark; c, basal disc mottled dark brown and black, distal area boldly contrasted brown and gray). 70FG. *Ahlbergia f. tricaudata*, holotype male, DS (F), VS (G) (a, HW deeply crenate; b, DS dark brown; c, VS brown basal disc contrasting light gray discal color, basal disc margin displaced distally along veins CuA1 and CuA2).



69



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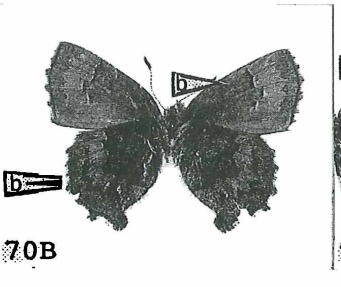
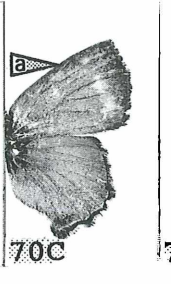


70B



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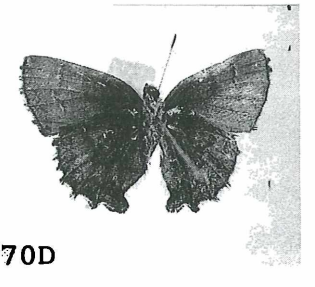

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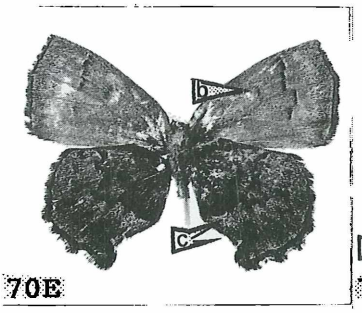

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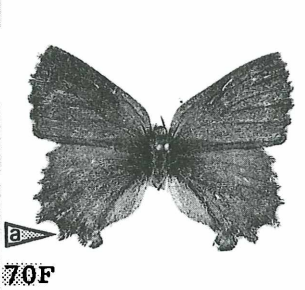

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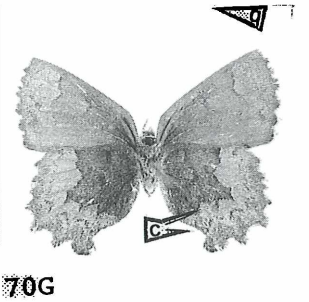
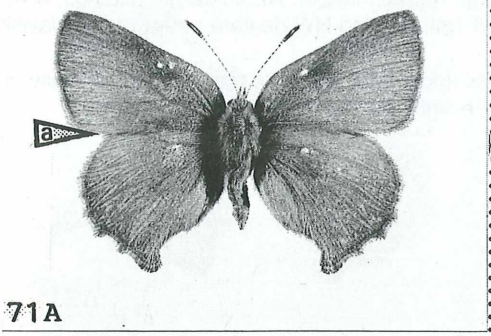
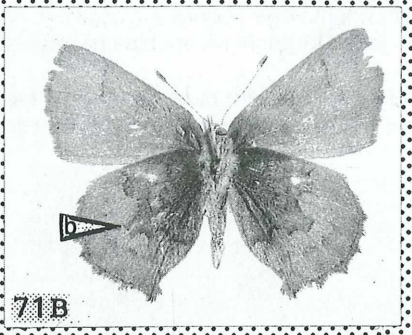


70G

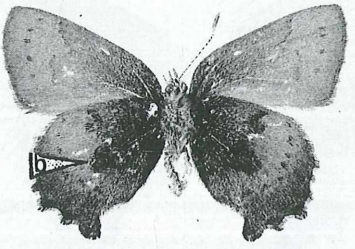
Fig. 71. Adults of *Ahlbergia* "*circe*" Group: *A. circe* complex and *A. haradai*. 71ABC. *Ahlbergia c. circe*, topotypical males [south Szechwan] (NHM) (A), DS, (B) VS, (C) female, Kangting [central Szechwan] (AMNH) (a, DS brown; b, VS brown with darker basal disc distended along veins CuA1, CuA2). 71DE. *Ahlbergia c. montivaga*, holotype male, DS (E), VS (D) (a, VS yellow brown, markings more mottled throughout). 71F. *Ahlbergia haradai*, holotype "female" [male? (see b)] (a, DS bright gray-blue; b, scent brand?; c, VS basal disc and anal marks russet over light gray).



71A



71B



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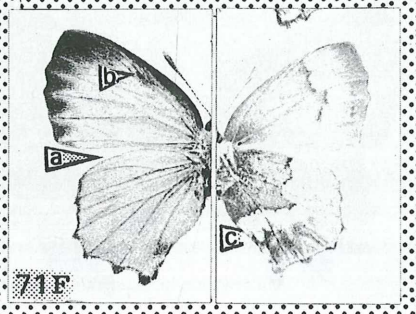

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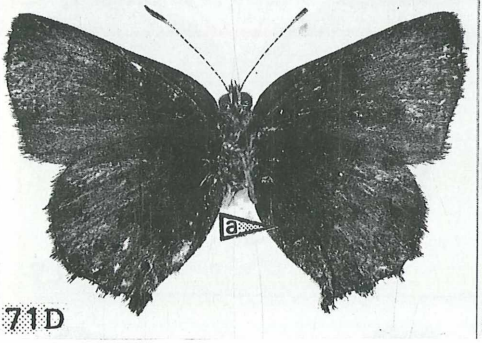

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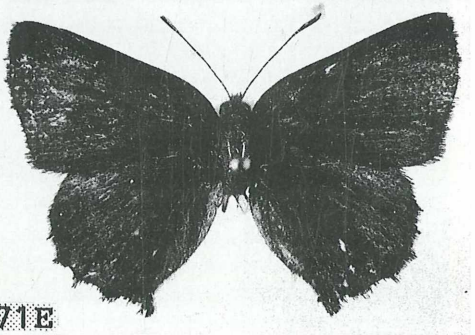
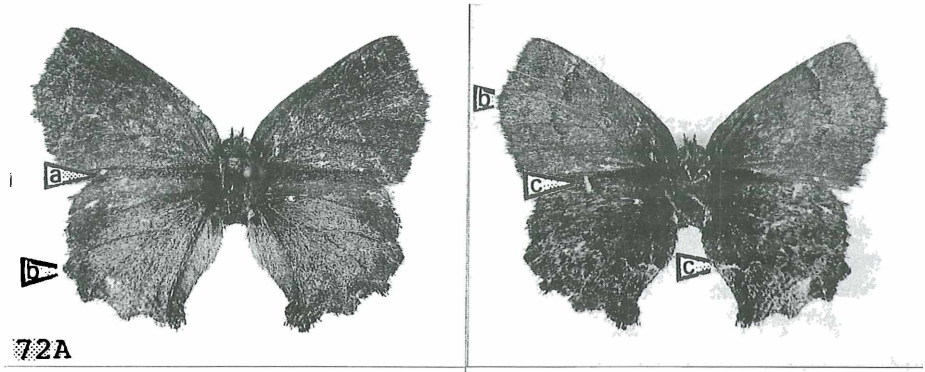
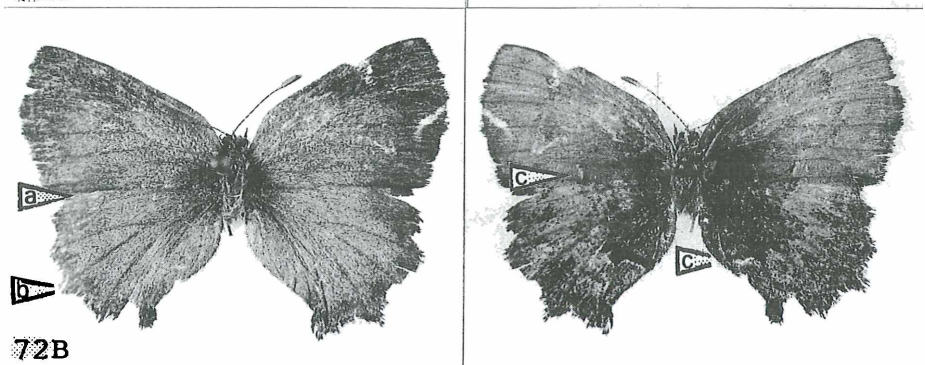


71E

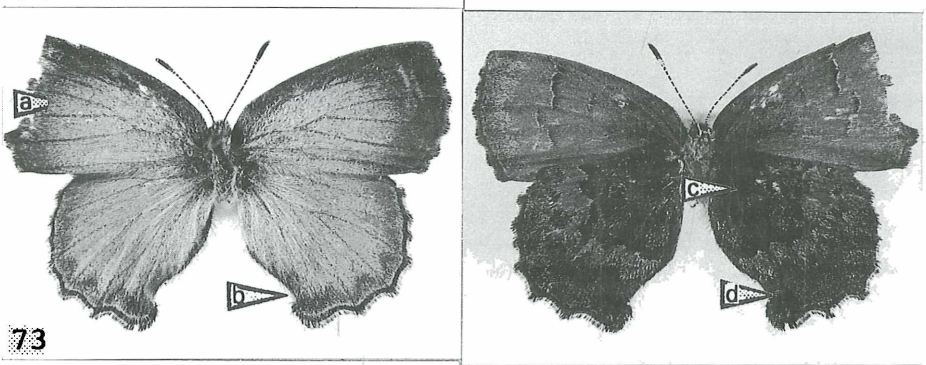
Figs. 72-74. Adults of *Ahlbergia* "*circe*" Group, continued. 72AB. *Ahlbergia prodiga*, holotype (A), allotype (B), DS left, VS right (a, DS iridescent silvery blue basad wide dark margins; b, wing shape angled and crenate; c, VS basal disc suffused blackish and [as in *Novosatsuma pratti*] bright white slashes at costal and anal edge of disc margin). 73. *Ahlbergia caesius*, holotype (a,b, DS bright silvery blue basad black FW borders and HW dentate margin; c, VS lavish brown in disc, d, suffused widely brown and blue across limbal area). 74. *Ahlbergia lynda*, holotype (a, DS wing base violet; b, VS basal disc angulate, lined white marginally and anally, c, white suffusion along crescents; d, *Thecla*-spot; e, suffused blue-gray across limbal area).



72A



72B



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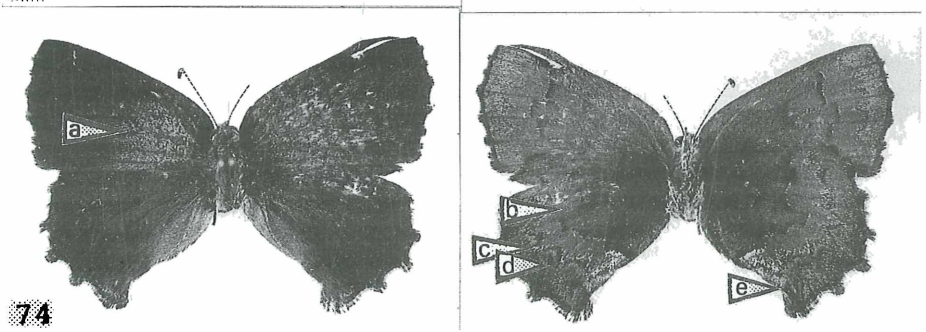
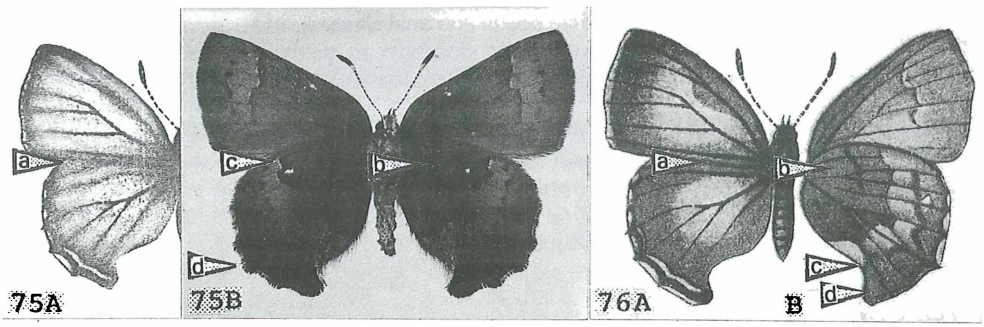
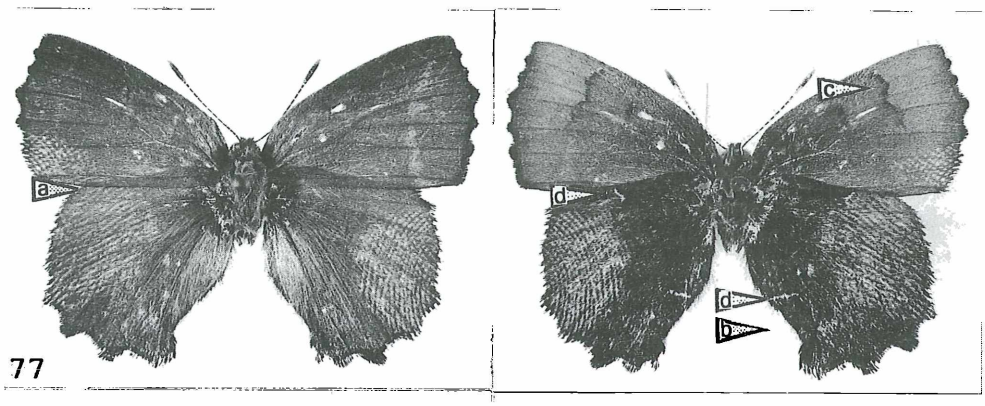
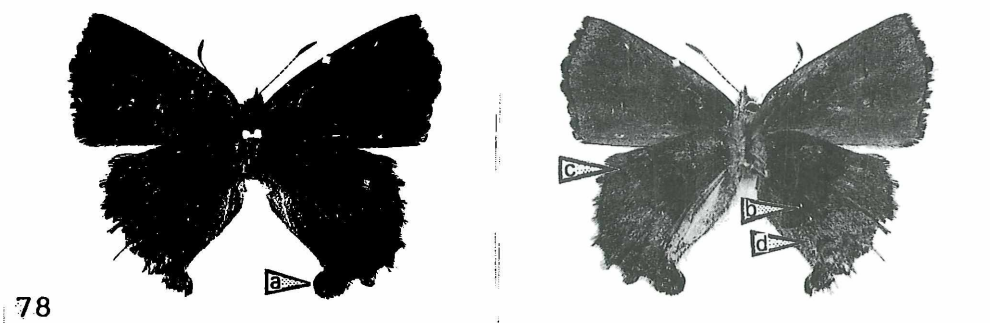


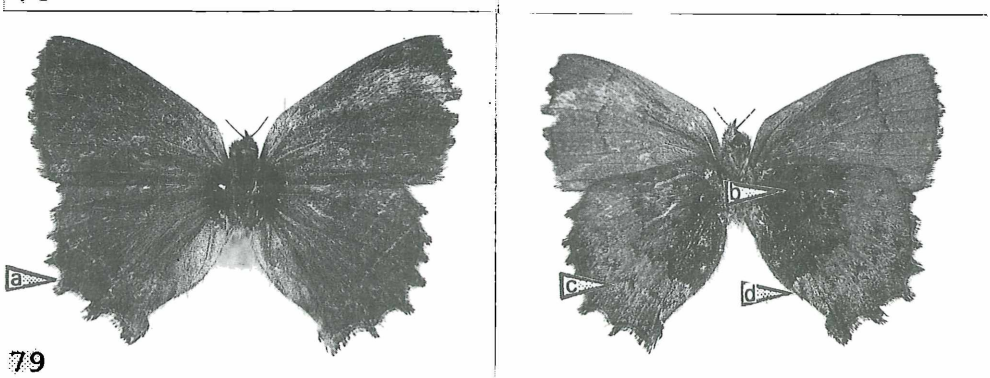
74

Figs. 75-79. Adults of *Ahlbergia* "*leechii*" Group and Adults of *Novosatsuma*. 75AB. *Ahlbergia leechii*, A, DS rendering (a, DS bright silvery blue to margins), B, VS (transposed from color slide) (b, basal disc very dark, well defined with, c, white spot along costal edge; d, distal ground concolorous yellow-brown followed by red-brown in submargin). 76AB. *Ahlbergia nicevillei*, SEITZ (1921) figure of NHM specimen designated herein as lectotype male) (A) DS, (B) VS (a, DS silvery blue baso-medial; b, VS basal disc mottled and with dark postbasal line;, c, limbal area with jagged crescent line and, d, drab brown patch). Adults of *Novosatsuma* "*pratti*" Group. 77. *Novosatsuma collosa*, holotype, DS left, VS right (a, DS ground auburn; b, VS yellow brown with, c, no white along FW line, d, white costal and anal spots). 78. *Novosatsuma matusiki*, holotype, DS left, VS right (a, anal lobe prominent; b, VS basal disc outer margin as wide brown band; c, costal brown patch; d, suffusive gray-white along anal margin. 79. *Novosatsuma magnasuffusa*, holotype male, DS left, VS right (a, dentate margins; b, basal disc brown with internal postbasal line; c, disc paralleled by brown crescent line, d, white suffusion and line along anal margin).

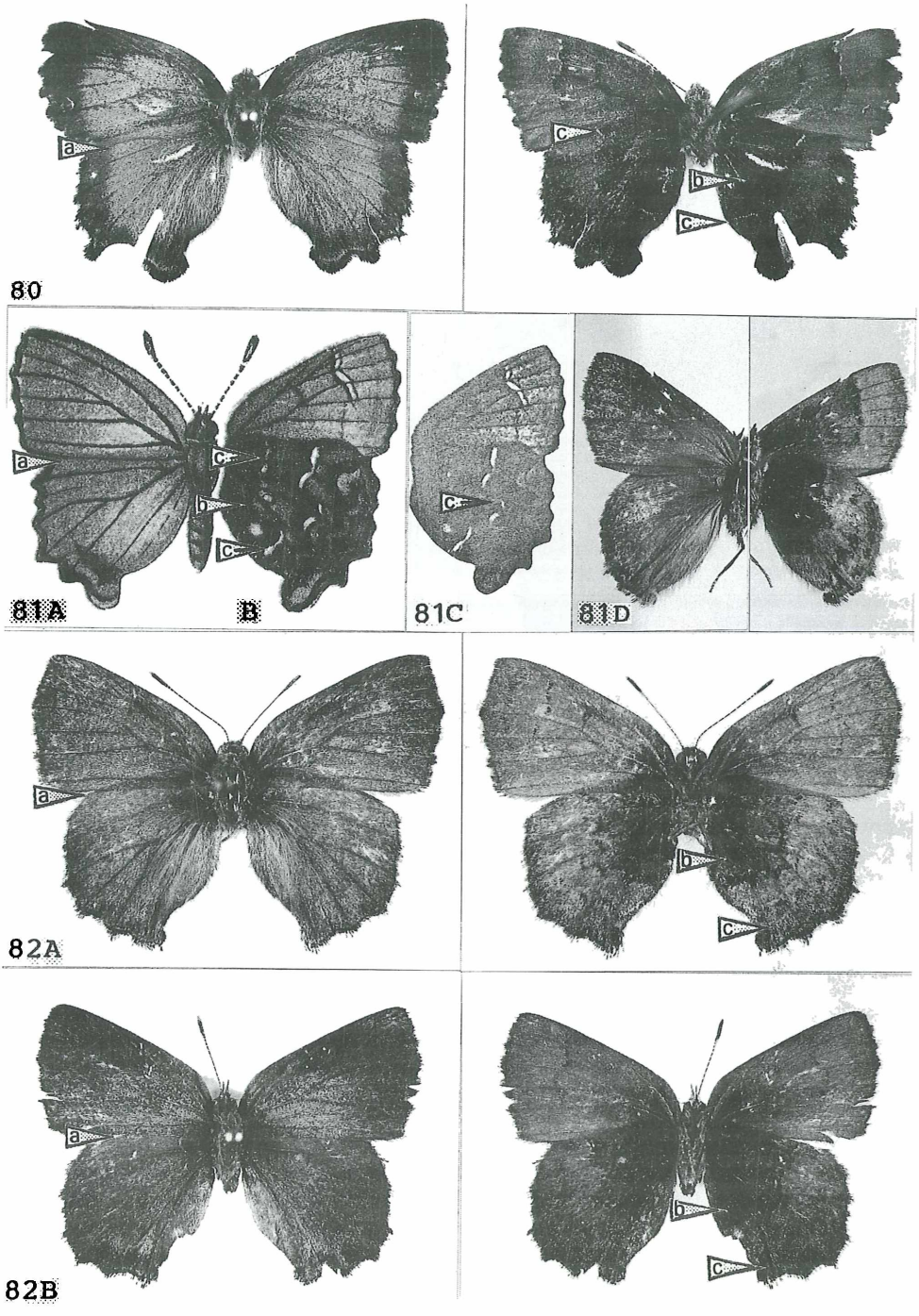




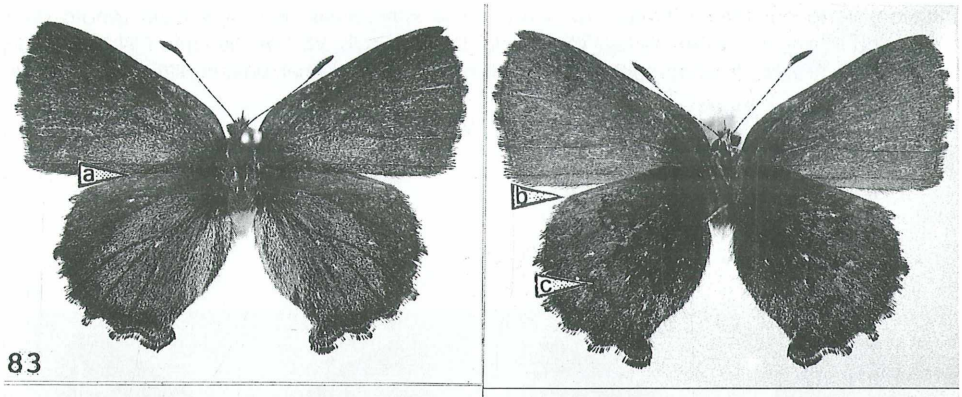




Figs. 80-82. *Novosatsuma* continued; Adults of *Novosatsuma* "*pratti*" and "*monstrabila*" Groups. 80. *Novosatsuma plumbagina*, holotype male, DS left, VS right (a, DS bright silvery blue within crisp black borders; b, VS black; c, white costal and anal slashes). 81ABC. *Novosatsuma pratti*, SEITZ (1921) figure of NHM specimen designated herein as lectotype female, (A) DS, (B) VS (a, DS blackish, flecked steel blue; b, VS mottled deep brown; c, disc margin marked with white slashes, most prominent at costal and anal margins); (C) VS male, showing reduction of all spots except costal and anal, as in many specimens). 81D. Inserted here by format constraint – holotype male of *Cisincisalia moecki*, Central American elfin, DS left, VS right (see Appendix 1). Adults of *Novosatsuma* "*monstrabila*" Group. 82AB. *Novosatsuma oppocoenosa*, holotype (A), allotype (B), DS left, VS right (a, DS baso-medial deep azure blue; b, VS disc mottled black-brown; c, limbal area suffused bright red-brown).



Figs. 83-85. Adults of *Novosatsuma* "*monstrabila*" Group. 83. *Novosatsuma magnapurpurea*, holotype, DS left, VS right (a, DS, baso-medial purple; b, VS entirely grizzled dull brown; c, blackish crescent-line paralleling disc). 84. *Novosatsuma cibdela*, holotype, DS left, VS right (a, DS bright silvery blue; b, VS pattern concentric bands of dark sepia over red-brown). 85. *Novosatsuma monstrabila*, holotype, DS left, VS right (a, DS bright silvery blue; b, VS mottled concentric bands of sepia over gray-white, c, unique markings along anal margin).



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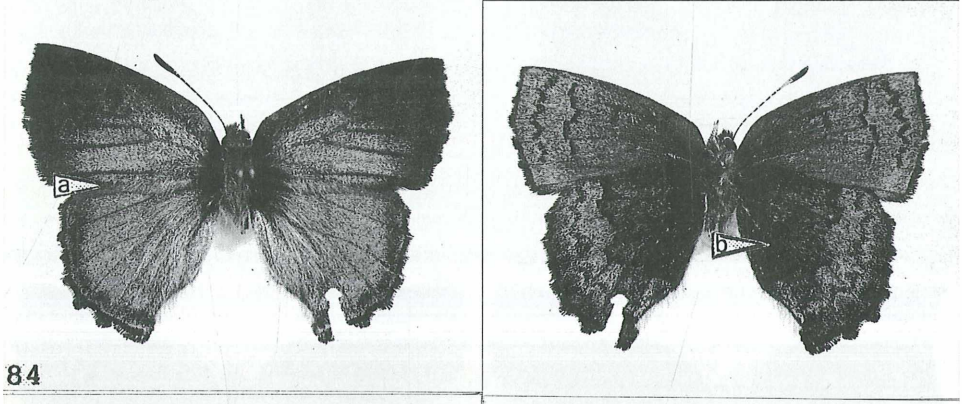

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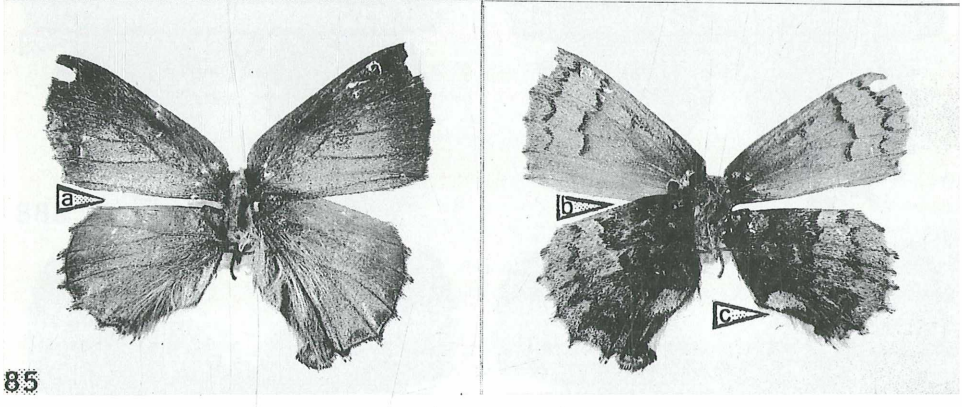

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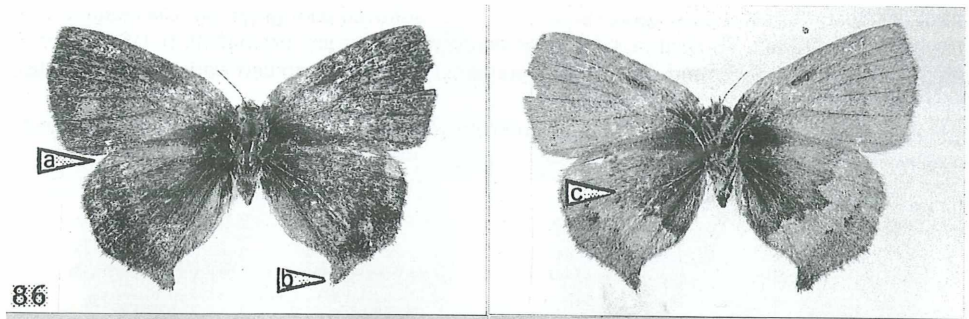
Fig. 86-88. Adults of *Cissatsuma* "*albilinea*" Group. 86. *Cissatsuma albilinea*, male, Tatsienlu (AMNH), DS left, VS right (a, DS brown; b, pronounced anal lobe; c, VS with white lineal suffusion along postmedial areas). 87. *Cissatsuma kansuensis*, paratype male (photo dark, transposed from color slide) DS left, VS right (a, DS brown; b, VS HW disc and FW bases very dark mottled brown; c, white spot at costa; d, gray suffusion anal/postmedial area; e, limbal orange in cell CuA1 resembling "*Thecla*-spot"). 88AB. *Cissatsuma halosa*, holotype (A), allotype (B), DS left, VS right (a, DS brown; b, VS simple pattern brown disc paralleled by brown cresent line).



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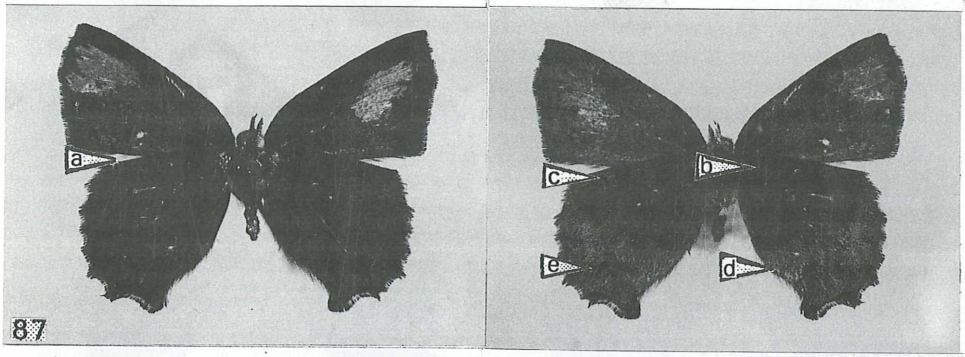

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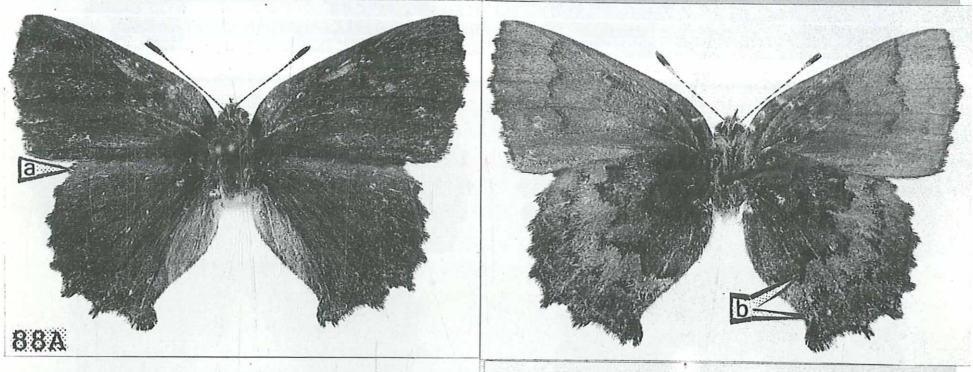
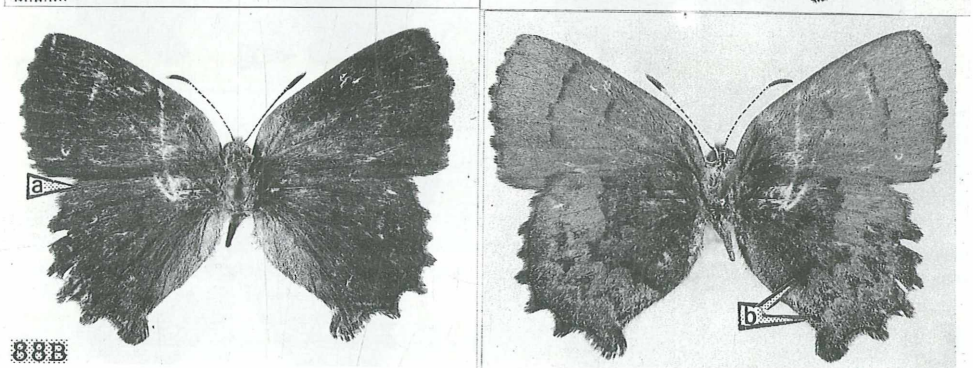
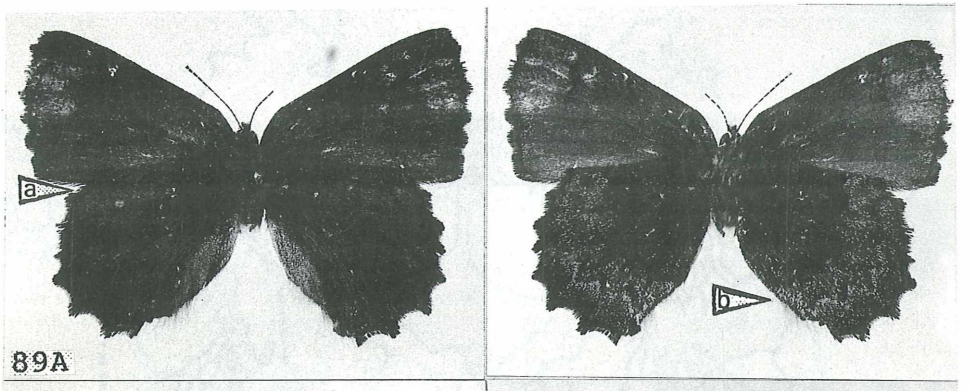


88A

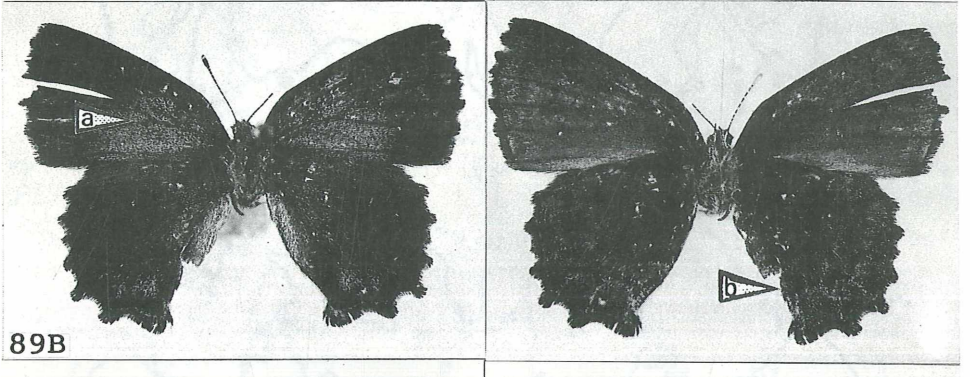


88B

Figs. 89-91. Adults of *Cissatsuma* "*tuba*" Group. 89AB. *Cissatsuma tuba*, holotype (A), allotype (B), DS left, VS right (a, DS male brown, DS female baso-discally lavender; b, VS concentric bands of chestnut brown over lighter brown variously suffused with gray). 90. *Cissatsuma crenata*, holotype, DS left, VS right (a, anal lobes and crenate margins prominent; b, DS flecked to suffused bluish; c, VS ground light beige contrasted by greatly mottled darker brown in disc and crescent line; d, white anal line, e, orange brown resembling *Thecla*-spot). 91. *Cissatsuma contexta*, holotype, DS left, VS right (a, VS, margins of basal disc and crescent line interwoven along veins by black suffusion).



89A



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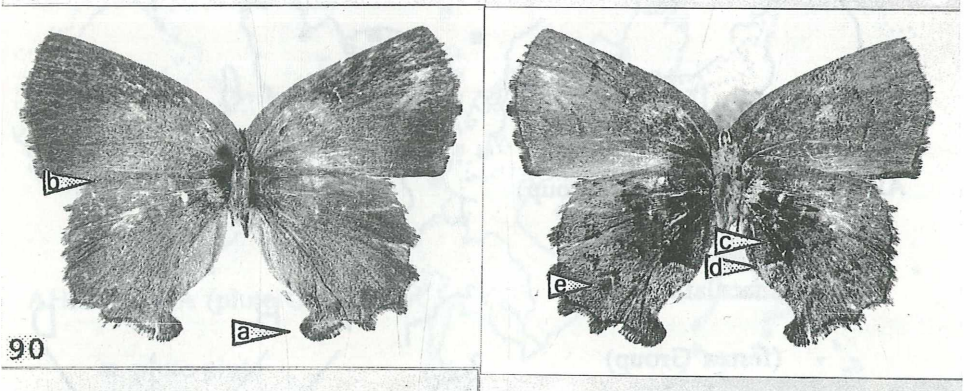

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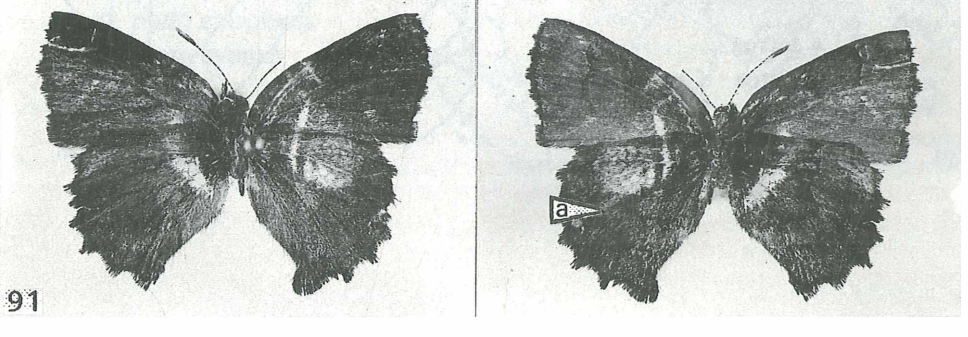

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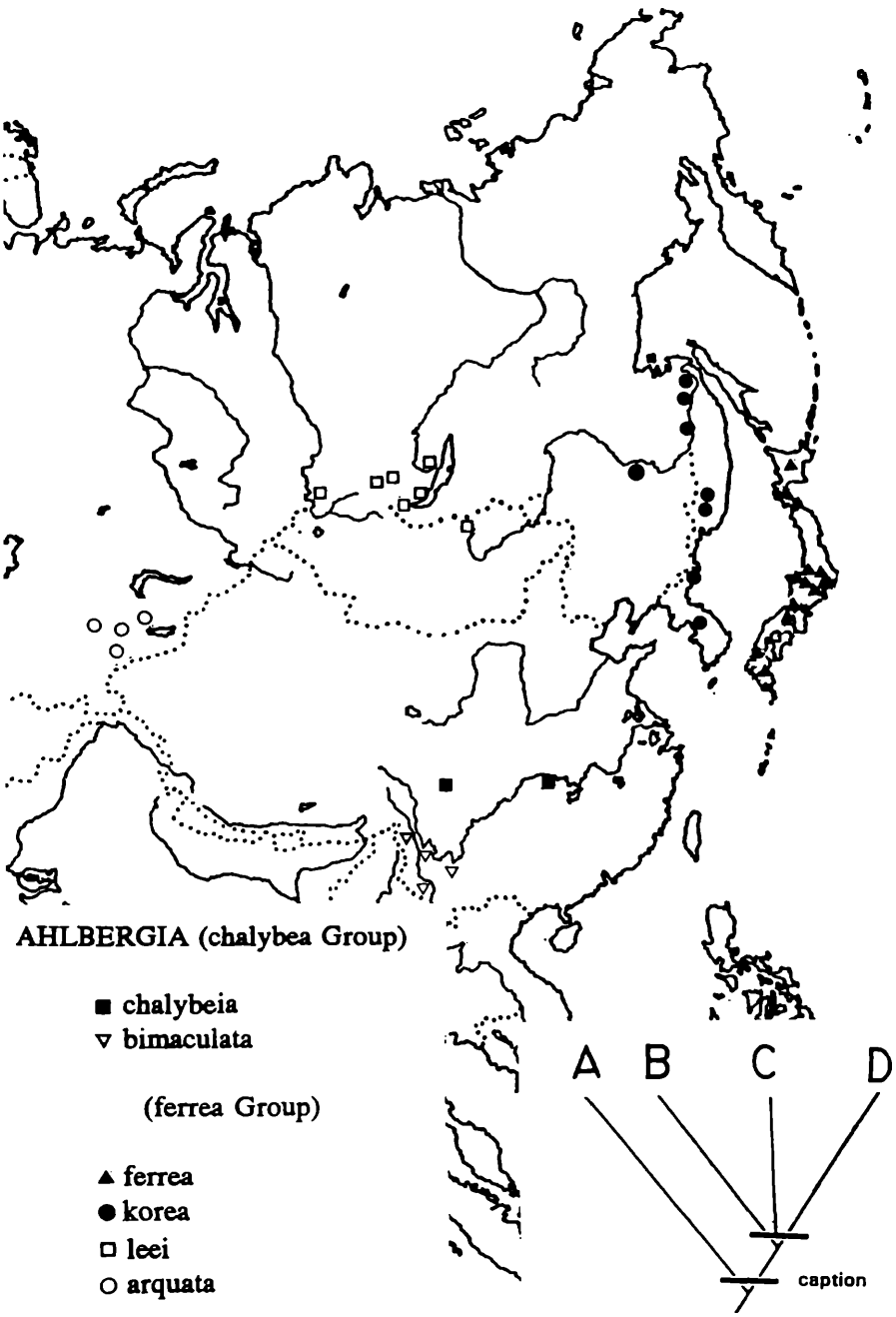

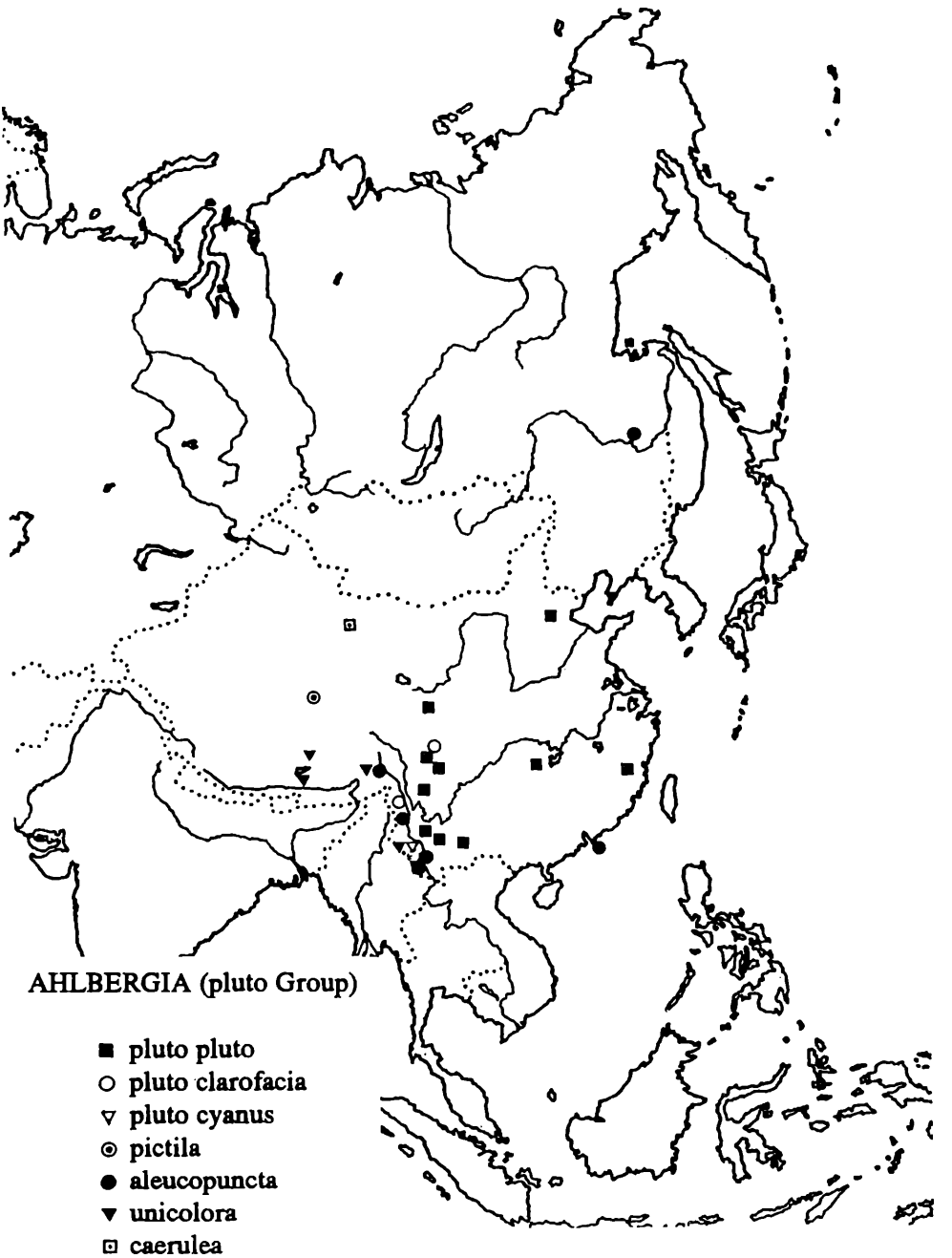

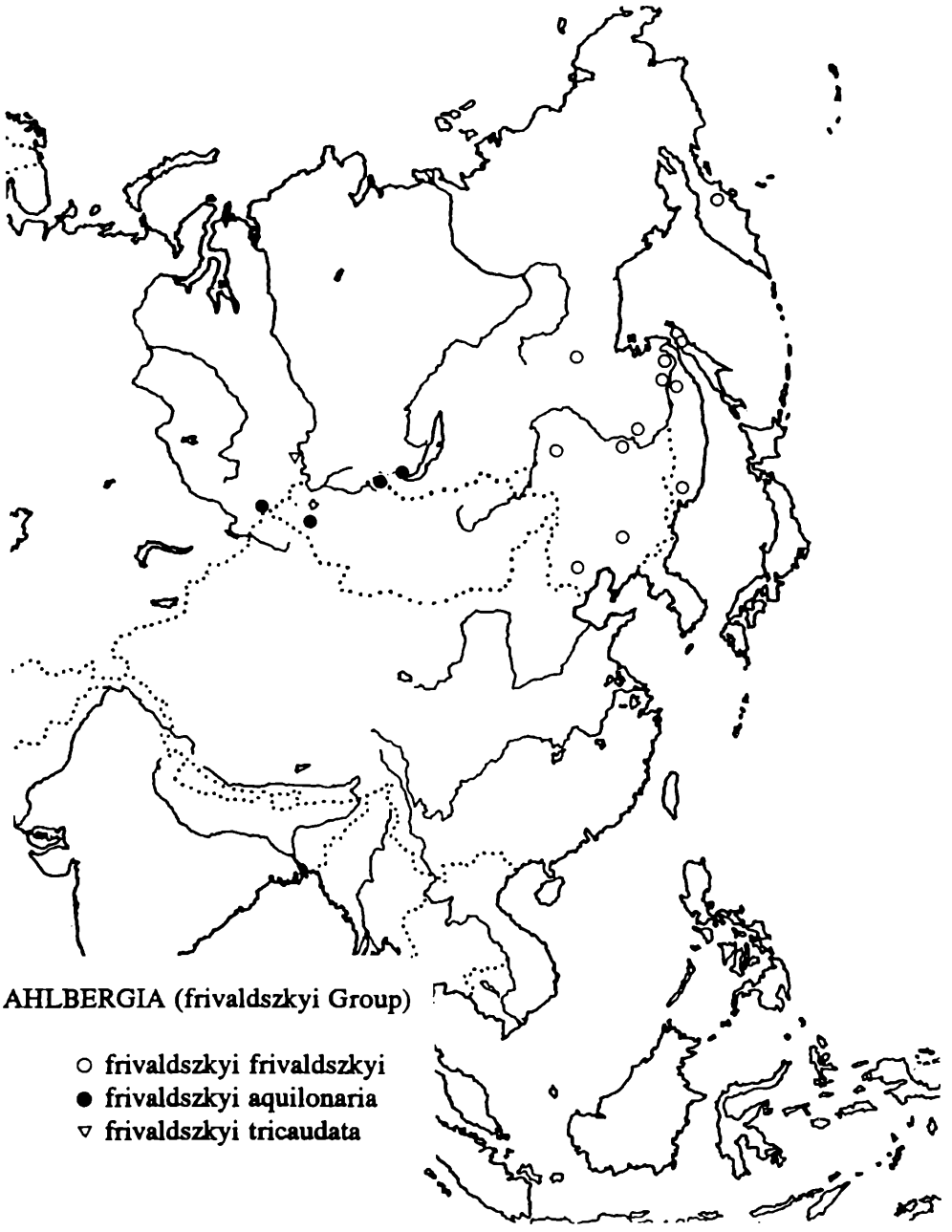

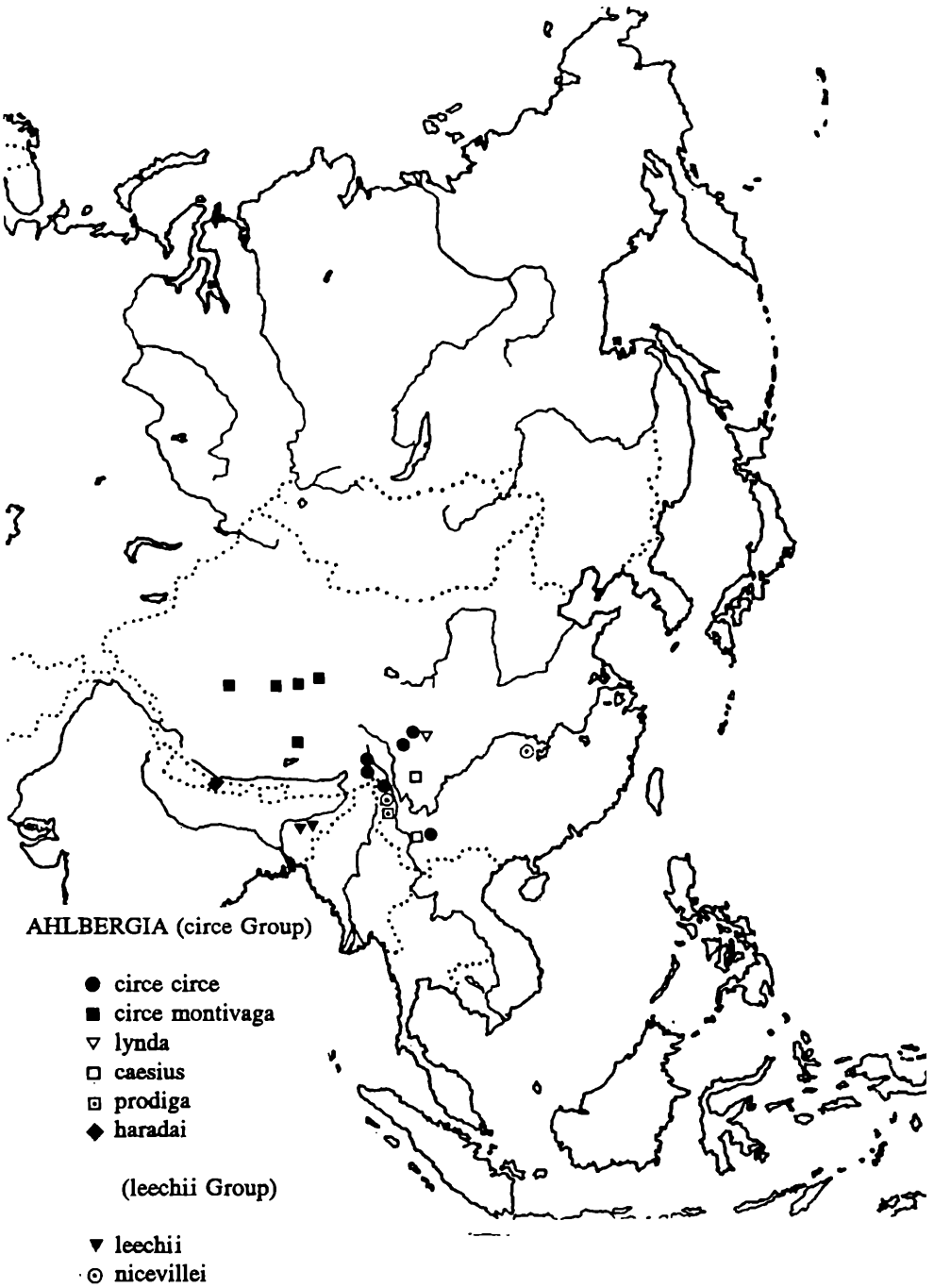

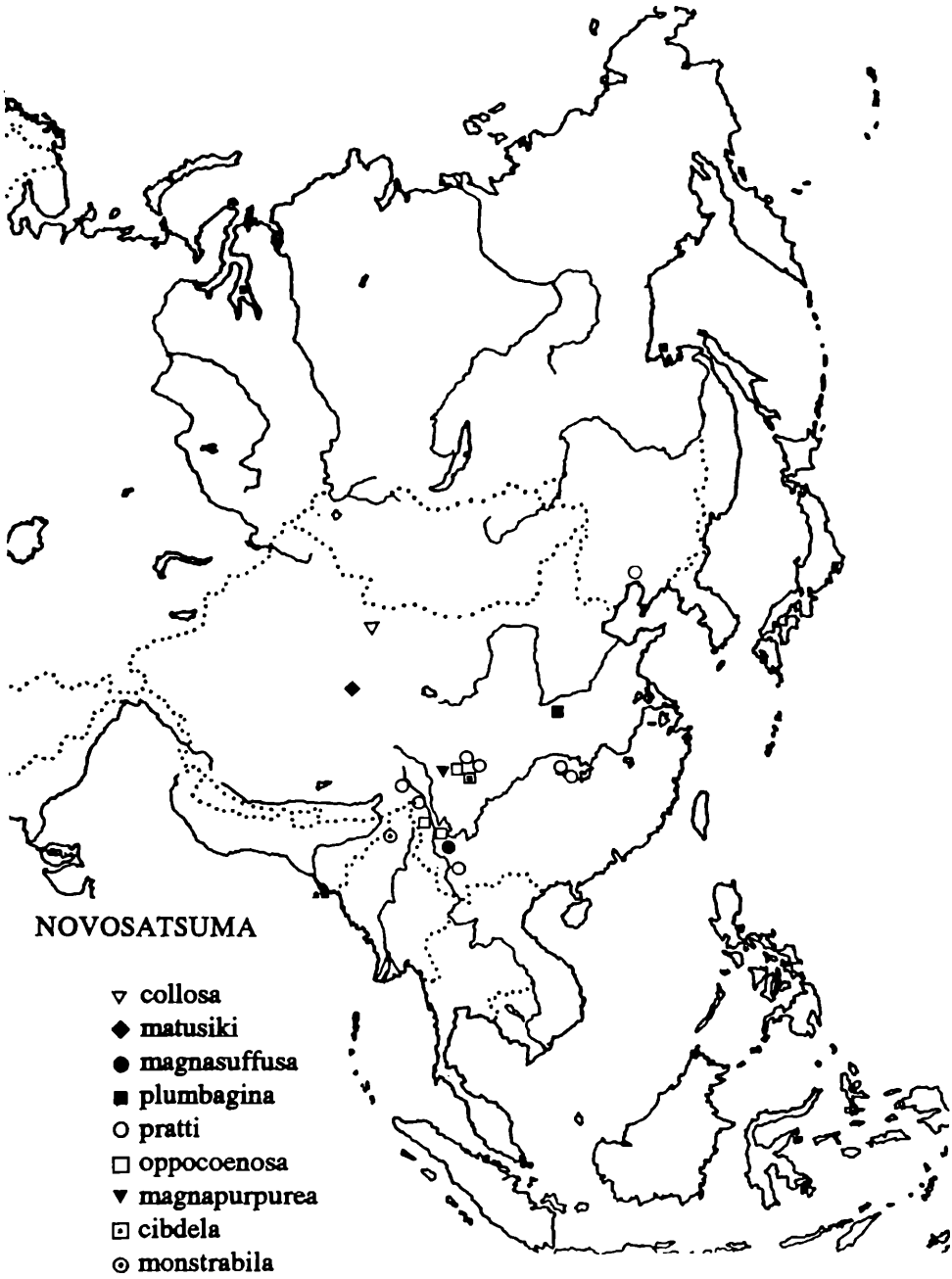

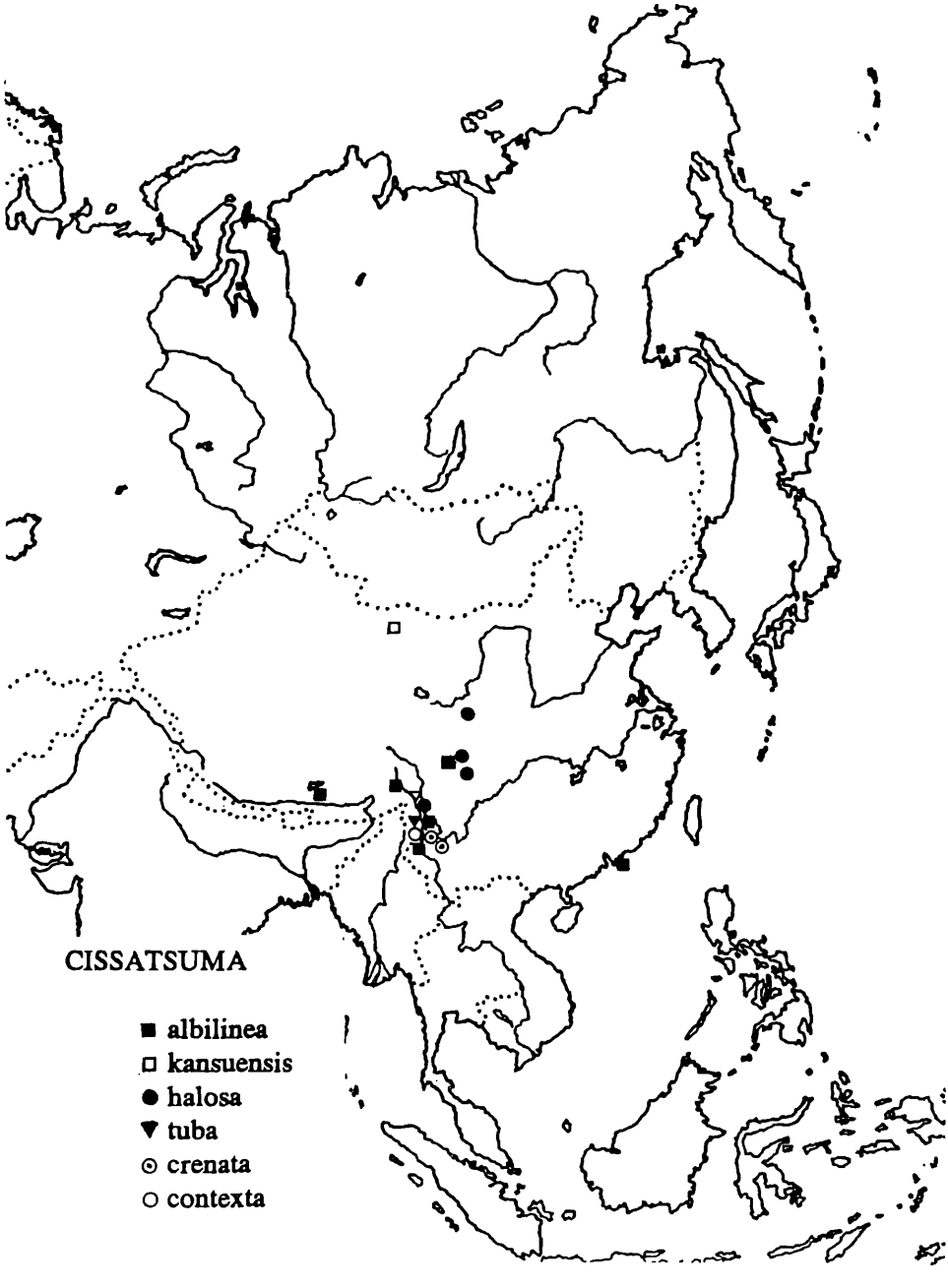

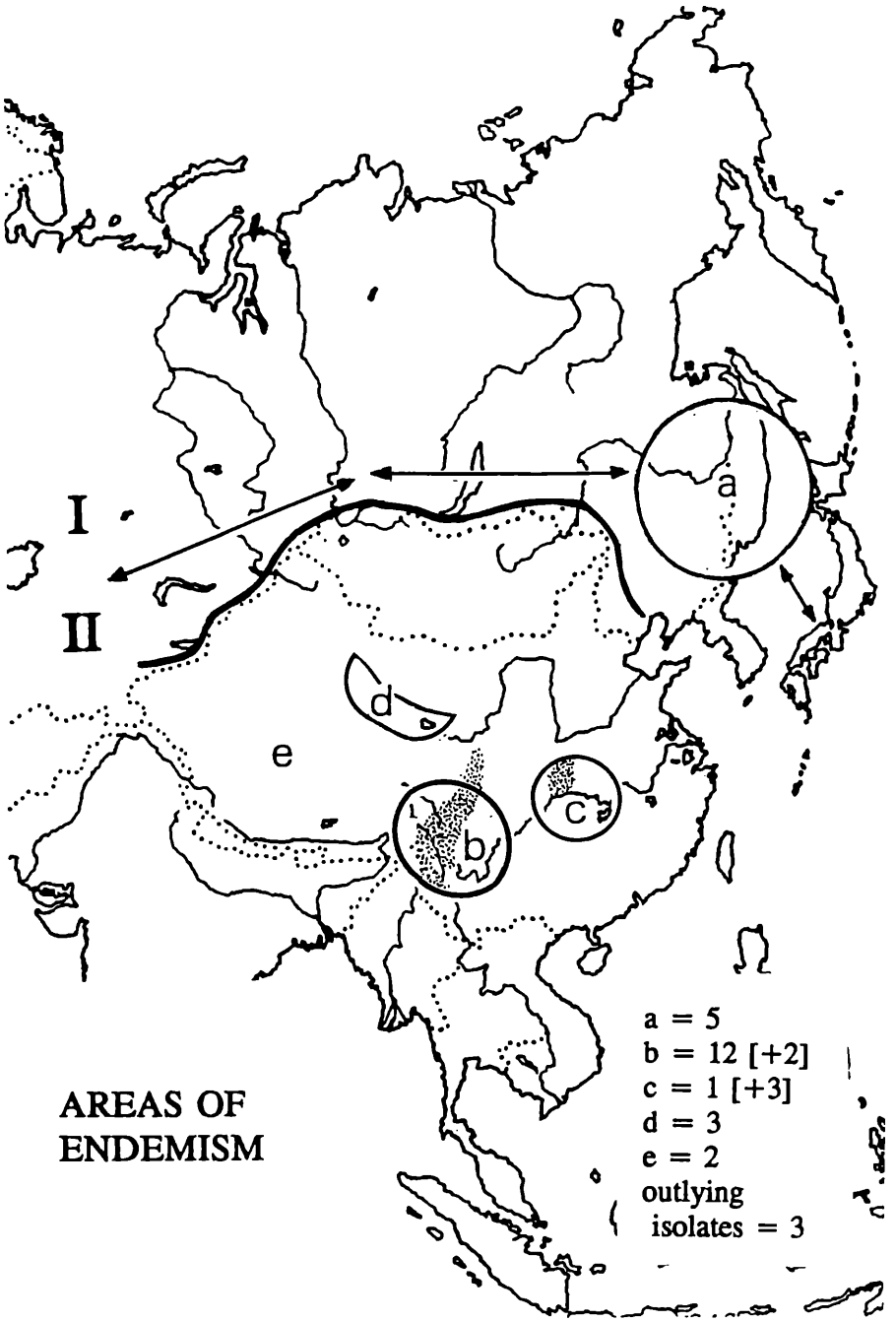

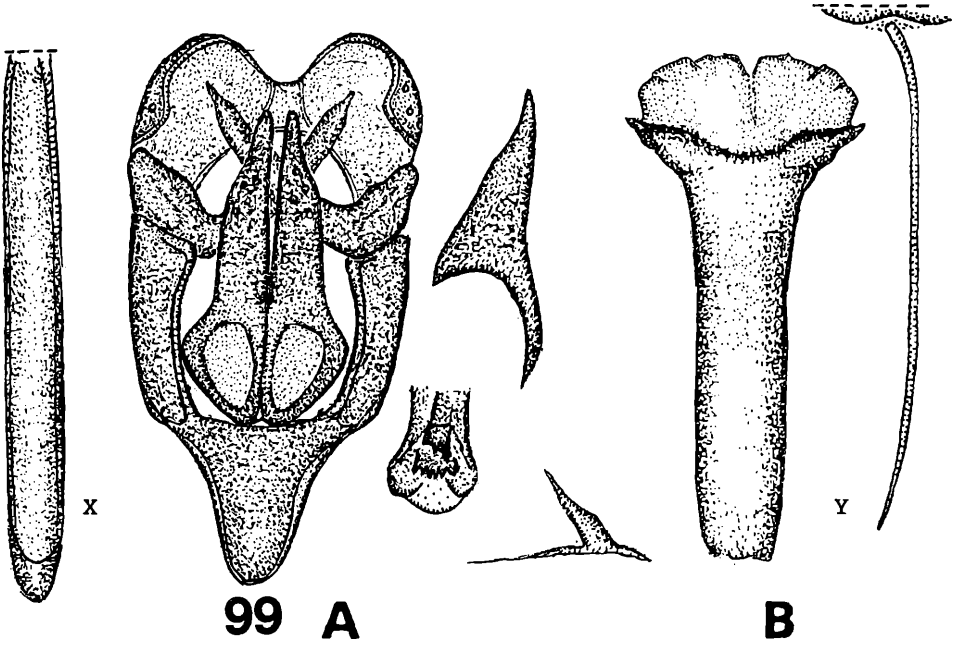

99 A B

Demokratie in Deutschland oder Diktatur der Bürokraten

Jeder Verleger in Bayern ist gezwungen, zwei Freiexemplare von jedem Druckerzeugnis kostenfrei an die Bayerische Staatsbibliothek in München und ein weiteres an die Deutsche Bibliothek in Frankfurt am Main zu senden. Dies habe ich als gerade noch tragbar empfunden.
Seit der Vereinigung gibt es jetzt zwei nationale Bibliotheken: Eine in Frankfurt/Main und eine in Leipzig. Diese in Leipzig ist nun zusätzlich mit einem Pflichtexemplar zu beschenken. Dies halte ich für unannehmbar, untragbar und für Unrecht. Das gesamte deutsche Schrifttum kann durch eine "Deutsche Nationalbibliographie" schnell und zuverläßig angezeigt werden. Im Zeitalter der Datenverarbeitung und Computer kann auch von beiden Bibliotheken eine gemeinsame Datenbank aufgebaut und genutzt werden. Es existieren ja auch nicht gleichzeitig BND und STASI (oder doch?!) oder zwei Verteidigungsministerien nebeneinander. Statt mit Sparmaßnahmen voranzugehen, fordern Staat und Politiker nur, um sich gleichzeitig selbst maßlos zu bedienen.
Gegen das Unrecht vorzugehen ist nun fast aussichtslos, schließlich leben wir in einem Rechtsstaat. Bevor Verfassungsbeschwerde erhoben werden kann, muß der Instanzenweg erschöpft sein, d.h. das Verwaltungsverfahren muß durchlaufen werden. Nach Erfolglosigkeit hat die Verwaltungsgerichtsbarkeit über die Rechtmäßigkeit der Ablieferungspflicht des Pflichtexemplares zu entscheiden. Erst dann ist eine Verfassungsbeschwerde möglich. Bis dahin wären allerdings Prozeßkosten von etwa DM 10 000,-- zu bezahlen. Das jedoch kann ich mir finanziell nicht leisten. Somit wird der Weg, Recht zu bekommen, blockiert, weil wir ja in einem Rechtsstaat leben.
Aus diesem Grund veröffentliche ich obige Zeilen solange, bis man mir verbietet, meine Meinung über diese Demokratie und diesen Rechtsstaat zu äußern, oder bis sich couragierte, vermögende Leute finden, die gegen das Unrechtgesetz ankämpfen bis es zurückgenommen wird.

Democracy in Germany or dictatoral beaurocracy

Every publisher in Bavaria is made to give two free examples of each publication to the Bavarian State Library (Munich) and a further example to the German Library (Frankfurt/Main). This was just about acceptable for me.
Since the joining of East and West Germany, we now have two national libraries, one in Frankfurt and one in Leipzig. Now the library in Leipzig is to be additionally provided with one. This I find totally unacceptable and unjust. All German literary works could be quickly gattered together in the form of a "German National Bibliography" We live in the age of data processing and computer technology, and it would be possible to build up a data base from both libraries. The BND (Germany's "Secret Service") and the "STASI" (former East Germany's "Secret Service") do not exist side by side, or do they? Two Ministries of Defence also do not exist next to one another, so why two State Libraries? The State and politicians should be setting an example to the people, and yet all they seem to do is serve themselves.
Although we live in a state where the people has the rights, it is pointless to fight such injustice. Through the beaurocracy of our state and in our society, we must go from one stage to the next a bit like an obstacle course. Unless we have a good case it is pointless to spend appr. DM 10,000 required to get to the finish. The chance is there naturally for those with a good case and the finance, but who has this? Those that have the money would rarely attempt this anyway. Our democracy gives us the opportunity, but our beraucracy hinders our attempts.
On these grounds I'm publishing the above statement until someone refuses to let me speak my mind or until someone with the finance makes it possible to fight the injustice.

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