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Revision of the Australian Zuphiinae 3. The genus *Pseudaptinus* Castelnau

(Insecta, Coleoptera, Carabidae)

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Abstract

As a third part of a general revision of the Australian Zuphiinae the genus *Pseudaptinus* Castelnau is revised. The known species *P. fulvus* (Castelnau) and *P. australis* (Blackburn) are redescribed. *P. australis* is transferred from *Acrogenys* Macleay to *Pseudaptinus*. For *P. fulvus* (Castelnau) a lectotype and paralectotypes are designated. Following species are newly described: *P. brittoni* sp. nov., *P. iridescens* sp. nov., *P. punctatostriatus* sp. nov., *P. cyclophthalmus* sp. nov., *P. monteithi* sp. nov., and *P. hirsutulus* sp. nov.

All Australian species belong to the subgenus *Thalpius* Leconte, so far that subgenus is at all justified. The phylogenetic status of *Pseudaptinus* is briefly discussed and it is stated, that the genus is quite primitive. The differences between the Australian species are discussed and presented in a key. Most species look extremely similar, with exception of *P. hirsutulus* sp. nov., which is likely representative of an own subgenus. The rest may be divided into three groups: 1. *P. fulvus*, *P. australis*, *P. brittoni*. 2. *P. iridescens*, *P. punctatostriatus*, *P. cyclophthalmus*. 3. *P. monteithi*. *P. iridescens* of the second group seems most generalized, whereas first and third groups seem more derivative.

The known distributions of the species are mapped. Since Australian species of *Pseudaptinus* seem extremely scarce in collections, nothing is known about life history. It is to be expected, that in future new species will be likely discovered, and the range of the known species will be better known.

The zoogeography of the genus is briefly discussed. The general distribution suggests, that *Pseudaptinus* is a descendant of an early tropical-subtropical Gondwanan faunal element, which is not represented on whatever grounds in Africa nor India.

Introduction

The subfamily Zuphiinae is a quite distinctive but not very numerous group of truncatipennian Carabidae. Especially in Australia, Zuphiinae are very heterogenous. The Australian Zuphiines are distributed in the Genera *Zuphium* Latreille, *Parazuphium* Jeannel, *Acrogenys* Macleay, *Pseudaptinus* Castelnau, *Colasidia* Basilewsky, and *Planetes* Macleay. The taxonomic status of *Planetes*, however, is rather controverse (BASILEWSKY 1963, JEDLIČKA 1963, HABU 1967, REICHARDT 1967, DARLINGTON 1968). So far 15 Zuphiine species are known from Australia. By far most species have been described in last century and most are not recognizable. Therefore, a revision of the Australian Zuphiinae has been started (BAEHR 1984a, b) which is continued here with the revision of the genus *Pseudaptinus*.

Very few is known about the life histories of Zuphiinae, especially of the Australian species (BAEHR 1984a). Perhaps, most species are hygrophilous and live near standing or running water in the tropical-subtropical part of Australia, but they are also distributed in dry areas of the interior, as for example, some *Pseudaptinus*-species. All species seem to be very scarce and they are caught chiefly at light. Generally, Zuphiinae are pantropical Carabids, which penetrate just into temperate zones. Thus, they lack from Tasmania (SLOANE 1920) and are rather scarce in temperate southern Australia.

In Australia, Zuphiinae are considered quite recent invaders from tropical southeastern Asia. Perhaps, this is true only for some of the highly evolutive genera as *Zuphium*, *Parazuphium*, *Planetes*, and *Colasidia*. Other genera are endemic (*Acrogenys*) or possess a very curious distribution in Australia and America, respectively, being absent from southeastern Asia (*Pseudaptinus*). Therefore, Zuphiinae are rather interesting with regard to zoogeographical questions.

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Abbreviations of collections used in text

ANIC	– Australian National Insect Collection, Canberra
BM	– British Museum, London
CMC	– Collection B. P. Moore, Canberra
FMT	– Museum G. Frey, Tützing
MCSN	– Museo Civico di Storia Naturale, Genova
NMV	– National Museum of Victoria, Melbourne
QM	– Queensland Museum, Brisbane
MMS	– Macleay Museum, Sydney

Methods

Some measurements are presented in figures 3 and 4. Overall length of specimens has been measured from tip of labrum to apex of elytres. All measurements were made under a stereolens by use of an ocular micrometer. For measurements of ratio length/width of 6th antennal segment and of ratio length of eye/length of temples 160× magnification has been used, for the other measurements 64× and 40× magnification, respectively.

Classification

Subfamily Zuphiinae

Zuphietae, Bonelli 1810, Obs. ent. I, Tab. syn.

Galéritides (part), Lacordaire, 1854, p. 79

Zuphiinae, Basilewsky 1953 a, p. 224, 1963, p. 3

BAHR, 1984 a, p. 119

Zuphiini, BEDEL, 1895, p. 15

SLOANE, 1920, p. 120 (Zuphiini!), 1923, p. 246

ANDREWES, 1929, p. 46

CZIKI, 1932, p. 1562

JEDLIKA, 1963, p. 477

HABU, 1967, p. 253

REICHARDT, 1967, p. 8, 1977, p. 448

DARLINGTON, 1968, p. 218

Zuphiidae, Jeannel, 1942, p. 1091

Zuphiitae, Jeannel, 1949, p. 1047

for further information see CZIKI, 1932, p. 1562

Genotype: *Zuphium* Latreille.

Diagnosis: Elytres truncate. Body entirely pubescent. „Neck“ distinctly separated from head. Head with 2 supraorbital setae. Antennae densely pubescent from 1st segment. 1st segment usually as long as 2nd and 3rd segments together or longer. Palps usually pubescent, penultimate segment of labial palps plurisetose. Labrum not enlarged, as wide as clypeus. Mandibular scrobe without seta, but usually pubescent dorsally and/or ventrally. Paraglossae membranous. Pronotum with distinct lateral border. Tarsi pubescent above, claws smooth. ♂ fore tarsus symmetrical (except *Planetes*). Coxal cavities of anterior coxà biperforate. Parameres conchoid, right paramere small.

For determination of the genus *Pseudaptinus* see key to Australian and New Guinean genera of Zuphiinae in BAEHR (1984a, b).

Tribus Zuphiini.

Apart from the tribe Zuphiini two other tribes have been described, Leleupidiini (BASILEWSKY 1951), a group of aberrant soil living Zuphiines, and Patriziini (BASILEWSKY 1953). This tribe was originally created only for the genus *Patrizia* Alluaud, which proved later to be a younger synonyme of *Agastus* Schmidt-Göbel (MATEU 1972). Later on BASILEWSKY (1962) enclosed some other genera, among them *Pseudaptinus*, (and *Thalpius*), in his tribe Patriziini. He was followed by other authors, such as REICHARDT (1971, 1972, 1977) and MATEU (1982). Thus, according to those authors only *Zuphium* and *Parazuphium* belong to the tribe Zuphiini, all other genera, with the exception of Leleupidiini, belong to Patriziini. All genera of Patriziini appear much more primitive than *Zuphium* or *Parazuphium*. As distinguishing character the considerably larger maxillary palps, as compared with the labial palps, were used, which, indeed, are enormously enlarged in *Agastus*. The maxillary palps of the other genera of Patriziini (sensu BASILEWSKY 1962) are distinctly longer than the labial palps, but by no means to the same extent as in *Agastus*. On the other hand, the palps of Zuphiini (sensu BASILEWSKY 1962) are not at all equally large, as f. e. REICHARDT (1977) stated, but at least in *Zuphium* the labial palps are just half as long as the maxillary palps.

With regard to numerous peculiarities *Agastus* is clearly distinguished from the other genera of Patriziini (sensu BASILEWSKY 1962), whereas the remaining genera show several similarities. Moreover, Basilewsky, as well as Reichardt and Mateu did not mention the Australian genus *Acrogenys*, which, perhaps, they did not know. With regard to its palps *Acrogenys* should be included to Patriziini, but it shares still less similarities with *Agastus*.

The different shape of the palps may be a valuable character, indeed, if we were able to demonstrate conclusively its apomorphic status. In my opinion this is not possible at present for two reasons: First, we cannot plainly demonstrate, e. g. by comparison with nearly related groups, that similar palps indeed constitute the original status in Zuphiinae. Second, the character is not clearly distinctive in different groups, thus, classification by use of that character may be quite uncertain. I do not think it satisfactory to classify tribes (or subtribes according to the concept of categories) after just one character, which, in addition, is rather inconstant. Therefore, I prefer to maintain the tribe Patriziini in its original form (sensu BASILEWSKY 1951), that is, only for the genus *Agastus*, until no additional characters have been proposed for that classification. Consequently, I prefer to return *Pseudaptinus* to Zuphiini.

Genus *Pseudaptinus*

Pseudaptinus Castelnau, 1834, Etud. Ent. I (1835), p. 56

CZIKI, 1932, Col. Cat., p. 1560

Diaphorus Dejean, 1831, Spec. Gén., Col. V., p. 278, 300

LECONTE, 1851, Ann. Lyc. Nat. Hist. New York V, p. 173, 1861, Classif. Col. N. Amer. I, p. 20

LACORDAIRE, 1954, Gen. Col. I, p. 88

CHAUDOIR, 1862, Bull. Soc. Nat. Mosc. 35, IV, p. 315, 1972, Rev. Mag. Zool. (2), 23, p. 139

Type-species: *Pseudaptinus albicornis* (Klug, 1934)

Diagnosis

Genus of the subfamily Zuphiinae and the tribe Zuphiini. Head distinctly separated from neck, but temples rounded. Mentum with a flat, unidentate tooth. Glossa narrow, bisetose, paraglossae membranous, tied to glossa. Palpes pilose, Lacinia densely spinose. Mandibular scrobe dorsally and ventrally pilose. 1st antennal segment not much longer than 2nd and 3rd segments together. Pronotum with one anterior marginal seta. Elytres convex, somewhat depressed. Striae distinct, punctate. ♂ fore tarsus symmetrical, just outer edge clothed. Orifice of aedeagus with two membranes. Right paramere present, but smaller than left.

Subgenus *Thalpius* Leconte

Thalpius, Leconte, 1851, l. c., p. 174

LACORDAIRE, 1854, l. c., p. 89

CHAUDOIR, 1972, l. c., p. 105

CZIKI, 1932, l. c., p. 1561

Enaphorus, Leconte, 1851, l. c., p. 174

LACORDAIRE, 1854, l. c., p. 89

Zuphiosoma, Castelnau, 1867, Not. Austr. Col., p. 17, 1868, Trans. R. Soc. Vict., 8, p. 103

CHAUDOIR, 1877, Bull. Soc. Nat. Mosc., 52, 1, p. 252

MACLEAY, 1888, Proc. Linn. Soc. N. S. Wales (2), 3, p. 449

Type-species: *Pseudaptinus pygmaeus* (Dejean, 1826)

Differentiation of the subgenera of *Pseudaptinus* is difficult, because all distinctive characters mentioned in the literature (LECONTE 1851, LACORDAIRE 1854, REICHARDT 1971, 1972, 1977) are very weak and refer only to general habits. Only some features mentioned by CHAUDOIR (1872) seem somewhat more substantial and have been verified by comparison of numerous American species.

In recent publications (esp. REICHARDT 1971, 1972, 1977, MATEU 1982) *Pseudaptinus* and *Thalpius* are considered separate genera. But as stated above, there are only very few and rather weak separating characters which support such opinion. Hence REICHARDT in his keys (e. g. 1977) gives just one distinguishing character, namely: no sharp basal angles of pronotum or sharp angles, respectively. But this character, too, varies considerably in *Thalpius*. Therefore, I refrain from recognizing *Thalpius* as an own genus on account of such a weak character.

Diagnosis

Pronotum more depressed, wider than in *Pseudaptinus* (s. str.), border stronger, basal angles distinct, sharp to acute. Base behind basal angles excised. Elytres generally wider and more depressed.

Based on such attributes all known and newly described Australian species belong to the subgenus *Thalpius*. But the considerable variability of body shape and of form of pronotum indicates, that the subgenus *Thalpius* does not represent a well-founded systematical unit. Thus, arrangement of the Australian species is done only with reservation. Describing of further subgenera is disclaimed, although the morphological differences between some Australian species are more important than between some American *Pseudaptinus* (s. str.) and *Thalpius*, respectively.

All Australian species agree in some more characters, which are not mentioned in the descriptions below:

Head: Temples separated from summit by a suture. Frontal furrows delicate. Apex of clypeus polysetose, labrum sexsetose, laterally pilose. Gular and mental setae present. Antennae with a long tactile seta at 1st segment. 2nd to 11th segments densely, rather erectly pilose. Pronotum: Basal angles prominent, sometimes acute. Median line apically and basally shortened, anterior transversal line indistinct. Median part basally raised above lateral parts, basal grooves indistinctly defined, however. Anterior

seta at first third, posterior seta at basal angles. Lower side above procoxa basally smooth, not pilose. Elytres: Intervals convex, striae distinctly punctate. Scutellar stria long, basal pore present. Pores and tactile setae of odd intervals not or scarcely perceptible. Apex with very narrow membranous fringe. Winged. Last abdominal segment of ♂ unipunctate, of ♀ bipunctate. Aedeagus: Apically with two membranes. Ventral side widely membranous, dorsal side sclerotized and with numerous narrow longitudinal furrows. Internal sac large, trapezoid, densely covered with numerous small teeth (exception: *P. hirsutulus* sp. nov.). Tip of internal sac bent upward. Right paramere triangular, smaller than left.

Key to the Australian species of the genus *Pseudaptinus*

1. Eyes just as long as temples or shorter (Fig. 3 a–c, g) 2.
– Eyes distinctly longer than temples (Fig. 3 d–f, h) 5.
2. Antennae very long, median segments more than 3× as long as wide (Fig. 4 c, f) 3.
– Antennae short, median segments less than 2.5× as long as wide (Fig. 4 a, b) 4.
3. Eyes perceptibly shorter than temples (Fig. 3 g). Pronotum long, narrow, basal angles very acute (Fig. 12), pronotum and elytres rather convex. Striae very coarsely punctate, puncture of intervals double-rowed (Fig. 5 g). Pilosity unequal, rather erect. Glossa medially incised, last segment of labial palpus very sparsely pilose (Fig. 1 g). Aedeagus short and thick, apex abruptly sloping. Left paramere very large, broadly rounded off apically, right paramere short (Fig. 19) *monteithi* sp. nov.
– Eyes about as long as temples (or longer) (Fig. 3 c). Pronotum wider, basal angles far less acute (Fig. 8). Pronotum and elytres fairly depressed. Striae rather finely punctate, punctures of intervals in 3–4 rows (Fig. 5 c). Pilosity even, rather depressed. Glossa apically square, last segment of labial palpus densely pilose (Fig. 1 c). Aedeagus long, narrow, and rather low, apex gently sloping. Membranous part narrow basally. Left paramere narrow, apically square, right paramere rather long and narrow (Fig. 15) *brittoni* sp. nov.
4. Larger (5.5–5.9 mm). Eyes larger (Fig. 3 a). Antennae longer, median segments more than 2× as long as wide (Fig. 4 a). Sides of pronotum more sinuate, basal angles more acute (Fig. 6). Aedeagus small and low, thickened before apex, then gently sloping. Both parameres very long and narrow (Fig. 14). *fulvus* (Castelnau)
– Smaller (4.9 mm). Eyes smaller (Fig. 3 b). Antennae short, nearly moniliform, median segments just a little more than 1.5× as long as wide (Fig. 4 b). Sides of pronotum less sinuate, basal angles less acute (Fig. 7) *australis* (Blackburn)
5. Eyes just slightly longer than temples (Fig. 3 c). Pronotum and elytres rather depressed. Antennae very long, median segments more than 3× as long as wide (Fig. 4 c). Aedeagus long, rather low, apex gently sloping. Membranous part narrow basally. Apex of left paramere square (Fig. 15) . . . *brittoni* sp. nov.
– Eyes much longer than temples (Fig. 3 d–f, h). Body more convex. Antennae shorter, median segments less than 3× as long as wide (Fig. 4 d–f, h). Aedeagus much thicker and shorter, respectively. Apex more abruptly sloping or apical lamelles with pilose appendices (Fig. 16–18, 20) 6.
6. Small (4.55–5.05 mm). Colour brownish black to black, shining. Antennae short, median segments slightly more than 1.5× as long as wide (Fig. 4 h). Head short, neck exceptionally distinctive. Paraglossae apically curved inwards (Fig. 1 h). Striae very coarsely punctate, puncture of intervals fine (Fig. 5 h). Pilosity very long, erect, but quite sparse. Hairs about twice as long as an interval wide. Aedeagus small and low, internal sac not trapezoid. Membrane in front of lamelles finely pilose, lamelles laterally with pilose appendices (Fig. 20) *hirsutulus* sp. nov.
– Larger (over 5.4 mm). Colour reddish to brown above, at most elytres dark brown and iridescent. Antennae longer, median segments over 2× as long as wide (Fig. 4 d–f). Head longer, neck less distinctive. Paraglossae rounded apically (Fig. 1 d–f). Puncture of striae and intervals less dissimilar (Fig. 5 d–f). Pilosity shorter. Aedeagus larger, rather thick. Internal sac broadly trapezoid, lamelles without pilose appendices (Fig. 16–18) 7.
7. Antennae rather long, median segments more than 2.5× as long as wide (Fig. 4 d). Glossa medially with additional setae (Fig. 1 d). Striae finely punctate, puncture of intervals dense, in 3–4 rows, punctures not much smaller than punctures of striae (Fig. 5 d). Pilosity dense, rather depressed. Elytres distinctly

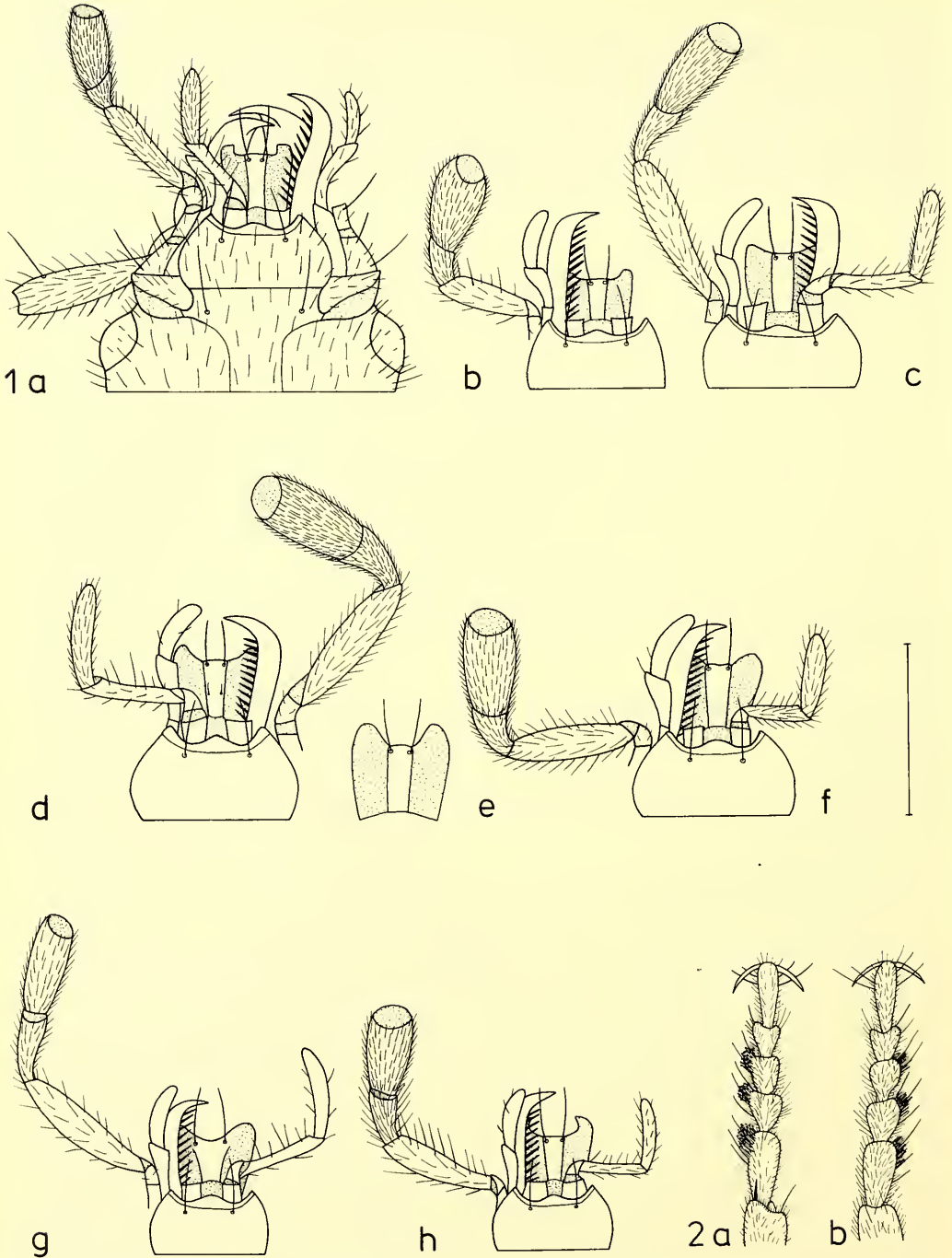


Fig. 1. Lower side of head, and mouthparts: a. *Pseudaptinus fulvus* (Castelnau), b. *P. australis* (Blackburn), c. *P. brittoni* sp. nov., d. *P. iridescens* sp. nov., e. *P. punctatostriatus* sp. nov. (only glossa and paraglossa), f. *P. cyclophthalmus* sp. nov., g. *P. monteithi* sp. nov., h. *P. hirsutulus* sp. nov. Scale: 0,5 mm. Fig. 2. Left ♂ fore tarsus of *Pseudaptinus iridescens* sp. nov. a. Lower side, b. Upper side.

- iridescent, darker than forebody. Aedeagus very thick and broad, both parameres large, apex of right paramere very short and wide (Fig. 16) *iridescens* sp. nov.
- Antennae shorter, median segments slightly more than 2× as long as wide (Fig. 4 e, f). Glossa without additional setae (Fig. 1 e, f). Striae coarsely punctate, puncture of intervals considerably finer, less dense, in 2–3 rows (Fig. 5 c, f). Pilosity less dense. Elytres not or less distinctly iridescent. Aedeagus less big, right paramere longer and more acute (Fig. 17, 18) 8.
8. Eyes very large, semicircular and projecting (Fig. 4 f). Maxillary and labial palps rather short, apex of paraglossae short, broadly rounded off (Fig. 1 f). Puncture of striae less coarse (Fig. 5 f). Pilosity rather long, unevenly erect and depressed. Aedeagus fairly small and narrow, rather curved dorsally. Internal sac small. Right paramere very long and narrow (Fig. 18) *cyclophthalmus* sp. nov.
- Eyes less semicircular and protruding (Fig. 4 e). Maxillary and labial palps long, apex of paraglossae much longer than glossa (Fig. 1 d, e). Punctures of striae very coarse, punctures nearly as wide as intervals (Fig. 5 e). Pilosity rather sparse, regular and depressed, hairs shorter. Aedeagus short and thick, widened apically. Internal sac very large. Right paramere much shorter (Fig. 17) *punctatostriatulus* sp. nov.

Description of species

Pseudaptinus fulvus (Castelnau, 1867)

(Figs. 1 a, 3 a, 4 a, 5 a, 6, 14, 21)

Castelnau, 1867, l. c., p. 17, 1968, l. c., p. 103 (*Zuphiosoma*).

CHAUDOIR, 1877, l. c., p. 252 (*Zuphiosoma*).

MACLEAY, 1888, l. c., p. 449 (*Zuphiosoma*).

CZIKI, 1932, l. c., p. 1561

Types: I saw three syntypes (MCSN). Two of them bear blue labels written by CASTELNAU: “*Rockhamptonia fulva*”. One specimen (♂) bears a type label: “Rockhampton. Esempl. tipica, Coll. CASTELNAU” and a black label: “*Zuphiosoma fulva* Cast.”, both written by GESTRO. In addition, it bears a new red label: “Typus”. This specimen is herewith designated as lectotype. The two remaining specimens (♂, ♀) also bear black labels with the designation: “Rockhampton. Coll. CASTELNAU”, written by GESTRO, in addition new labels: “Syntypus di *Rockhamptonia fulva* Cast.” These are herewith designated as paralectotypes. The genus name “*Rockhamptonia*” perhaps has been never published.

Locus typicus: Rockhampton

Diagnosis: Length 5.5–5.9 mm, width 1.95–2.1 mm (14 specimens measured). Colour: Reddish brown, tip of abdomen lighter. Also antennae, palps, and legs somewhat lighter. A medium-sized, rather depressed species with small eyes, medium-sized antennae, and very small and depressed aedeagus.

Description:

Head: Eyes small, not much projecting laterally, temples longer than eyes, posterior supraorbital seta far behind eyes (Fig. 3 a). Glossa square apically, paraglossa short, apex hooklike curved inwards,

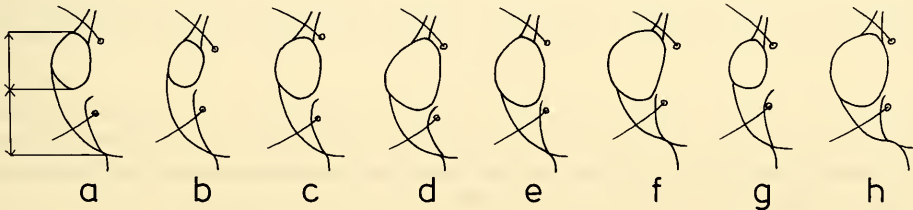


Fig. 3. Left side of head, showing ratio eyes/temples of the Australian *Pseudaptinus*-species: a. *P. fulvus* (Castelnau), b. *P. australis* (Blackburn), c. *P. brittoni* sp. nov., d. *P. iridescens* sp. nov., e. *P. punctatostriatulus* sp. nov., f. *P. cyclophthalmus* sp. nov., g. *P. monteithi* sp. nov., h. *P. hirsutulus* sp. nov.

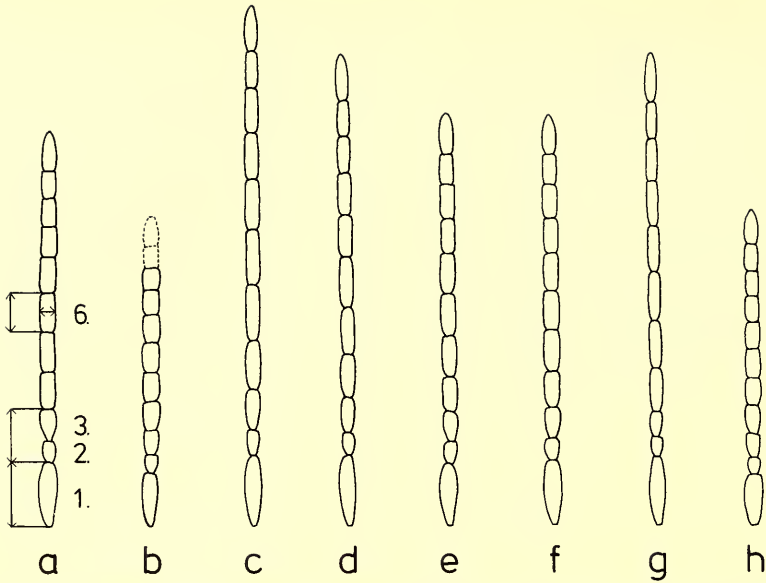


Fig. 4. Antennas of the Australian *Pseudaptinus*-species: a. *P. fulvus* (Castelnau), b. *P. australis* (Blackburn), c. *P. brittoni* sp. nov., d. *P. iridescens* sp. nov., e. *P. punctatostratus* sp. nov., f. *P. cyclophthalmus* sp. nov., g. *P. monteithi* sp. nov., h. *P. hirsutulus* sp. nov. Length ratios are indicated by arrows.

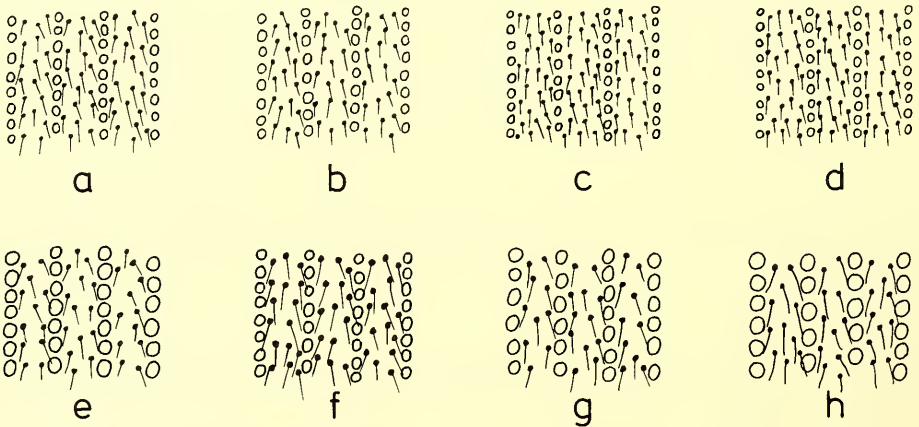


Fig. 5. Sculpture of elytra in Australian *Pseudaptinus*-species, taken from 2nd to 5th interval: a. *P. fulvus* (Castelnau), b. *P. australis* (Blackburn), c. *P. brittoni* sp. nov., d. *P. iridescens* sp. nov., e. *P. punctatostratus* sp. nov., f. *P. cyclophthalmus* sp. nov., g. *P. monteithi* sp. nov., h. *P. hirsutulus* sp. nov.

labial palpus short, last segment rather densely pilose. Galea distinctly pilose. Maxillary palpus rather short, densely pilose (Fig. 1 a). Antennae medium-sized, median segments about $2\frac{1}{4}\times$ as long as wide (Fig. 4 a), first segment distinctly longer than 2nd and 3rd segments together.

Pronotum (Fig. 6) longer than wide, fairly depressed. Anterior angles rounded, posterior angles moderately projecting, about 100° . Sides before angles gently sinuate. Densely punctate above, pilosity rather erect.

Elytres (Fig. 6): About $1.5\times$ longer than wide, widest in posterior third. Apex roundly cut off. Puncture of striae moderately coarse, punctures about $\frac{1}{4}$ as wide as an interval, intervals depressed and rather sparsely punctate in 2–3 rows (Fig. 5a). Punctures of intervals about $\frac{1}{3}$ as large as punctures of striae. Pilosity regular, depressed, almost as long as one interval wide.

Legs rather short. Tibia and tarsus of hind legs relatively short, 1st segment of hind tarsus less than $\frac{1}{3}$ as long as hind tibia.

Aedeagus (Fig. 14): narrow and depressed, dorsal side rather curved, strongly thickened before apex, then gently sloping. Internal sac indistinctly toothed. Left paramere narrow and long, cut off apically, apex of right paramere very long and narrow.

Variation: A very homogenous species. Apart from some sexually variation (♀ elytres wider) there is some variation of relative length of eyes and of shape of ♂ parameres which are somewhat wider in some ♂♂ than drawn in Fig. 14.

Distribution (Fig. 21): According to the material at hand, southeastern Australia from western Victoria to southwestern and southern Queensland, to the north as far as Rockhampton.

Material examined (15 Ex.):

Victoria: Kulkyne Lakes, 1♂, 4♀♀ (CMC), Wyperfeld National Park, 1♀ (ANIC).

New South Wales: Coombah, 1♂ (CMC), s. Hay, 1♀ (CMC), Chiswick near Armidale, 1♀ (ANIC), New South Wales, 2♂♂ (NMV). Queensland: Windorah/Cooper's Creek, 1♂ (QM), Rockhampton, 1♂, lectotype, 1♂, 1♀, paralectotypes (MCSN).

Activity period: Since most of the specimens at hand have been collected quite recently, relatively much dated material is at hand. Specimens have been collected in September (6) and November–February.

Habits: Some specimens were collected in flood refuse, others at light. Such collections give no information about the habits of the species. But light colour and collecting circumstances point to a subterranean habit near water, as in most other Zuphiines.

Pseudaptinus australis (Blackburn, 1890) nov. comb.

(Figs. 1b, 3b, 4b, 5b, 7, 21).

Blackburn, 1890, Trans. Roy. Soc. South Australia, XII, p. 132.

CZIKI, 1932, l. c., p. 1569.

Types: Only the holotype (♀) from the Blackburn Collection (BM) was at hand. Apparently this species has been never recaptured since first discovery. The type specimen bears a round, red, printed label "Type", a determination label: "*Acrogenys australis* Blackb.", written by Blackburn himself, and a printed label: "Blackburn Coll. 1910–236." Left fore leg, left antenna except for 1st and 2nd segments, 10th and 11th segments of right antenna, and both labial palps except for the basal segments are missing.

Locus typicus: Adelaide.

Diagnosis: Length: 4.9 mm, width: 1.75 mm. Blackburn (1890) stated: " $2\frac{3}{5}$ lines", that is about 5.85 mm, perhaps he measured from tip of mandible to tip of abdomen. Colour: Yellowish brown, head and pronotum somewhat darker. Legs, antennes, and mouth parts yellow. A small, depressed species with very small eyes and almost moniliform antennes.

Description:

Head: Eyes small, not projecting beyond temples, these much longer than eyes (Fig. 3b). Thus, summit very wide. Glossa and paraglossa similar to *P. fulvus*, but apex of paraglossa less hook-shaped. Galea presumably not pilose, maxillary palps very short, 1st segment wide, densely pilose (Fig. 1b). Antennes very short, almost moniliform (Fig. 4b), less than half as long as body, median segments just little more than $1.5\times$ as long as wide. Basal segment just as long as 2nd and 3rd segments together.

Pronotum (Fig. 7): Fairly wide and rather depressed, basally rather wide. Anterior angles broadly rounded, posterior angles just slightly projecting, sides slightly sinuate. Slightly punctate above, pilo-

sity rather short and moderately erect. Elytres (Fig. 7): Short and wide, about $1.5\times$ as long as wide, apically widest, depressed above. Apex roundly cut off, drawn in medially. Striae rather strongly punctate, punctures about $\frac{1}{3}\times$ as wide as one interval (Fig. 5 b). Intervals depressed, punctures in 2–3 rows, about $\frac{1}{3}$ as large as punctures of striae. Pilosity regular, fairly depressed, hairs shorter than an interval wide.

Legs short and stout, all tarsi very short. 1st segment of hind tarsus far shorter than $\frac{1}{3}$ of hind tibia. Aedeagus: unknown (type is a ♀).

Variation: unknown, since only holotype is known.

Distribution (Fig. 21): Only known from locus typicus, Adelaide, southern South Australia.

Material examined (1 Ex.):

South Australia: Adelaide, 1 ♀, holotype (BM).

Activity period and habits: Unknown. BLACKBURN (1890) stated only, that he collected the specimen “in flood refuse of the Torrens” (river).

Notice: This species has been originally described as a member of *Acrogenys* Macleay, which is a genus of large, black Zuphiines (BAEHR 1984 a), from which *P. australis* is distinguished already by colour and habitus.

Pseudaptinus brittoni sp. nov.

(Figs. 1 c, 3 c, 4 c, 5 c, 8, 15, 21).

Types: Holotypus: ♂, Millstream, Western Australia, 21°35'S, 117°04'E, near mouth of Dawson's Creek, 7. XI. 1970, at light, leg. E. B. Britton (ANIC). Paratypes: all of the same locality: 1 ♂, 1 ♀, Dawson's Creek, 7. XI. 1970, 1 ♂, 2 ♀♀, n. St. John's Creek, 7. XI. 1970, 3 ♂♂, 2 ♀♀, Deep. Reach, 8. XI. 1970, 2 ♂♂, 2 ♀♀, Crystal Pool, 28. X. 1970, 3 ♀♀, open eucalypt-paperbark woodland, 28. X. 1970, 1 ♀, spinifex-eucalypt junction, 29. X. 1970, 2 ♀♀, eucalypt-spinifex, 30. X. 1970, all leg. E. B. Britton (ANIC, a pair in Coll. of. author).

Locus typicus: Millstream, Western Australia.

Diagnosis: Length: 5.85–6.5 mm, width: 2.05–2.2 mm (10 Ex. measured). Colour: Fully coloured reddish brown, head slightly darker, sutural stripe lighter. Legs, antennae, and mouth parts just slightly lighter, light brown. A rather large, depressed species with medium-sized eyes and very long antennae and palps, habitually rather similar to *P. fulvus*.

Description of holotypus:

Length: 6.22 mm, width: 2.15 mm, Colour: as above.

Head: Eyes rather large, somewhat longer than temples, laterally slightly protruding (Fig. 3 c). Suture between occiput and temples very deep, curved near posterior supraorbital seta. Pilosity of head short and erect. Apex of labrum slightly excised. Glossa as in *P. fulvus*, paraglossa short and wide, not hooked apically. Labial palps very long, 1st segment densely pilose. Galea apparently glabrous. Maxillary palps also very elongate, especially remarkable in forelast segment (Fig. 1 c). Antennae very elongate (Fig. 4 c), median segments more than $3\times$ as long as wide. 1st segment slightly longer than 2nd and 3rd segments together.

Pronotum (Fig. 8): Somewhat more convex than in *P. fulvus*, especially median part more raised. Anterior angles rounded, posterior angles rather acute, about 100°, sides distinctly sinuate. Border fairly distinct. Puncture dense, pilosity rather erect.

Elytres (Fig. 8): Relatively long and parallel, slightly depressed. Apex roundly cut off, not drawn in medially. Puncture of striae rather fine (Fig. 5 c), punctures about $\frac{1}{5}$ as wide as an interval. Intervals depressed, densely punctate in 3–4 rows. Punctures half as large as punctures of striae. Pilosity dense, short, regular, rather depressed. Hairs considerably shorter than an interval wide.

Legs rather elongate, especially first tarsal segments. Basal segment of hind tarsus longer than $\frac{1}{3}$ of hind tibia.

Aedeagus (Fig. 15): Moderately large, not thickened before apex. Apex gently sloping. Membranous area of ventral side remarkably narrow basally. Internal sac distinctly toothed. Left paramere mo-

derately wide, cut off apically, right paramere moderately elongate. Aedeagus rather similar to that of *P. fulvus*.

Variation: A very homogenous species with little variation (Tab.), just elytres in ♀♀ a little wider.

Distribution (Fig. 21): So far only known from the vicinity of Millstream, northwestern Hamersley Range, Western Australia.

Material examined (21 Ex.):

Western Australia: Millstream, 8♂♂, 13♀♀, holotypus, paratypes (ANIC, Coll. of author).

Activity period: The species has been collected from September to November, mostly at light.

Habits: Unknown, but some informations on collecting circumstances, e. g. “eucalypt-paperbark”, “eucalypt-spinifex”, suggest, that the species lives in rather dry surroundings, perhaps near water.

Tab. 1: N: Number of specimens measured. 1: Length (tip of mandible – apex of elytres) in mm. 2: Pronotum, ratio width/length. 3: Elytres, ratio length/width. 4: Ratio width of head/width of pronotum. 5: Ratio length of temples/length of eyes. 6: Ratio length of antenna/body length. 7: Ratio length of 1st segment/length of 2nd + 3rd segments of antenna. 8: Ratio length/width of 6th segment of antenna. 9: Ratio length of posterior tarsus/length of posterior tibia. 10: Ratio length of basal segment of posterior tarsus/length of posterior tibia.

Tab. 1	N	1	2	3	4	5
<i>P. fulvus</i>	14	5,5 –5,9	0,88–0,94	1,54–1,64	0,74–0,81	1,11–1,18
<i>P. australis</i>	1	4,9	0,94	1,54	0,79	1,37
<i>P. brittoni</i>	10	5,85–6,5	0,88–0,93	1,62–1,74	0,78–0,82	0,85–0,98
<i>P. iridescens</i>	10	5,45–6,7	0,89–0,96	1,59–1,75	0,79–0,84	0,6 –0,71
<i>P. punctatostriatus</i>	2	5,7 –5,75	0,91–0,93	1,64–1,71	0,8	0,62–0,67
<i>P. cyclophthalmus</i>	1	5,85	0,94	1,67	0,92	0,54
<i>P. monteithi</i>	9	4,7 –5,9	0,82–0,89	1,62–1,69	0,83–0,88	1,06–1,16
<i>P. hirsutulus</i>	10	4,55–5,05	0,95–0,98	1,6 –1,67	0,93–0,99	0,48–0,53
		6	7	8	9	10
<i>P. fulvus</i>		0,52–0,56	1,16–1,24	2,15–2,26	0,85–0,86	0,3
<i>P. australis</i>		?	1,04	1,63	0,85	0,29
<i>P. brittoni</i>		0,61–0,67	1,05–1,12	3,15–3,5	0,92–0,94	0,35
<i>P. iridescens</i>		0,53–0,59	1,08–1,16	2,52–2,9	0,92–0,93	0,33
<i>P. punctatostriatus</i>		0,56–0,58	1,08–1,15	2,2 –2,23	0,95–0,96	0,3
<i>P. cyclophthalmus</i>		0,57	1	2,15	0,9	0,3
<i>P. monteithi</i>		0,7 –0,76	1,38–1,45	3,45–3,7	0,97–0,99	0,38
<i>P. hirsutulus</i>		0,5 –0,53	1,26–1,32	1,63–1,68	1 –1,02	0,32

Pseudaptinus iridescens sp. nov.
(Figs. 1 d, 2, 3 d, 4 d, 5 d, 9, 16, 22).

Types: Holotypus: ♂, Old Doongan, Western Australia, 15°19' S, 126°32' E, 2 VIII, 1975, leg. J. F. B. Common & M. S. Upton (ANIC). Paratypes: 1♂, 1♀, Cooper Creek, Windorah, S. W. Queensland, 29. IX. 1983, G. B. Monteith (QM), 1♀, 20 km east of Thylungra, S. W. Queensland, 22. IX. 1983, G. B. Monteith (QM), 1♀, Carson escarpment, W. A., 14°49' S, 126°49' E, 9.–15. VIII. 1975, leg. J. F. B. Common & M. S. Upton (Coll. of author), 1♀, Drysdale River, W. A., 15°02' S, 126°55' E, 3.–8. VIII. 1975, leg. J. F. B. Common & M. S. Upton (ANIC), 1♀, Coastal Plains Research Station, C.S.I.R.O., n. Darwin, N. T., at light, 5. VIII. 1966, leg. E. C. B. Langfield (ANIC), 1♀, Lake Hattah, nw. Victoria, light trap, 28. XI. 1967, leg. G. W. Andersen (ANIC), 1♀, Anthony Lagoon, N. T., IX. 1965, leg. Demarz (FMT), 1♀, Walgett, NSW, H. J. Carter Coll. (NMV).

Locus typicus: Old Doongan, northernmost Western Australia.

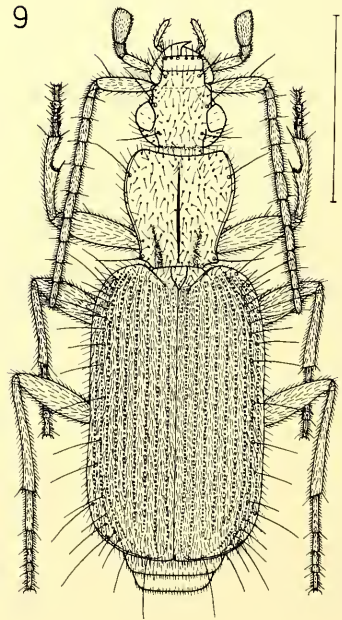
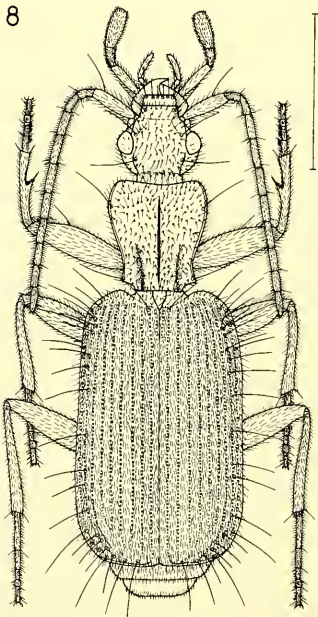
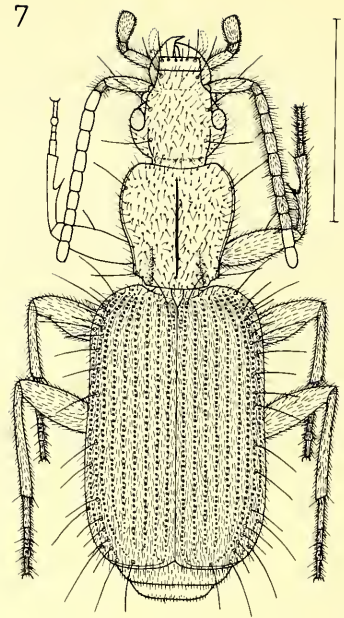
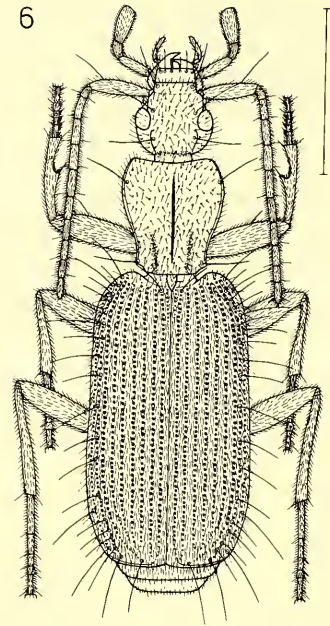


Fig. 6. *Pseudaptinus fulvus* (Castelnau), lectotype, ♂ (MCSN). Scale: 2 mm. Fig. 7. *Pseudaptinus australis* (Blackburn), holotype, ♀ (BM). Scale: 2 mm. Fig. 8. *Pseudaptinus brittoni* sp. nov., holotype, ♂ (ANIC). Scale: 2 mm. Fig. 9. *Pseudaptinus iridescens* sp. nov., holotype, ♂ (ANIC). Scale: 2 mm.

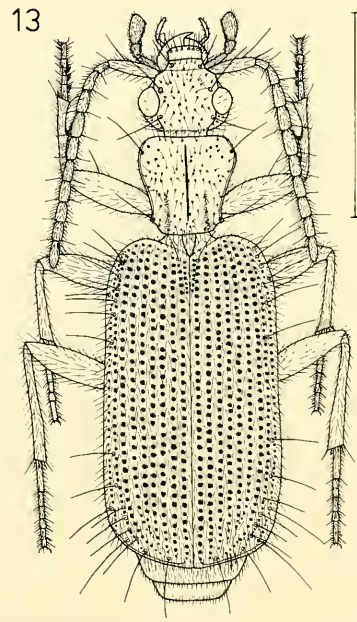
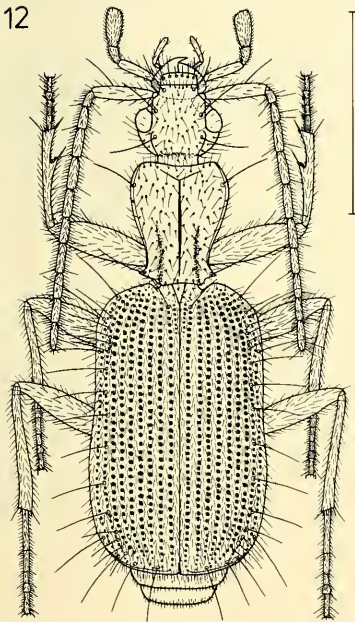
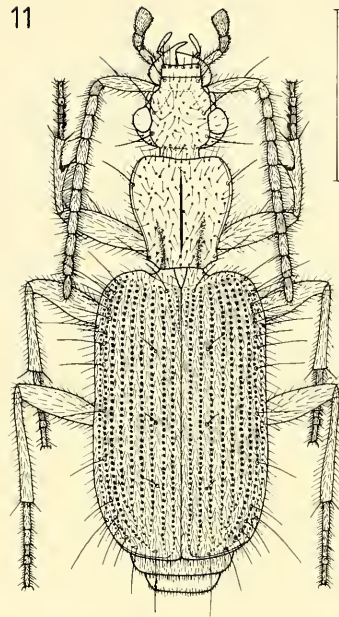
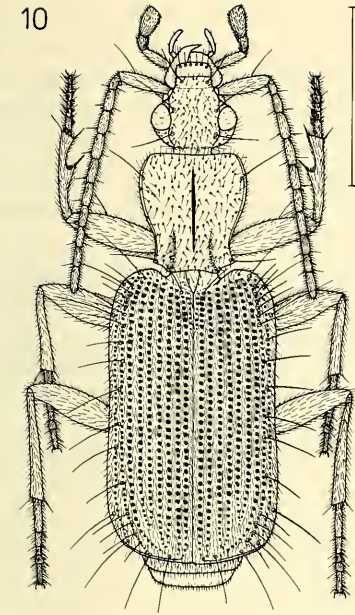


Fig. 10. *Pseudaptinus punctatostriatus* sp. nov., holotype, ♂ (ANIC). Scale: 2 mm. Fig. 11. *Pseudaptinus cyclophthalmus* sp. nov., holotype, ♂ (ANIC). Scale: 2 mm. Fig. 12. *Pseudaptinus monteithi* sp. nov., holotype, ♂ (ANIC). Scale: 2 mm. Fig. 13. *Pseudaptinus hirsutulus* sp. nov., holotype, ♂ (ANIC). Scale: 2 mm.

Diagnosis: Length: 5.45–6.7 mm, width: 1.9–2.15 mm (10 specimens measured). Colour: Head dark brown, pronotum reddish brown, elytres dark brown with lighter sutural stripe and border, iridescent. Lower side reddish brown. Legs, antennes, and palps yellowish-brown. The species is characterized by large eyes, rather elongate antennes, and iridescent and finely and densely punctate elytres. The big aedeagus is also characteristic.

Description of holotypus:

Length: 5.45 mm, width: 1.9 mm. Colour in holotype especially contrasting with very dark head and elytres and a conspicuous red sutural stripe.

Head: Eyes very large, far protruding laterally, temples just $\frac{2}{3}$ as long as eyes (Fig. 3 d). Labrum square apically. Glossa bisetose, but halfway with two additional setae. Paraglossae long, rounded off apically. Labial palpus elongate, 1st segment densely pilose. Last segment of galea sparsely pilose. Maxillary palps rather elongate, very densely pilose (Fig. 1 d). Antennes rather elongate, median segments $2.5\text{--}3\times$ as long as wide (Fig. 4 d), basal segment just little longer than 2nd and 3rd segments together. Head fairly densely punctate, pilosity rather long, erect, but rather unequal.

Pronotum (Fig. 9): Moderately convex, slightly excised apically. Anterior angles rounded, posterior angles prominent, about 100° , sides elongately sinuate. Side border narrow. Puncture moderately dense, pilosity unequal, rather erect.

Elytres (Fig. 9): Rather elongate, parallel, not considerably widened apically, rather convex. Shoulders projecting, apex just lightly rounded. Puncture of striae fine, punctures about $\frac{1}{6}$ as wide as an interval. Intervals depressed, puncture dense, in 3–4 rows (Fig. 5 d). Pilosity regular, depressed. Hairs shorter than an interval wide.

Legs moderately elongate, basal segment of hind tarsus about $\frac{1}{3}\times$ as long as hind tibia.

Aedeagus (Fig. 16): Extremely large and thick, slightly curved. Internal sac symmetrical, complicatedly built, densely covered with small teeth. Left paramere very broad, apex widely rounded off, also right paramere very short and wide.

Variation: Rather variable in size and body proportions. Especially ♀♀ are wider and have the apex of elytres considerably widened. But large eyes, rather long antennes, and the darker and iridescent colour of elytres characterize the species fairly well, in spite of all differences. Also the aedeagus of both ♂♂ at hand is very similar.

Distribution (Fig. 22): From northwestern Victoria through western New South Wales and western Queensland to the Northern Territory, and to northernmost Western Australia. In the eastern and southern states the species has been found only in the drier interior.

Material examined (10 Ex.):

Victoria: 1 ♀, Lake Hattah (ANIC).

New South Wales: 1 ♀, Walgett (NMV).

Queensland: 1 ♂, 1 ♀, Cooper's Creek, Windorah (QM), 1 ♀ 20 km e. Thylungra (QM).

Northern Territory: 1 ♀, Anthony Lagoon (FMT), 1 ♀, Coastal Plains Research Station, Darwin (ANIC).

Western Australia: 1 ♂, Old Doongan, holotype (ANIC), 1 ♀, Carson escarpments (ANIC), 1 ♀, Drysdale River (ANIC), all in northeastern Kimberley Plateau.

Activity period: The species was collected in April (1), August (4), and September (5).

Habits: As stated above, most specimens are from drier areas of the interior. Some were collected at light. Nothing else is known about the habits of this species.

Pseudaptinus punctatostriatus sp. nov.

(Figs. 1 e, 3 e, 4 e, 5 e, 10, 17, 21)

MACLEAY, 1888, l. c., p. 449, as *Zuphiosoma fulvum* Casteln.

Types: Holotypus: ♂, Bernie springs, 8 km ese of Cape Crawford, $16^\circ40'S$, $135^\circ51'E$, Northern Territory, 26. X. 1975, leg. M. S. Upton (ANIC). Paratypes: ♀, Waterfall Creek, 60 miles e. of Pine Creek, Northern Territory.

ry, 7.–8. VIII. 1964, leg. P. B. Carne (ANIC), 1 ♀, 1 (sex not determinated), Barrier Range, NW. Australia, Macleay Coll. (MMS).

Locus typicus: Bernie Springs, Northern Territory.

Diagnosis: Length: 5.7–5.75 mm, width: 1.95 mm. Colour: Reddish brown, rather shining, border and tip of abdomen lighter. Legs and palps yellowish, antennes slightly darker. The species is rather easily discernable by its extremely coarse puncture of elytres, its large eyes, its convex yet in the median part depressed elytres, and by the sparse, depressed pilosity.

Description of holotype:

Length: 5.7 mm, width: 1.95 mm.

Head: Eyes large, far protruding laterally. Temples just $\frac{2}{3}$ as long as eyes (Fig. 3 e). Labrum square apically. Glossa elongate, without additional setae, paraglossae long, rounded apically (Fig. 1 e), labial palpus rather long (1st segment is missing), last segment of galea extremely sparsely pilose, maxillary palps elongate, as in *P. iridescens* (Fig. 1 d). Antennae moderately elongate (Fig. 4 e), median segments about twice as long as wide, 1st segment slightly longer than 2nd and 3rd segments together. Head rather sparsely punctate, pilosity rather erect.

Pronotum (Fig. 10): Depressed, apex straightly cut off, anterior angles shortly rounded, posterior angles rather acute, 90–100°, sinuosity of sides elongate, but uneven. Side border distinct. Puncture dense, pilosity rather erect.

Elytres (Fig. 10): Elongate and parallel, convex, yet depressed in median part. Shoulders rounded, but prominent, apex obliquely cut off. Striae very coarsely punctate, punctures nearly as wide as intervals, thus, intervals laterally distinctly grooved. Intervals slightly convex, sparsely, about double-rowed punctate. Punctures much smaller than those of striae (Fig. 5 e). Pilosity sparse, rather depressed, even. Hairs about as long as an interval wide. No larger pores at 3rd interval, but 3 erect setae each discernable. Legs moderately elongate, basal segment of hind tarsus shorter than $\frac{1}{3}$ of hind tibia.

Aedeagus (Fig. 17): Rather short and thick, widest before apex. Internal sac elongate, distinctly covered with teeth. Left paramere broad, apically rounded, apex of right paramere short, broadly rounded off.

Variation: The ♀ paratype at hand differs in some respects from the holotype, which may be partly sexual differences, e. g.: a little wider, pronotum more rounded, puncture of striae somewhat less

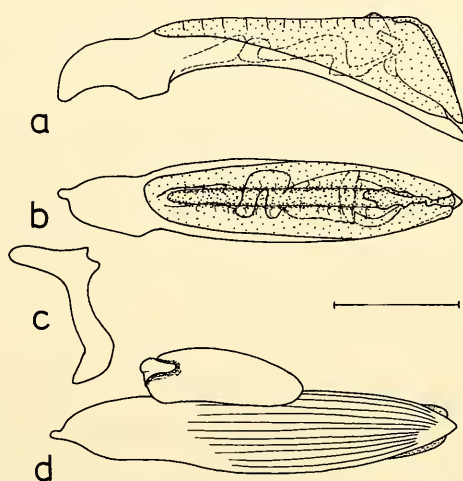


Fig. 14. *Pseudaptinus fulvus* (Castelnau), aedeagus: a. left side, b. ventral side, c. right paramere, d. dorsal side with left paramere. Scale: 0,25 mm.

coarse, puncture of intervals slightly denser, pilosity of elytres more erect. In spite of these differences, I think that both specimens belong to the same species.

Distribution (Fig. 21): Northern and eastern Northern Territory, northwest Australia

Material examined (4 Ex.):

Northern Territory: 1 ♂, Bernie Springs, holotypus (ANIC), 1 ♀, 60 m e. Pine Creek, paratype (ANIC).

Western Australia: 1 ♀, 1 (sex not determinated), Barrier Range, Northwest Australia (MMS).

Activity period: Two specimens were collected in August and October.

Habits: Unknown.

Pseudaptinus cyclophthalmus sp. nov.

(Figs. 1 f, 3 f, 4 f, 5 f, 11, 18, 22).

Types: Holotype: ♂, Nourlangie Creek, 8 km n. of Mt. Cahill, 12°48'S, 132°42'E, Northern Territory, 26. X. 1972, at light, leg. E. B. Britton (ANIC).

Locus typicus: Mt. Cahill, Northern Territory.

Diagnosis: Length: 5.85 mm, width: 2.05 mm. Colour: Head with exception of clypeus and labrum dark brown, pronotum and elytres reddish brown, posterior half of elytres darker, slightly iridescent. Sutural stripe and border reddish. Lower side dark brown, anterior and posterior borders of sternites lighter. Fore head, mouth parts, and antennes yellowish brown, legs yellow. The species is characterized by its very large and prominent eyes, medium-sized antennes, and erect and hirsute pilosity.

Description of holotype:

Size and colour as in diagnosis.

Head: Nearly as wide as pronotum. Eyes extraordinarily large, semicircular and laterally protruding, temples just half as long as eyes (Fig. 3 f). Suture between summit and temples conspicuous, posterior supraorbital seta near posterior border of eye. Neck particularly distinct. Labrum apically square. Paraglossa short and rounded apically, labial palpus rather short, pilosity dense and rather long. Galea almost glabrous, maxillary palps fairly short, pilosity long, erect (Fig. 1 f). Antennes moderately elongate, median segments little more than twice as long as wide (Fig. 4 f). Basal segment about as long as 2nd and 3rd segments together. Puncture of head moderately dense, pilosity long, erect, hirsute.

Pronotum (Fig. 11): Rather convex, apically distinctly excised, anterior angles broadly rounded. Posterior angles rather obtuse, about 110°, not very prominent. Sides elongately sinuate. Border distinct. Densely punctate, pilosity long, hirsute, moderately erect.

Elytres (Fig. 11): Elongate, somewhat widened apically, shoulders rounded, apex roundly cut off. Scutellar stria very long, more than 10 punctures behind scutellum. Striae coarsely punctate, punctures about $\frac{1}{3}$ as wide as an interval. Intervals lightly convex, rather finely punctate in 2–3 rows. Punctures about $\frac{1}{3}$ as wide as punctures of striae (Fig. 5 f). Pilosity hirsute, long, partly erect, partly depressed, hairs longer than an interval wide. Three pores and setae at 3rd intervals perceptible.

Legs rather short, basal segment of hind tarsus less than $\frac{1}{3}$ as long as hind tibia.

Aedeagus (Fig. 18): Rather small and low, apex strongly elevated, then abruptly sloping. Internal sac small, distinctly covered with small teeth. Left paramere very wide apically, roundly cut off, apex of right paramere narrow and elongate.

Variation: Unknown, only holotype at hand.

Distribution (Fig. 22): Northernmost Northern Territory.

Material examined (1):

Northern Territory: Nourlangie Creek, holotypus (ANIC).

Activity period: The unique specimen was collected in October.

Habits: Unknown, the specimen was caught at light.

Pseudaptinus monteithi sp. nov.
(Figs. 1g, 3g, 4g, 5g, 12, 19, 23).

MOORE, 1967, Ent. Arb. Mus. Frey, 18, p. 321, as *Pseudaptinus fulvus* (Cast.).

Types: Holotypus: ♂, s. of Cunnamulla, Queensland, 15. X. 1968, at light, leg. J. A. L. Watson (ANIC). Paratypes: 1♂, 2♀♀, Cooper Creek at Windorah, S. W. Queensland, 29. IX. 1983, leg. G. B. Monteith (QM, Coll. of author), 1♀, 20 km e. of Thylungra, S. W. Queensland, 22. IX. 1983, leg. G. B. Monteith (QM), 1♂, Anthony Lagoon, NT, IX. 1965, leg. H. Demarz (FMT), 1♀, Pentland, Qld, 6. IX. 1942, J. G. Brookes, Bequest, 1976 (ANIC), 1♀, s. Hay, NSW, 13. XII. 1972, leg. B. P. Moore (CMC), 1♂, Kenwick, WA, 1960/1961, leg. H. Demarz (CMC).

Locus typicus: Cunnamulla, Queensland.

Diagnosis: Length: 4.7–5.9 mm, width: 1.65–2.05 mm.

Colour: Reddish brown, head slightly darker, fore head, mouth parts, antennes, and legs yellowish brown. The species is easily distinguished by the acute posterior angles of pronotum, its very thin and elongate antennes and legs, and by its coarse puncture and sparse pilosity of elytres.

Description of holotypus:

Length: 5.15 mm, width: 1.8 mm. Colour as above. Head: Just a little narrower than pronotum. Eyes slightly shorter than temples, not prominent, posterior supraorbital seta well behind posterior border of eye (Fig. 3g). Labrum rounded apically. Glossa short, broadly excised apically, paraglossa slightly longer, apex widely rounded. Both palps very elongate, labial palps sparsely pilose. Galea glabrous. Also pilosity of maxillary palps comparatively sparse, but hirsute (Fig. 1g). Antennes very elongate, median segments about $3.5\times$ as long as wide (Fig. 4g). First segment almost $1.5\times$ as long as 2nd and 3rd segments together. Pilosity of antennes rather sparse, but hirsute. Also head quite sparsely pilose and punctate.

Pronotum (Fig. 12): Elongate, rather convex. Anterior angles obliquely rounded, posterior angles conspicuously acute, less than 80° . Sides in front of hind angles strongly sinuate. Pronotum at posterior angles almost as wide as at anterior third. Median line deep, anterior transversal line rather distinct. Puncture sparse, but very coarse, pilosity likewise sparse, hirsute.

Elytres (Fig. 12): Moderately elongate, convex, apically considerably widened, sides at anterior third perceptibly excised. Shoulders rounded, apex cut off. Striae very coarsely and rather sparsely punctate, punctures about half as wide as an interval. Thus, intervals laterally perceptibly grooved. Intervals lightly convex, rather coarsely, about double-rowed punctate. Punctures about $\frac{1}{2}-\frac{1}{3}$ as large as punctures of striae (Fig. 5g). Pilosity sparse, erect, hirsute, hairs about as long as an interval wide, or slightly longer. Legs elongate, especially tarsi. Basal segment of hind tarsus almost $\frac{2}{5}$ as long as hind tibia.

Aedeagus (Fig. 19): Very short and thick. Apex abruptly sloping. Internal sac large, strongly folded, indistinctly toothed. Parameres in comparison with aedeagus very large, left paramere broadly rounded apically, apex of right paramere very short and wide.

Variation: Extremely variable in size, especially all ♂♂ smaller and somewhat narrower than ♀♀. Other characters very similar.

Distribution (Fig. 23): Western New South Wales, southwestern and central Queensland, eastern Northern Territory, and southwestern Western Australia.

Material examined (9):

New South Wales: 1♀, s. Hay (CMC).

Queensland: 1♂, Cunnamulla, holotypus (ANIC), 1♂, 2♀♀, Windorah (QM, Coll. of author), 1♀, Thylungra (QM), 1♀, Pentland (ANIC).

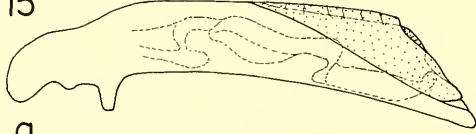
Northern Territory: 1♂, Anthony Lagoon (FMT).

Western Australia: 1♂, Kenwick (CMC).

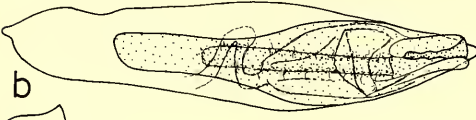
Activity period: The species has been collected in September (6), October (1), and December (1).

Habits: Unknown, some species were collected at light.

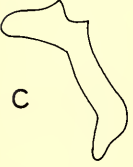
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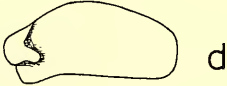
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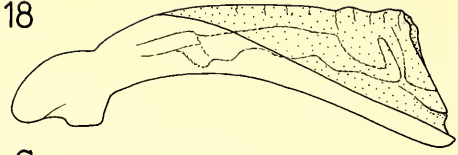


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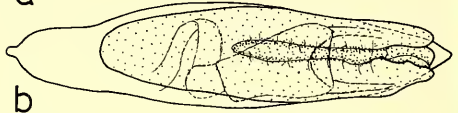


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a



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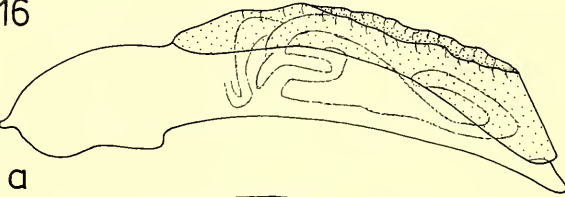


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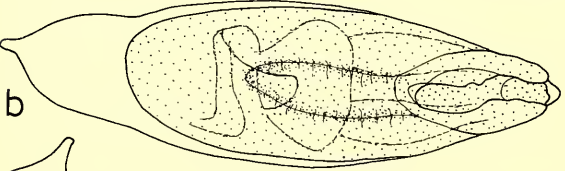


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a



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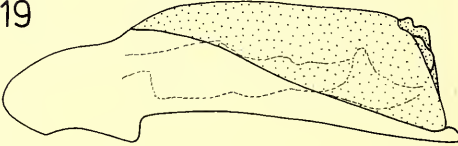


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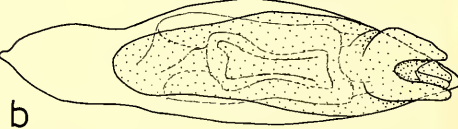


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a



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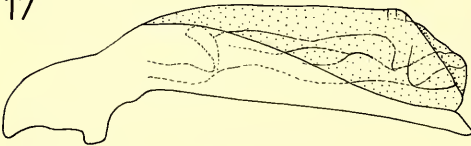


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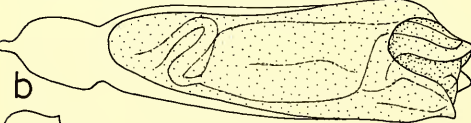


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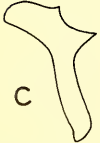
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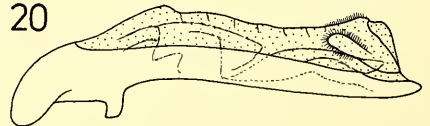


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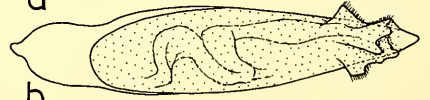


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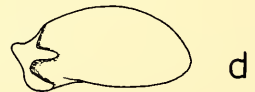
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b



c



d

Pseudaptinus hirsutulus sp. nov.
(Figs. 1h, 3h, 4h, 5h, 13, 20, 23).

Types: Holotype: ♂, Cahills Crossing, East Alligator River, 12°26'S, 132°58'E, Northern Territory, 29. V. 1973, at light, leg. E. G. Matthews (ANIC). Paratypes: 2 ♀♀, Cahills Crossing, same dates as holotypus, 1 ♂, 6 km ssw. Oenpelli, 12°22'S, 133°01'E, Northern Territory, 30. V. 1973, at light, leg. E. G. Matthews, 3 ♂♂, 2 ♀♀, Coastal Plains Research Station, C.S.I.R.O., n. Darwin, NT, at light, 30. V. 1966, leg. E. C. B. Langfield, 3 ♂♂, 1 ♀, same locality, same collector, 6. VI. 1966, 1 ♀, same locality, same collector, 5. VIII. 1966 (all ANIC, except a pair in Coll. of author).

Locus typicus: Cahills Crossing, East Alligator River, Northern Territory.

Diagnosis: Length: 4.55–5.05 mm, width: 1.6–1.7 mm. Colour: Fully coloured shining black, last abdominal sternites somewhat lighter. Basal antennal segment reddish brown, upper side dark brown, remaining segments yellowish. Mandibles reddish, palps and legs yellow. Easily discernable from all other Australian species by very dark colour, small size, very large, semicircular eyes, extremely coarse puncture of the shining upper side, very long, hirsute pilosity, and the unique aedeagus.



Fig. 21. Distribution of *Pseudaptinus fulvus* (Castelnau): ●, *P. australis* (Blackburn): ■, *P. brittoni* sp. nov.: ◆, and *P. punctatostratus* sp. nov.: ▼.

Description of holotypus:

Length: 4.55 mm, width: 1.6 mm. Colour: Deep black, shining, in other respects as above.

Head: very wide and short, almost as wide as pronotum (Fig. 12). Eyes very large, semicircular, conspicuously protruding laterally (Fig. 3h). Temples half as long as eyes, suture between summit and

Fig. 15.–20. Aedeagus of *Pseudaptinus*: a. left side, b. ventral side, c. right paramere, d. left paramere. Scale as in Fig. 14. Fig. 15. *P. brittoni* sp. nov.; Fig. 16. *P. iridescens* sp. nov.; Fig. 17. *P. punctatostratus* sp. nov.; Fig. 18. *P. cyclophthalmus* sp. nov.; Fig. 19. *P. monteithi* sp. nov.; Fig. 20. *P. hirsutulus* sp. nov.



Fig. 22. Distribution of *Pseudaptinus iridescens* sp. nov.: ● and *P. cyclophthalmus* sp. nov.: ◆.

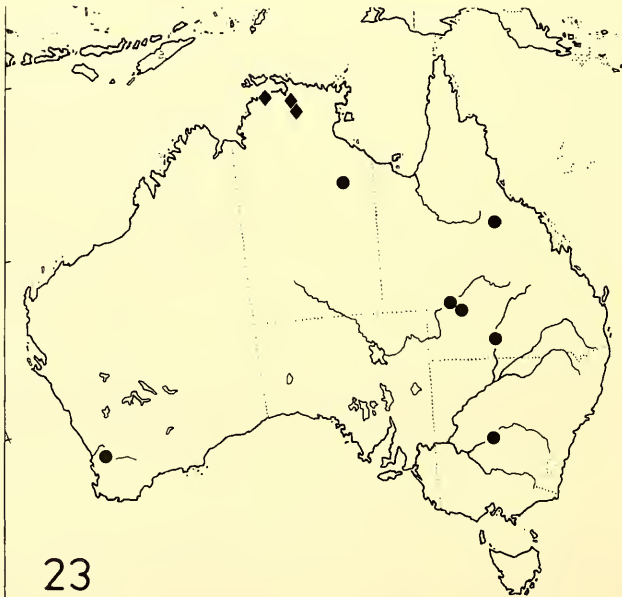


Fig. 23. Distribution of *Pseudaptinus monteithi* sp. nov.: ● and *P. hirsutulus* sp. nov.: ◆.

temples distinct. Posterior supraorbital seta in front of posterior border of eye (Fig. 3 h). Neck remarkably constricted. Temporal grooves indistinct. Labrum square apically. Paraglossae much longer than glossa, hooked apically. Both palps rather elongate, pilosity comparatively sparse. Galea very sparsely pilose (Fig. 1 h). Antennae short, median segments about $1.5\times$ as long as wide (Fig. 4 h). Basal segment little longer than 2nd and 3rd segments together. Head sparsely, but very coarsely punctate und hirsute.

Pronotum (Fig. 13): Almost as wide as long, convex. Anterior angles rounded, widest part near apex. Posterior angles rather acute, $90\text{--}100^\circ$, sinuosity of sides elongate. Lateral border extremely narrow. Median line shallow, almost attaining apex. Puncture very coarse, pilosity very long, erect.

Elytres (Fig. 13): Convex, rather short, slightly widened apically. Sides behind first third conspicuously excised. Shoulders rounded, apex cut off. Puncture of striae extremely coarse, punctures as wide as intervals, these laterally strongly grooved by the punctures. Intervals convex, shining, puncture very fine and sparse, about double-rowed. Punctures less than $\frac{1}{6}$ as large as punctures of striae (Fig. 5 h). Pilosity sparse, but very long and erect. Hairs about twice as long as an interval wide.

Legs short, hind tibia not longer than hind tarsus.

Aedeagus (Fig. 20): Elongate, fairly narrow and low. Before apex slightly raised, then abruptly sloping. Lamelles of orificium distinctly asymmetrical, each laterally with an evertable lateral lamelle, whose borders are densely covered with minute hairs. Lamelles also ventrally distinctly covered with hairs. Internal sac narrow, asymmetrical, not trapezoid, no teeth discernable. Left paramere widely oval, apex of right paramere rather elongate and acute.

Variation: This species is very homogenous. No sexual variation was observed. Some specimens have the sides of the elytres reddish brown, they are possibly not fully coloured.

Distribution (Fig. 23): Northernmost Northern Territory east of Darwin, northwestern Arnhemland.

Material examined (14):

Northern Territory: 6 ♂♂, 4 ♀♀ n. Darwin (ANIC, Coll. of author), 1 ♂, Holotype, 2 ♀♀, Cahills Crossing, East Alligator River (ANIC), 1 ♂, Oenpelli (ANIC).

Activity period: Most specimens were caught in May (9) and June (4), one in August.

Habits: Unknown, all specimens were collected at light.

Note: Especially structure of aedeagus, but some external features, too, make it possibly necessary, to constitute an own subgenus (or even a genus) for *P. hirsutulus*. Such a procedure, however, should only be considered, when a general revision of the whole genus *Pseudaptinus* (and *Thalpins*) is attempted.

Discussion

A detailed differential diagnosis of the species has been omitted, for that purpose the reader should consult the key and the diagnoses heading the description of each species. The systematic position of the genus *Pseudaptinus* and its relations to other Zuphiine genera shall not be discussed in detail, since not even all authors agree in limitation of the subfamily Zuphiinae. It is possible, however, to name some apomorphic or plesiomorphic characters, respectively, which may illustrate the phylogenetical status of *Pseudaptinus*. Possible apomorphic characters of *Pseudaptinus*, with respect to the supposed basic plan of Zuphiinae are.:

1. Light colour (of most species).
2. Moderately elongated basal segment of antenna.
3. Elytres without distinctive tactile setae at odd intervals.
4. Aedeagus with well developed lamelles at orificium.

Such (gradually) apomorphic characters are contrasted by some important plesiomorphic features:

1. Head rounded behind, neck just moderately constricted.
2. Eyes rather large, posterior supraorbital seta not very far from posterior border of eye.

3. Basal segment of antenna not decidedly scapiform.
4. Body rather convex.
5. Elytres deeply striated, intervals fairly convex.
6. Right paramere rather large.

These characters show clearly, that *Pseudaptinus* does not belong to the more evolved Zuphiinae. In many respects it is more apomorphic than the genus *Acrogenys*, for example, but far less than either *Zuphium* or *Parazuphium*.

Within the Australian species of *Pseudaptinus* it is likewise rather difficult to ascertain a well founded phylogenetical grouping. Most species seem to be very closely related, thus, differences between most species are by no means important and very few species are immediately distinguishable and morphologically well limited. Most species are only distinguishable by means of differential characters. Only *P. hirsutulus*, which possibly could require an own subgenus, and *P. monteithi* are clearly defined species. The remaining species may be roughly divided into two groups. The first group which seems to be nearer to a natural grouping includes *P. fulvus*, *P. australis*, and *P. brittoni*. The species of that group are distinguished by their depressed body, relatively light colour, small to medium sized eyes, moderately coarse puncture, and (at least *P. fulvus* and *P. brittoni*, where ♂♂ are available) by their small and very similar aedeagus. The second group includes *P. iridescens*, *P. punctatostriatus*, and *P. cyclophthalmus* and it is far less homogenous. Common characters are: large eyes, more convex body shape, and darker colour. Of this group *P. iridescens* is most probably nearest to the species of the first group.

If the apomorphic characters as mentioned above are correctly recognized, there is some reason to regard the first group as more apomorphic in some respects. In that group *P. fulvus* seems to hold a central position with regard to morphology, whereas *P. australis* seems a little more advanced because of its more depressed body, lighter colour, and smaller eyes. *P. brittoni* in some respects looks more primitive, e. g. in more convex body, darker colour, larger eyes, in others more advanced, e. g. very elongate antennae and mouth parts.

By reason of their many special features *P. hirsutulus* and *P. monteithi* seem to be quite derivative species, in spite of some presumably primitive characters.

In the second group *P. iridescens* seems to be the most generalized species which takes a linking position to the first group. *P. punctatostriatus* and *P. cyclophthalmus*, on the other hand, seem more specialized. But this is only a very vague assumption, particularly because nothing is known about the relationships to the American members of the genus or else of the whole genus to other Zuphiine genera.

Nevertheless, distribution of the Australian species could support some of the assumptions above. Firstly, however, current knowledge with regard to distribution and life history of the species should be briefly discussed. Australian species of *Pseudaptinus* are greatest rarities in the collections, and, as can be seen from the material examined, they have been collected in considerable numbers not before last 20 years. Almost 90% of the specimens mentioned in text were collected since 1965, most of them at light, additional specimens in flood refuse. Moreover, three species are still known only from 1–2 specimens each. The Australian *Pseudaptinus*-species therefore must have a very secret way of life, or they live in such remote areas, as to escape hitherto the notice of collectors. Both surmises are likely correct, because most specimens have been discovered in northern and northwestern Australia, and in southwestern Queensland, respectively, remote areas indeed, which have been visited by very few collectors. On the other hand, some species have been caught in considerable quantities at light, but never have been found by hand collecting. Those species must lead a very secret way of life in wet ground near water, beneath deeply imbedded stones or boulders, or even in termite's nests. In any case the suggested distribution is most probably rather tentative and incomplete. Moreover, it is to be expected, that due to careful searching still new species should be discovered.

With regard to the material at hand, we can ascertain a distribution pattern as following: Few species are wide ranging, first of all *P. iridescens*, which is distributed over whole eastern and southern Australia from Victoria to northwest Australia. Wide ranging are also *P. fulvus* – southeastern Australia from

Victoria to subtropical Queensland, and *P. monteithi* – western Queensland to eastern Northern Territory, and southwestern Western Australia. As far as known, each of the remaining species is constricted to a fairly limited area. With exception of *P. australis* all are confined to the northern part of Northern Territory and to northern Western Australia.

The preceding suggestions about the relationships of the species correspond to some extent to the distribution pattern. *P. iridescens*, perhaps the most generalized species, has the widest range which overlaps the ranges of almost all other species. *P. fulvus*, the most generalized species of the second group, is also widely distributed, but only in the southern part of the range of *P. iridescens*. With exception of the morphologically isolated species *P. monteithi* and *P. hirsutulus* the remaining species can be regarded as offshoots of either *P. fulvus* – *P. australis* in the far south, *P. brittoni* in the north-west, or of *P. iridescens* – *P. punctatostriatus* and *P. cyclophthalmus*, both in the far north. Thus, the most generalized species seems to inhabit wide areas in eastern and northern Australia, whereas more derivative (or specialized) species occupy either far northern areas or invaded southern Australia (*P. fulvus*, *P. australis*, *P. monteithi*).

The suggestions above are very speculative, nevertheless, they coincide with similar observations in the genus *Acrogenys*. At the northern fringe of a widely distributed, rather generalized species of this genus (*A. hirsutus* Macleay) evolved more derivative species whose ranges are much more limited (BAEHR 1984a). A similar pattern of distribution was stated by FREITAG (1979) in the case of the Australian species of *Cicindela*.

If these views are correct, in Australia the genus *Pseudaptinus* must be part of the dry area fauna of the subtropical-tropical region, which just reaches in those areas to the coast, where climate is semiarid or at least not fully humid. This is true for most parts of northern and northwestern Australia, but also for the vicinity of Rockhampton in eastern Queensland (DARLINGTON 1961). Whether the complete lack of *Pseudaptinus*-species from the whole region between northwestern Western Australia and eastern South Australia (with exception of one record from southwestern Australia) is referable to inadequate exploration of these areas, or if it reflects actually a distribution gap, is still completely unknown.

When regarding the concentration of species in northern Australia the genus *Pseudaptinus* could be likely considered a rather recent invader from Southeast Asia, as it is true for many hygrophilous Carabids of the drier areas of northern Australia. If that would be true, *Pseudaptinus* should belong to the well known Old World circumtropical fauna. But this opinion is opposed by the fact, that *Pseudaptinus* is completely absent from the whole Oriental and Aethiopian faunal provinces, respectively, whereas many species live in subtropical-tropical America. This distribution pattern suggests, that *Pseudaptinus* is a member of the so called "Gondwanaland" fauna, rests of which are detectable today in the southern continents and in India. Nevertheless, a greater part of the (younger) Gondwanaland fauna, which perhaps originated not before the detachment of Africa and India off the Gondwana continent (CROOK 1981), today is restricted to the southern parts of South America and Australia, and to New Zealand (e. g. Migadopinae, Merizodinae a. o.), and it was probably always adapted to (cool) temperate climates. If thought to be a part of that younger Gondwanaland fauna *Pseudaptinus* in both regions must have altered since its ecological requirements to a considerable extent, which is not at all probable.

Assumed, on the other hand, that *Pseudaptinus* belongs to an older, always subtropical (or tropical) Gondwanaland fauna, it is to be explained, why the genus is completely absent from either Africa or India. Perhaps the genus originated and invaded Australia, when Africa and India were already separated, but before the climate in the rest of the Gondwana continent was becoming cooler. In future, it has to be examined, however, if such a suggestion actually is consistent with the geological and climatical history of Gondwanaland.

The idea, that *Pseudaptinus* is a rest of such an older Gondwanaland faunal element, which either was at no time present in Africa nor India, or was displaced there by a more advanced fauna and became extinct, is supported by some other Carabid groups with a rather similar distribution pattern. Atten-

tion is drawn namely to the genera *Loxandrus* (Pterostichinae) which inhabits both, North and South America, as well as eastern and northern Australia, and *Notobia* (Harpalinae). In the opinion of NOONAN (1973, 1981) this genus, with the subgenera *Anisotarsus* in America and *Diaphoromerus* in Australia, exhibits an extremely similar pattern of distribution as *Pseudaptinus* and is likewise taken for a remnant of an older, southern faunal element.

In any case, the history of distribution of *Pseudaptinus* is still rather unsettled, especially as their next relatives are yet unknown, and as there are no informations about time of origin of the genus, nor about its evolutionary rate.

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