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Holcophora Staudinger, 1871, a senior synonym of *Aponoea* Walsingham, 1905, syn. n., (Lepidoptera, Gelechioidea, Gelechiidae): with *Holcophora inderskella* (Caradja, 1920), comb. n., transferred from *Blastobasis* Zeller, 1855 (Blastobasidae)

David Adamski[1], Klaus Sattler[2]

1 *Department of Entomology, National Museum of Natural History, P.O. Box 37012, MRC-168, NHB-E526, Smithsonian Institution, Washington, D.C. 20013−7012, USA; AdamskiD@si.edu*

2 *Insects Division, Department of Life Sciences, Natural History Museum, Cromwell Road, SW7 5BD, UK; K.Sattler@nhm.ac.uk*

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Abstract. *Blastobasis inderskella* Caradja, 1920, is transferred from Blastobasidae to Gelechiidae and placed in the Palaearctic genus *Holcophora* Staudinger, 1871. The genus *Aponoea* Walsingham, 1905, **syn. n.**, is newly synonymized with *Holcophora*, and three new combinations are proposed: *Holcophora inderskella* (Caradja, 1920), **comb. n.**, *H. obtusipalpis* (Walsingham, 1905), **comb. n.** and *H. pruinosella* (Chrétien, 1915), **comb. n.** Lectotypes are designated for *Holcophora statices* Staudinger, 1871, and *Aponoea obtusipalpis* Walsingham, 1905. *Holcophora inderskella* is redescribed with supportive images of diagnostic features. Its unique frontal process is described and illustrated and aspects of frontal processes in Gelechiidae are discussed.

Introduction

Blastobasis inderskella Caradja, 1920, is one of numerous micromoths almost never referred to again in the scientific literature after its description. During an examination of Caradja types by KS in 1987, it was discovered that *B. inderskella* was misplaced in Blastobasidae and should be transferred to the Gelechiidae. A manuscript transfer of *inderskella* to the Gelechiidae, but without assignment to a specific genus, was made by KS in the collection of the Natural History Museum, London, and specimens from Mongolia were associated with that name. The transfer from Blastobasidae to Gelechiidae was subsequently formalised by Sinev (2014: 81). We are now able to assign *inderskella* to the genus *Holcophora* Staudinger, 1871, with which we newly synonymize *Aponoea* Walsingham, 1905.

Materials and methods

Moths examined included type specimens as well as non-type specimens from Museum für Naturkunde, Berlin, Germany (MfN); Muséum Naţional d'Histoire Naturelle "Grigore Antipa", Bucharest, Romania (MGAB); Hungarian Natural History Museum, Budapest, Hungary (HNHM); Natural History Museum, London, United Kingdom (NHMUK); and Muséum national d'Histoire naturelle, Paris, France (MNHN). Kornerup and Wanschner (1978) was used as a colour standard for the description of the adult vestiture. Pinned specimens and their associated slide-mounted geni-

talia, and other features were examined with dissecting and compound microscopes, the head structure with a scanning electron microscope. In some instances heads were removed from a specimen, descaled and appropriately treated for SEM study. After examination they were re-attached to the thorax using water-soluble glue that would permit renewed detachment of the head should that become necessary. We use terms for the male and female genitalia following Hodges (1986) and Ponomarenko (2008, 2009). Abbreviations for male genitalia are as follows: ae = aedeagus; g = gnathos; t = tegumen; u = uncus; v = vinculum; vc = valva (costa); vs = valva (sacculus). Abbreviations for female genitalia are as follows: aa = apophyses anteriores; ap = apophyses posteriores; cb = corpus bursae; db = ductus bursae; ds = ductus seminalis; o = ostium; p = papillae anales; s = signum.

Results

Holcophora Staudinger, 1871

Holcophora Staudinger, 1871: 313. Type species: *Holcophora statices* Staudinger, 1871: 313, by monotypy. [Figs 1–4]
Aponoea Walsingham, 1905: 125. Type species: *Aponoea obtusipalpis* Walsingham, 1905: 125, by original designation and monotypy. **Syn. n.** [Figs 5–8]

Generic diagnosis. The two type species, *Holcophora statices* and *Aponoea obtusipalpis* have similarly patterned forewings (Figs 1, 5) and long labial palpi (the palpi are upturned in the former species and more or less porrect in the latter species). Although these characters were once considered important for generic recognition, the genitalia (Figs 2–4, 6–8) provide a more reliable suite of characters for setting generic limits. We propose that *Holcophora* Staudinger is a senior subjective synonym of *Aponoea* Walsingham because they share: a stout or shortened tegumen; bifurcate apices of the saccular part of the valvae; inwardly-curved and narrowed apical 2/3 of the costal part of the valvae; both saccular and costal parts of the valvae short, extending to or slightly exceeding the uncus; tegumen about .6 wider at widest point compared with width of tegumen at level of anterior arch; aedeagus shorter than saccular and costal parts of valvae; and signum with transverse mesial ridge.

Hostplants. Plumbaginaceae.

Distribution. Palaearctic.

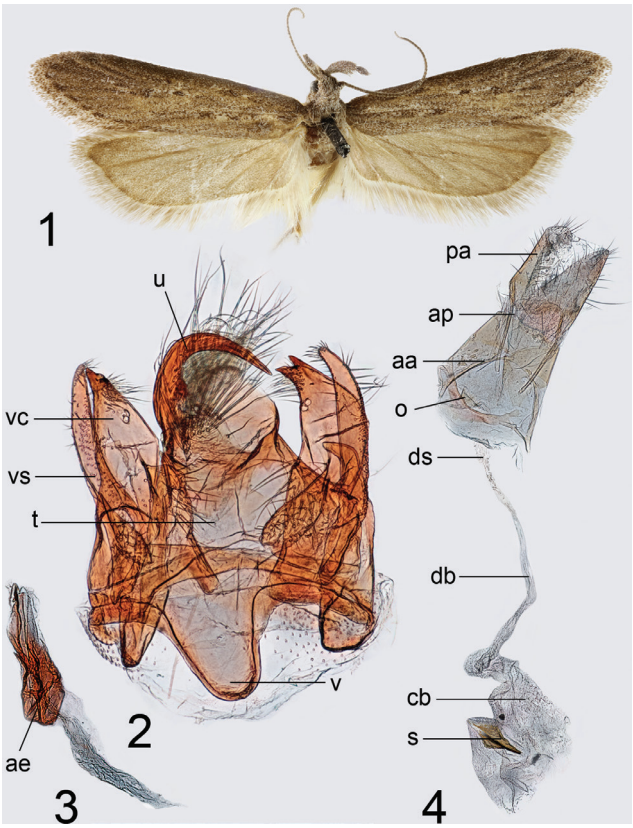
Remarks. The subfamily and tribal position of *Holcophora* is still somewhat uncertain. Meyrick placed *Holcophora* and *Aponoea*, separated only by *Rhynchopacha* Staudinger, 1871 (= *Athrips* Billberg, 1820), in his 'Group 7 (*Dichomeris* type)' (=Dichomeridinae), Karsholt et al. (1996: 120) in Gelechiinae (Chelariini). We follow Ponomarenko (2009: 195, English translation), who placed *Holcophora* in Gelechiinae (Gelechiini), based on specifics of the male genitalia musculature.

Holcophora inderskella (Caradja, 1920), comb. n.

Figs. 9–17

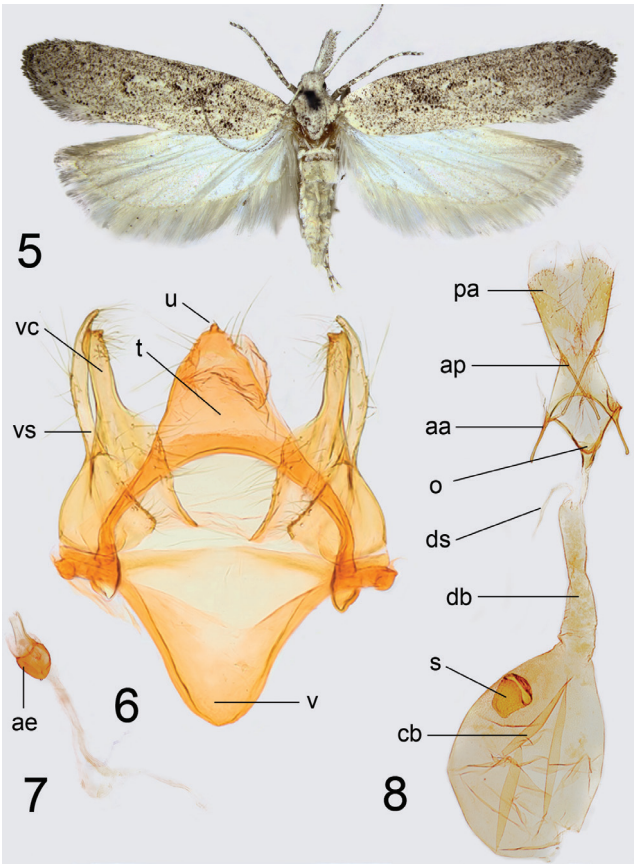
Blastobasis inderskella Caradja, 1920: 122. Lectotype ♂ [damaged], KAZAKHSTAN: Oz Inder, ('Indersky Salzsee'), 22.vi.1907 [(*Bartel*)], designated by Popescu-Gorj 1992: 156 (MGAB, Bucharest), (Fig 14). Paralectotype, ♀ [damaged], same label data as above, (Fig. 15).

Redescription [based on Mongolian specimens]. Adult: Head covered with narrow, convergent, mottled scales. Ocelli present. Proboscis present, basal part squamose, white. Outer surface of



Figures 1–4. *Holcophora statices* Staudinger. **1.** Habitus. **2–3.** Male Genitalia, aedeagus and genital capsule, BM genitalia slide NHMUK0103114723. **4.** Female genitalia, BM genitalia slide NHMUK0110314724, (male and female specimens from Europe).

labial palpus gray intermixed with few pale gray scales tipped with white and pale gray scales, and white scales along apical margin of all palpomeres; inner surface similar but with white scales along dorsal part. Scape of antenna without pecten, pale gray intermixed with grayish brown scales, flagellum with alternating pale gray and brownish gray flagellomeres; male first flagellomere unmodified. Denuded head (Figs 9–13), with medio-posterior part of vertex raised, anteriorly tapered to form distinctive ridge ending at transfrontal sulcus, raised vertex area sparsely set with scale sockets in contrast to densely set surrounding area; frons beneath transfrontal sulcus with strongly protruding medial ridge bearing two or three processes of descending size, longest process at level of antennal sockets; medial ridge set in ovoid ring of strong teeth (each tooth originating from enlarged scale socket). Thorax: Tegula and mesoscutum white, intermixed with few white scales each tipped with brown. Legs with tibiae and femura with alternating white and brown banding on outer surface, mostly white intermixed with few brown scales on inner surface; tarsomeres mostly brown, with narrow white apical band. Forewing (Fig. 9): length 6.0–6.1 mm (n=2), white intermixed with brown, pale gray, and mottled scales; venational pattern demarcated by contrastingly darker scales on areas between veins than paler scales on areas above veins; two brown,

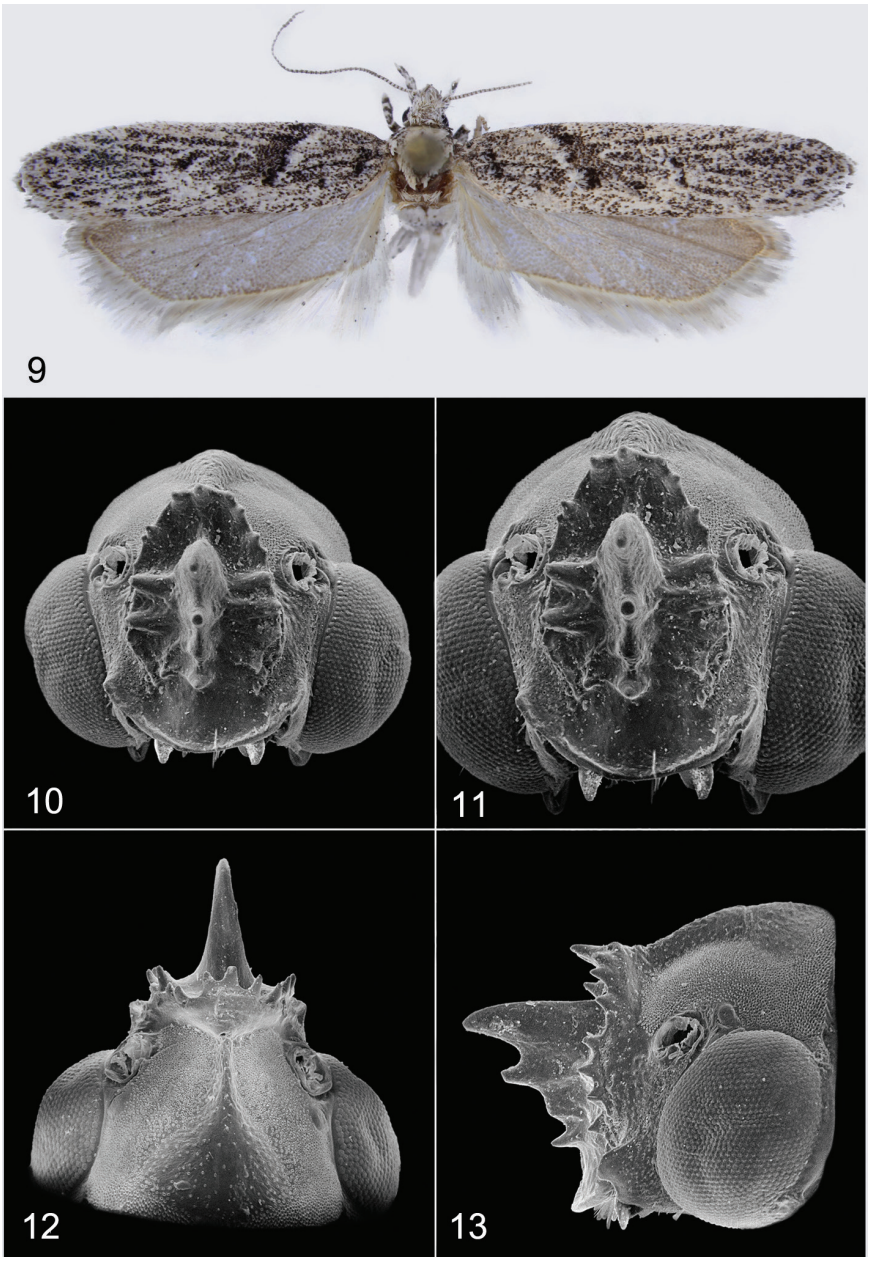


Figures 5–8. *Aponoea obtusipalpis* Walsingham. **5.** Habitus. **6–7.** Male genitalia, aedeagus and genital capsule, BM genitalia slide 25342. **8.** Female genitalia, BM genitalia slide 25343, Lectotype. (male and female specimens from North Africa).

oblique fasciae along base and near midcell; basal fascia bearing two brown scale tufts and midcell fascia bearing four brown scale tufts. Lower surface pale brownish orange, with white scales along costa; fringe white, tipped with brown. Hindwing: translucent pale grayish brown, slightly darkened towards apex; fringe pale grayish brown tipped with slightly darker banding of brown. Abdomen: All terga without transverse, irregular rows of spine-like setae (unlike Blastobasidae). Male genitalia (Figs 16–17): Uncus short, with acuminate apex. Gnathos elongate, with upwardly curved apical end, extending beyond uncus. Tegumen elongate. Left saccular part of valva with narrow shaft, broadly curved near middle, with setose cucullus; right saccular part of valva with apical half missing; costal part of valva about 2/3 length of tegumen, widened at base, gradually narrowing apically. Vinculum extending posterolaterally from wide base, curving abruptly, forming converging, opposable apices. Aedeagus downturned, somewhat widened basally, gradually narrowed towards accuminate apex, nearly as long and extending from a bulbous base. Female genitalia: not examined.

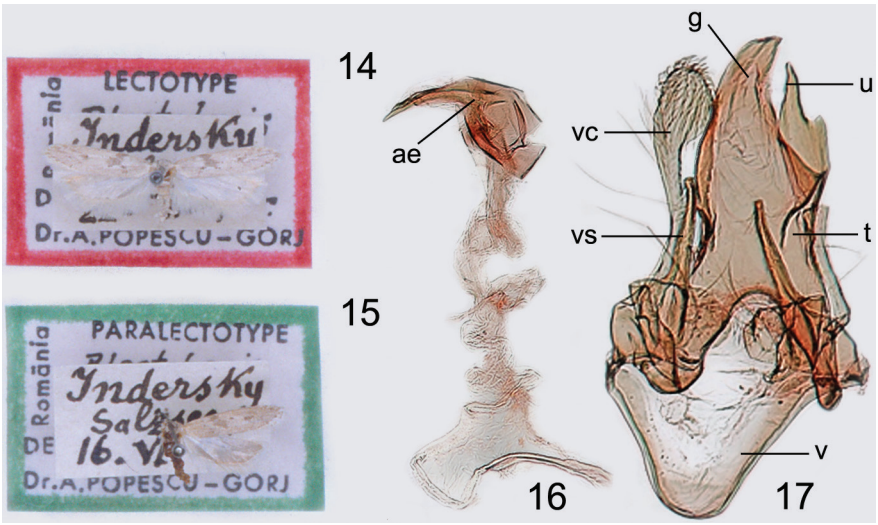
Hostplant(s). Unknown.

Distribution. Palaearctic: Kazakhstan, Mongolia.



Figures 9–13. *Holcophora inderskella* (Caradja). **9.** Habitus. **10–11.** Denuded head showing frontal process (frontal view). **12.** Head showing vertex and frontal process (dorsal view). **13.** Head (lateral view). (male specimens from Mongolia).

Remarks. *B. inderskella* was described by Caradja from two fresh males from Oz Inder ('Indersky Salzsee'), about 48°30'N, 51°58'E, in Kazakhstan. The collector, the German lepidopterist and insect dealer Max Bartel, is not mentioned in the original description, nor is he recorded on the specimen labels, but can be inferred from Caradja (1910: 106).



Figures 14–17. *Holcophora inderskella* (Caradja). **14.** Lectotype. **15.** Paralectotype. **16–17.** Aedeagus and genital capsule, BM genitalia slide 14883. (Male specimen from Mongolia).

Caradja gave no indication what characters he used to place this species in the Blastobasidae and we assume that it may have been superficial similarities in the forewing pattern. His proposal of the name *inderskella* is conditional. He introduced the species as '*Bl.* sp. (?*segnella* Z.)' and stated that, unless it were *Blastobasis* (now *Hypatopa*) *segnella* Zeller, a taxon unknown to him, it had to be a new species for which he proposed the name *B. inderskella*. Prince Aristide Caradja's collection survived, with little damage, the Second World War and the challenging post-war period on his estate at Grumăzești in north-eastern Romania before it was incorporated in the Muzeul Național de Istorie Naturală 'Grigore Antipa', Bucharest, Romania, where KS had the opportunity to study it in 1987. By that time all types had been extracted and placed in a separate type collection, lectotypes had been selected and a type catalogue, including formal designations of lectotypes, was subsequently published (Popescu-Gorj 1992).

Both type specimens of *B. inderskella* still exist in the collection but, as a result of psocid feeding before they reached the museum, are in poor condition: both lack the head and (most of) the abdomen, while the paralectotype also lacks the left-hand wings. On examination it was immediately obvious that *B. inderskella*, despite some rather superficial similarities to *Hypatopa segnella* (Zeller, 1873) in the forewing markings, was a species of Gelechiidae. Fresh specimens from Mongolia, collected by Z. Kaszab, Budapest, were tentatively identified by KS as *inderskella* and placed under that name in the NHMUK collection but without a generic assignment (further specimens exist in HNHM Budapest). We are confident that the generic placement in *Holcophora* is accurate, however, the specific identity should be re-assessed when fresh specimens from the type-locality (Kazakhstan) become available.

B. inderskella differs in the presence of a prominent frontal process from the other three species here included in *Holcophora*. We do not believe that character on its own justifies the separation of *inderskella* into its own genus as species with and without such modifications of the head structure coexist in otherwise undisputed genera of Gelechiidae (e.g. *Athrips* Billberg, *Ornativalva* Gozmány, *Prolita* Leraut, *Scrobipalpa* Janse).

Holcophora obtusipalpis (Walsingham, 1905), comb. n.

Aponoea obtusipalpis Walsingham, 1905: 125. Lectotype ♀, ALGERIA: Biskra, 7.iii.1903 (*Walsingham*, no. 96644). PRESENT DESIGNATION. (NHMUK, London).

Mesophleps cinerellus Turati, 1930: 80, pl. 2, fig. [unnumbered]. Lectotype ♂, LIBYA: Cyrenaica, Banghāzi ('Bengasi'), 21.iii.1922 (*Krüger*). (NHMUK, London), designated by Li and Sattler 2012: 57. Synonymized with *Aponoea obtusipalpis* Walsingham, 1905, by Li and Sattler 2012: 57.

Hostplant. *Limoniastrum guyonianum* Dirieu suspected (Walsingham 1905: 126, Chrétien 1917: 480) – Plumbaginaceae.

Distribution. Palaearctic: North Africa (Algeria, Libya), Spain.

Remarks. *Aponoea obtusipalpis* was described by Walsingham from 'Type ♀ (96644); ♂ (96648)'; the description was made from the female, which is here designated as the lectotype. No paratypes were specified in the original description although 18 specimens in all were mentioned and paratypes were labelled in Walsingham's collection.

Holcophora pruinosella (Chrétien, 1915), comb. n.

Aponaea [*sic*!] *pruinosella* Chrétien, 1915: 330. Syntypes, unspecified sex, TUNISIA: Gafsa, ex *Statice pruinosa*, v, vi., em. vii. (*Chrétien*). (MNHN, Paris).

Hostplant. *Limonium pruinosum* Chaz. ('*Statice pruinosa*') (Chrétien 1915: 330) – Plumbaginaceae.

Distribution. Palaearctic: North Africa (Tunisia).

Remarks. *Aponaea pruinosella* was described by Chrétien from an unspecified number of specimens from Gafsa, bred from larvae feeding in May and June on *Limonium pruinosum* (Plumbaginaceae), the adults emerging in July. Not examined.

Holcophora statices Staudinger, 1871

Holcophora statices Staudinger, 1871: 313. Lectotype ♂, RUSSIAN FEDERATION: S Russia, Volgograd, Krasnoarmeysk ('Sarepta') (*Christoph*), PRESENT DESIGNATION. (ZMHU, Berlin).

Hostplant(s). Unknown. *Limonium* sp. ('*Statice*') sp. suspected (Staudinger 1871: 313) – Plumbaginaceae.

Distribution. Palaearctic: Europe (France, Hungary, Romania, Ukraine, Russia), Kazakhstan, China.

Remarks. *Holcophora statices* was described by Staudinger from 15 specimens, both sexes, he had received from H. Christoph under the manuscript name *Ypsolophus statices*. As there was only one female amongst the 15 specimens Staudinger concluded that Christoph may not have bred the species but collected the adults from *Limonium* ('*Statice*') *Statice* flowers.

Head structures. Various modifications of the head structure, culminating in distinct frontal processes are widespread in Lepidoptera and have independently evolved in many families. If present they are equally developed in both sexes. Their function, although plausibly interpreted in a few instances as that of a cocoon cutter, is largely obscure. Sand grains found on the head around such processes suggest that in some species they may assist the adult in drilling through soil on eclosion from the pupa. In Gelechioidea frontal processes are known in Autostichidae (Symmocinae), Cosmopterigidae and Gelechiidae. In the last family they occur in several genera unrelated to each other, such as *Athrips* Billberg, 1820 (1 of 70+ spp., Palaearctic), *Catatinagma* Rebel, 1903 (1

of 5 spp., Palaearctic), *Caulastrocecis* Chrétien, 1931 (2 of 7 spp., Palaearctic), *Cerofrontia* Janse, 1951 (1 of 1 sp., Afrotropical), *Leistogenes* Meyrick, 1927 (1 of 1 sp., Neotropical), *Ornativalva* Gozmány, 1955 (about 15 of 60+ spp., Palaearctic), *Prolita* Leraut, 1993 (8 Nearctic, of 22 spp., Holarctic), *Scrobipalpa* Janse, 1951 (2 Palaearctic, of 300+ spp. worldwide) and others. Examples were illustrated by Hodges (1966, pl. 8, *Prolita*) and Sattler (1976, pls 6–12, *Ornativalva*). Such specializations of the head structure can provide useful characters for species recognition but they are not important at the generic level as in several genera (*Athrips*, *Ornativalva*, *Prolita*, *Scrobipalpa*) there exist species with processes next to such without. In Gelechiidae there seems to be a concentration of species with frontal processes in arid parts of the Palaearctic and Nearctic regions.

Frontal modifications are only obvious once the head is freed of scales, and even a prominent frontal process can otherwise remain hidden in the scale cover. On the denuded head the transfrontal sulcus, the border between frons and vertex, normally extends in an almost straight line between the antennal sockets and is clearly visible as a narrow band free of scale bases. If a discrete frontal process is developed it usually arises beneath the transfrontal sulcus which it tends to push dorsad. Various teeth and protuberances, when present, originate from enlarged scale bases, and the central process may be surrounded by such enlarged scale sockets which can be arranged into a distinctive arc. An additional arc of teeth sometimes arises above the transfrontal sulcus. The whole range of such developments is demonstrated in the genus *Ornativalva* Gozmány, 1955 (Sattler 1976: 92, pls 5–12), where the arrangement in *O. cornifrons* Sattler, 1976, is not unlike that in the unrelated *H. inderskella*.

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