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Notes on Gnorimoschemini of Australia and New Zealand (Lepidoptera, Gelechiidae)

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The Gnorimoschemini of Australia and New Zealand until recently received no detailed study, the known members being described in the genera *Gelechia* Hübner, 1825; *Phthorimaea* Meyrick, 1902; *Aristotelia* Hübner, 1825; *Gnorimoschema* Busck, 1900. The generic status of several Australian species has recently been revised: Janse, 1951 erected the genus *Scrobipalpa* for *Gelechia heliopa* Lower, 1900. Povolný, 1967 erected the genus *Symmetrischema* for *Phthorimaea plaesiosema* Turner, 1919 and the same author (Povolný, 1966) referred *Phthorimaea silignitis* Turner, 1919, to *Ephysteris* Meyrick, 1908 (subgenus *Opacopsis* Povolný, 1964). Subsequently Povolný, 1974 described the new genus *Australiopalpa* to contain three new species, viz *A. commoni* Pov., *A. tristis* Pov. and *A. bumerang* Pov. All members of the tribe known from Australia and New Zealand are dealt with in this paper. The members of the genera *Australiopalpa* Povolný, 1974 and *Empista* Povolný, 1968 are included on the basis of recent papers (Povolný, 1974, Povolný, 1975), whereas other gnorimoschemoid species (mainly Australian) are revised.

Taxonomy

Genus **Scrobipalpa** Janse, 1951

Janse, 1951 Moths of South Africa, 5 : 199

Scrobipalpa (Scrobipalpa) leucocephala (Lower, 1893) comb. nov.

(Figs. 1—11, 13—26, 44, 48, 49, 56—64, Map 1)

Gelechia leucocephala Lower, 1893, Trans. Roy. Soc. S. Austr., 17 : 169
Gnorimoschema leucocephala (Lower) Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 321—322
Phthorimaea leucocephala (Lower) Meyrick, 1925, Gen. Ins., 184 : 93
Gelechia perdita Lower, 1899 Proc. Linn. Soc. N. S. W., 24 : 96—97 **syn. nov.**
Gnorimoschema perdita (Lower) Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 392
Phthorimaea perdita (Lower) Meyrick, 1925 Gen. Ins. 184 : 93
Gnorimoschema petrinodes Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 318 **syn. nov.**
Phthorimaea petrinodes (Meyrick) Meyrick, 1925 Gen. Ins., 184 : 93

Types

Gelechia leucocephala Lower was originally described from a single female with data "17 Oct. Parkside" and could not be located in the South Australian Museum,

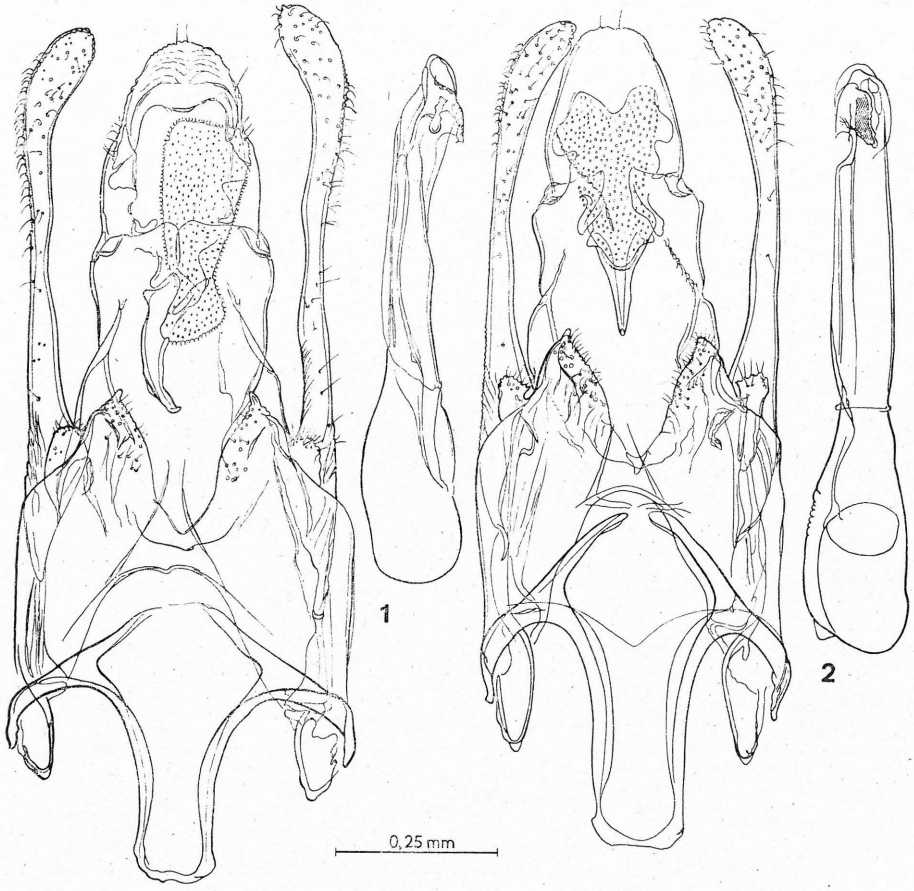


Plate 1: male genitalia of *Scrobipalpa leucocephala:* 1 — f. *atripennis* (Millstream, W. A.); 2 — f. *atripennis* (Balranald, N. S. W.)

One male has been studied from Broken Hill, N. S. W. (coll. Lower, 21. 4. 12, slide Au. 2) labelled "*leucocephala*" probably by Lower and which closely corresponds with the original description. This specimen is not the holotype.

Gelechia perdita Lower was described from ten specimens taken during August at Broken Hill, N. S. W. Nine specimens labelled *G. perdita* probably by Lower are present in the South Australian Museum from Broken Hill, N. S. W., none of which were taken during August so they cannot be accepted as syntypes.

Gnorimoschema petrinodes Meyrick was described from three females taken at Broken Hill, N. S. W. and Duaringa, Q. in March. Two specimens, one from each locality, are present in the British Museum (Nat. Hist.). One female syntype with label data "Broken Hill, N. S. Wales, O L. 11. 3. 98" is hereby designated the Lectotype. I have been able to study a colour transparency of the Lectotype (courtesy

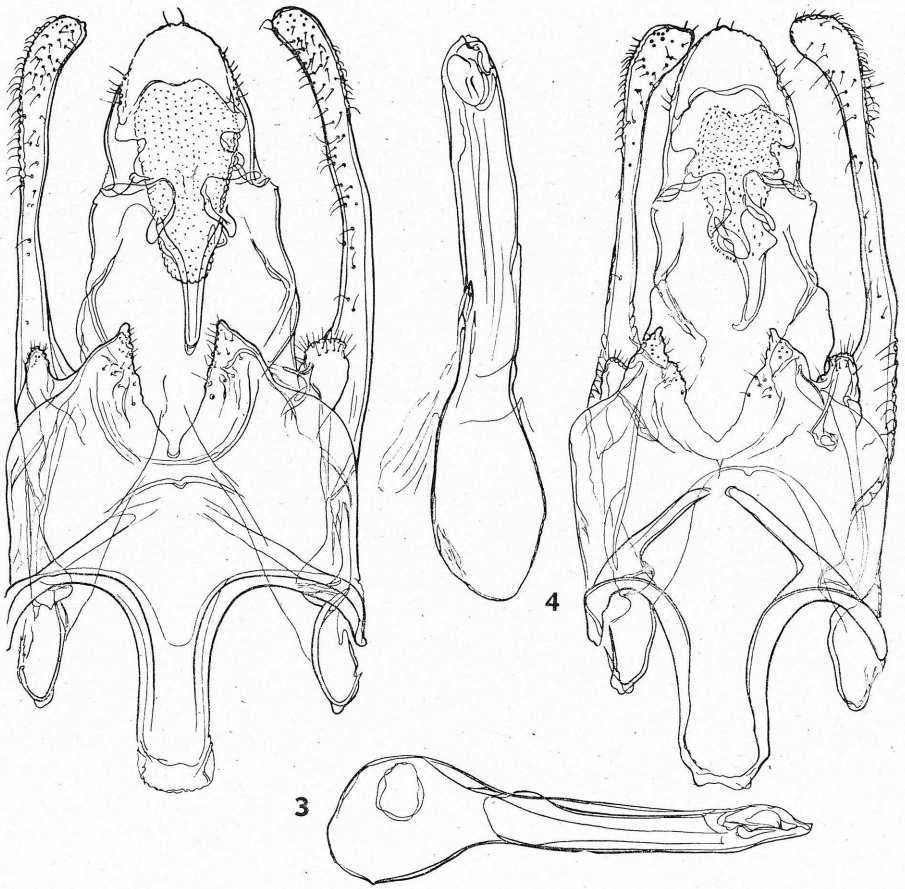


Plate 2: male genitalia of *Scrobipalpa leucocephala:* 3 — f. *griseipennis* (Bourke, N. S. W.); 4 — f. *griseipennis* transitive to f. *atripennis* and to nominate form, a rather small specimen (Bourke, N. S. W.)

I. F. B. Common) and a drawing of the female genitalia (courtesy E. D. Edwards) both of which clearly showed to belong to the *S. leucocephala* Low. complex of forms.

Descriptions of *leucocephala* Low. and *perdita* Low. by Meyrick, 1904 were based on specimens sent to him by Lower and agree with specimens labelled as these species in the South Australian Museum.

The material studied and the descriptions of these three forms demonstrate a close relation of all the three forms.

Material studied

Gelechia leucocephala Low: 1 ♂, Broken Hill, Coll, Lower, 21. 4. 22 (slide Au. 2). This is not the Holotype.

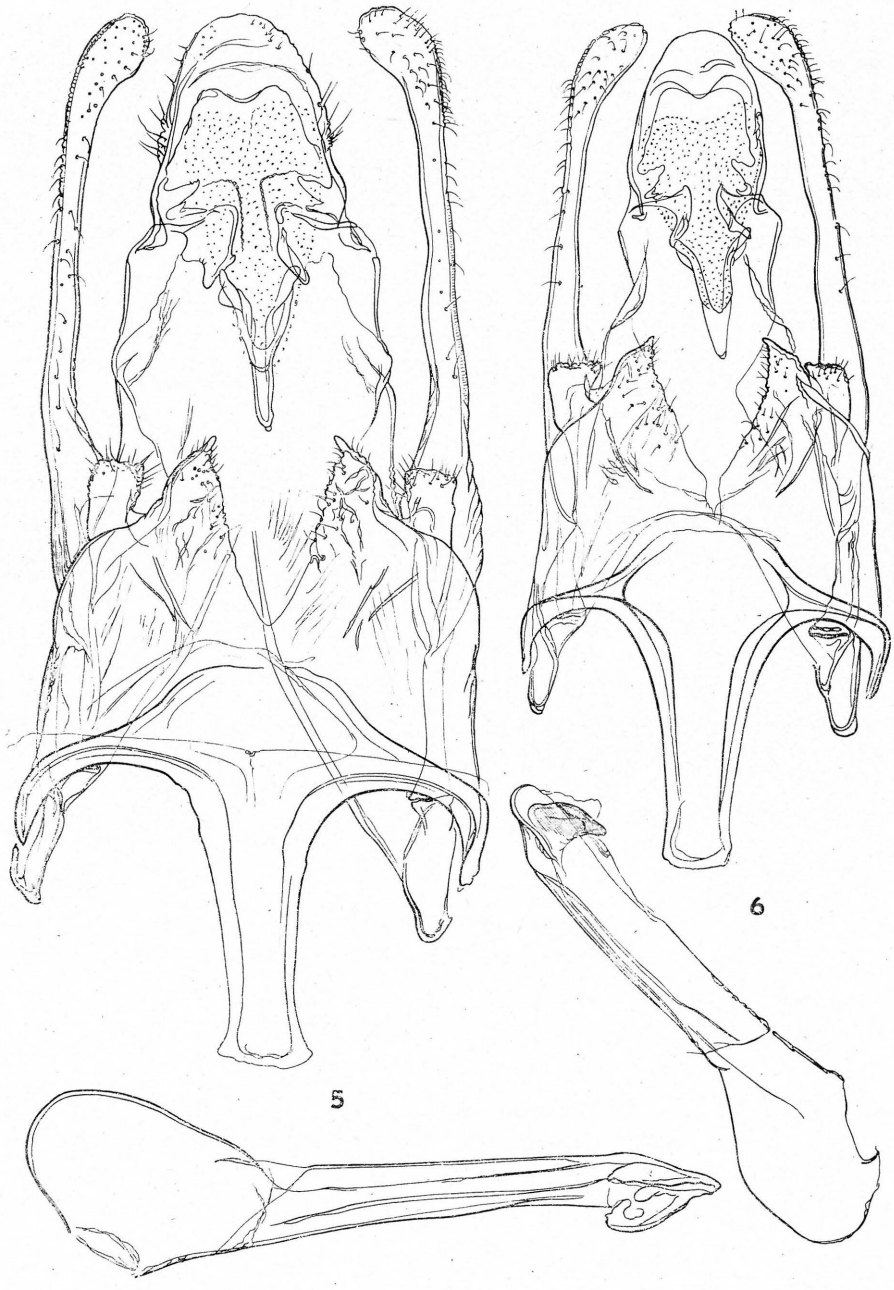


Plate 3: male genitalia of *Scrobipalpa leucocephala:* 5 — f. *marmoreipennis* (Esperance, W. A.); 6 — f. *marmoreipennis*, transitive to f. *megalopennis* (Dongara, W. A.)

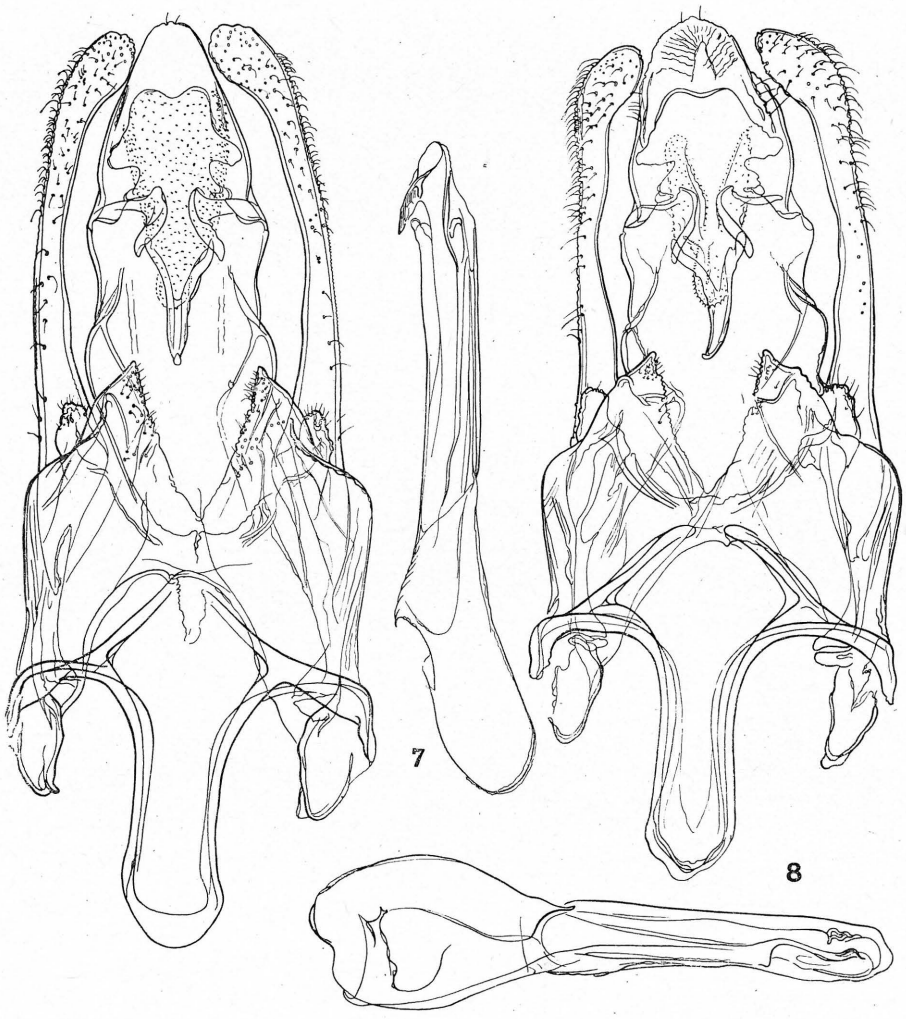


Plate 4: male genitalia of *Scrobipalpa leucocephala:* 7 — f. *megalopennis* (Ceduna, S. A.); 8 — f. *megalopennis* (Ceduna, S. A.)

Gelechia perdita Low.: 1 ♂ Broken H., 1. 7. (?) 00 (slide Au. 3); 1 ♂ Broken Hill, Coll. Lower, 6. 10. 14 (sl. Au. 4); 1 ♀ Broken Hill, 1. 11. 01; "*G. perdita* Lw.", 3327, Broken Hill, 14. 10. 07; 1 ♂ Broken Hill, 7. 10. 91; 1 ♂ Broken Hill, Coll. Lower, 10. 10. 14 (abd. missing); 1 ♀ Broken Hill, Coll. Lower, 6. 10. 14 (sl. Au. 5); 1 ♂ Broken Hill, 11. 10. 97 (abd. missing). These specimens are not the Syntypes of *G. perdita* Low.; 1 ♂ Tas. 73, *Phthorimaea perdita* Low. Tasmania, T 73 I 15/03.

Gnorimoschema petrinodes Meyr.: 1 ♀ *Gnorimoschema petrinodes* Meyr., Broken Hill, N. S. Wales, O. L. 11/3/98, Lectotype hereby designated.

F. *atripennis* f. n.: 2 ♂♂ Standley Chasm, 42 km W. of Alice Springs, NT., 11. Oct. 1972, E. D. Edvards et M. S. Upton; 1 ♂ 2 miles W. of Balranald, NSW., 6 May 1968, I. F. B. Common

et M. S. Upton, (sl. G. 1931); 1 ♀ Pingrup, W. A., 21. Nov. 1958, I. F. B. Common, (sl. G. 1930); 1 ♂ 30 mls. S. of Geraldton, W. A., 3. Nov. 1958, I. F. B. Common; 1 ♂ 5 km SE of Millstream, WA. 21.37 S 117.06 E, 17 Apr. 1971 I. F. B. Common et M. S. Upton, (sl. G. 1899); 2 ♂♂ Mugincoble, NSW., Emg. 1. Jun. 1973 G. Wearne, 11/73 Larva boring roots Solanum eleagnifolium (sl. G. 1737, G. 1738).

F. *griseipennis* f. n.: 1 ♂ 30 mls S. of Bourke N. S. W., 25 Oct. 1957, I. F. B. Common (sl. G. 1896); 1 ♀ 17 mls. S. E. Charleville, Q. 20. Oct. 1957, I. F. B. Common (sl. G. 1897); 1 ♀ 70 mls. N. of Bourke, NSW., 24 Oct. 1957, I. F. B. Common (sl. G. 1956); 1 ♀ 65 mls. E. of Thargomindah, Q. 23 Oct., 1957, I. F. B. Common (sl. G. 1957); atypical f. *griseipennis:* 1 ♂ 16. 10. 98 Broken Hill, *Gelechia perdita* Low. (sl. G. 1903); 1 ♂ 70 mls N. of Bourke, NSW., 24 Oct. 1957, I. F. B. Common (sl. G. 1952); 1 ♀ 16 mls. W. of Charleville, Q. 21 Oct. 1957, I. F. B. Common (sl.G. 1900).

F. *marmoreipennis* f. n.: 2 ♀♀ 3 km SSW of Dongara, WA., 15 Oct. 1970, Upton et Feehan (sl. G. 1944); 1 ♂ 41 miles E. of Esperance, WA. 24 Mar. 1968, I. F. B. Common et M. S. Upton (sl. G. 1951); atypical f. *marmoreipennis:* 1 ♀ 30 mls of Geraldton, W. A., 3. Nov. 1958, I. F. B. Common (sl. G. 1950).

F. *megalopennis* f. n.: 3 ♂♂ 29 miles E. of Ceduna, S. A. 17 Mar. 1968, I. F. B. Common et M. S. Upton (sl. G. 1545, G. 1904, G. 1925); 8 ♀♀ same data (sl. G. 1905); 1 ♂, 4 ♀♀ 107 miles SSE. of Carnarvon, W. A. 12. April 1968, I. F. B. Common et M. S. Upton; 1 ♂ 5 ♀♀ same data, 21. April 1968; 1 ♀ 35 mls. E. of Ceduna, S. A., 28 Nov. 1958, I. F. B. Common; 1 ♀ 50 mls S. of Coolgardie, W. A. 28 Oct. 1958, I. F. Common (sl. G. 1926); 2 ♂♂, 1 ♀ 58 miles E. of Nullarbor, S. A., 2 May 1968, I. F. B. Common et M. S. Upton; 2 ♀♀ Ooldea, S. A. Oct. 1939, W. A. M. (sl. G. 1927, G. 1932); 1 ♀ 41 miles E. of Esperance, WA. 24 Mar. 1968, I. F. B. Common et M. S. Upton.

F. *leucocephala* Low.: 4 ♂♂ 65 miles E. of Thargomindah, Q 23 Oct. 1957, I. F. B. Common (sl. G. 1953); 1 ♀ Broken Hill, N. S. W. *Gelechia leucocephala* Low. (sl. 1901); 2 ♀♀ same data, (sl. G. 1898, 1902); 2 ♂♂, 1 ♀ 70 mls. N. of Bourke, NSW., 24. Oct. 1957, I. F. B. Common (sl. G. 1952); 1 ♂ 7 miles ESE of Dongara, W. A. 17 April 1968, I. F. B. Common et M. S. Upton (sl. G. 1908); 1 ♂ Standley Chasm, 42 km W. of Alice Springs, NT. 11. Oct. 1972 E. D. Edwards et M. S. Upton.

Description

♂ Head, labial palpus and thorax ochreous white to clearwhite. Second and third labial segments with dark basal and subapical rings. Antennae dark fuscous with individual whitish scales. Forewing usually rather narrow with costa gently arched, apex moderately pointed, hind margin rather oblique. Ground colouration varies from blackish or brownish to pale ochreous. The pattern consists of more or less obsolete stigmata in the middle and with indication of darker spots near the base. In other cases wing pattern may consist of transverse bands or scattered spots of varying distinctness. Hindwing dark to light grey, cilia grey to whitish ochreous. Abdomen fuscous of various tinges, in some individuals the three basal segments appear to be ochreous yellowish. Legs whitish banded with blackish irroration.

♀ Sexual dimorphism not very discinctive. Wings are usually more rounded out and female moths appear to be individually stouter. Ground colouration in nearly all the forms is paler, so that the spotting may appear more distinctive than in males.

Size of both sexes considerably vary, the smallest individuals being usually males. Length of forewing 6—9 mm (Figs. 56—64).

Genitalia

♂ Generally rather stout with all the elements typical of the genus well developed. Uncus usually rounded to moderately tapered. Gnathos rather prominent and deep. Valva with moderately swollen apex, slightly curved. Its tip is usually slightly longer than the upper margin of uncus, but in several instances this relation may be quite

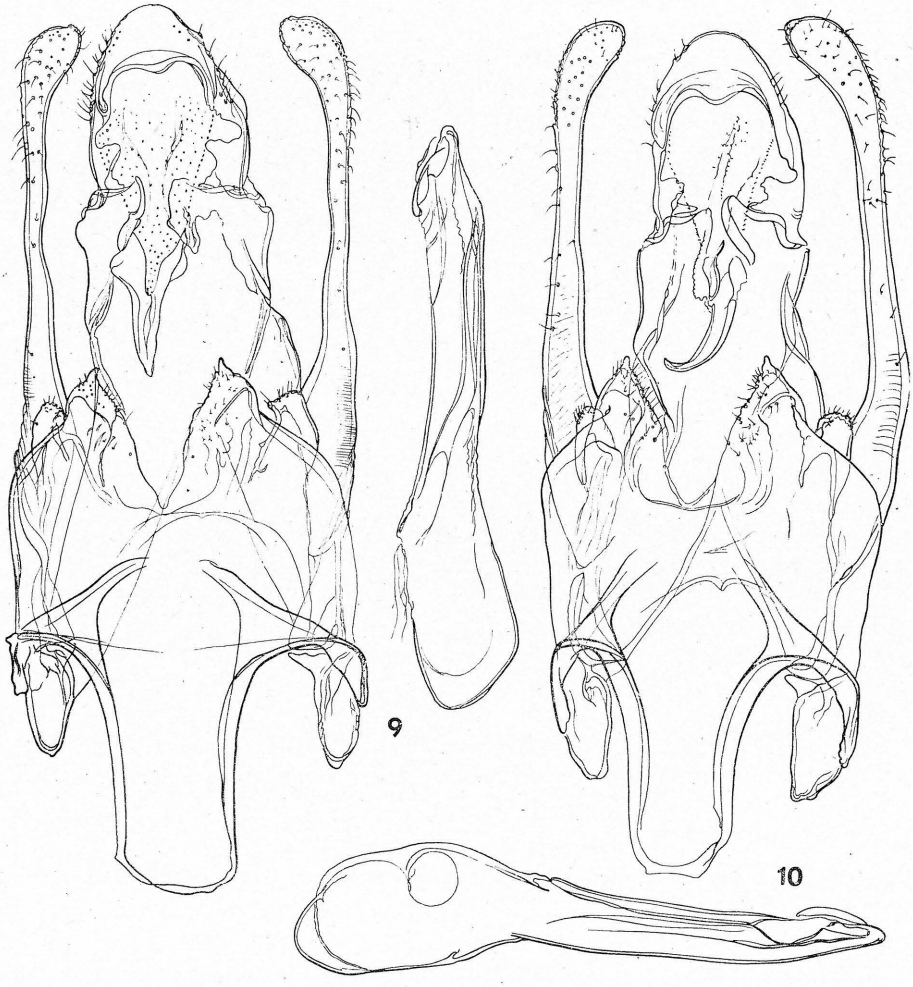


Plate 5 — male genitalia of *Scrobipalpa leucocephala:* 9 — intermediate (nominate form) (Broken Hill, N. S. W.); 10 — intermediate (*Scrobipalpa perdita* Low.) (Broken Hill, N. S. W.)

reverse. The paired process of sacculus is distinctly more prominent than the paired parabasal process of valva, with more or less deep medial excavation and tapered tip. Saccus varies in both length and width. Aedeagus long, stout, its length corresponding about 2/3 of the length of genitalia. Caecum aedeagi more or less swollen, subterminal spine having the form of a distinctive hook. Size, form of uncus, saccus, paired saccular process etc. vary.

♀ Subgenital plate is considerably variable in size, form, length of fore apophyses and sculpture and mainly in size and form of signum. Mostly it is subquadrate with either straight or convex lateral ledges and long apophyses. Its medial membranous

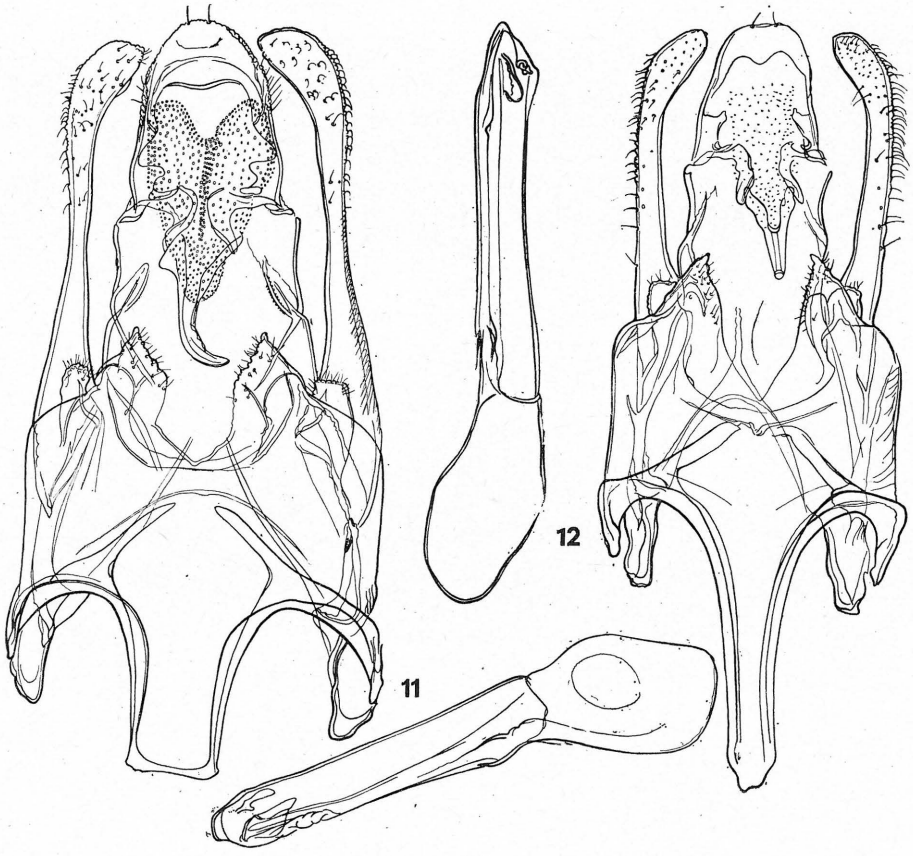


Plate 6: male genitalia: 11 — *Scrobipalpa leucocephala*, intermediate between f. *griseipennis* and f. *atripennis* (Broken Hill, N. S. W.); 12 — *Scrobipalpa heliopa* (Iron Knob, S. A.)

portion behind the ostial region has a more or less defined sculpture resembling a network or foam like. Its fore proximal margin protrudes slightly towards ostium bursae forming a short funnel. Signum bursae is a stout spine of various size and more or less curved.

In general, the genitalia of both sexes show the same scale of variability in size and form, which is characteristic also of size, colouration and wing pattern of moths. (Figs. 1—26)

Distribution: Widespread in Australia (see map 1). One specimen (see material studied) is known from Tasmania. This specimen is so far the only representative of the tribe Gnorimoschemini known from Tasmania.

The following forms may be distinguished:

forma *atripennis* f. n.

Compared with other forms of this species complex it is medium-sized with relatively slender wing. Forewing dark brown to blackish so that in males the dark

markings may be invisible. Sometimes groups of greyish scales are present producing an irrorate pattern. Male genitalia of medium size, the saccus relatively short and obtuse; the female with subgenital plate narrow, apophyses long and the signum curved. (Figs. 1, 2, 13, 14, 56)

Distribution: Widespread in Australia (Alice Springs N. T., Balranald N. S. W., Pingrup W. A., Millstream W. A. etc.). (Map 1)

forma *griseipennis* f. n.

A medium-sized to large broad-winged form. Forewing grey to brown, only with indication of darker spots near the base, or without any, then unicolorous brown. Male genitalia rather broad, with broad saccular excavation and distinct semicircular folds below the excavation. Female subgenital plate rather variable much as in f. *atripennis*. (Figs. 3, 4, 15, 16, 18, 57, 58.)

Distribution: Mostly in Eastern Australia (Bourke N. S. W., Charleville Q., Thargomindah Q.). (Map 1.)

forma *marmoreipennis* f. n.

A large, stout, broad-winged form with pale ochreous to whitish forewing. Wing pattern in the form of two diffuse dark transverse bands, one being praebasal at the wing base, the other near the outside margin termen. Most of the forewing is whitish to ochreous with individual groups of dark scales forming minute blackish dots. ♂ — Genitalia large and stout with saccus prolonged, medial excavation of sacculus long with convexly converging margins of paired processes. Subgenital plate subquadrate, signum small. (Figs. 5, 6, 21, 59, 60.)

Distribution: Known only from the coast of Western Australia (Dongara W. A. and Esperance W. A.), (Map 1)

forma *megalopennis* f. n.

The biggest and stoutest moths of this complex, having long, slender, moderately acute forewing. Mostly grey to brownish in colour with numerous agglomerations of darker scales forming scattered spots of varying distinctness. Males are appreciably smaller with broader wings and darker in colour. Male genitalia stout, uncus tending to have an obtuse tip, saccus broad with sides parallel. Female with subgenital plate very big, signum very big and of various shapes. (Figs. 7, 8, 19, 20, 62, 63.)

Distribution: South and Western Australia (Ceduna S. A., Nullarbor S. A., Ooldea S. A., Coolgardie W. A., Esperance W. A.). (Map 1.)

Foodplant: Scrobipalpa leucocephala Lower f. *atripennis* f. n. has been reared from the roots of Solanum eleagnifolium (Solanaceae), a weed introduced to Australia.

Comments: *Scrobipalpa (Scrobipalpa) leucocephala* Low. contains a number of, often sympatric, forms the taxonomic status of which is difficult to assess. Most individuals are clearly separable into forms but intermediates suggest that gene flow, of varying degree, exists between forms. In some populations one form may prevail and some geographical variation is apparent but the general absence of isolatory factors in the dry areas of Australia continues to permit gene flow. At present it seems best to consider the taxon a complex species consisting of closely related apomorphic forms. It is an unparalleled and complex situation with similarities to that of the *Scrobipalpa (Euscrobipalpa) salinella-instabilella* and *Scrobipalpula psilella* group in which however the forms can be geographically isolated and/or have different food plants.

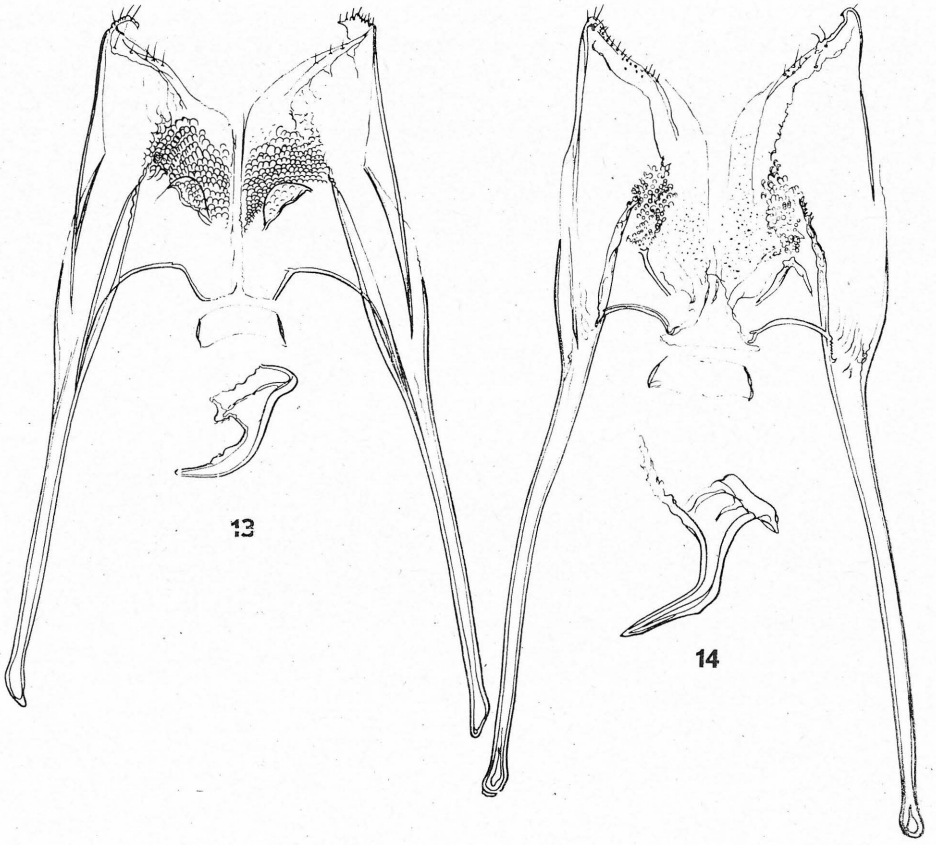


Plate 7: female genitalia of *Scrobipalpa leucocephala:* 13 — *f. atripennis* (Pingrup, W. A.); 14 — f. *atripennis* (Balranald, N. S. W.)

Scrobipalpa (Scrobipalpa) heliopa (Lower, 1900)

(Figs. 12, 27, 65, Map 3)

Gelechia aptatella Walker, 1864 List Lep. Het. Brit. Mus., 29 : 636
Gelechia heliopa Lower, 1900, Proc. Linn. Soc. N. S. W., 25 : 147
Gnorimoschema heliopa Lower Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 320—321
Phthorimaea heliopa (Lower) Meyrick, 1925 Gen. Ins., 184 : 94
Scrobipalpa heliopa (Lower, 1900) Janse, 1951 The moths of South Africa (Gelechiadae), 5 : 173—300 (typus generis)
Scrobipalpa heliopa (Lower, 1900) Povolný, 1966 Acta ent. bohemoslov., 63 : 133
Scrobipalpa (Scrobipalpa) heliopa (Lower, 1900) Povolný, 1967 Acta sci. nat. Acad. Sci. Boh., Brno, 6 : 211—212

The name *aptatella* Walker has priority but because of economic importance of this species the name *heliopa* Lower, which is better known and well established in the literature, is preserved.

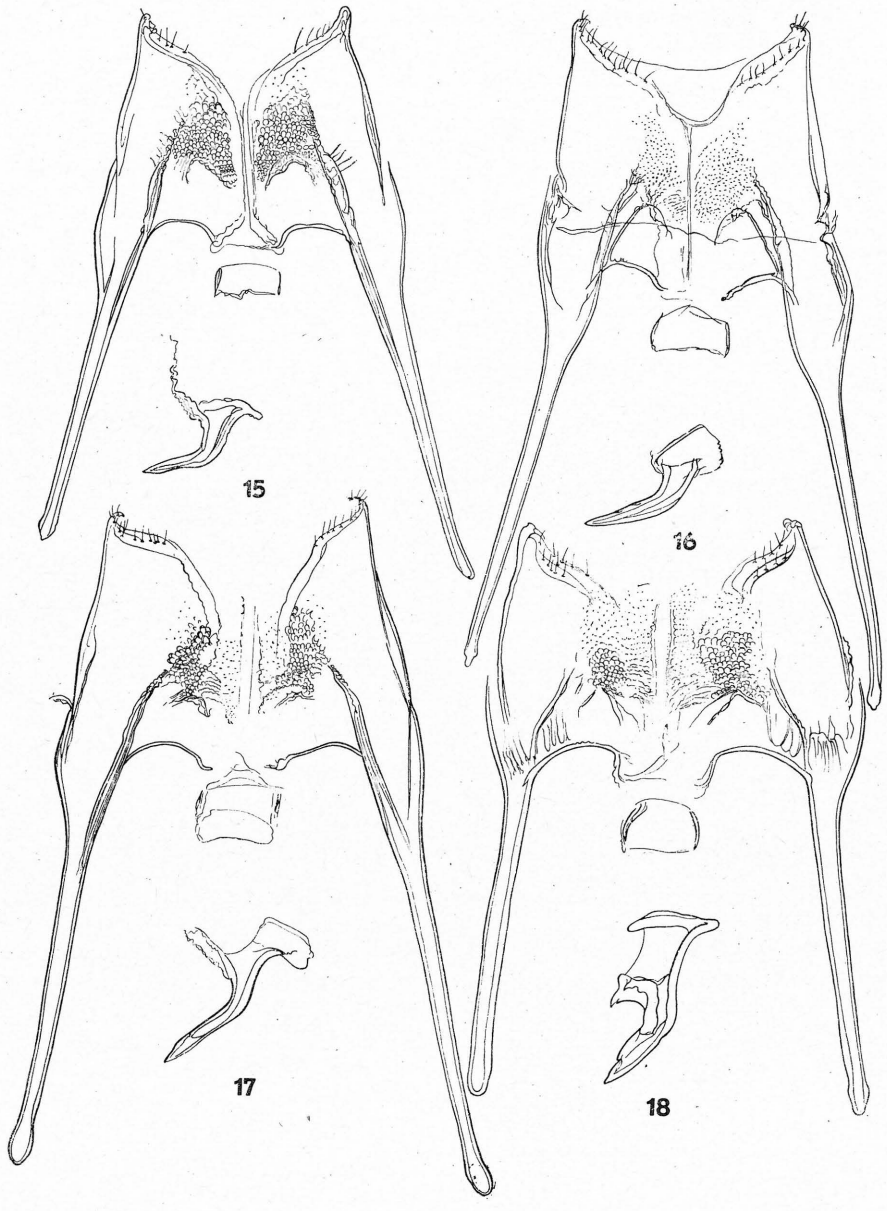


Plate 8: female genitalia of *Scrobipalpa leucocephala:* 15 — f. *griseipennis* (Thargomindah, Q.); 16 — f. *griseipennis* (Charleville, Q.); 17 — f. *griseipennis*, intermediate (Charleville, Q.); 18 — f. *griseipennis* (Bourke, N. S. W.) — signum extraordinary strong

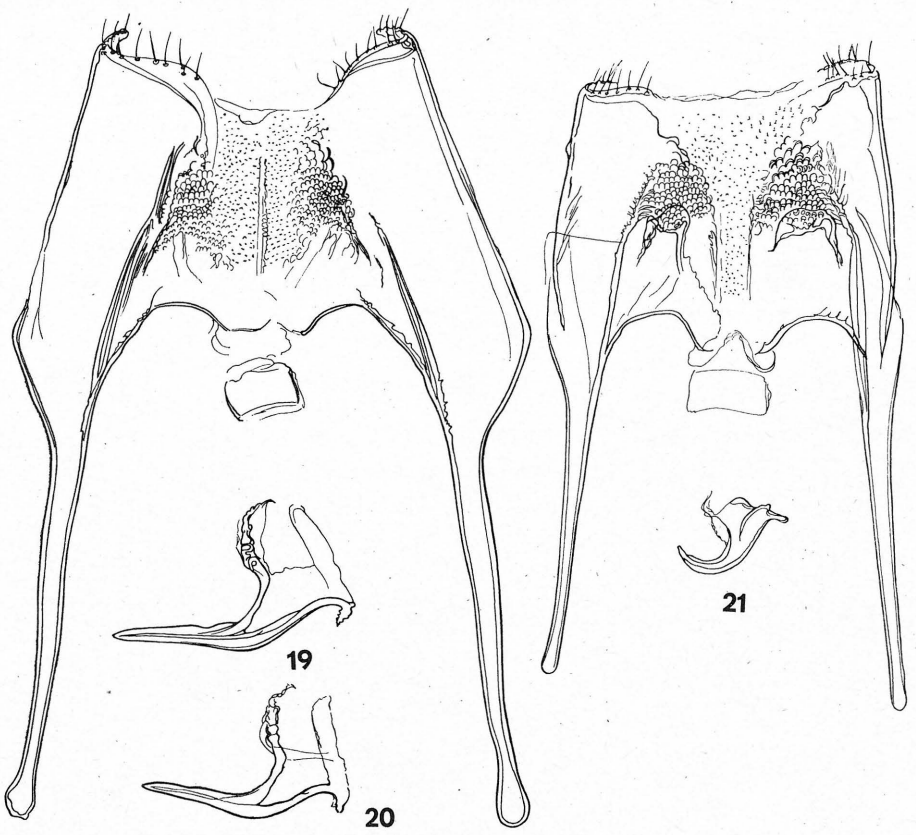


Plate 9: female genitalia of *Scrobipalpa leucocephala:* 19, 20 — f. *megalopennis* (with two types of signum bursae, Ceduna, S. A.); 21 — f. *marmoreipennis* (Dongara, W. A.)

Diakonoff, 1967 obviously confused the male of "*Phthorimaea*" *heliopa* (Lower) with the male of *Stomopteryx subsecivella* (Zeller) as seen from his figures of genitalia (p. 357, figs. 214, 215). Consequently, the female of *S. subsecivella* (Zell.) figured on p. 356 (fig. 210) is not conspecific and even not congeneric with the figured male of this species. The same mistake is evidenced also by the photograph (fig. 210) of *S. subsecivella* (Zell.). Due to this confusion his interpretation of *Stomopteryx subsecivella* (Zell.) (p. 149—150) should be revised or confronted with the types of this species in order to avoid further possible mistakes, especially because both *Scrobipalpa heliopa* (Low.) and *Stomopteryx subsecivella* (Zeller) are pests of crops.

Types

The species was described from four specimens from Broken Hill, N. S. W. in October. Although I have concentrated all the existing material of the tribe from Australian Musea and from other entomological institutions no types of this species could be traced.

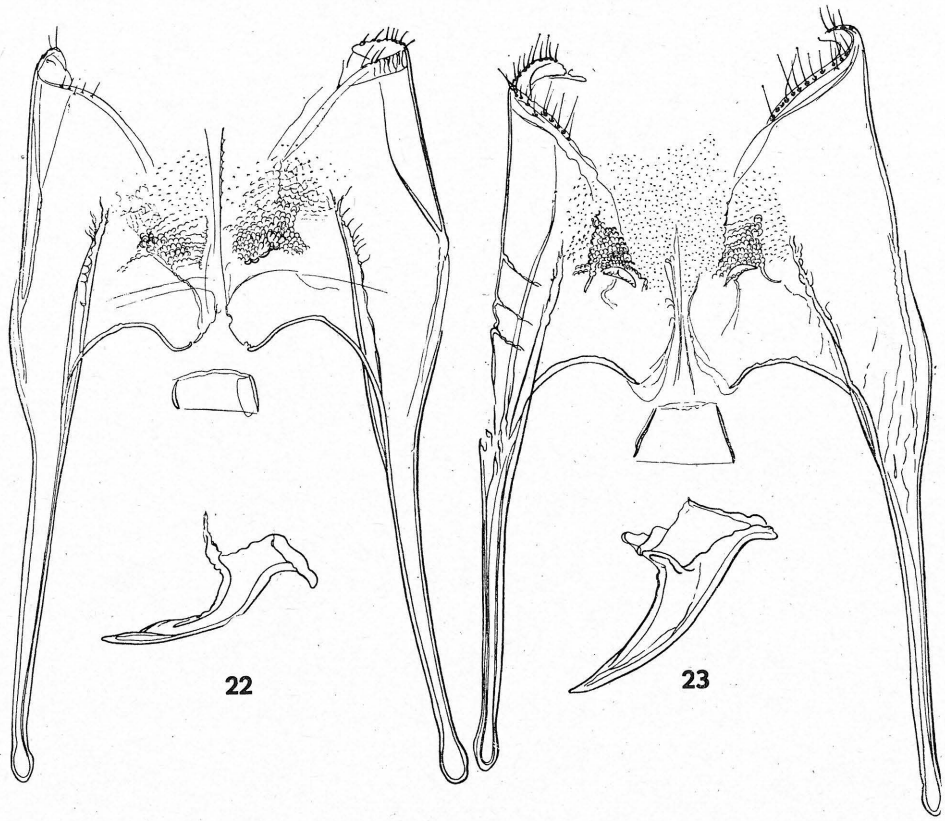


Plate 10: female genitalia of *Scrobipalpa leucocephala:* 22 — f. *megalopennis* (Coolgardie, W. A.); 23 — f. *megalopennis* (Ooldea, S. A.)

Material studied

1 ♀ Broken Hill, N. S. W., 19. Nov. 1949, I. F. B. Common (sl. G. 1948); 1 ♂ same data (abdomen missing); 1 ♂ 6 miles W. of Iron Knob, S. A., 16 Mar. 1968, I. F. B. Common et M. S. Upton; 1 ♂ 4 km ESE of Millstream WA., 21.36 S 117, 07 E, 18 April 1971, I. F. B. Common et M. S. Upton; 1 ♂ Koonalda Cave, SA. 11. Oct. 1970, 31.24 S 129.50 E., Upton et Feehan.

Description

In general appearance, this is a rather uniformly coloured species with pale brownish ground colouration, the wing pattern being rather indistinct.

Head ochreous whitish, the white scales being more or less distinctive. Labial palpus ochreous whitish, second segment with darker off-standing scales, third segment with darker rings near the base and subapically. Thorax ochreous to whitish brown. Forewing pale brownish ochreous with groups of brown scales. The typical trinity of dots and some additional darker spots are usually poorly defined, but more distinct in a few individuals. In such indivudals traces of faint spots are present also near the base and along the costa.

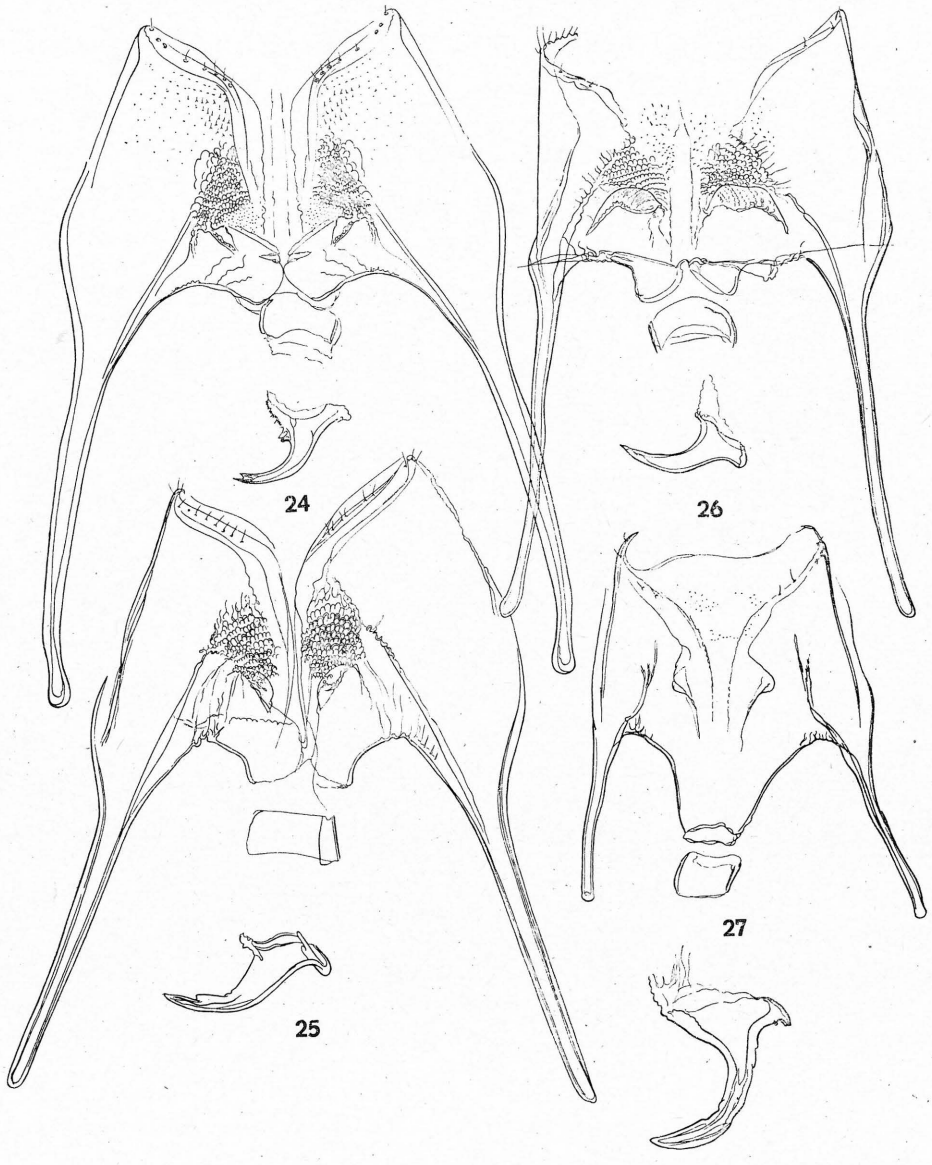


Plate 11: female genitalia of *Scrobipalpa leucocephala:* 24 — intermediate (*Scrobipalpa perdita* Low.) (Broken Hill); 25 — intermediate (nominate form) (Broken Hill); 26 — intermediate (nominate form) (Broken Hill); 27 — *Scrobipalpa heliopa* (Broken Hill)

♀ Female is usually stouter than male, but there exists no important difference between the two sexes — Length of forewing 5—7 mm. (Fig. 65.)

Genitalia

♂ Male genitalia (Fig. 12) show a striking resemblance to the genitalia of the *Scrobipalpa leucocephala*-complex, and can be distinguished only on the very long slender saccus of *S. heliopa*.

♀ In contrast, the female genitalia (Fig. 27) can be immediately distinguished by the funnel-like portion of the oral part of the subgenital plate towards ostium bursae. The very short anterior apophyses and the large strongly curved signum bursae are also characteristic of the species.

The genitalia present strong evidence of a close relation between *S. heliopa* and *S. leucocephala*-complex, *S. heliopa* being, compared with the other species, very constant both habitually and anatomically typical of homeostatic species.

Distribution

The species is widespread in Australia being known from Queensland, New South Wales, South Australia and Western Australia. Its taxonomic and phylogenetic position indicates that it has been endemic to Australia but it has spread secondarily to tropics and subtropics of the Old World. (Map 3.)

Foodplant

It is a well known pest of tobacco (Nicotiana) and egg-plant or aubergine (Solanum melongena) but its natural foodplant in Australia is unknown.

Comments

The species is rather uniformly pale brownish in colour with a rather indistinct wing pattern (Fig. 65). It is of interest and possibly significant that specimens taken in their original habitats in Australia are more subtly coloured and smaller than specimens from cultures. The male genitalia are very similar to that of the *Scrobipalpa leucocephala* Low.-complex, the only distinctive character being the long slender saccus of *S. heliopa* Low. The female genitalia may be immediately distinguished by the funnel-like portion of the oral part of the subgenital plate towards ostium bursae. The very short anterior apophyses and the large, strongly curved signum bursae are characteristic. *S. heliopa* Low. is very constant morphologically and in appearance compared to *S. leucocephala* Low.

Scrobipalpa (Scrobipalpa) nonyma (Turner, 1919) comb. nov.

(Figs. 28, 47)

Phthorimaea nonyma Turner, 1919 Proc. Roy. Soc. Qld., 21 : 125
Phthorimaea nonyma Turner Meyrick, 1925 Gen. Ins. 184 : 93

Type

The unique Holotype is in the Natural Museum of Victoria labelled "*Phthorimaea nonyma* Turner, TYPE, Type-T 4459, Gisborne V., 1. 11. 08, G. Lyell, G. Lyell 2970, Holotype" (National Museum of Victoria). The original description agrees well with

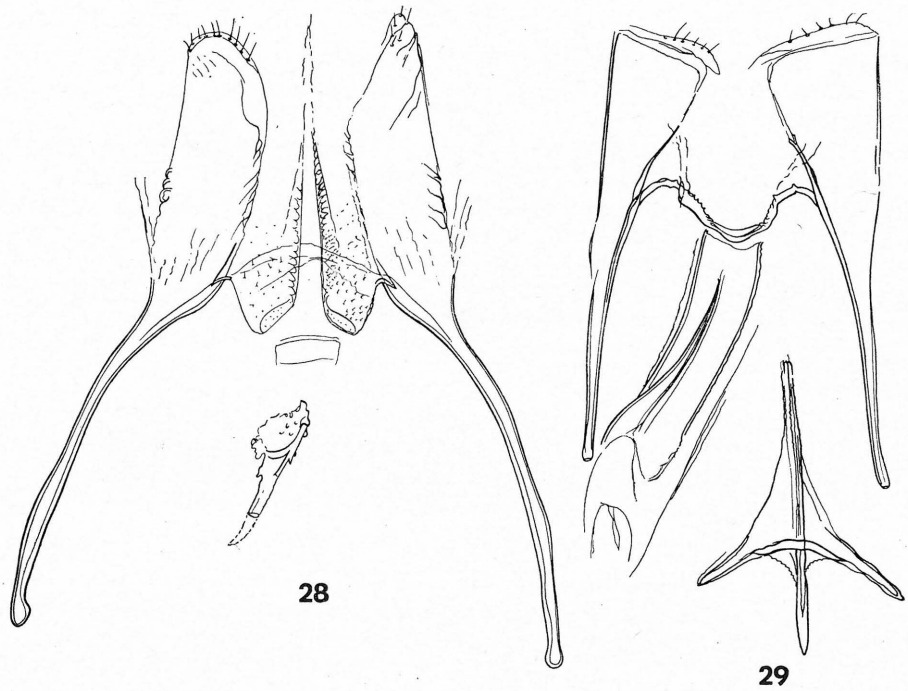


Plate 12: female genitalia of: 28 — *Scrobipalpa nonyma* (Holotype, Gisborne V.); 29 — *Ephysteris (Opacopsis) silignitis* (Palm. Is., N. Q.)

the appearance of this specimen although a female and not a male as stated. (Fig. 28, 47.)

Material studied

Holotype.

Description

Due to the satisfactory original description of this species it appears unnecessary to completely redescribe its habitus. The ground colouration of the forewing is pale whitish brown with lines of darker scales stretching towards the marginal spots of the apex. In the middle, there is the well developed trinity of dark stigmata. (Fig. 47.)

Genitalia

♀ The female genitalia (Fig. 28) have a comparatively narrow subgenital plate without striking foam-like sculpture and are typical of the subgenus *Scrobipalpa*. The praeostial sclerite is paired, forming two peninsular processes towards the ostium bursae and covered with spinulate microsculpture. The signum is in the form of

a nearly straight thorn (tip missing in the Holotype). Anterior apophyses are slender and visibly curved.

Distribution

Known only from Gisborne, Victoria.

Foodplant

Unknown.

Comments

This species is immediately recognisable by the well developed trinity of dark stigmata on the forewing. The female genitalia have a comparatively narrow subgenital plate without the striking structure typical of *S. leucocephala*. Phylogenetically, it coincides with the subgenus *Scrobipalpa* s. str.

Scrobipalpa (Euscrobipalpa) pyrrhanthes (Meyrick, 1904) comb. n.

(Figs. 30—32, 40—42, Map 3)

Gnorimoschema pyrrhanthes Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 318—319.
Phthorimaea pyrrhanthes (Meyrick) Meyrick 1925, Gen. Ins., 184 : 93.
Gnorimoschema marina Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 319, **syn. nov.**
Phthorimaea marina (Meyrick) Meyrick, 1925, Gen. Ins., 184 : 93.
Gnorimoschema xerophylla Meyrick, 1904, Proc. Linn. Soc. N. S. W., 29 : 320, **syn. nov.**
Phthorimaea xerophylla (Meyrick) Meyrick, 1925, Gen. Ins., 184 : 93.

Types

Gnorimoschema pyrrhanthes Meyrick was described from three specimens containing both sexes from Carnarvon, W. A. in October. A male in the British Museum (Nat. Hist.) labelled "Carnarvon, W. Australia, 25. 10. 86" is hereby designated as the Lectotype. Two Paralectotypes with similar data are in the British Museum (Nat. Hist.).

Gnorimoschema marina Meyrick was described from four specimens comprising both sexes from Kiama, N. S. W. A male in the British Museum (Nat. Hist.) labelled "Kiama, N. S. Wales bred 26. 1. 79" is hereby designated Lectotype. Three paralectotypes (one with abdomen missing) with similar data are in the British Museum (Nat. Hist.).

Gnorimoschema xerophylla Meyrick was described from 21 specimens containing both sexes from Melbourne, Victoria and Broken Hill, N. S. W. A male in the British Museum (Nat. Hist.) labelled "Melbourne, Victoria bred 19. 10. 82" is hereby designated Lectotype. Ten Paralectotypes all from Melbourne with similar data to the Lectotype are in the British Museum (Nat. Hist.).

Material studied

I have been able to study a colour transparency of each of the Lectotypes and a drawing of the genitalia of each, but have been unable to examine any females. 1 ♂, *Gnorimoschema pyrrhanthes* Meyrick, Lectotype, Carnarvon, W. Australia, 25. 10. 86; *Gnorimoschema marina* Meyrick, ♂ Lecto-

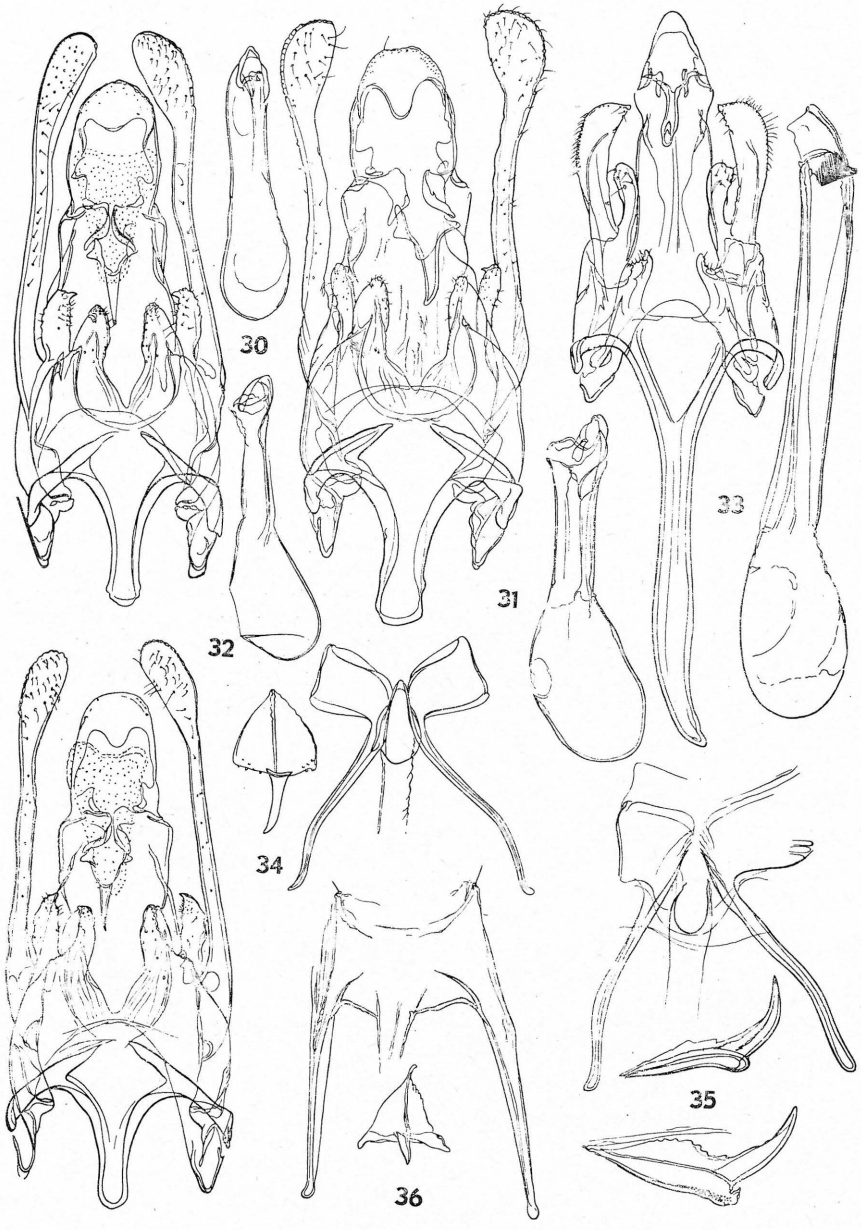


Plate 13: Genitalia of: 30, 31, 32 — males of *Scobipalpa pyrrhanthes* (Bakkly Table, Northern Terr., Bridgetown, W. A., Black Mt., Arnhem Ld.); 33 — male of *Ephysteris (Opacopsis) silignitis* (Brisbane Q.); 34, 35 — females of *Ephysteris (Ochrodia) subdiminutella ferritincta* (Black Mt.-West Northern Terr., Alice Springs), signa bursae of various form and position; 36 — female of *Ephysteris (Ephysteris) promptella australiae* ssp. n. (Magnetic Is., N. Q.)

type, Kiama, N. S. Wales, bred 26. 1. 79; *Gnorimoschema xerophylla* Meyrick, ♂ Lectotype, Melbourne, Victoria, bred 26. 10. 82; 1 ♂ Black Mt. A. C. T. Light Trap, 8 Oct. 1959, I. F. B. Common (sl. 1548); 1 ♂ same data 22 Sept. 1963 (sl. G. 1909); 1 ♂ Canberra A. C. T., Emg. 28 Aug. 1948, I. F. B. Common (Pupa under bark of *Eucalyptus blakeleyi)*, (sl. G. 1923); 1 ♂ Acton A. C. T., light 10. 10. 1948, I. F. B. Common (sl. G. 1909); 1 ♂ At light Goudan, Bakkly Table, N. T., 7. 8. 60, E. M. Ekley (sl. G. 1911); 1 ♂ 17 miles SE. of Coolgardie, WA., 28. April 1968, I. E. B. Common et M. S. Upton (sl. G. 1947); 1 ♂ 10 mi. of Bridgetown, W. A. 2. Oct. 1951, I. F. B. Common (sl. G. 1945).

Description

♂ This is a moderately variable species with variously developed wing pattern, manifesting characters typical of its subgenus.

Head, thorax and tegulae covered by grey to pale whitish scales with slightly darker tips. Frons and labial palpus mostly whitish. Labial palpus, viewed laterally, shows distinctive dark spotting, the second segment having two such spots, the third segment having two darker ringlets. Forewing pale to dark ash grey, dorsum and the area between the stigmata being visibly lighter (ochreous to brownish). As well as the usual trinity of stigmata, additional spots are present near the wing base and on its costa on the level of the third (outward) stigma. In the wing apex an additional moderately defined spot is present. All these stigmata and spots are blackish, sometimes surrounded by brownish tinge. The immediate impression of the moth is distinctly scrobipalpoid. — Length of forewing 5.5—6.2 mm. (Fig. 54.)

♀ Although Meyrick, when describing this species, mentioned also the female sex, he did not emphasize any differences. I did not see any female.

Genitalia

♂ The male genitalia (I have not seen any females) are quite typical of the subgenus *Euscrobipalpa* Pov., which is primarily Palaearctic. The species is characterised by its long slender valvae with broadly rounded ends, which are appreciably longer than the rounded uncus. The pair of saccular processes are comparatively broad, only the curved tips being strongly sclerotized. The basal process of the valva is stout and tapered, saccus short and slender, aedeagus rather short with and inflated caecum. (Fig. 30—32, 40—42.)

Distribution

This widespread species is known from Northern Territory, Western Australia, Victoria and New South Wales. (Map 3.)

Foodplants

Meyrick recorded mines of an irregular crumpled whitish blotch in leaves of Stackhousia spathulata (Stackhousiae) and similar mines amongst spun leaves of Atriplex nummularia (Chenopodiaceae).

Comments

This is a moderately variable species typical of its subgenus. So far as is known. *S. pyrrhanthes* Meyr. is confined to Australia.

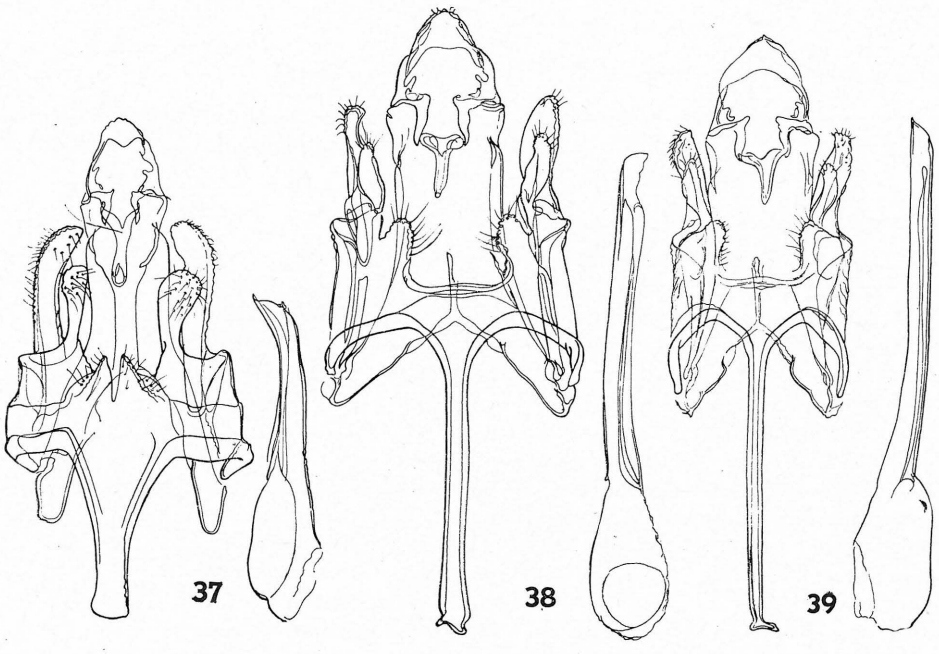


Plate 14: Male genitalia of: 37 — *Ephysteris (Ephysteris) promptella australiae* ssp. n. (Cairns, N. Q.); 38, 39 — *Ephysteris (Ochrodia) subdiminutella ferritincta* (Alice Springs, W. Slopes, N. S. W.)

Scrobipalpa (Euscrobipalpa) eschatopis (Meyrick, 1904) comb. nov.

(Figs. 45, Map 3)

Gnorimoschema eschatopis Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 321
Phthorimaea eschatopis (Meyrick) Meyrick, 1925 Gen. Ins., 184 : 93

Type

The unique female Holotype is in the British Museum (Nat. Hist.) with label data "*Gnorimoschema eschatopis* Meyr., ♀ Holotype, Carnarvon, A. Australia, 22. 10. 86".

Material studied

I was able to study a colour transparency of the Holotype and a drawing of the genitalia.

Description

♀ In accordance with the original description the transparency shows a slender silvery moth with a poorly developed trinity of darker stigmata typical of the genus and a few grey scales near the base of the costa.

Genitalia

♀ The female genitalia are correspondingly subtle, and both the paired periostial peninsular sclerites and substantial parts of the subgenital plate itself, near the base of apophyses, are covered with a fine foam-like sculpture. The signum is strongly curved without indentation. (Fig. 45.)

Distribution

Known only from Carnarvon, W. A.

Foodplant

Unknown.

Comments

This species may well be closely related to *Scrobipalpa (Euscrobipalpa) minimella* Povolný (1964, Acta Sci. nat. Acad. Sci. Bohemoslov., Brno, ser. nov., 3 : 13) from Afghanistan (Polichomri), which is of similar size, the same silvery colouration and pattern and has a very similar subgenital plate. When more material becomes available the two forms could prove to be identical.

Genus **Ephysteris** Meyrick, 1908

Meyrick, 1908 Proc. Zool. Soc. Lond., 274

Ephysteris (Ephysteris) promptella australiae ssp. nov.

(Figs. 36, 37, 55, Map 2)

Epithectis petiginella (Mann, 1867) Verh. zool.-bot. Ges. Wien, 17 : 843
Aristotelia cacomicra Walsingham, 1907 Proc. Zool. Soc. Lond., 931
Ephysteris chersaea Meyrick, 1908 Proc. Zool. Soc. Lond., 725
Ephysteris oschophora Meyrick, 1910 Rec. Ind. Mus., 5 : 219
Anapatetris crystallista (Meyrick, 1911) Ann. Trans. Mus., 2 : 229
Phthorimaea dispensata Meyrick, 1921 Ann. Transv. Mus., 8 : 73
Metzneria xanthorhabda Gozmány, 1951 Rov. Közl. (Fol. Ent. Hung.) s. n., 4/3,7 : 20

These are probably not yet all the existing synonyms, since the species was obviously described in different gelechioid genera. Some of the names, e. g. *despectella* Walker, 1863; "*Scrobipalpa phanatica* Meyrick, 1921" sensu Janse, 1950—1951 The Moths of South Africa, are obviously confused.

Types

Holotype ♂, *Ephysteris (Ephysteris) promptella australiae* ssp. n., Cairns, N. Q., 7. 8. 26, Reg. No. 3001 (sl. G. 1917), Australian Nat. Ins. Collection; 15 ♂♂ and 7 ♀ Paratypes, Australian Nat. Ins. Collection, are labelled as follows: 1 ♂, Cairns, N. Q., F. H. T.; 1 ♂, Mossman, N. Q., 5. 9. 39 (sl. G. 1916); 1 ♂ Townsville, N. Q." 5. 8. 26; 1 ♂, Townsville, 1900 Aug. (sl. G. 1935); 1 ♂, Townsville, N. Q., 20. 6. 35; 1 ♂ "Palm Is." N. Q., 28. 5. 26; 1 ♂, Magnetic I., N. Q., 24. 6. 35; 1 ♂, Eumundi, 9. 11. 02; 2 ♂♂, Mooloolah, Q., 13. 10. 23 (sl. G. 1550); 5 ♂♂, Brisbane, 16. 9. 02, 2. 5. 02, 10. 9. 02, 19. 8. 02, 22. 8. 02 (last sl. G. 1546); 1 ♀, Cairns dist. F. P. Dodd; 1 ♀, Kuranda,

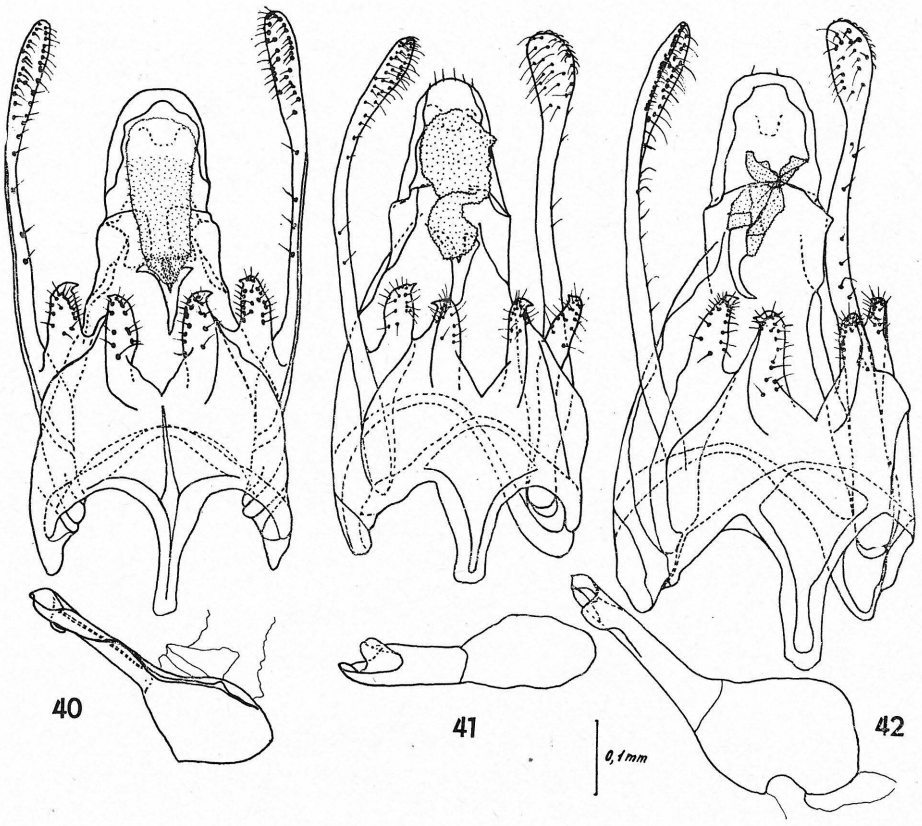


Plate 15: Male genitalia of *Scrobipalpa pyrrhanthes:* 40 — *"Gnorimoschema" pyrrhanthes* Meyr., Lectotype, Carnarvon (W. A.); 41 — *Gnorimoschema marina* Meyr., Lectotype, Kiama (N. S. W.); 42 — *Gnorimoschema xerophylla* Meyr., Lectotype, Melbourne (V.)

1900 Oct.; 1 ♀ Gordonvale, N. Q., F. H. T. (Cane Borer, E. Jarvis); 1 ♀ Magnetic I., N. Q., 23. 6. 35 (sl. G. 1934); 1 ♀, Townsville, N. Q. 4. 8. 26; 2 ♀♀, Brisbane, 18. 4. 19, 22. 8. 02; 1 ♂, 1 ♀ Paratypes, in coll. Povolný, Mor. Mus. Brno, are labelled as follows: 1 ♂, Cairns, N. Q., F. H. T.; 1 ♀, Chinchilla, Q., 27. 10. 35.

Material studied

As above.

Description

♂ Head dark brown to grey with blackish tinge, frons visibly lighter. Labial palpus grey to blackish, third segment with two more or less distinct whitish ringlets, one at middle, another at the tip. Thorax and tegulae grey to blackish, sometimes

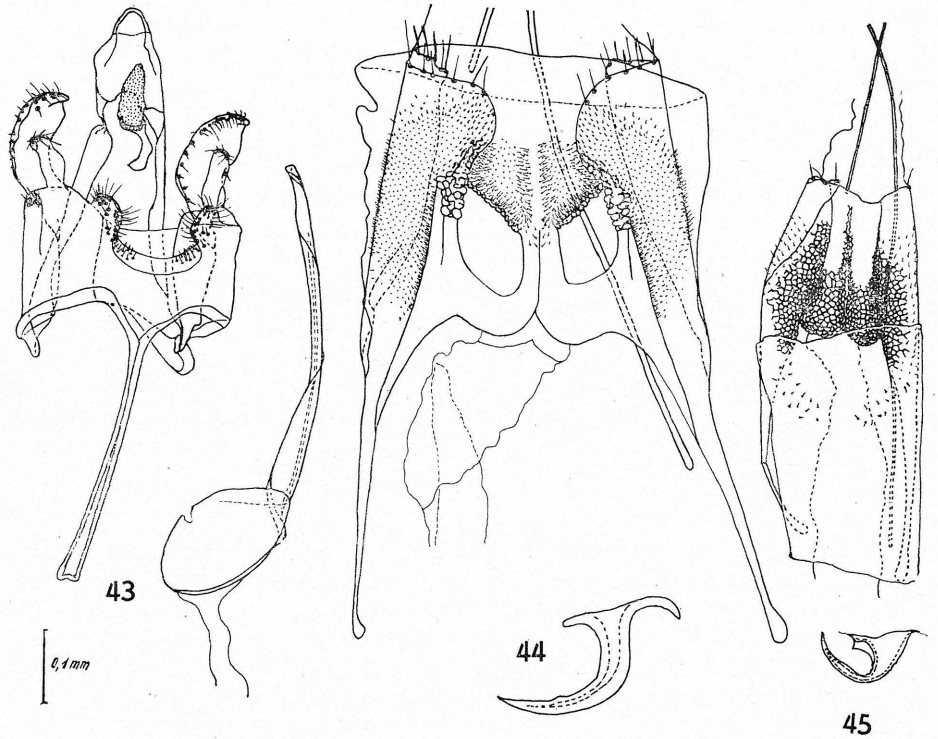


Plate 16: Genitalia of type specimens: 43 — ♂ *Caryocolum* (subg.?) *bucolicum* (Meyr.), Lectotype, Quorn (S. A.); 44 — ♀ *Scrobipalpa leucocephala* (syn. *Gnorimoschema petrinodes* Meyr., Lectotype, Broken Hill, N. S. W.); 45 — ♀ *Scrobipalpa eschatopis* (Meyr.), Holotype, Carnarvon (W. A.)

with brownish tones. Forewing uniform grey to blackish, sometimes with brownish tinge, in especially dark specimens ferruginous longitudinal veins may be visible. The trinity of typical stigmata is almost obscured by their dark background, even when magnified. In some individuals the second and third stigmata may be more strongly developed in the form of dark spots. The basic forewing colouration is dark pale to grey. When compared with specimens from the Mediterranean and eremic Africa and Asia, ssp. *australiae* appears distinctly darker and lacks the colour variability of examples from populations living in the continents mentioned. In the nominate form, the light brownish or dark brownish tone prevails, and the trinity of dark stigmata is more or less visible. Occasional specimens occur appearing deep brown (never blackish) with reduced wing pattern, An exception is the insular population of the Canary Islands, where black individuals may occur. I did not observe any substantial differences in size of the Australian specimens, except that these moths seemed to be relatively narrow-winged.

♀ Forewing usually shorter 3.6—3.8 mm and the moths appear slenderer. — Length of forewing 3.8—4.2 mm. (Fig. 55.)

Genitalia

Both male and female genitalia (Figs. 36, 37) conform in structural details with those of the Palaearctic and Ethiopian populations of this species.

Distribution

This species is known only from Eastern Queensland from Mossman to Brisbane. (Map 2.)

Foodplant

One female paratype bears label "Cane Borer, E. Jarvis". This almost certainly refers to sugar cane. This is in agreement with the statement of Meyrick, 1925 that larva feeds in stems of cultivated cereals and grasses. Also the fact that the species is confined with dry grassland in most of its distributional area indicates that Gramineae are its foodplants.

Comments

This subspecies is distinctly darker and lacks the colour variability of examples from populations of Asia, Africa and the Mediterranean. In the nominate subspecies the forewing has a prevailing light brownish or dark brownish hue and the trinity of dark stigmata are more or less visible. Occasional specimens are deep brown but never blackish. In the insular population on the Canary Islands black individuals may occur. Australian specimens seem to be relatively narrow-winged.

Ephysteris (Opacopsis) silignitis (Turner, 1919)

(Figs. 29, 33, 52, 53, Map 3)

Phthorimaea silignitis Turner, 1919 Proc. Roy. Soc. Qld., 31 : 125
Phthorimaea silignitis Turner, Meyrick, 1925 Gen. Ins. 184 : 93
Ephysteris (Opacopsis) silignitis (Turner, 1919) Povolný, 1966 Acta ent. bohemoslov., 63 : 141

Types

Originally described from thirteen specimens. From these a male labelled "Cardwell 1900 Aug, *Phthorimaea silignitis* Turner, TYPE", is hereby designated the Lectotype, Reg. No. 2099. Two males and four females have been indentified as Paralectotypes labelled as follows: 1 ♂, Mareeba, Aug. 1900; 1 ♂, Dalby, 4. 4. 03 (sl. G. 1928); 1 ♀, Townsville, 1900 Sep; 1 ♀, Townsville, F. P. Dodd, 17. 9. 00; 1 ♀, Townsville, F. P. Dodd, 14. 9. 00; 1 ♀, Dalby, 5. 4. 03.

Material studied

Type specimens and the following material: 1 ♂, Maroochydore, Q., 11. 8. 12; 2 ♂♂, 2 ♀♀, Eungella, N. Q. 6. 10. 29, 7. 10. 29; 1 ♀ Rockhampton, Q., 9. 1. 49, I. F. B. Common; 1 ♀, Cairns, N. Q., 15. 9. 1930; 2 ♀♀, Milmerran Q., 19. 9. 1931; 1 ♂, Townsville, N. Q., 8. 1. 1926; 1 ♂, Rockhampton, Q., 4 Apr. 1948, I. F. B. Common (sl. G. 1919).

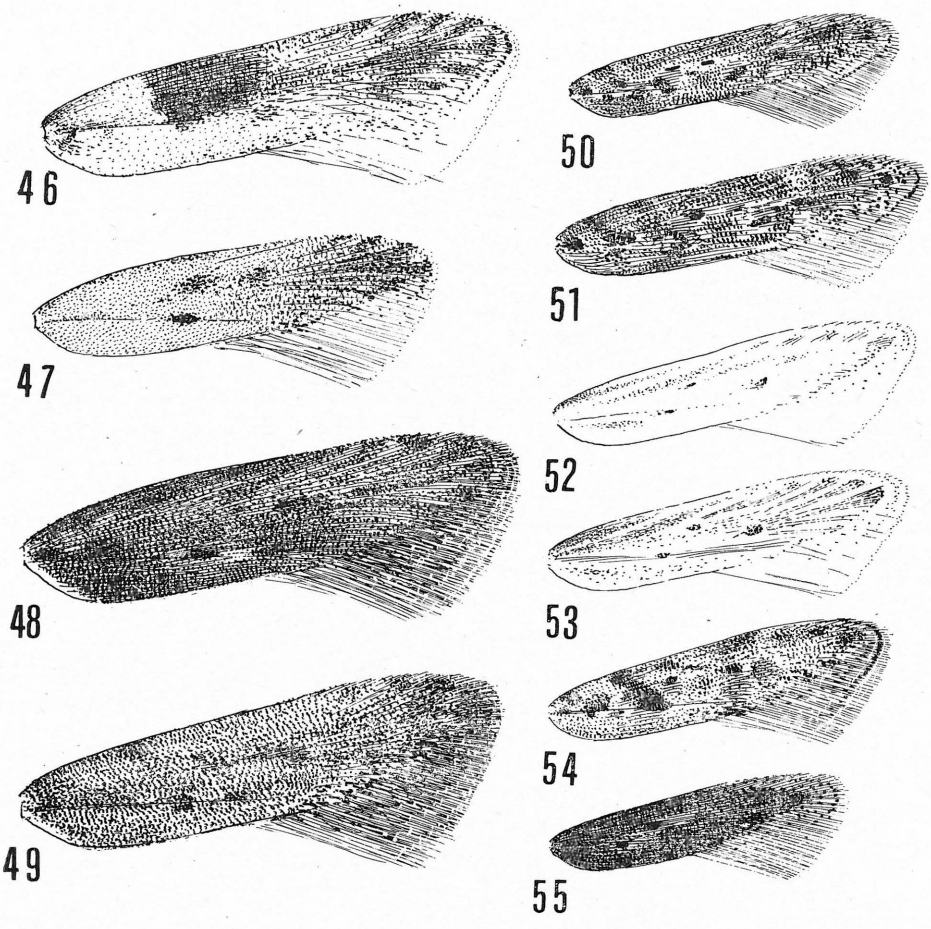


Plate 17: Wing pattern of: 46 — *Symmetrischema plaesiosema*, Holotype; 47 — *Scrobipalpa nonyma*, Holotype; 48 — *Scrobipalpa perdita*, after a specimen authenticated by Lower and Meyrick; 49 — *Scrobipalpa leucocephala*, after a specimen authenticated by Lower and Meyrick; 50 — *Ephysteris subdiminutella ferritincta*, Lectotype; 51 — *Ephysteris subdiminutella ferritincta*, Mildura; 52 — *Ephysteris silignitis*, Lectotype; 53 — *Ephysteris silignitis*, Eungella; 54 — *Scrobipalpa pyrrhanthes*, Lectotype; 55 — *Ephysteris promptella australiae*, Paratype.

Description

♂. Head, thorax and labial palpus nearly wholly white with the exception of individual scales having slightly darker tips. Forewing white, but sometimes having a slightly creamy yellowish tinge and, in typical individuals, with a more or less distinct trinity of greyish to blackish stigmata, sometimes surrounded by brownish scales. In the tornal area of the forewing, mainly on its margin, traces of spots are present in the form of blackish scales. In individuals with especially prominent wing pattern these marginal spots are well defined together with dark scales along the veins.

♀ Females appear to be more narrow-winged than males and more delicate. — Length of forewing 4.5—5.5 mm. (Figs. 52, 53.)

Genitalia

♂ The structure of the male and female genitalia of this species is typical of the subgenus *Opacopsis* (viz Povolný, 1966). In the male the long and slender saccus and very long aedeagus are important specific characters. (Fig. 33.)

♀ In the female the broad subgenital plate (Figs. 29) is subquadrate, the sclerotised portion of the ductus bursae is long and broad, the signum bursae is rather big, slender and asymmetrically quadrangulate.

Distribution

This species is known from Eastern Queensland from Mareeba to Brisbane. (Map 3.)

Foodplant

Uknown as in all other species of the subgenus *Opacopsis*. Gramineae are probable foodplants.

Comments

The similarity shown by species of this subgenus make the affinities of this species difficult to determine. However it is similar to *Ephysteris (Opacopsis) deserticolella* (Stgr.), from the Near and Middle East including Cyprus and South Russia, which is even more whitish in appearance than E. silignitis.

Ephysteris (Ochrodia) subdiminutella ferritincta Turner, 1919. comb. nov.

(Figs. 34, 35, 38, 39, 50, 51, Map 2)

Aristotelia ferritincta Turner, 1919 Proc. Roy. Soc. Qld., 31 : 115
Aristotelia ferritincta Turner Meyrick, 1925 Gen. Ins. 184 : 45

Types

This species was described from two specimens. One, a male, labelled "Toowomba, Q., 2. 4. 16, *Aristotelia ferritincta* Turner, Type" is hereby designated the Lectotype, Reg. No. 3000. Another, a female, labelled "Toowomba, Q., 2. 4. 16" is designated the Paralectotype. Only the male sex was described.

Material studied

I have studied the types and very numerous series of this species from Queensland (Toowomba, Yeppoon, Cunna mulla etc.), New South Wales (Bulloo Overflow, W. Slopes, Upper Allyn R., Mildura, Ebor etc.), Western Australia (Balladonia, Coolgardie, Murchison R.), Northern Territory (Alice Springs, Black Mt.), South Australia (Iron Knob, Kingscote etc.). This material was collected by numerous collectors (Britton, Common, McInnes, Upton, Wearne), of whom G. R. Wearne could rear numerous specimens from seed capsules of *Tribulus terrestris* (Zygophyllaceae). Collecting data include February, March, April, May, September, October and November.

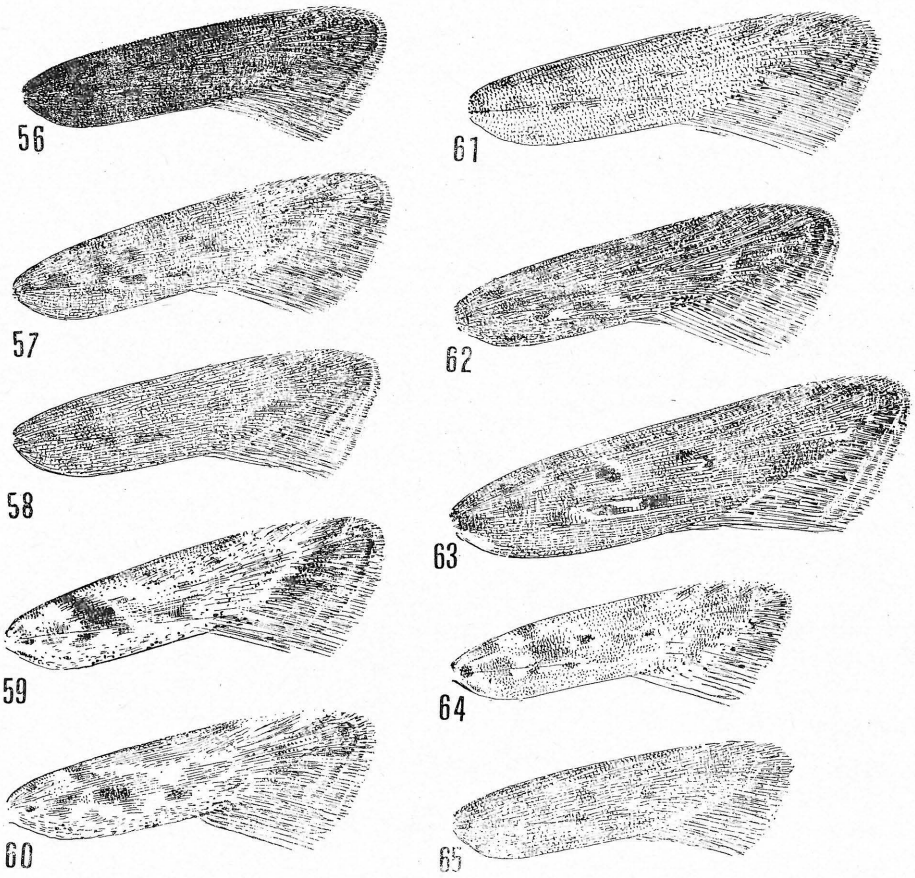


Plate 18: Wing pattern of: 56 — *Scrobipalpa leucocephala* f. *atripennis;* 57 — *Scrobipalpa leucocephala* f. *griseipennis* (male); 58 — *Scrobipalpa leucocephala* f. *griseipennis* (female); 59 — *Scrobipalpa leucocephala* f. *marmoreipennis* (female); 60 — *Scrobipalpa leucocephala* f. *marmoreipennis* (male); 61—*Scrobipalpa leucocephala intermediate* f. *griseipennis*—f. *marmoreipennis;* 62 — *Scrobipalpa leucocephala* f. *megalopennis* (male); 63 — *Scrobipalpa leucocephala* f. *megalopennis* (female); 64 — *Scrobipalpa leucocephala* f. *leucocephala* (small and pale individual); 65 — *Scrobipalpa heliopa,* Broken Hill

Description

♂ Head, tegulae and thorax covered by pale ochreous to whitish grey scales, frons in most individuals distinctly lighter. Labial palpus laterally ash-grey, inner surface distinctly grey to whitish. Second segment with an indistinct medial ring of whitish tinge, third segment with whitish tip and medial ringlet.

Forewing with basic colouration dark grey; individual scales are essentially ash-grey with darker to blackish tips. The trinity of characteristic stigmata is variously distinct according to the intensity of the wing colouration. Any additional spots are

concentrated mostly near the wing base, below the third stigma, and in some individuals, also in the apical area. In some individuals the stigmata may be surrounded by ferruginous scales and the third stigma is represented by a brownish group of scales. Length of forewing 4—6 mm.

♀ Females are markedly lighter and have less distinct tones of colouration and more prominent spotting. Females are a little stouter, with relatively broader wings. (Figs. 50, 51.)

Genitalia

♂ The structure of the male and female genitalia of this subspecies closely conforms with the genitalia of the afro-eurasian populations of *E. subdiminutella* with its numerous habitual forms. They seem to fall into the medium-sized genitalia of the distribution curve of this species (Povolný, 1964). In the male the saccus in some individuals is extremely slender, its tip seems to be slightly bifurcate (Figs. 38, 39).

♀ The female subgenital plate and its structures show the same variation as found in afro-eurasian populations of this species. (Figs. 34, 35.)

Distribution

The species appears to be widespread in Australia and particularly in the drier areas, although the type locality happens to be quite a high rainfall area for Australia. (Map 2.)

Foodplant

The species was frequently reared from seed capsules of *Tribulus terrestris* (Zygophyllaceae) (G. R. Wearne).

Comments

This distinctive subspecies is darker and much less variable than the polymorphic populations of this species as we known them especially from Northern Africa. Numerous forms of afro-eurasian populations are characterised by variation in wing pattern and particularly in colouration from pale to dark brown and uniformly grey individuals, which frequently may occur sympatrically (Povolný, 1964a, 1966).

Genus **Caryocolum** Gregor et Povolný, 1954

Gregor et Povolný, 1954 Zool. a entomol. listy, 17 (3) : 87

Caryocolum bucolicum Meyrick, 1904 comb. nov.

(Figs. 43, Map 3)

Gnorimoschema bucolica Meyrick, 1904 Proc. Linn. Soc. N. S. W., 29 : 317—318
Phthorimaea bucolica (Meyrick) Meyrick, Gen. Ins. 184 : 93

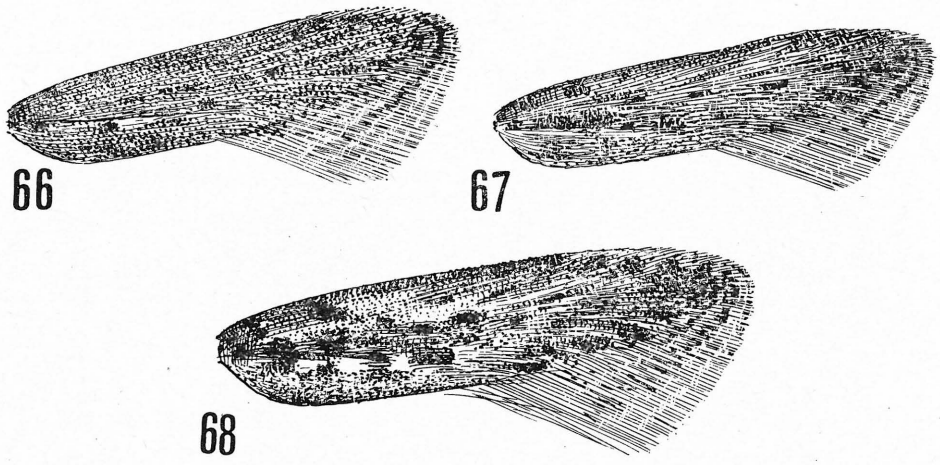


Plate 19: Wing pattern of: 66 — *Australiopalpa tristis;* 67 *Australiopalpa bumerang;* 68 — *Australiopalpa commoni.*

Types

This species was described from thirty specimens in the British Museum (Nat. Hist.). From these a male specimen was selected labelled "Quorn, S. Australia, 24. 10. 82, *Gnorimoschema bucolica* Meyr." and is hereby designated the Lectotype.

Material studied

I was able to study a colour transparency (courtesy I. F. B. Common) and a drawing of the genitalia of the Lectotype (courtesy E. D. Edwards).

Description

The habitual character of the Lectotype as seen in the colour transparency corresponds well with the original description of this species by Meyrick, 1904.

Genitalia

The drawing of male genitalia (Fig. 43) shows a species closely related to the members of the genus *Caryocolum* Gregor et Povolný, 1954 with two minor differences: The aedeagus is slender for most of its length but is inflated basally (in *Caryocolum* s. str. the aedeagus is strong and of nearly uniform width throughout) and it seems that the species has a hooklet-like gnathos (absent in *Caryocolum* s. str.).

Distribution

According to the original description it is widespread in Queensland, New South Wales, South Australia mostly in dry areas.

Foodplant

Unknown.

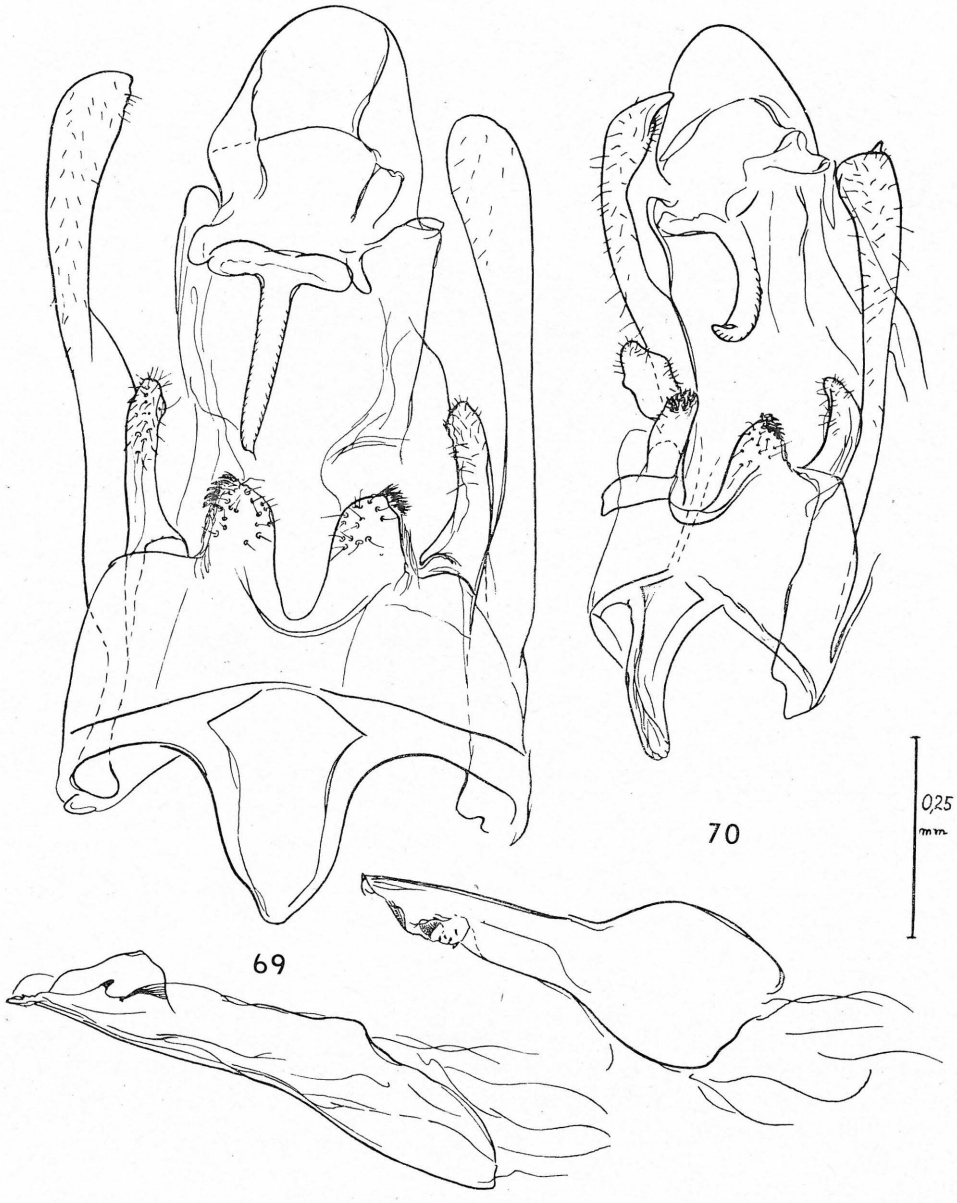


Plate 20: Male genitalia of: 69 — *Empista (Z.) cheradias* (Meyr.), Lectotype; 70 — *Empista (Z.) plemochoa* (Meyr.), Lectotype

Comments

It is almost certain that this species is close to the genus *Caryocolum* Gregor et Povolný. It differs, however, in detailed structures of male genitalia from *Caryocolum* s. str. This fact should be confirmed by the study of female genitalia of this species. These characters indicate an isolated position of *C. bucolicum* in the genus.

Genus **Symmetrischema** Povolný, 1967

Povolný, 1967 Acta ent. Mus. Nat. Pragae, 37 : 53—55

Symmetrichema plaesiosema (Turner, 1919)

(Fig. 46)

Phthorimaea plaesiosema, Turner, 1919 Proc. R. Soc. Qld., 31 : 126
Phthorimaea plaesiosema Turner Meyrick, 1925 Gen. Ins. 184 : 93
Symmetrischema plaesiosema (Turner) Povolný, 1967, Acta ent. Mus. Nat. Pragae, 37 : 53—55,
Phthorimaea aquilina Meyrick, 1917 Trans. Ent. Soc. Lond., 44, **syn. nov.**
Gnorimoschema aquilina (Meyrick, 1917) Meyrick, 1925 Gen. Ins. 184 : 90
Symmetrischema aquilinum (Meyrick) Povolný, 1967 Acta ent. Mus. Nat. Pragae, 37 : 53—55
Phthorimaea melanoplintha Meyrick, 1926 Exot. Microl., 3 : 532
Gnorimoschema tuberosella Busck, 1931 Proc. Ent. Soc. Wash., 33 : 59

Type

I have studied the Holotype male of *S. plaesiosema* Turner, labellled "Sydney 24. Nov. 14, *Phthorimaea plaesiosema* Turn., TYPE, G. M. Goldfih Collection" now in the Australian Museum, Sydney. For other material see Povolný, 1967.

Description

Due to numerous synonyma (see above) it appears unnecessary to redescribe this species, which is characterised by its semicircular to triangular dark shade on forewing fused of the three characteristic stigmata (Fig. 46).

Genitalia

For male and female genitalia see Povolný, 1967; Gates Clarke, 1969.

Distribution

Within Australia this species occurs in the eastern part of New South Wales and in the South West of Western Australia. It also occurs in New Zealand although the species and genus are of Neotropical origin and are secondary in Notogea.

Foodplants

Solanum nigrum (Solanaceae) and cultivated Solanaceae.

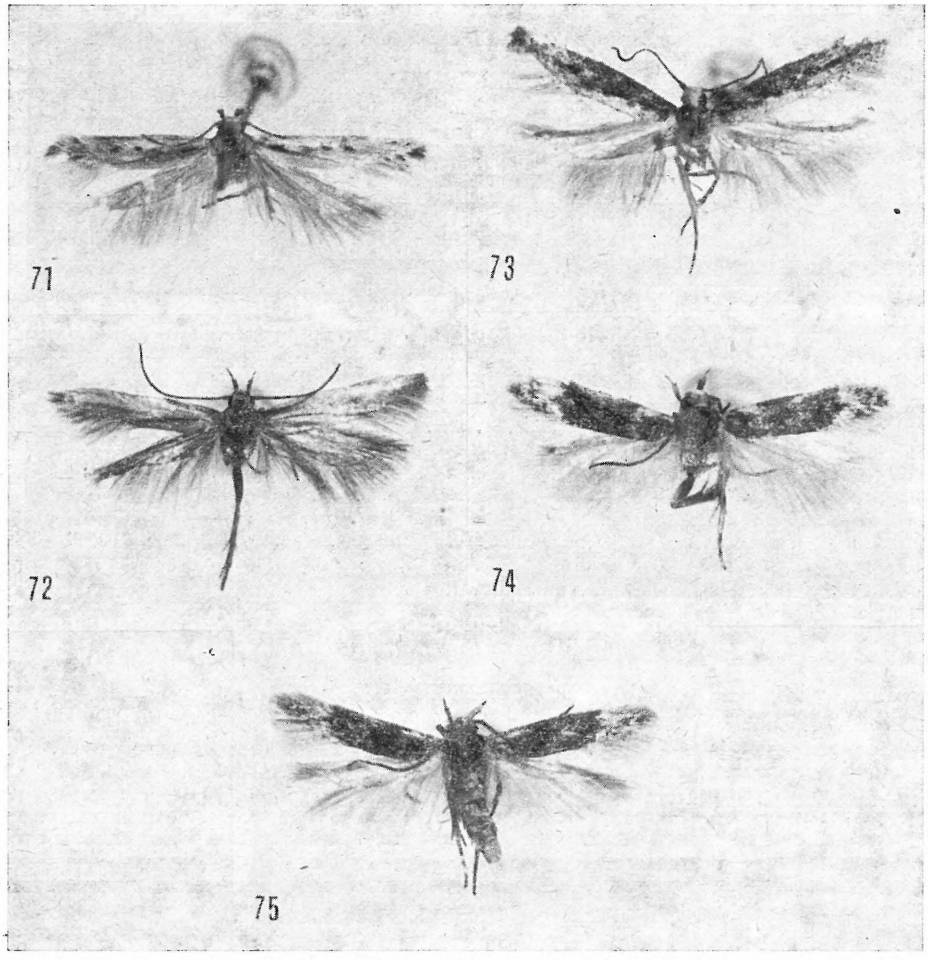


Plate 21: Photographs of: 71 — *Empista cheradias* (Meyr.), Invercargill, New Zealand, AP. 12.06, Lectotype; 72 — *Empista plemochoa* (Meyr.), Otira R., New Zealand, C. V. H. 12.14, Lectotype; 73 — *Empista brontophora* (Meyr.); Christchurch, New Zealand, 24.2. 82, Holotype; 74 — *Empista glaucoterma* (Meyr.), Invercargill, New Zealand, AP. 15.11.08, Syntype (?); 75 — *Empista glaucoterma* (Meyr.), same data, Syntype (?)

Comments

To the previously known synonyma of this species (*melanoplintha* Meyr., *tuberosella* Busck — see Povolný, 1967) also *Gnorimoschema aquilina* (Meyrick, 1917) must be added. This is clearly seen from figures published by Gates Clarke, 1969 (Vol. VII, Pl. 72, Figs 1, 1a, 1b) and by Meyrick, 1925 (184, Pl. 2, Fig. 35). The drawing of the Holotype aedeagus by Povolný, 1967 (p. 54, fig. 3) shows that the lateral bifurcation of aedeagus characteristic of *S. plaesiosema* was broken off in Holotype of *G. aquilina*. The new combination for *G. aquilina* Meyr. proposed by Gates Clarke, 1969 was unnecessary, because Meyrick, 1925 was the first to propose this generic status.

As in many other cases, Gates Clarke, 1969 also omitted the fact that *G. aquilina* was tranferred into the genus *Symmetrischema* two years ago (Povolný, 1967).

Genus **Phthorimaea** Meyrick, 1902

Meyrick, 1902 Ent. Month. Mag., 38 : 103
Povolný, 1964 Acta Soc. ent. Čechoslov., 61 (4) : 338–339

Phthorimaea operculella (Zeller, 1873)

Bryotropha operculella Zeller, 1873 Verh. zool.-bot. Ges. Wien, 23 : 262

Comments

This very widespread pest of Solanaceae also occurs widely in Australia having originated in Neotropical Region.

Genus **Australiopalpa** Povolný, 1974

(Figs. 66–68, 75a, 76, Map 4)

Povolný, 1974 Acta ent. bohemoslov., 71 : 42–50

In the present paper only the key to the species of this recently described Australian genus is given. For other information see Povolný, 1974. Type-species: *Australiopalpa commoni* Pov.

Key to the species of *Australiopalpa*

Medium sized greyish gnorimoschemoid moths with more or less apparent simple pattern of spots and stigmata disseminated over forewings. (Figs. 66–68.) The most important distinguishing characters are found in genitalia (Figs. 75a, 76).

1. Length of forewing less than 6 mm, wing pattern indistinct (Fig. 66, 67)..... 2
   — Length of forewing more than 6 mm, wing pattern distinct (Fig. 68)..... *Australiopalpa commoni* Pov.
2. Three pairs of saccular processes, saccus with obtuse tip (Fig. 75a)..... *Australiopalpa tristis* Pov.
   — Two pairs of saccular processes, saccus with rounded tip..... *Australiopalpa bumerang* Pov.

Genus **Empista (Zeempista)** Povolný, 1968

(Figs. 69, 70–75, 77, 78)

Povolný, 1968 Khumbu Himal, 3 (1) : 116–123, Innsbruck-München
Povolný, 1975 Acta ent. bohemoslov., 71 : 414–428

In the present paper only the key to the species of this recently described subgenus (*Zeempista* Povolný, 1974) from New Zealand is given. For other information see Povolný, 1974. Type species: *Empista (Zeempista) cheradias* Meyrick.

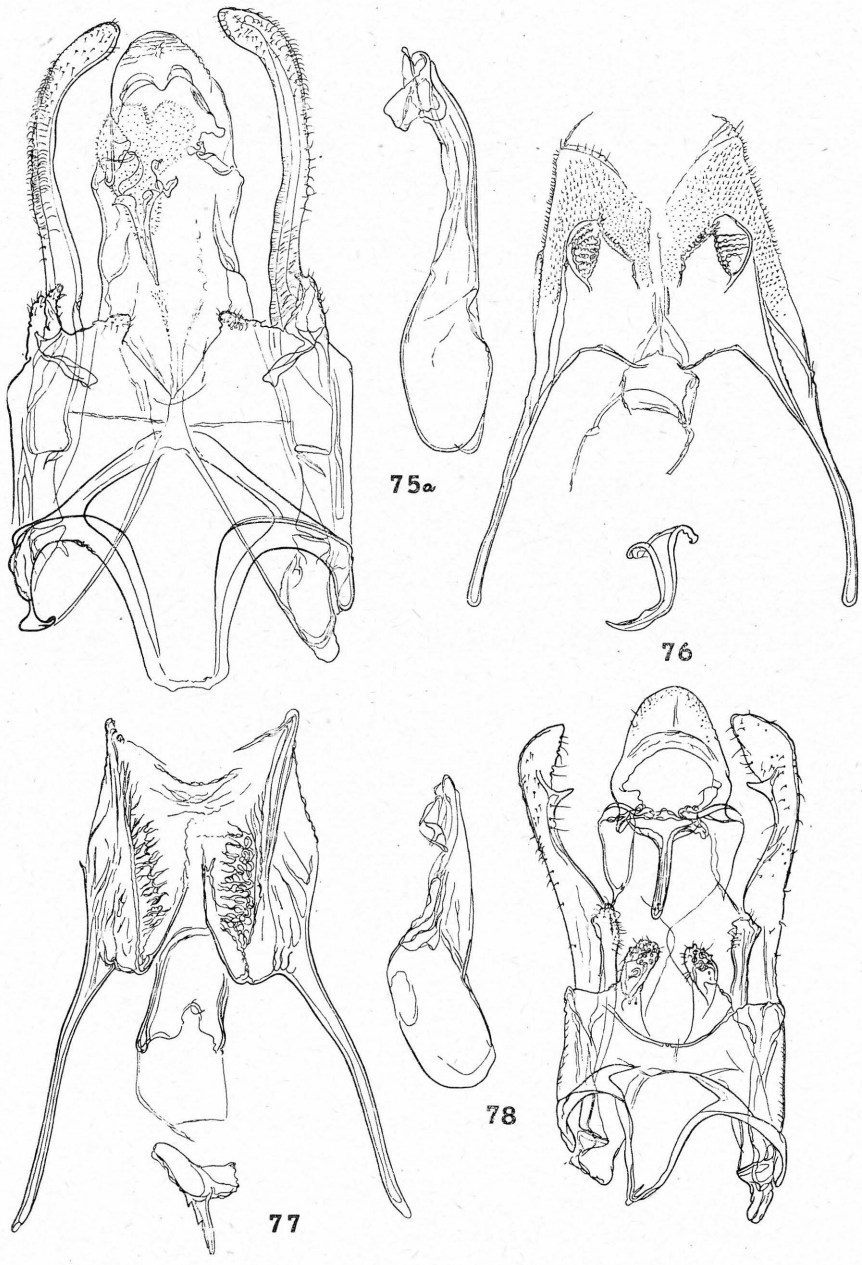


Plate 22: Genitalia of: 75a — male of *Australiopalpa tristis*, Paratype, Boulia, Q.; 76 — female of *Australiopalpa tristis*, Paratype, Yanna, Q.; 77 — female of *Empista* (Z.) *quieta*, Allotype, Bottle Lake; 78 — male of *Empista (Z.) quieta*, Holotype, Bottle Lake.

Key to the species of *Empista (Zeempista)*

1. Forewing more or less cinereous to grey, irregularly spotted.....2
   — Forewing pale to brownish with more or less defined pattern of three stigmata in the middle and possibly additional spots near base and/or margin.....3
2. Forewing cinereous, spotting and stigmata reduced and indistinct..... ..... *Empista (Z.) quieta* Philp. (Fig. 77, 78)
   — Forewing deep cinereous to pale, stigmata and marginal spots well defined (Figs. 73, 74, 75)..... *Empista (Z.) brontophora* Meyr.
3. Forewing costally with a distinctive pale longitudinal streak, trinity of dark stigmata poorl visible (Fig. 72)..... *Empista (Z.) plemochoa* Meyr. (Fig. 70)
   — Forewing costally without a pale streak (Fig. 71).....4
4. Forewing chocolate brown with a trinity of more or less obsolete stigmata, sometimes with a field of pale scales in 2/3 of hind margin..... ..... *Empista (Z.) matermea* Pov.
   — Forewing uniform pale with more or less distinctive pattern of longitudinal stigmata axially and marginally (Fig. 71)..... ..... *Empista (Z.) cheradias* Meyr. (Fig. 69)

Comments

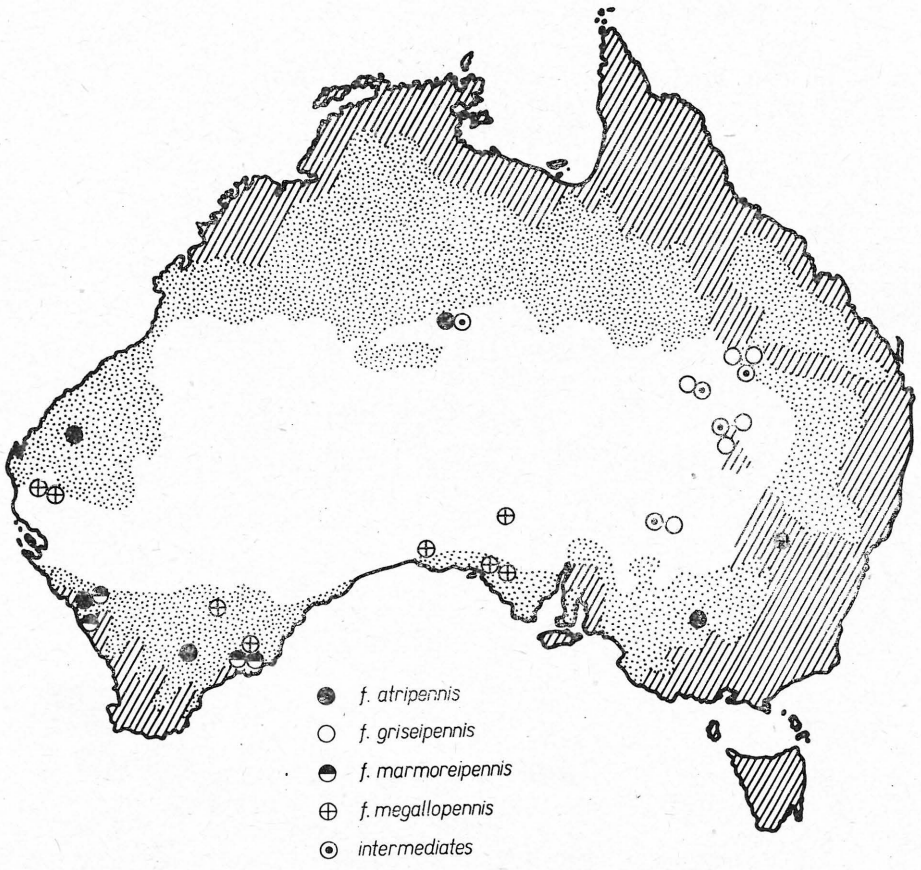
Especially females of these species tend towards a reduction of wings.

Appendix

Of the other Australian species described in the genus *Phthorimaea* Meyrick the Holotypes of *Phthorimaea frequens* Meyrick, 1921 (Exotic Microl., 2 : 426, viz Gates Clarke, 1969, Vol. VII, p. 155) and *Phthorimaea chersochlora* Meyrick, 1922 (Ark. f. Zool., 14/15/ : 3) could be studied. These two species do not belong to the tribe Gnorimoschemini and will be treated in a special paper.

Discussion

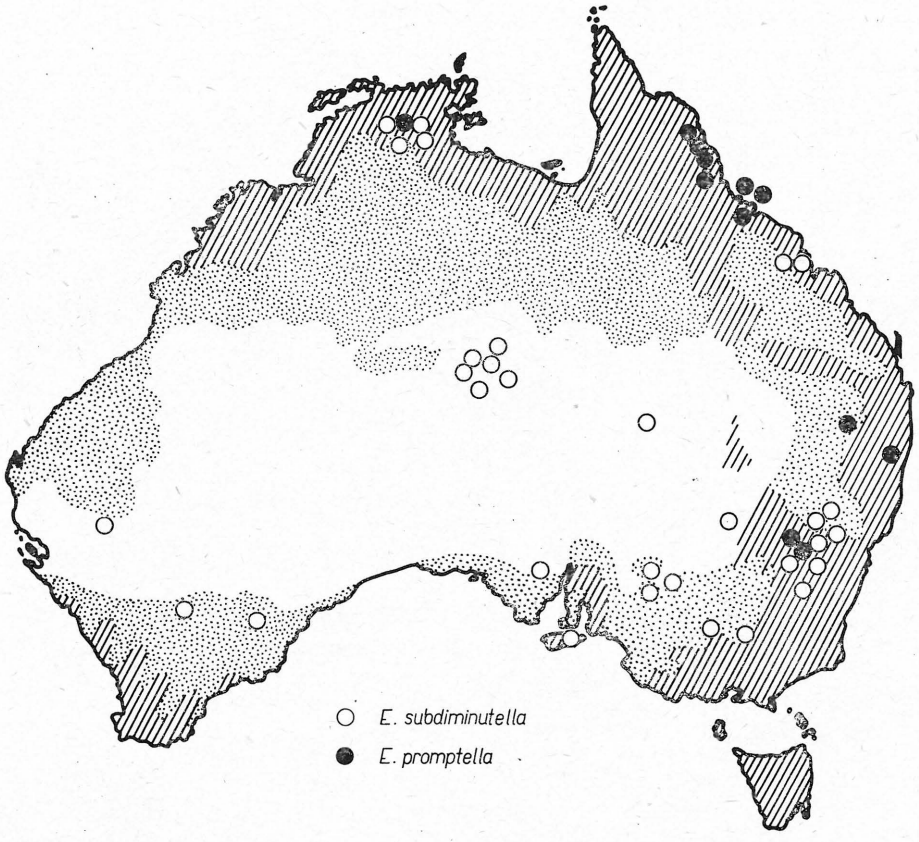
The tribe Gnorimoschemini appears to be a natural monophyletic branch of the Gelechiidae, originating in the continents of the Northern Hemisphere, where the most important centres of the speciation of the tribe are in dry eremic areas. Such well developed genera as *Gnorimoschema, Scrobipalpopsis, Gobipalpa,* and others demonstrate this. Subsequent entry into South Africa by members of the tribe appears to have produced a secondary centre of speciation in the Kalahari area. The higly specialised genera and species in the mountain ranges of Central and South America probably are the result of a secondary dispersal from the drier areas of North America. This probably occurred after the formation of the Panamanian isthmus and led to an occupation of niches unparalleled in the Northern Hemisphere. Australian and New Zealand Gnorimoschemini show no close relationship to those of South America. Australian species are also not closely related to those of New Zealand. Surprisingly few genera and species occur in Australia compared with the



Map 1: Distribution of the forms of the *Scrobipalpa (Scrobipalpa) leucocephala* (Lower) — complex in Australia. Based on materials authenticated in this paper.

Palaearctic and Nearctic Regions and it is unlikely that enough new species will be found to affect this observation significantly. We may therefore tentatively deduce that the Gnorimoschemini of Australia and New Zealand are not of Gondwanian age but have entered Australia following contact with Asia (Povolný, 1967b). It is generally accepted that this first occurred during the Mesozoic era.

The ancestors of *Australiopalpa* Pov., to permit the development of this one australendemic genus, must have entered Australia during the Tertiary period. It could have been expected to speciate rapidly in the adequate niches of the continent and that only three known species have developed is remarkable. This genus shows clear relationship with some Holarctic genera (particularly *Gnorimoschema*). All these genera may have separate at about the same time and as some of their obviously old representatives (species) show structural characters considered to be primitive (plesiomorphic), may be quite ancient.

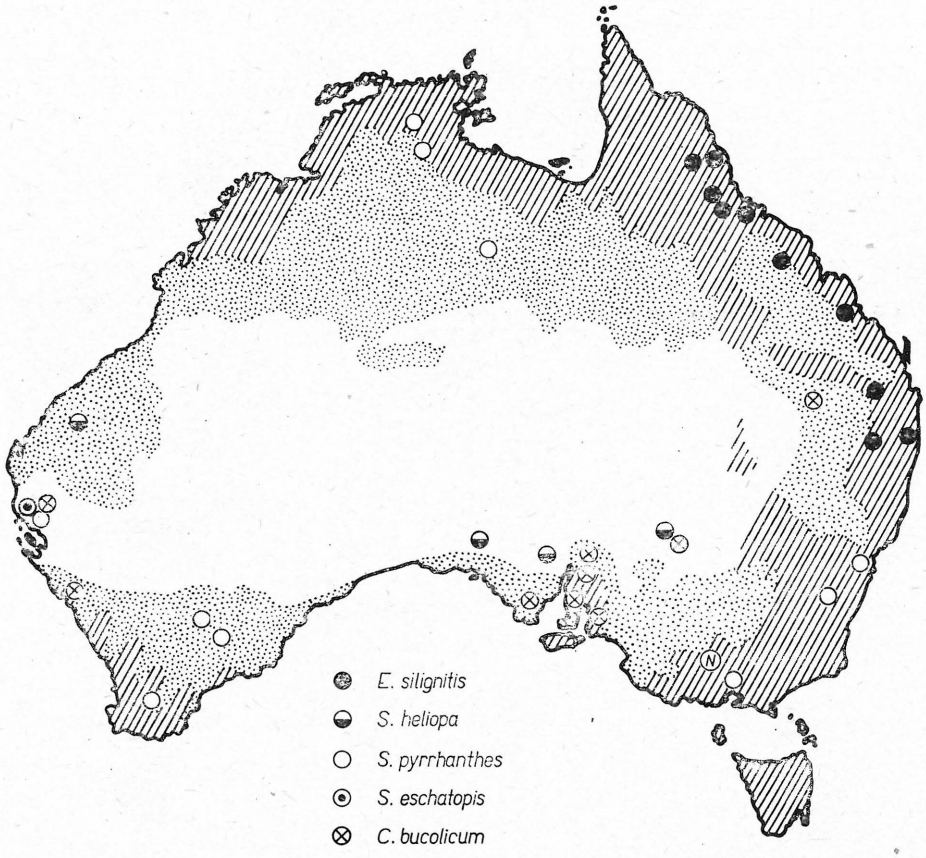


Map 2: Distribution of *Ephysteris (Ochrodia) subdiminutella ferritincta* (Turner) and *Ephysteris (Ephysteris) promptella australiae* ssp. n. in Autralia. Based on materials authenticated in this paper.

The subgenus *Scrobipalpa* Jan. is also endemic to Australia and contains only three known species. These seem to show more primitive morphological characters than members of the subgenus *Euscrobipalpa* Pov. which is well developed in the Palaearctic Region where many species occur. *Scrobipalpa (Scrobipalpa) leucocephala* (Low.) appears to be in a process of active speciation. That speciation has not proceeded further in *Australiopalpa* or the subgenus *Scrobipalpa* s. str. may be due to a lack of adequate vacant niches in drier areas of Australia or an absence of geographical barriers to permit speciation.

The subgenus *Euscrobipalpa* is represented by two species the ancestors of which probably entered Australia well after those of the subgenus *Scrobipalpa*. I have not been able to examine a female of *Scrobipalpa (Euscrobipalpa) pyrrhanthes* (Meyr.) and so cannot suggest a Palaearctic or Oriental species to which it may be closely related.

Ephysteris (Opacopsis) silignitis (Tur.) may be related to several species of this

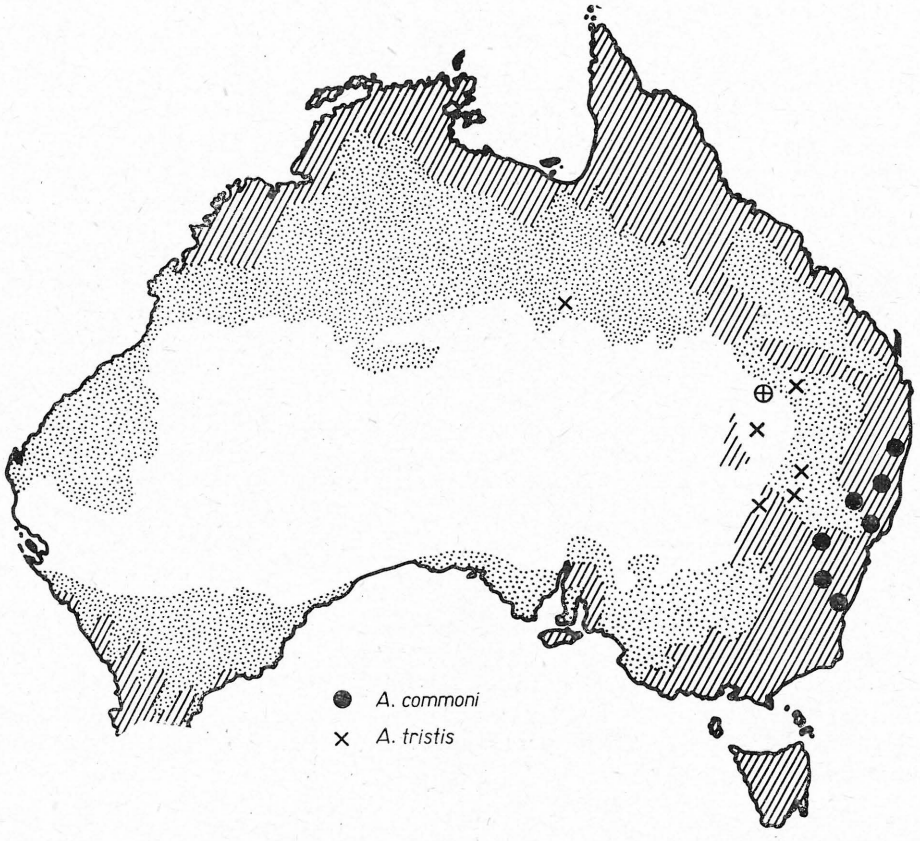


Map 3: Distribution of *Ephysteris (Opacopsis) silignitis* (Turn.), *Scrobipalpa (Scrobipalpa) heliopa* (Low.), *Scrobipalpa (Scrobipalpa) pyrrhanthes* (Meyrick), *Scrobipalpa (Euscrobipalpa) eschatopis* (Meyr.) and *Caryocolum bucolicum* (Meyr.) in Australia. Based on material authenticated in this paper.

genus and subgenus in drier areas of Asia. Both species could be present in isolated habitats or islands north of Australia or within the Oriental Region. They could have entered Australia as recently as the last Glacial period.

Ephysteris (Ephysteris) promptella (Stgr.) nad *Ephysteris (Ochrodia) subdiminutella* (Staint.) occur widely in the eremic regions of the Old World and are represented in Australia by dark coloured subspecies. They have clearly reached Australia recently. All these species are probably capable of considerable passive movement over water in strong air currents.

Two species present in Australia are not indigenous. *Symmetrischema plesiosema* (Turn.) is a pest of cultivated Solanaceae and has been introduced from Neotropical America. *Phthorimaea operculella* (Zell.) a well known pest of potato, also originated in the Neotropical Region.



Map 4: Distribution of *Australiopalpa* Pov. in Australia. Based on materials authenticated in this paper. Cross in circle—*A. bumerang*.

All the New Zealand Gnorimoschemini (with the exception of the above introduced pests) belong to the Palaearctic genus *Empista* Pov., originally described from Nepal. Five of six known species of this genus living in New Zealand (South Island) represent an endemic subgenus (*Zeempista* Pov.). These facts indicate that from the viewpoint of zoogeography the New Zealand Gnorimoschemini are linked with their close relatives of Himalaya and are consequently also confined with the Tertiary history of Notogea and its ancient connection with Asia.

The Australian and New Zealand species do not belong to any special branch of the tribe Gnorimoschemini, but represent obviously several successive waves of invasion from the North.

As long as the knowledge of the autocology of the Notogean species of Gnorimoschemimi remains as limited as it is, we cannot apply any other theories (e. g. plesiochory and apochory) to estimate the possible coincidence between the presumed plesiomorphini and apomorphismi and the history of the environmental changes. But it seems clear enough that the Gnorimoschemini of Australia and New Zealand offer excellent objects for similar biogeographical considerations.

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It should be appreciated that the present paper is offered as only an initial step towards a better understanding of the Notogean Gnorimoschemini and that, as will be apparent from the results, various practical and theoretical aspects peculiar to the Australian and New Zealand faunas remain to be further elucidated when more material becomes available.

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