A Revision of the Australian Osmylidae: Kempyninae
(Insecta : Neuroptera)

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Abstract
Keys and illustrated descriptions are provided to enable separation of the Australian Osmylidae: Kempyninae. Twelve species are recognized in the genera: *Kempynus* (seven; five described as new), *Australysmus* (four; three described as new) and *Clydosmylus*, gen. nov. (one new species).

Introduction
The subfamily Kempyninae contains some of the largest and most spectacular Osmylidae. It is a truly ‘southern group’ of Neuroptera, and is confined to Australia, New Zealand and southern South America. The group was comprehensively revised by Kimmins (1940), and a further South American species was described by Adams (1971). Adams (1969, 1971) also drew attention to the potential taxonomic value of the internal female reproductive system in Osmylidae.

The Kempyninae is equivalent to the Kalosmylinae of Kimmins (1940). As Carpenter (1943) indicated, use of the latter name was probably an error, as Kimmins synonymized *Kalosmylus* Krüger with *Kempynus* Navás in that paper.

This paper is a revision of recent Australian Kempyninae, based on adult characters. Few species are common, and most are known from only one locality. Both described Australian species are re-illustrated and nine new species are described and illustrated; a New Zealand species is tentatively recorded from Queensland. Nomenclature for wing venation is indicated in Figs 1 and 2, and terminology for genitalia is indicated on Figs 7–11 (based on Adams 1969).

Within the Osmylidae, the Kempyninae show a number of presumed primitive features (such as the basal position of the forewing MP fork) and appear to be related to the Stenosmylinae—from which, however, they differ in many features (Kimmins 1940).

Wing figures are photographs of set specimens. Genitalic figures are from macerated abdomens stored in microvials of glycerine: setae and trichobothria are omitted from drawings. As Adams (1969) noted, dissection and staining (here, with chlorazol black E or acid fuchsin) is necessary to discern details of the female genitalia. Because of individual variation in size, genitalia figures are not all scaled; in general, they are referred to a scaled figure of the abdominal apex. Wing lengths (FW, HW), total body length (B) and antenna length (A) are given in millimetres.

Collections of the following institutions (with abbreviations used in the text) have been examined: British Museum (Natural History), London (BMNH) Australian National Insect Collection, Canberra (ANIC) National Museum of Victoria, Melbourne (NMV) University of Queensland, Brisbane (UQ) Queensland Museum, Brisbane (QM) Australian Museum, Sydney (AM) South Australian Museum, Adelaide (SAM) Western Australian Museum, Perth (no specimens)
Osmylidae may be distinguished from other Australian Neuroptera by the presence of ocelli, although these are sometimes not well developed. Kempyninae Carpenter (=Kalosmylinae Krüger of Kimmins 1940) are separated from other Osmylidae by: forewing with single subcostal crossvein; MP forked near base but beyond separation of MA from Rs; hindwing with basal fork of MA somewhat sinuous, appearing as a basal crossvein to Rs; CUP long.

List of Extant Species of Kempyninae

Kempynus citrinus (McLachlan)  
crenatus Adams  
falcatus Navás  
incisus (McLachlan)  
kimminsii, sp. nov.  
latiusculus (McLachlan)  
longipennis (Walker)  
maculatus, sp. nov.  
millgrovensis, sp. nov.  
striatus, sp. nov.  
theatus, sp. nov.  
Euosmylus stellae (McLachlan)  

New Zealand  
S. America  
S. America  
New Zealand, ?Australia  
Australia  
New Zealand  
Australia  
Australia  
Australia  
Australia  
New Zealand
**Revision of Australian Kempyninae**

*Australysmus lacustris* Kimmins  
*biproctus*, sp. nov. Australia  
*furcatus*, sp. nov. Australia  
*neboissi*, sp. nov. Australia  
*Clydosmylus montanus*, gen. et sp. nov. Australia

**Key to Recent Genera of Kempyninae**

1. Forewing MP2 branching in basal half of wing; hindwing with many crossveins producing 2–3 rows of cells in fork of MP before fork of MP2; wings strongly falcate, relatively narrow (large sp., FW > 32 mm) .............................................. *Clydosmylus*, gen. nov.
   Forewing MP2 branching, if at all, only at or beyond half wing length; hindwing with single row of cells in fork of MP before branching of MP2 (usually smaller) ....................... 2

2. Hindwing MP fork wide, crossveins between them (at least distally) somewhat sinuous (Fig. 3) .......................................................... *Kempynus* Navás
   Hindwing MP fork narrow, cells more or less quadrate ........................................ 3

3. Wings distinctly falcate; relatively small species (expans 24–34 mm); (spermatheca constricted) (New Zealand) .......................................................... *Euosmys* Krüger
   Wings not, or scarcely falcate; relatively larger (expans at least 38 mm) (Australia) ........
   ............................................................................................................. *Australysmus* Kimmins

*Kempynus* and *Australysmus* are clearly very closely related, and intergrade on the major wing character here (and elsewhere) used to separate them. The ensuing descriptive account of the Australian species emphasizes the likely continuum between these genera.

The distributional data noted in this account confirm that the Kempyninae show a well marked southern distribution and that, with the exception of *K. incisus*, all are endemic. However, species of *Kempynus* from Australia, New Zealand and South America are clearly very closely related.

No Kempyninae have been recorded from Western Australia, and the subfamily appears to be confined, in Australia, to the eastern Bassian province. Only *K. longipennis* is known from Tasmania, and most of the other species are known from limited parts of the Australian mainland. Although more collecting is needed, their absence from northern Queensland appears to be real.

*Kempynus* is the most widely distributed genus in Australia, and is the only one recorded from Queensland. *Clydosmylus* is known only from a single locality in southern New South Wales, and *Australysmus* may well be speciating in upland areas of south-eastern Australia.

**Genus Kempynus** Navás

*Kempynus* Navás, 1912, p. 59.
*Kalosmylus* Krüger, 1913, p 23; Kimmins, 1940, p. 189.
*Osmynus* Banks, 1913, p. 214; Kimmins, 1940, p. 189.

Type-species: *Osmylus incisus* McLachlan.

Wings falcate or not, forewing margin sometimes sinuous posteriorly. Hindwing branches of MP divergent, and at least more distal crossveins basal to fork of MP2 sinuous; no secondary venation in this region. Female: spermathecae usually large and constricted. Pronotum relatively long, usually nearly twice as long as wide.

**Key to Species of Kempynus**

1. Hindwing distinctly marked, other than for shading of pterostigma and apical gradate crossveins ............................................................. 2
   Hindwing unmarked except for (sometimes) shading of pterostigma and/or gradate veins ............................................................. 3
2(1). Hindwing with conspicuous greyish brown spot behind pterostigma, otherwise pale; forewing with area behind pterostigma largely pale .................................................... *kimminsi*

Hindwing with more diffuse shading over much of apical half; forewing with area behind pterostigma with large brown patch ................................................................. *incisus*

3(1). Forewing largely unmarked except for broken longitudinal streak from base of MP to wing apex ................................................................. *striatus*

Forewing more extensively marked, never in form of longitudinal streak ......................................................................................................................... 4

4(3). Female: gonocoxite VIII with distinct lateral processes; gonocoxite IX strongly tapered apically; spermathecae very large; male: tergite IX strongly tapered anteroventrally. (Forewing falcate, with pronounced marginal lobe between MP and CUA) ................................................... *theactus*

Female: gonocoxite VIII lacking lateral processes; gonocoxite not strongly tapered; spermathecae of 'normal' size; male: tergite IX not strongly tapered anteroventrally. (Forewing, if falcate, with marginal lobe not as pronounced as above) ................................................................. 5

5(4). Female: basal costal cell region of forewing with veins numerous and incrassate; male wing normal. (Male genitalia with mediuncus strongly arched—Fig. 18) ............... *maculatus*

Female: forewing costal area normal. (Male, where known, with mediuncus less strongly arched—Fig. 11) .................................................................................................................... 6

6(5). Forewing posterior margin scarcely lobed, hindwing apex not strongly pointed (Fig. 5). (Female gonocoxite VIII not produced dorsally) ................................................................. *longipennis*

Forewing posterior margin more distinctly lobed, hindwing apex strongly pointed (Fig. 20). (Female gonocoxite VIII produced dorsally at apex) ................................................................. *millgrovensis*

**Kempynus ? incisus** (McLachlan)

(Fig. 3)

*Osmylus (?) incisus* McLachlan, 1863, p. 112.


*Kempynus excisus* Navás 1912, p. 59 (lapsus).

**Material Examined**

2 ex, both old and damaged, lacking abdomens and most appendages; wings relatively complete: 'Queensland' (NMV).

**Comments**

This rather variable species is widespread in New Zealand, but has not been recorded from Australia. It is not possible to confirm the identity of the present specimens because of the absence of genitalia, but the wing pattern (Fig. 3) is extremely similar to that depicted by Kimmins (1940, pl. VI, fig. 1). No more recent Australian specimens have been seen, and the provenance of the two individuals noted here should be regarded as unconfirmed.

**Kempynus longipennis** (Walker)

(Figs 5–13)

*Osmylus longipennis* Walker, 1853, p. 235.


**Coloration.** Very dark brown. Eyes dark greyish brown. Frons dark, labrum and clypeus slightly paler; palpi pale at bases of segments; vertex dark except immediately external to lateral ocelli. Antennae dark brown. Pronotum dark, setae dark. Pterothorax and abdomen black. Wings strongly marked with greyish brown, pterostigma somewhat reddened. Legs
with coxae dark; femora paler—I and II with broad dark central band, base and apex dark; tibiae with 3 dark bands, the central one scarcely evident on III; tarsomeres darkened apically.

Morphology. Pronotum slightly longer than wide, not tapered anteriorly. Female coxa I without field of pedicelled setae. Wing venation as in Figs 5, 6.


Female. Abdominal apex as in Figs 7, 8. Tergite IX scarcely lobed ventrally; gonocoxite IX relatively narrow; gonocoxite VIII with sparse setae over anterior half, forked, relatively simple; sternite VIII with strongly sclerotized anterior and lateral margins, unornamented; sternite VII simple, transverse. Spermathecae (Fig. 9) constricted in middle, not bent, apical region laterally narrowed; ducts not strongly convoluted; bursal gland small, colletorial gland large.
Male. Abdominal apex as in Fig. 10. Tergites VIII and IX wholly distinct. Gonarcus (Fig. 11) setose latero-apically, slightly sinuous; gonocoxite broad, with ventral margin somewhat sclerotized; mediuncus strongly arcuate with apex narrowed and tapered. Hypandrium internum (Figs 12, 13) transverse apically, with median keel much shorter than lateral arms.


Type

Sex indet., ‘Australia’, ‘O. longipennis’ (BMNH).

Other Material Examined

Tasmania: Cracroft Crossing, 1, NMV; Damper Inn, 1, NMV; Franklin R., 1, ANIC, 1, NMV; Gordon R., 2, NMV; Hastings Caves, 2, ANIC, 9, NMV; Hellyer Gorge, 4, ANIC, 13, NMV; Hobart,
**Figs 7–13.** *Kempynus longipennis* (Walker): 7, female, abdominal apex; 8, sternites VII, VIII, gonocoxite VIII, ventral aspect; 9, internal reproductive system with insert of spermatheca in dorsal aspect; 10, male, abdominal apex; 11, genitalia, lateral aspect; 12, 13, hypandrium internum, ventral aspect (12), and lateral aspect (13). Scales in millimetres. e, ectoproct; t, tergite; s, sternite; g, gonocoxite; gs, gonarcus; m, mediuncus; bg, bursa gland; cg, colleterial gland; sp, spermatheca.

Strickland Ave, 2, ANIC, 2, NMV; Murchison R., 1, ANIC; Russell Falls National Park, 6, NMV; Southport, 1, ANIC; Strahan, 1, ANIC, 1, NMV.

**Comments**

This species is rather variable in the intensity of wing markings, and the depth of body pigmentation is also variable. The type is relatively lightly marked. Although several species
of *Kempynus* are known to vary in wing pigmentation, wing shape generally appears to be more constant. In the present series there is minor variation in the sinuosity of the posterior margin of the forewing.

*K. longipennis* is widely distributed in Tasmania, but has not been found on the Australian mainland, although the exact provenance of the type is unknown.

Figs 14-20. *Kempynus maculatus*, sp. nov: 14, female, abdominal apex; 15, gonocoxite VIII, ventral aspect; 16, female, internal reproductive system; 17, male abdominal apex; 18, genitalia, lateral aspect; 19, genitalia, ventral aspect; 20, hypandrium internum, lateral aspect. Scales in millimetres.

*Kempynus maculatus*, sp. nov. (Figs 4, 14-20)

*Coloration.* Dark brown to black. Eyes dark grey. Labrum and clypeus pale; frons dark; vertex pale laterally, dark centrally; palpi dark; antennal scape and pedicel dark, flagellum
paler. Pronotum black, traces of paler dorsolateral stripes, setae dark. Pterothorax dark except for slight paler markings on lateral mesonotal lobes. Abdomen black. Forewing marked with greyish brown (Fig. 4); pterostigma greyish brown. Legs: coxae dark; femora I, II darkened on outer edge, inner edge with 3 black bands, III pale; tibiae with 3 dark bands; tarsus dark except base of t1.

Morphology. Pronotum c. 1½ times as long as wide. Female coxa I without pedicelled setae. Venation as in Fig. 4: forewing margin of both sexes slightly sinuous; basal costal region of female with very dense incrassate crossveins, recurved dorsally.

Female. Abdominal apex as in Fig. 14. Tergite IX somewhat sinuous ventrally; gonocoxite VIII (Fig. 15) with broad anterior lobes and strongly narrowed in central region; sternite VIII scarcely sclerotized. Spermathecae (Fig. 16) constricted, apical region bent and slightly wider than basal spherical lobe; bursa and colleterial glands small.

Male. Abdominal apex as in Fig. 17. Genitalia (Figs 18–20) very similar to those of *longipennis*, except mediuncus rather larger.

Dimensions. FW 26–29, HW 24–26, A c. 12, B 15.

Types
Ho1otype 2, New South Wales, Wollongong, 19.vi.1962, V. J. Robinson (ANIC). Paratypes: 16, 19, same data as holotype (ANIC).

Other Material Examined
Queensland: Emerald, 16 (ANIC) is tentatively referred to this species.

Comments
This species appears to be closely related to *K. longipennis*, from which it differs in the more sinuous forewing margin, and on small details of genitalia of both sexes. The extensive suffusion of the forewing base in the female is unusual. *K. maculatus* also resembles *K. millgrovensis*, sp. nov., in wing shape: the only known female of the latter lacks the forewing development of *K. maculatus* and differs substantially in genitalic features.

*Kempynus millgrovensis*, sp. nov.
(Figs 21, 23–26)


Morphology. Pronotum about twice as long as broad, slightly tapered anteriorly; with long dorsal and marginal setae. Coxa I without pedicelled setae. Wing shapes and venation as in Fig. 21.

Female. Abdominal apex as in Fig. 23. Tergite IX with slight ventral lobe; gonocoxite IX slender, gradually tapered; gonocoxite VIII (Figs 24, 25) apically bifurcate, narrowed posteriorly; sternite VIII simple, slightly sclerotized; sternite VII simple, rounded.
Spermathecae (Fig. 26) strongly constricted, and with apical region bent and tapered; bursal gland indistinct, colleterial gland moderately large.

*Male.* Unknown.

*Dimensions.* FW 29, HW 27, A 14, B 13.

**Figs 21, 22.** Wings of holotypes: 21, *Kempynus millgrovensis*, sp. nov.; 22, *K. thecatus*, sp. nov.

**Type**

Holotype ♀, Victoria, Millgrove, 26.iii.1958, A. Neboiss (NMV).

**Comments**

See under *K. thecatus.*
Kempynus thecatus, sp. nov.
(Figs 22, 27–35)

Coloration. Very dark brown to black. Eyes black. Face glossy black; antennal surround pale except (narrowly) dorsally; palpi dark. Vertex predominantly pale, but with narrow black streaks, in some specimens extending to more obvious black suffusion. Ocelli and antennae pale. Pronotum black, anterior and lateral margins with long dark hairs. Remainder of thorax black, with white hairs except dark on mesoprescutum. Wings with pale greyish brown pattern, forewing pterostigma darker. Legs with coxae and femora dark brown; tibiae with 3 dark brown bands, otherwise pale, tibia III with central band scarcely evident; tarsi pale except for darkening of t5.

Morphology. Pronotum c. 1¼ times as long as wide. Female coxa I without pedicelled setae. Wing venation as in Fig. 22; first branch of Rs in forewing arises well beyond MP fork; forewing distinctly falcate, hind margin strongly sinuous.

Female. Abdominal apex as in Fig. 27. Tergite IX narrow and with slight anteroventral lobe; gonocoxite IX short, strongly tapered; gonocoxite VIII (Figs 28, 29) with ventrally directed lateral processes, rounded apical lobes, not narrowed posteriorly. Sternite VIII (Figs 28, 29) broad and shallow with paired venrally directed processes. Spermathecae (Fig. 30) very large (Fig. 27), strongly constricted and with long curved apical region; bursal and colletellar glands small.

Male. Abdominal apex as in Fig. 31. Ectoproct slightly lobed; tergite IX slender, tapered anteroventrally; sternite IX fairly deep. Gonarcus (Figs 32, 33) slightly emarginate medially; gonocoxite broad and membranous, extends slightly beyond apex of gonarcus; mediuncus
deep, apex blunt, membranous sacs small. Hypandrium internum (Figs 34, 35) broad, arch deep, median keel as long as lateral arms.


Figs 27–35. *Kempynus thecatus*, sp. nov.; 27, female, abdominal apex; 28, 29, sternite VIII and gonocoxite VIII, lateral aspect (28), and ventral aspect (29); 30, internal reproductive system; 31, male, abdominal apex; 32, genitalia, lateral aspect; 33, genitalia, ventral aspect; 34, 35, hypandrium internum, ventral aspect (34), and lateral aspect (35). Scales in millimetres.

Types

Comments

As with K. kimminsi, sp. nov., the paratype series are generally much paler than the holotype. Several of them appear to have been dissected, although the detached parts are not now associated.

K. thecatus is very similar to K. millgrovensis, sp. nov., known only from Victoria. It is clearly distinct on genitalia, and on the position of the first branch of Rs in the forewing.

Kempynus kimminsi, sp. nov.
(Figs 36, 38–46)

Abdomen dark. Wings marked with greyish brown; pterostigma reddened, base and apex cream in forewing. Legs dark brown, unmarked.

*Morphology.* Pronotum about twice as long as broad, slightly tapered anteriorly. Female coxa I with few pedicelled setae. Wing shape and venation as in Fig. 36.

*Figs 38–46.* *Kempynus kimminsii,* sp. nov.: 38, female, abdominal apex; 39, sternites VII and VIII, ventral aspect; 40, 41, gonocoxite VIII, ventral aspect (40), and lateral aspect (41); 42, internal reproductive system; 43, male, abdominal apex; 44, genitalia, lateral aspect; 45, gonarcus and gonocoxites, ventral aspect; 46, mediuncus, ventral aspect. Scales in millimetres.

*Female.* Abdominal apex as in Figs 38, 39; tergite IX with triangular anterolateral lobe; gonocoxite IX relatively short, narrow basally; gonocoxite VIII (Figs 40, 41) with broad divergent ventrolateral lobes, scattered short setae; tergite VIII slightly arched dorsally, angled ventrally and with anterior margin thickened; sternite VIII with narrow
curved median projection, anterior rim transverse; sternite VII rounded. Spermathecae (Fig. 42) strongly constructed, with apical portion ovoid and slightly broader than basal region; bursal and colleterial glands both relatively small.

**Male.** Abdominal apex as in Fig. 43. Tergite IX angled dorsally; sternite IX broad and rounded. Gonarcus (Figs 44, 45) shallowly rounded, with lateral setal tufts; gonocoxite broad, tapered and extending little beyond gonarcus; mediuncus (Figs 44, 46) tapered apically into membranous sacs, dorsally arched anteriorly. Hypandrium internum not found.


**Types**

Holotype ♂, Queensland, National Park, Dec. 1921, H. Hacker (ANIC). Paratypes: 1♀, same locality 7.i.1936, J. L. Groom; 1♂, same data as holotype; 1♂, M. E. Lindsay [Mt Lindesay?], 1–2.i.1939, J. E. Teach; 1♀, 1♂, Lamington Plateau, 4.i.1941, E. J. Dumigan; 1 sex indet., Montville, 25.v.1936, A. A. Ross (all UQ).

**Comments**

This striking species is known only from Queensland, and is readily separable from all others on the shape and patterning of the wings. Most of the paratypes are considerably paler than the holotype and, in some, the wings are almost completely pale: it is not known whether this is an artefact. The holotype, although found in a different collection from a paratype with the same data, is considerably darker.

*Kempynus striatus*, sp. nov.  
(Figs 37, 47–50)

**Coloration.** Pale buff. Eyes black. Labrum black, clypeus paler, frons with broad black band below antennae; palpi darkened apically. Vertex mainly pale; ocelli blackened; dorsal rim of antennal socket narrowly blackened; 2 narrow black lines from behind antennae to hind margin. Antennae pale buff, unmarked, except for trace of darker line along inner dorsal side of scape; all head hairs pale. Pronotum pale, except for 2 dark brown stripes and setae sited on small dark spots. Pterothorax dark brown: almost black at wing bases, slight traces of buff mid-dorsally. Forewings marked with greyish brown, with indication of longitudinal wing-stripe (Fig. 37). Hindwing unmarked. Abdomen dark brown. Legs: coxae II, III dark brown, coxa I dark basally; femora I, II with basal and preapical dark brown bands, III more completely darkened dorsally; tibiae all with 3 dark bands, less distinct on III; tarsi with t1–t3 paler, t4 and t5 rather darker. All leg hairs pale.

**Morphology.** Pronotum about twice as long as broad; narrow: at widest about equal to interocular interval. Coxa I with no pedicelled setae. Forewing tapered (Fig. 37), not falcate. Venation as in Fig. 37.

**Female.** Abdominal apex as in Fig. 47. Gonocoxite IX very broad; tergites VIII and IX not lobed; gonocoxite VIII (Figs 48, 49) apically divided, tapered posteriorly, lateral lobes scarcely evident; sparse short setae; sternite VIII membranous. Spermathecae (Fig. 50) strongly constricted, apical region bent and bluntly rounded; bursal and colleterial glands small.

**Male.** Unknown.

**Dimensions.** FW 34, HW 30, A c. 13, B 15.

**Type.**

Holotype ♀, Australian Capital Territory, Lee’s Spring, 2.iv.1958, E. F. Riek (ANIC).
Comments

As well as being distinct on genitalic features from other known Kempyninae, this species has a wing pattern unique in known Australian specimens. However, as Adams (1971) showed for *K. falcatus* Navás, a longitudinal forewing streak may be present as an individual variation in taxa normally patterned otherwise. However, the wing shape, and details of forewing venation (note the unusual mid-wing link between *CuA* and *CuP*) also separate this individual from other known species.

Figs 47–50. *Kempynus striatus*, sp. nov., female: 47, abdominal apex; 48, 49, gonocoxite VIII, ventral aspect (48), and lateral aspect (49); 50, internal reproductive system. Scale in millimetres.

Genus *Clydosmylus*, gen. nov.

Wings falcate and relatively narrow. Venation very dense: forewing costal crosseins in basal half of costal cell with numerous anastomoses; fork of forewing *MP* almost opposite 1st branch from *Rs*, *MP2* forked in basal third of wing and also about ¼ length of wing. Hindwing with branches of *MP* widely separated, *MP2* branching well before end of *CuA*, several rows of small cells between branches in central length of wing; basal length of *MA* sinuous. *Cu2* long. Large species.

Genitalia (of single known species) similar to those of *Kempynus*; female: spermathecae constricted, gonocoxite VIII very large, sternite VIII elaborated; male: gonarcus broad, ectoproct lobed. Pronotum long and slender. Female coxa I without pedicelled setae.

Type-species: *Clydosmylus montanus*, sp. nov.

Because of the overall similarity of genitalic pattern in the Kempyninae, venation provides the basis of the defined genera. *Clydosmylus* has much more extensive reticulate venation than any other kempynine genus, and the unusual branching pattern of the forewing *MP2* is also distinctive. It appears to represent an elaboration of the more conservative *Kempynus* venation.
Clydosmylus montanus, sp. nov.
(Figs 51-60)


Fig. 51. Clydosmylus montanus, gen. et sp. nov., wings: 51, male paratype; 52, female holotype.

Antennae pale: very slightly darkened over apical 1/3 of flagellum. Pronotum pale, margins blackened; setae black. Pterothorax with narrow black midline, otherwise tawny with greyish suffusion. Wings tawny yellow with greyish brown markings. Abdomen dark tawny brown. Legs: coxae and femora tawny brown; tibiae I and II with 4 dark (black) bands including apex, III paler but base and apex dark; apices of t1-t5 all darkened. Female: Overall rather darker, wings dark greyish tawny.
Morphology. Pronotum about twice as long as wide, sides parallel. Female coxa I without pedicelled setae. Wings strongly falcate, venation as in Figs 51, 52: forewing costal crossveins with many irregular anastomoses in basal half; MP fork about opposite origin of 1st branch from Rs; many irregular crossveins between MP2 and CuA (forewing) and between forks of MP (hindwing); forewing membrane in Rs area behind stigma distorted into a partial bulla; similar but less pronounced in hindwing.

Figs 53–60. Clydosmylus montanus, gen. et sp. nov.: 53, female, abdominal apex; 54, gonocoxite VIII, ventral aspect; 55, sternites VII, VIII, ventral aspect; 56, spermatheca; 57, male, abdominal apex; 58, genitalia, lateral aspect; 59, genitalia, ventral aspect; 60, hypandrium internum, ventral aspect. Scales in millimetres.
Female. Abdominal apex as in Fig. 53. Tergite IX with blunt anteroventral lobe; gonocoxite IX somewhat tapered; gonocoxite VIII (Fig. 54) large, broad with 3 lateral lobes on each divergent arm; tergite VIII large; sternite VIII (Fig. 55) with strong tapered lateral lobes and spatulate ventrally directed median lobe. Spermathecae (Fig. 56) constricted, apical region swollen and scarcely bent (remainder of internal system missing in specimen).

Male. Abdominal apex as in Fig. 57. Ectoproct lobed; trichobothrial field on raised prominence. Tergite IX tapered ventrally; sternite IX deep. Gonarcus (Figs 58, 59) very broadly arched, emarginate medially; gonocoxite membranous, not markedly broad; mediuncus small, strong ventral projection. Hypandrium internum (Fig. 60) small, slender.

Dimensions. δ FW 37, HW 33, A 20, B 16. 9 FW 33, HW 29, A 15.

Types
Holotype δ, New South Wales, Clyde Mountain, I. F. B. Common and M. S. Upton (no date) (ANIC). Paratypes: 1δ, same locality, 16 miles SE. Braidwood, 29.iii.1960, I. F. B. Common (ANIC); 1δ, same locality, near Braidwood, 28.xii.1975, M. S. and B. J. Moulds (AM).

Comments
The above genitalic description is based on the two ANIC specimens, the abdomens of which had been partly cleared at some earlier date; both have now been more adequately prepared, but some fragments are not present.

The very striking appearance of this insect immediately differentiates it from any other Australian osmylid. Wings of the two sexes are markedly different in colour (but similar in venation) and, as the only known specimens are from a single locality, it is unlikely that they represent more than one species.

Genus Australysmus Kimmins

Australysmus Kimmins, 1940, p. 197.

Type-species: Australysmus lacustris Kimmins.

Wings not falcate, forewing margin never sinuous. Hindwing branches of MP not widely separated, crossveins between them basal to branching of MP2 not sinuous, cells quadrate. Female: spermathecae usually small and unconstricted. Pronotum relatively short, sometimes scarcely longer than wide.

Key to Species of Australysmus

1. Forewing and hindwing relatively uniformly patterned. (Male tergite strongly extended and divided; female tergite VIII strongly arched.) ........................................... biproctus
   Forewing and hindwing with strongly contrasted patterning. (Genitalia not as above) .......... 2

2(1). Wing appearing basically brown or greyish brown. (Female sternite VII with median furca, spermathecae constricted; male gonarcus arch relatively broad and shallow.) .......... furcatus
   Wing appearing basically pale with brownish or greyish markings. (Female sternite VII unornamented, spermathecae not constricted; male gonarcus arch relatively narrow and deep.) ................................. 3

3(2). Smaller species (FW to c. 24 mm); wings pale greyish with darker markings. (Female gonocoxite VIII with lateral lobes extending to or beyond apex; male tergite IX with posterior process angled ................................................................. lacustris
   Larger species (FW 27–29 mm); wings pale yellowish with darker markings. (Female gonocoxite VIII with lateral lobes not extending to apex; male tergite IX with posterior process continued smoothly to anterior region) ............................................................. neboissi
Australysmus lacustris Kimmins
(Figs 61, 65, 66, 68–80)

Australysmus lacustris Kimmins, 1940, p. 198.

Types
Holotype ♂, paratypes ♂, ♀, New South Wales, Mt Kosciusko, Blue Lake (holotype, paratype ♀), Club Lake (paratype ♀), 1.ii.1930, R. J. Tillyard (BMNH) (seen).

Figs 61, 62. Wings: 61, Australysmus lacustris Kimmins, Piper's Creek; 62, A. neboissi, sp. nov., holotype.

Other Material Examined
New South Wales: Mt Kosciusko, Blue Lake, 5, ANIC; Pipers Creek, 16, ANIC. Victoria: Falls Creek, 14, NMV; Mt Buller, 1, NMV.
Figs 63, 64. Wings: 63, *Australysmus biproctus*, sp. nov.; 64, *A. furcatus*, sp. nov.

Comments
This species was well described and illustrated by Kimmins (1940), and is re-figured here for purposes of comparison with related taxa. There appears to be a complex of similarly marked *Australysmus* in south-eastern Australia, and specimens from several localities differ slightly in wing markings, in pronotal markings and in details of female genitalia. The former features may well represent local variations, but the latter are more likely to represent specific differences. Two female examples of *lacustris* are figured: one (Figs 77–80) from the type locality, and one (Figs 68–71) representing a series from Piper's
Creek to indicate the extent of such variation. The species described below is clearly very closely related to *lacustris* but is regarded as distinct on its consistently larger size (FW of *lacustris* 18–24 mm) and rather different gonocoxite VIII. More intensive collecting of this species complex is needed to clarify the status of its various constituents.

**Australysmus neboissi**, sp. nov.  
(Figs 62, 67, 81-90)

**Coloration.** Buff. Eyes grey. Labrum and clypeus slightly darkened; frons pale; antennal surround slightly darkened. Palpi dark brown except at extremities of segments. Ocelli black, in pale surrounds. Vertex pale. Antennae, except base of scape, dark brown. Pronotum buff, with dark brown markings (Fig. 67), setae mainly pale but a few long laterals browned. Dorsum of pterothorax mainly dark brown; slight yellow markings on median third and across centre of lateral scutal lobes. Abdomen dark greyish brown to black. Wings often somewhat tawny, marked with greyish brown (Fig. 62). Legs: coxae and femora pale; tibiae darkened basally and apically; tarsus pale, but all tarsomeres darkened at apex; leg hairs pale.

**Morphology.** Wing venation as in Fig. 62. Pronotum as in Fig. 67.

**Female.** Abdominal apex as in Fig. 81. Tergite IX narrow dorsally, strongly expanded ventrally, with tapering anteroventral lobe; tergite VIII with small anteroventral lobe; gonocoxite VIII (Figs 82, 83) with apices of arms relatively slender and dorsally angled, lateral processes slender; sternite VIII (Fig. 84) with slight lateral flanges. Spermathecae (Fig. 85) small, almost spherical, not constricted.

**Male.** Abdominal apex as in Fig. 86. Ectoproct large; tergite IX tapered ventrally, slightly expanded posterior dorsal margin; sternite IX deep. Gonarcus (Figs 87, 88) deeply arched;
gonocoxite relatively narrow; mediuncus with dorsal process slightly longer than in *lacustris*. Hypandrium internum (Figs 89, 90) fairly narrow.


Figs 81–90. *Australysmus neboissi,* sp. nov.: 81, female abdominal apex; 82, 83, gonocoxite VIII, lateral aspect (82), and ventral aspect (83); 84, sternite VIII, ventral aspect; 85, internal reproductive system; 86, male abdominal apex; 87, genitalia, lateral aspect; 88, genitalia, ventral aspect; 89, 90, hypandrium internum, ventral aspect (89), and lateral aspect (90). Scales in millimetres.

*Types*

Holotype ♂, Victoria, Healesville, 7.i.1954, Neboiss (NMV). Paratypes: 1♀, 1♂, same data as holotype (ANIC); 9♂, 4♀, same data as holotype (NMV).
Other Material Examined

Victoria: Cement Creek, 16, NMV; Cumberland Falls, SE. Marysville, 1, NMV; Erica, 1, NMV; Gunyah, 1, ANIC; Mirrimbah, 6, NMV; 12 miles W. Neerim, 2, NMV; Tarra Falls, Tarra Valley, 1, NMV; 8 km NE. Toolangi, 1, NMV; Toorongo Falls, NE. Noojee, 3, NMV.

Comments

See under A. lacustris (p. 415). This species is named for Dr A. Neboiss, in appreciation of his extensive collecting of Kempyninae over a considerable period.

Australysmus biproctus, sp. nov.

(Figs 63, 91–101)

Coloration. Very dark brown. Eyes black. Palpi dark. Face, except labrum in some specimens, dark except buff patch on genae. Vertex dark except at eye border; lateral ocelli narrowly pale externally. Antennae dark. Pronotum predominantly dark, slight traces of irregular pale dorsolateral streaks; fringe of long pale setae. Pterothorax dark, very slightly paler in midline; pleura paler. Abdomen dark. Wings with pale greyish brown mottling (Fig. 64); pterostigma rather darker than rest of wing, with paler intervals cream. Legs: coxae and femora relatively pale, darkened apically; tibiae with 3 dark brown bands; tarsus with apices of t1–t4, whole of t5 dark.

Morphology. Pronotum almost square. Wings relatively slender; venation as in Fig. 63.

Female. Abdominal apex as in Fig. 91. Tergite IX strongly produced anteroventrally; gonocoxite IX broad; tergite VIII strongly arched dorsally, a narrow anteroventral extension; gonocoxite VIII (Figs 92, 93) deep, with digitate lateral processes, arms not otherwise markedly divergent; sternite VIII (Fig. 94) broad, shallow, sides projected posteriorly; sternite VII (Fig. 94) with digitate setose lateral lobes and a pronounced median furca bearing numerous spicules. Spermathecae (Fig. 95) small, discoidal.

Male. Abdominal apex as in Fig. 96. Ectoproct extended dorsally, broad; tergite IX (Fig. 97) produced posteriorly into 2 long bluntly digitate processes, strongly tapered anteroventrally; sternite IX short. Gonarcus (Figs 98, 99) slender, ventrally directed, not emarginate; gonocoxite slender; mediuncus produced dorsally. Hypandrium internum (Figs 100, 101) fairly broad, median keel as long as lateral arms.


Types

Holotype ♂, Victoria, 12 km SE. Merrijig, Howqua River, 30.xi.1971, A. Neboiss (NMV). Paratypes: 26♂, 19♀, same data as holotype (NMV); 1♂, New South Wales, Island Bend, 21.i.1959, E. F. Riek (ANIC).

Comments

The extraordinary development of the male tergite IX, and of the female tergite VIII and sternite VII readily separate this from related species. The wings are less heavily patterned than those of other species of Australysmus but the venation is very similar.

Australysmus furcatus, sp. nov.

(Figs 64, 102–111)

Coloration. Dark brown. Eyes black. Face and palpi dark. Vertex slightly paler along posterior margin. Antennae and ocelli dark. Pronotum dark except for paling at anterior angles, a fringe of dark setae. Pterothorax dark; a slightly paler band around posterior of mesoprescutum. Abdomen dark. Wings (Fig. 64) mottled with dark greyish brown. Legs
greyish brown: femora darkened dorsally, tibiae with traces of 3 darkened bands, all narrow, less distinct on III; apices of t1–t5 darkened.

*Morphology.* Pronotum slightly longer than wide. Wing venation as in Fig. 64.

**Figs 91–101.** *Australysmus biproctus*, sp. nov.: 91, female abdominal apex; 92, 93, gonocoxite VIII, ventral aspect (92), and lateral aspect (93); 94, sternites VII and VIII, ventral aspects; 95, internal reproductive system; 96, male, abdominal apex; 97, tergite IX, dorsal aspect; 98, genitalia, lateral aspect; 99, genitalia, ventral aspect; 100, 101, hypandrium internum, ventral aspect (100), and lateral aspect (101). Scales in millimetres.

**Female.** Abdominal apex as in Fig. 102. Tergite IX lacking pronounced anteroventral lobe; gonocoxite IX moderately broad; tergite VIII not arched, a small anteroventral extension; gonocoxite VIII (Figs 103, 104) shallow with arms arched to converge, only narrowly separated distally; sternite VIII (Fig. 105) a simple sclerotized plate; sternite VII
(Fig. 105) with pronounced median furcate process. Spermathecae (Fig. 106) slightly constricted, apical region narrower than basal region; ducts long, convoluted.

**Male.** Abdominal apex as in Fig. 107. Ectoproct with slight dorsolateral lobes and produced posteriorly; tergite IX small; sternite IX shallow. Gonarcus arch (Figs 108, 109).

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**Figs 102–111.** Australysmus furcatus, sp. nov.: 102, female abdominal apex; 103, 104, gonocoxite VIII, lateral aspect (103), and ventral aspect (104); 105, sternites VII and VIII, ventral aspect; 106, internal reproductive system; 107, male abdominal apex; 108, genitalia, lateral aspect; 109, gonarcus and gonocoxites, ventral aspect; 110, 111, hypandrium internum, ventral aspect (110), and lateral aspect (111). Scales in millimetres.
broad, gonocoxite narrow, mediuncus broad. Hypandrium internum (Figs 110, 111) tapered posteriorly, median keel extending slightly beyond lateral arms.

Dimensions. FW 25, HW 23, A 8, B 14–16.

Types
Hoctype ♀, Victoria, Carisbrook Falls, 16 km NE. Apollo Bay, 4.xii.1972, Neboiss and Malcolm (NMV). Paratypes: 1♂, 1♀, same data as holotype; 1♂, Victoria, Bell’s Clearing, 6 km S. Aberfeldy, 9.ii.1977, A. A. Calder (NMV).

Comments
In the unusual development of the female sternite VII, this species somewhat resembles A. biproctus. It is clearly distinct on other genitalic features and in wing pattern more resembles A. lacustris and A. neboissi. The wing pattern is, though, more intensely brown than in either of these, and the extended spermathecae, as well as other genitalic details, afford ready distinction.

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References

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**Notes:**

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