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A contribution to the knowledge of the Embolemidae and Dryinidae (Hymenoptera Chrysidoidea)

Abstract - The following new species of Embolemidae are described: *Ampulicomorpha nepalensis*, from Nepal; *A. pecki*, from South Africa; *A. wilkersoni*, from Colombia; *A. gilli*, from Venezuela; *A. suavis*, from Costa Rica; *A. gressitti*, from New Guinea; *Embolemus huberi*, from Iran; *E. harteni*, from Yemen; *E. pecki*, from Japan, Taiwan and Indonesia; E. *sanbornei* and *E. capensis*, from South Africa; *E. bestelmeyeri,* from Argentina; *E. andersoni*, from Guatemala. New keys to the world Embolemidae are given. In addition, a new species of Dryinidae, *Dryinus fullertoni*, from Florida (U.S.A.) is described. A new key to the females of *Dryinus inconsultus* (Olmi) group is given.

Riassunto - *Contributo alla conoscenza degli Embolemidae e Dryinidae mondiali (Hymenoptera Chrysidoidea).*

Sono descritte le seguenti nuove specie di Embolemidae: *Ampulicomorpha nepalensis*, del Nepal; *A. pecki,* del Sud Africa; *A. wilkersoni*, di Colombia; *A. gilli*, del Venezuela; *A. suavis,* di Costa Rica; *A. gressitti*, di Nuova Guinea; *Embolemus huberi*, dell'Iran; *E. harteni,* dello Yemen; *E. pecki*, di Giappone, Taiwan e Indonesia; *E. sanbornei* ed *E. capensis*, del Sud Africa; *E. bestelmeyeri*, di Argentina; *E. andersoni*, di Guatemala. Sono inoltre proposte nuove chiavi dicotomiche per tutte le specie di Embolemidae attualmente conosciute nel mondo. Nella famiglia Dryinidae è descritta una nuova specie della Florida (U.S.A.), *Dryinus fullertoni*. E' proposta una nuova chiave dicotomica delle femmine del gruppo *Dryinus inconsultus* (Olmi).

Key words: Embolemidae, Dryinidae, taxonomy, new species.

The Embolemidae and Dryinidae are two families of Chrysidoidea known in all the zoogeographic regions. Both were revised by Olmi (1984, 1989, 1993, 1995a, b).

As for the Embolemidae, in a recent revision of the world species Olmi (1995a) listed 2 genera (*Ampulicomorpha* Ashmead 1893 and *Embolemus* Westwood 1833) and 18 species, including two fossil species. Rasnitsyn (1996) later transferred to

Embolemidae the fossil genus *Baissobius* Rasnitsyn 1975, with the following three species: *B. carolianus* Rasnitsyn 1996 from Mongolia (later Early Cretaceous), *B. parvus* Rasnitsyn 1975 from Transbaikalian Russia (early Early Cretaceous) and *B. minimus* Rasnitsyn 1996 from Transbaikalian Russia (lower Lower Cretaceous).

As for the Dryinidae, in a recent revision of world genera belonging to Dryininae subfamily Olmi (1993) proposed a new classification.

After the publication of my revisions of the world species, I examined other collections of embolemids and dryinids and identified other new species described in the present paper.

MATERIAL AND METHODS

This paper is based on the study of embolemid and dryinid specimens kept in the following collections:

AL: Provincial Museum of Alberta, Edmonton, Alberta, Canada
B: Bishop Museum, Honolulu, Hawaii, U.S.A.
DE: Florida State Collection of Arthropods, Gainesville, Florida, U.S.A.
FU: Biology Department, University of Central Florida, Orlando, Florida, U.S.A.
LA: Natural History Museum of Los Angeles County, Los Angeles, California, U.S.A.
LE: National Museum of Natural History, Leiden, The Netherlands
OL: Massimo Olmi's Collection, c/o Department of Plant Protection, Viterbo, Italy
OT: Canadian National Collection of Insects, Ottawa, Canada
WA: National Museum of Natural History, Washington, D.C., U.S.A.

As for the Embolemidae, the new species described in this paper were compared with the type series of all the described extant species. The collections where the types are deposited are listed in the revision of Olmi (1995a).

As for the Dryinidae, the new described species was compared with the types of the species of Dryinus inconsultus (Olmi) group. The collections where the types are deposited are listed in the revisions of Olmi (1984, 1989).

The terminology is that of Olmi (1984) revised after Gauld & Bolton (1988) and Olmi (1994, 1995a).

The following abbreviations are used: F = female specimen; FF = female specimens; M = male specimen; MM = male specimens.

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SYSTEMATIC ACCOUNT

Family EMBOLEMIDAE

Genus *Ampulicomorpha* Ashmead 1893

Ampulicomorpha nepalensis n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 3.12-3.62 mm (holotype: 3.31 mm); totally testaceous or testaceous-brown; antennae geniculate, not distally thickened, without rhinaria; antennal segments in following proportions: 31-6-16-15-14-14-13-12-12-15; antennae articulated to two strong frontal contiguous processes; antennal sockets very far from upper margin of clypeus; head pyriform, shiny, alutaceous, with dorsal side flat, covered with short hairs; occipital carina complete; ocelli distinct; POL = 2; OL = 3; OOL = 11.5; OPL = 5; TL = 16; eyes very small, much shorter than head (8:30); frons between clypeus and antennal sockets with two very convergent longitudinal and median sutures; the sutures much closer together at antennal sockets than at clypeus; frontal area between anterior ocellus and antennal sockets with incomplete median longitudinal furrow only visible near antennal sockets; pronotum shiny, granulated, covered with fine short hairs and with a strong complete median longitudinal furrow; pronotum slightly longer than scutum (13:12); pronotal tubercles reaching tegulae; scutum and scutellum dull, granulated, covered with fine short hairs; notauli almost invisible (only small track visible near anterior margin of scutum); metanotum very short, shiny, smooth; propodeum dull, with strong transverse keel between dorsal and posterior surface; dorsal surface of propodeum rugose, with two median longitudinal keels from anterior to posterior margin, the keels forming trapezoid basal areola near anterior margin (fig. 1); posterior surface of propodeum rugose, with 2 longitudinal keels; mesopleura and metapleura shiny, smooth, finely punctate, without sculpture between punctures; forewing hyaline, without dark transverse bands, with five cells fully enclosed by pigmented veins (CC, BC, SBC, 1DC, 1SDC); 1DC cell subrectangular; marginal cell open; distal part of stigmal vein longer than proximal part (18:14); hind wing fully developed, hyaline; maxillary palpi with 5 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

DESCRIPTION OF THE MALE: fully winged; length 2.31 3.75 mm; head brown-testaceous or brown-black, with mandibles and clypeus testaceous; antennae totally brown or with segments 1-2 testaceous; thorax and propodeum brown-testaceous or black; gaster brown; legs testaceous; antennae not geniculated, not distally thickened, articulated on two conical frontal contiguous processes; antennal segments in following proportions: 10-4-15-14-14-13-11.5-11-10-13; antennae without rhinaria; head convex,

shiny, finely punctate, without sculpture between punctures, covered with fine short hairs; frontal area between anterior ocellus and antennal sockets with incomplete median furrow, the furrow only visible near antennal sockets; occipital carina complete; POL = 1.5; OL = 1.5; OOL = 5; OPL = 5; TL = 5; frontal area between clypeus and antennal sockets with two convergent median and longitudinal sutures, the sutures directed from upper margin of clypeus to antennal sockets, closer together at antennal sockets than at clypeus; clypeus with margins rounded; subocular sulcus absent; eyes large, shorter than the head (8:17); pronotum dull, granulated, covered with short hairs, short, partly invisible because hidden behind occiput; pronotal tubercles reaching tegulae; posterior surface of pronotum much shorter than scutum (3:14); scutum dull, granulated, covered with short hairs; notauli incomplete, very short, extending approximately 0.10 length of scutum; scutellum dull, punctate, without sculpture between punctures; metanotum short, reduced, transverse; propodeum dull, reticulate-rugose; dorsal surface of propodeum with two longitudinal, median and subparallel keels from anterior margin to posterior surface, the keels forming a trapezoid basal areola near anterior margin of dorsal surface; propodeum with transverse keel between dorsal and posterior surface; posterior surface of propodeum rugose, with two complete longitudinal keels; mesopleura and metapleura shiny, smooth, without sculpture; petiole short; forewing and hind wing entirely weakly darkened; distal part of stigmal vein longer than proximal part (18:15); marginal cell open; 1DC and 1SDC cells fully enclosed by pigmented veins; dorsal membranous process of parameres with numerous hairs and papillae or scales distally (fig. 2); maxillary palpi with 6 segments; labial palpi with 2-3 segments (in a male from Godavari (Nepal) the right labial palp is 2-segmented, the left is 3-segmented); tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Holotype F: Nepal, Godavari, 6000', 7-13.VIII.1967, Malaise trap, Canadian Expedition coll. (OT); 2 paratypes (1F, 1M), same label data (OT); 3 paratypes (2 FF, 1M), same label locality data, 1-3.VIII.1967 (OT); 1 paratype F, same label locality data, 1-3.VIII.1967 (OL); 2 paratypes MM, same label locality data, 3.VIII.1967 (OT); 1 paratype F, same label locality data, 3.VIII.1967 (OL); 1 paratype M, same label locality data, 21.VII.1967 (OL); 1 paratype M, same label locality data, 13-17.VIII.1967 (OT); 1 paratype M, same label locality data, 13-19.VIII.1967 (OT); 1 paratype M, same label locality data, 21-30.VII.1967 (OT); 1 paratype M, same label locality data, 14-17.VII.1967 (OT); 1 paratype M, same label locality data, 20-23.VII.1967 (OT); 1 paratype M, Nepal, 28 km N of Trisuli, Dunche, 1950 m, 7-12.XI.1965, L.W. Quate coll. (B); 1 paratype M, Nepal, 20 km N of Trisuli, Bokaihunde, 2100 m, 13-17.XI.1965, L.W. Quate coll. (B); 1 paratype M, Nepal, Godavari, 6000', Malaise trap, 13-17.VIII.1967, W.R. Mason coll. (OT); 1 paratype M, Nepal, Latha Manang, W of Bagarchap, 235 m, 24.IX.1983, A. Smetana (OL); 1 paratype M, Nepal, Phulcoki, 2600 m, Oak forest ss., 13.X.1983, A. Smetana (OT); 1 paratype M, Nepal, Katmandu, Pulchauki, 7300', Malaise trap, 27-31.VII.1967, Canadian Expedition coll. (OT); 1 paratype M, same label locality data, 27.VII.1967 (OT); 1 paratype M, same label locality data, 7-11.VIII.1967 (OT); 2 paratypes MM,

same label locality data, 14-21.VII.1967 (OT); 2 paratypes MM, same label locality data, 21-27.VII.1967 (OT).

REMARKS: females of *A. nepalensis* n. sp. are very similar to females of the second Palaearctic species, *A. hachijoensis* (Hirashima & Yamagishi, 1975); the main difference concerns the shape of the propodeal basal areola: rectangular in *A. hachijoensis* (fig. 14 in Olmi, 1995a) and trapezoid in *A. nepalensis* (fig. 1). Stronger differences are visible in males: the head of *A. hachijoensis* has OOL much longer than OPL (fig. 16 in Olmi, 1995a), whereas in *A. nepalensis* OOL is approximately as long as OPL or slightly longer. Also in *A. nepalensis*, the proximal membranous process of the parameres has a number of hairs and scales distally (fig. 2), whereas the same region is smooth and hairless in *A. hachijoensis* (fig. 19 in Olmi, 1995a). In the key to the species of *Ampulicomorpha* proposed by Olmi (1995a), the female of *A. nepalensis* can be inserted at couplet 4, near *A. hachijoensis*, whereas the male can be inserted at couplet 5, near *A. hachijoensis* and *A. magna* Olmi 1995 (see the present key).

Ampulicomorpha pecki n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 3.12 mm; totally testaceous; antennae geniculate, not distally thickened, without rhinaria; antennal segments in following proportions: 25-5-11-11-11-12-11-10-10-14; antennae articulated to two strong frontal contiguous processes; antennal sockets very far from upper margin of clypeus; head pyriform, dull, granulated, with dorsal side flat, covered with short hairs; occipital carina complete; ocelli distinct; POL = 2; OL = 3; OOL = 9; OPL = 5; TL = 13; eyes very small, much shorter than head (5:27); frons between clypeus and antennal sockets with two very convergent longitudinal and median sutures, the sutures much closer together at antennal sockets than at clypeus; frontal area between anterior ocellus and antennal sockets with incomplete median longitudinal furrow only visible in front of anterior ocellus and near antennal sockets; pronotum dull, granulated, covered with fine short hairs, with a strong almost complete median longitudinal furrow, the furrow not visible near anterior margin of posterior collar; pronotum shorter than scutum (9:14); pronotal tubercles reaching tegulae; scutum and scutellum dull, granulated, covered with fine short hairs; notauli not visible (only small track visible near anterior margin of scutum); metanotum very short, shiny, smooth; propodeum dull, with strong transverse keel between dorsal and posterior surface; dorsal surface of propodeum reticulate-rugose, with two median longitudinal and irregular keels from anterior to posterior margin, the keels forming a rectangular basal areola near anterior margin (fig. 3); posterior surface of propodeum reticulate-rugose, without transverse or longitudinal keels; forewing hyaline, without dark transversal bands, with five cells fully enclosed by pigmented veins (CC, BC, SBC, 1DC, 1SDC); 1DC cell subrectangular; marginal cell open; distal part of stigmal vein longer than proximal part (17:12); hind wing fully developed, hyaline; maxillary palpi with 4 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

MALE: unknown.

MATERIAL EXAMINED: Holotype F: South Africa, Cape Province, Stormsrivier, 100 m, 5-30.XII.1981, S. Peck coll. (OT).

ETYMOLOGY: the species is dedicated to Prof. Stewart B. Peck, collector of the holotype.

REMARKS: *A. pecki* n. sp. differs from the second Ethiopian species of *Ampulicomorpha, A. magna* Olmi 1995, mainly by its testaceous colour, palpal formula (4/2) and rectangular basal propodeal areola (fig. 3). *Ampulicomorpha magna* has the colour of the body mostly brown, the palpal formula 5/2 and a square basal propodeal areola (fig. 13 in Olmi, 1995a). In the key to the females of *Ampulicomorpha* proposed by Olmi (1995a), *A. pecki* n. sp. can be inserted at couplet 4, near the new species *A. gilli* (see the present key).

Ampulicomorpha wilkersoni n. sp.

FEMALE: unknown.

DESCRIPTION OF THE MALE: fully winged; length 3.25 mm; head brown, with mandibles testaceous-darkened; antennae testaceous-darkened; thorax and propodeum brown; gaster and legs testaceous-darkened; antennae not geniculate, not distally thickened, articulated on two conical frontal contiguous processes; antennal segments in the following proportions: 19-4.5-15.5-14-13-13-11.5- 12-10-13.5; antennae without rhinaria; head convex, dull, granulated; frons with a complete median furrow from anterior ocellus to antennal sockets; occipital carina complete; POL = 3; OL = 2.5; OOL = 2.5; OPL = 3.5; TL = 3; frons with two almost parallel sutures directed from upper margin of clypeus to antennal sockets, the sutures hardly divergent near clypeus and complete between clypeus and antennal sockets; clypeus with margins rounded; subocular sulcus absent; eyes large, shorter than head (13:20); pronotum dull, granulated, covered with short hairs, crossed by a strong transverse impression; posterior surface of pronotum flat, inclined, with a strong median longitudinal furrow; pronotal tubercles reaching tegulae; pronotum much shorter than scutum (12:24); posterior surface of pronotum much shorter than scutum (7:24); scutum dull, granulated, covered with short hairs; notauli incomplete, very short, extending approximately 0.15 length of scutum; scutellum dull, granulated; metanotum short, reduced, transverse; propodeum dull, reticulate-rugose, the dorsal surface with two longitudinal, median and subparallel keels from anterior margin to posterior surface and with a broad basal areola (approximately as long as broad) near anterior margin between the two longitudinal keels; petiole very long, approximately as long as hind trochanters (8:8), much shorter than first tergite of gaster (8:23); forewing hyaline, without dark transverse bands or spots; distal part of stigmal vein longer than proximal part (24:15); 1DC and

1SDC cells fully enclosed by pigmented veins; maxillary palpi with 6 segments; labial palpi with 3 segments; tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Holotype M: Colombia, Valle dept., Penas Blancas, Malaise trap, 4-5.III.1975, R. Wilkerson coll. (DE).

ETYMOLOGY: the species is dedicated to Mr. R. Wilkerson collector of the holotype.

REMARKS: because of its very long petiole *A. wilkersoni* n. sp. is very similar to *A. australis* Olmi 1995. Its petiole is, however, shorter than in *A. australis*, and its temples are shorter. In the key to the males of *Ampulicomorpha* by Olmi (1995a), *A. wilkersoni* can be inserted at couplet 1, near *A. australis* Olmi (see the present key).

Ampulicomorpha gilli n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 3.43 mm; head brown, with clypeus and mandibles testaceous; antennae testaceous; mesosoma brown, with prothorax slightly lighter; petiole testaceous; gaster brown, with testaceous bands; legs testaceous-brown; antennae geniculate, not distally thickened, articulated to two conical frontal contiguous processes; antennal segments in following proportions: 28-7-10-10-9-10-9-8-7.5-13; antennae without rhinaria; head pyriform, shiny, smooth, alutaceous, finely covered with short hairs; occipital carina complete; genal carina complete; POL = 3; OL = 3; OOL = 10; OPL = 4; TL = 12; frontal line absent; frons between anterior ocellus and frontal conical processes with incomplete median longitudinal furrow near conical processes; frons between clypeus and conical processes with two very convergent longitudinal and median sutures, the sutures much closer together at antennal sockets than at clypeus; clypeus with margins rounded; subocular sulcus absent; eyes small; head more than twice as long as eyes (28:7); pronotum dull, granulated, covered with fine short hairs, crossed by a strong transverse impression, anterior collar not visible, hidden behind occiput, posterior surface flat, with a strong median longitudinal furrow; pronotal tubercles reaching tegulae; posterior surface of pronotum shorter than scutum (8:15); scutum shiny, covered with fine short hairs, granulated; notauli not visible; scutellum shiny, without sculpture, hairless; metanotum very short, smooth, without sculpture; propodeum with a transverse keel between dorsal and posterior surface; dorsal surface of propodeum very shiny, smooth, without sculpture, except for two large areolae surrounded by keels and located near anterior margin, the two areolae separated by a short median keel (fig. 4); the dorsal surface of propodeum has two tracks of median longitudinal furrows; posterior surface of propodeum dull, reticulate-rugose; mesopleura and metapleura shiny, smooth, without sculpture; propodeum, mesopleura and metapleura covered with fine short hairs; forewing hyaline, without dark transverse bands, with 4 cells fully enclosed by

pigmented veins (CC, BC, SBC, 1DC); 1SDC cell open, not fully enclosed by pigmented veins; marginal cell open; distal part of stigmal vein much longer than proximal part (20:12); petiole short, much shorter than gaster (3:58); maxillary palpi with 5 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

MALE: unknown

MATERIAL EXAMINED: Holotype F: Venezuela, Merida, Tabay, 2600 m, 11-27.VII.1986, B. Gill coll. (AL).

ETYMOLOGY: the species is dedicated to Mr. B. Gill, collector of the holotype.

REMARKS: because of its short petiole, complete longitudinal furrow in the posterior surface of pronotum, palpal formula (5/2) and OOL/OPL ratio, *A. gilli* n. sp. is similar to *A. magna* Olmi 1995 and *A. hachijoensis* (Hirashima & Yamagishi 1975). In *A. gilli*, however, the dorsal surface of the propodeum does not show a central basal areola formed by two median longitudinal keels (figs 13-14 in Olmi, 1995a), because the two basal lateral areolae are separated by only one short median keel (fig. 4). In the key to females of *Ampulicomorpha* proposed by Olmi (1995a), *A.gilli* and the previous *A. pecki* n. sp. can be inserted at couplet 4, near *A. pecki* and *A. magna* Olmi (see the present key).

Ampulicomorpha suavis n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 5.37 mm; head brown-black, with palpi brown; antennae brown; mesosoma brown-black; petiole, gaster and legs brown; antennae geniculate, not distally thickened, articulated to two conical frontal contiguous processes; antennal segments in following proportions: 45-10-24-18-16-16-16-16-14-19; antennae without rhinaria; head not pyriform, dull, granulated, smooth, finely covered with short hairs; occipital carina complete; genal carina complete; POL = 5; OL = 4; OOL = 8.5; OPL = 8.5; TL = 15; frontal line absent; frons between anterior ocellus and frontal conical processes with incomplete median longitudinal furrow near the conical processes frons between clypeus and conical processes with two almost parallel furrows directed from upper margin of clypeus to conical processes; clypeus with margins rounded; subocular sulcus absent; eyes large; head hardly more than twice as long as eyes (32:14); pronotum dull, granulated, covered with fine short hairs, crossed by a strong transverse impression; anterior collar of pronotum short, but not visible, hidden behind occiput; posterior surface of pronotum flat, with a strong median complete longitudinal furrow; pronotal tubercles reaching tegulae; posterior surface of pronotum shorter than scutum (18:31); scutum and scutellum dull, granulated, covered with fine short hairs; notauli incomplete, extending approximately 0.2

length of scutum; metanotum short, shiny, without sculpture, except for a central small areola surrounded by keels; propodeum with a strong transversal keel between dorsal and posterior surface; dorsal surface of propodeum dull, reticulate rugose, with two median subparallel longitudinal keels, the keels forming a basal areola near the metanotum (fig. 6); posterior surface of propodeum reticulate-rugose, with two oblique keels directed from posterior margin to sides of propodeum; areolae of posterior surface of propodeum much smaller than 1DC cell; mesopleura and metapleura smooth, granulated, dull; forewing darkened, with two darker transversal bands, with 5 fully enclosed cells (CC, BC, SBC, 1DC, 1SDC); marginal cell open; distal part of stigmal vein slightly shorter than proximal part (24:25); petiole short, as long as, or slightly shorter than hind trochanters (10:11), much shorter than gaster (10:80); maxillary palpi with 6 segments; labial palpi with 3 segments; tibial spurs 1, 2, 2.

MALE: unknown.

MATERIAL EXAMINED: Holotype F: Costa Rica, Alajuela Province, Peñas Blancas, 700 m, Primary rain forest, Malaise trap, 9.VI.1987, E. Cruz coll. (OT).

REMARKS: *Ampulicomorpha suavis* n. sp. is similar to *A. confusa* Ashmead 1893; however, in *A. suavis* the dorsal surface of the propodeum is sculptured by two median subparallel longitudinal keels, the keels forming a large basal median areola (fig. 6). In *A. confusa* the dorsal surface of the propodeum is irregularly rugose (fig. 1 in Olmi, 1995a). Further, in *A. suavis* the petiole is longer than in *A. confusa* (figs. 1-2 in Olmi, 1995a). In the key to females of *Ampulicomorpha* proposed by Olmi (1995a), *A. suavis* can be inserted at couplet 3, near *A. confusa* (see the present key).

Ampulicomorpha gressitti n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 2.62 mm; totally testaceous, with eyes brown; antennae geniculate, not distally thickened, without rhinaria; antennal segments in following proportions: 20-6-7.5-8-8-8-7.5-6.5-6.5-10; antennae articulated to two conical strong frontal contiguous processes; antennal sockets very far from upper margin of clypeus; frons between clypeus and antennal sockets with two median longitudinal and convergent sutures, the sutures closer together at antennal sockets than at clypeus; head pyriform, shiny, alutaceous, covered with fine short hairs, with dorsal side flat; occipital carina complete; ocelli distinct; POL = 1.5; OL = 2; OOL = 8; OPL = 3; TL = 11; occiput weakly excavated behind the ocellar triangle; eyes very small, much shorter than head (5:22); pronotum dull, granulated, covered with fine short hairs, sculptured by an incomplete median longitudinal furrow, the furrow short and visible only near posterior margin; pronotal tubercles reaching tegulae; scutum dull, granulated, covered with fine short hairs, longer than pronotum (13:6); notauli

very short, only visible near anterior margin of the scutum; parapsidal lines distinct; scutellum shiny, smooth, without sculpture; metanotum very short, transverse, smooth, without sculpture; propodeum shiny, without transverse keel between dorsal and posterior surface; dorsal surface of propodeum shiny, almost fully unsculptured, except for a few irregular keels near anterior margin; propodeal spiracles normally prominent; posterior surface of propodeum rugose, transversely striate, with two lateral pointed apophyses, without longitudinal keels; forewing fully developed, almost entirely darkened; marginal cell open; distal part of stigmal vein slightly longer than proximal part (12:11); 1SDC cell partly open, not fully enclosed by pigmented veins; 1DC cell closed, subrectangular; hind wings fully developed, hyaline; maxillary palpi with 5 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

MALE: unknown.

MATERIAL EXAMINED: Holotype F: Indonesia, New Guinea, Irian Jaya, Hollandia - Binnen, 100 m, 2.XI.1958, J.L. Gressitt coll. (B).

ETYMOLOGY: the species is dedicated to Mr. J.L. Gressitt, collector of the holotype.

REMARKS: because of its incomplete pronotal median furrow and its palpal formula (5/2), *A. gressitti* n. sp. is similar to *A. collinsi* Olmi 1995. However, *A. gressitti* lacks the two complete longitudinal keels that are visible on the propodeum dorsal region of *A. collinsi.* In the key to females of *Ampulicomorpha* proposed by Olmi (1995a), *A. gressitti* can be inserted at couplet 1, near *A. collinsi* (see the present key).

REVISED KEY TO THE WORLD SPECIES OF *AMPULICOMORPHA* ASHMEAD

Females

1 Pronotum with an incomplete median longitudinal furrow (fig. 9 in Olmi, 1995a); palpal formula 5/2 2
– Pronotum with a complete median longitudinal furrow (fig. 10 in Olmi, 1995a); palpal formula 4/2, 5/2 or 6/3. 3
2 Posterior surface of propodeum with two complete, strong longitudinal keels ..... *collinsi* Olmi (Oriental)
– Posterior surface of propodeum without two complete, strong longitudinal keels ..... *gressitti* n. sp. (New Guinea)
3 Ocelli very far from occipital carina, OOL as long as or slightly shorter than OPL (fig. 1 in Olmi, 1995a); labial palpi 3-segmented 4
– Ocelli very near occipital carina, OOL almost twice or more than twice as long as OPL (fig. 11 in Olmi, 1995a); labial palpi 2-segmented 6

4 Petiole very long, longer than hind trochanters (fig. 12 in Olmi, 1995a); posterior surface of propodeum with two complete longitudinal keels and sculptured by very large areolae; areolae slightly smaller than 1DC cell ..... *australis* Olmi (Australian)

– Petiole very short, as long as or shorter than hind trochanters (fig. 2 in Olmi, 1995a); posterior surface of propodeum without longitudinal keels (at most with two oblique, subtransverse keels) and sculptured by very small areolae; areolae much smaller than 1DC cell. 5

5 Dorsal surface of propodeum without longitudinal keels (fig.1 in Olmi, 1995a); petiole much shorter than hind trochanters ..... *confusa* Ashmead (Nearctic)

– Dorsal surface of propodeum with two subparallel median longitudinal keels forming a basal areola (fig. 6); petiole as long as or slightly shorter than hind trochanters ..... *suavis* n. sp. (Neotropic)

6 Maxillary palpi 4-segmented ..... *pecki* n. sp. (Ethiopian)

– Maxillary palpi 5-segmented 7

7 Dorsal surface of propodeum with two tracks of median longitudinal keels, the tracks not forming a basal areola (fig. 4) ..... *gilli* n. sp. (Neotropic)

– Dorsal surface of propodeum with two median longitudinal keels converging near the metanotum where they form a basal areola (figs. 13, 14 in Olmi, 1995a; fig. 1) 8

8 Dorsal surface of propodeum with two median longitudinal keels quite converging near the metanotum and forming a basal square shaped areola (fig. 13 in Olmi, 1995a) ..... *magna* Olmi (Ethiopian)

– Dorsal surface of propodeum with two median longitudinal keels more (fig. 1) or less (fig. 14 in Olmi, 1995a) converging near the metanotum and forming a rectangular (fig. 14 in Olmi, 1995a) or trapezoid (fig. 1) basal areola 9

9 Dorsal surface of propodeum with two median longitudinal keels less converging near the metanotum and forming a rectangular basal areola (fig. 14 in Olmi, 1995a) ..... *hachijoensis* (Hirashima & Yamagishi) (Palaearctic)

– Dorsal surface of propodeum with two median longitudinal keels more converging near the metanotum and forming a trapezoid basal areola (fig. 1) ..... *nepalensis* n. sp. (Nepal)

Males

1 Petiole very long, as long as or slightly longer than hind trochanters (fig. 15 in Olmi, 1995a); palpal formula 6/3 2

– Petiole short, shorter than hind trochanters (fig. 4 in Olmi, 1995a); palpal formula 5/2, 6/2 or 6/3 3

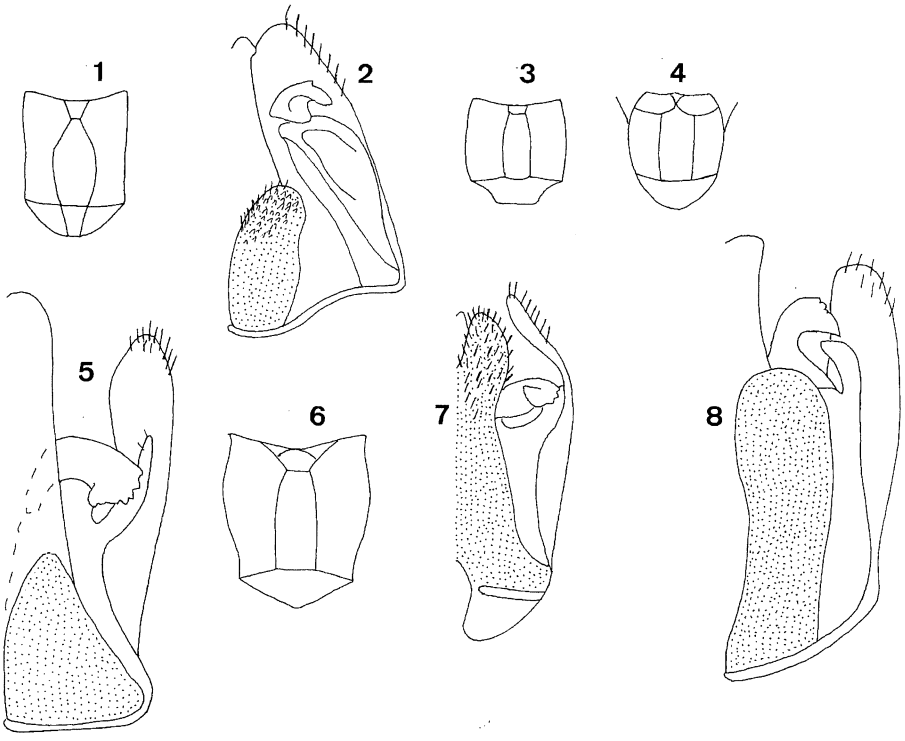
2 Petiole slightly longer than hind trochanters (fig. 15 in Olmi, 1995a); temples more than three times as long as POL ..... *australis* Olmi (Australian)

– Petiole approximately as long as hind trochanters; temples approximately as long as POL . ..... *wilkersoni* n. sp. (Neotropic)

3 Head testaceous-reddish or testaceous (fig. 32 in Olmi, 1995a) ..... *schajovskoyi* De Santis & Vidal Sarmiento (Neotropic)

– Head black or brown, with or without testaceous genal spots 4

4 Pronotum fully visible in dorsal view (fig. 3 in Olmi, 1995a)..*confusa* Ashmead (Nearctic)
– Pronotum partly hidden behind occiput..... 5
5 Dorsal membranous process of parameres completely without hairs, papillae, or scales (figs. 5 - 8)..... 6
– Dorsal membranous process of parameres at least partly with hairs or/and papillae or scales (fig. 19 in Olmi, 1995a; fig. 2)..... 7
6 Dorsal membranous process of parameres very short (fig. 5)..... *magna* Olmi (Ethiopian)
– Dorsal membranous process of parameres very long (fig. 8)..... *collinsi* Olmi (Oriental)
7 Dorsal membranous process of parameres with a few papillae proximally (fig. 19 in Olmi, 1995a), without hairs and papillae or scales distally..... ..... *hachijoensis* (Hirashima & Yamagishi) (Palaearctic, Oriental)
– Dorsal membranous process of parameres with numerous hairs and papillae or scales distally (fig. 2)..... *nepalensis* n. sp. (Nepal)



Figs. 1-8 - Propodeum in dorsal view of female holotypes of *Ampulicomorpha nepalensis* n. sp. (fig. 1); *A. pecki* n. sp. (fig. 3); *A. gilli* n. sp. (fig. 4); *A. suavis* n. sp. (fig. 6). - Male genitalia (right half) of *Ampulicomorpha nepalensis* n. sp. (fig. 2) (paratype from Bokaihunde, Nepal); *A. magna* Olmi (fig. 5) (paratype from Chishawasha, Zimbabwe); *A. collinsi* Olmi (fig. 8) (from Long Pa Sia, Sabah) and *Embolemus huberi* n. sp. (fig. 7) (holotype).

Genus *Embolemus* Westwood 1833

Embolemus huberi n. sp.

FEMALE: unknown.

DESCRIPTION OF THE MALE: fully winged; length 1.50 mm; head, mesosoma and gaster testaceous-brown; antennae testaceous; petiole and legs yellow; antennae filiform, not geniculate, not thickened distally, without rhinaria, articulated to prominent contiguous processes; antennal sockets very far from upper margin of clypeus; antennal segments in following proportions: 7-3-6.5-7-6-6-5.5-5.5-5-7; head shiny, smooth, without sculpture, with dorsal side swollen; occipital carina complete; ocelli distinct; POL = 2; OL = 2; OOL = 4; OPL = 2; TL = 4; frons with a track of median furrow near antennal sockets; eyes large, much shorter than head (5:12.5); pronotum very short; pronotal tubercles reaching tegulae; scutum, scutellum and metanotum shiny, smooth, without sculpture, finely covered with short hairs; notauli not visible; propodeum smooth, shiny, without sculpture, weakly rugose only near metanotum and distal apex; mesopleura and metapleura rugose; forewing hyaline, without dark transversal bands, with four cells fully enclosed by pigmented veins (CC, BC, SBC, 1DC); marginal cell open; distal part of radial vein slightly longer than proximal part (13:10); genitalia (fig. 7) with a long dorsal membranous process of parameres, the process with numerous short bristles distally; maxillary palpi with 3 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Holotype M: Iran, Tehran, in a pool at 18 Delauix Street, 4-6.VIII.1967, J.T. Huber coll. (OT).

ETYMOLOGY: the species is dedicated to Dr. John T. Huber, collector of the holotype.

REMARKS: *Embolemus huberi* n. sp. is very similar to the following new species *E. harteni*. For the differences see *E. harteni*.

Embolemus harteni n. sp.

FEMALE: unknown.

DESCRIPTION OF THE MALE: fully winged; length 1.56-2.25 mm (holotype 2.25 mm); head brown-testaceous or brown-black, with mandibles testaceous; antennae brown, with segment 2 testaceous; mesosoma brown-testaceous or brown-black; gaster and legs brown or brown-testaceous; antennae filiform, not geniculate, not thickened distally, without rhinaria, articulated to prominent and contiguous processes; antennal sockets very far from upper margin of clypeus; antennal segments in following proportions: 11-4-10-10.5-10-10-9-8.5-8-10; head shiny, smooth, hairy, without sculpture,

with dorsal side swollen; occipital carina complete; ocelli distinct; POL = 2; OL = 3; OOL = 4; OPL = 3; TL = 5; frons without tracks of median furrow between anterior ocellus and antennal sockets; eyes large, approximately 0.5 as long as head (7:15); frons between clypeus and antennal sockets with two incomplete longitudinal and median sutures, the sutures only visible in oral half or third of face; pronotum very short, rugose, not visible in dorsal view, hidden between head and scutum; pronotal tubercles reaching tegulae; scutum alutaceous or without sculpture, shiny, smooth, hairy, with track of a median longitudinal stria in the posterior half or third; notauli not visible; scutellum and metanotum shiny, smooth, without sculpture or alutaceous; propodeum smooth, shiny, without sculpture, with a few rugosities near metanotum; forewing hyaline, without dark transversal bands, with 3 cells enclosed by pigmented veins (CC, BC, SBC); marginal cell open; first discal (1DC) and first subdiscal cells (1SDC) not visible, not enclosed by pigmented veins; stigmal vein with distal part longer than proximal part (23:16); genitalia (fig. 9) with a dorsal membranous process of parameres, the process with papillae and bristles distally; maxillary palpi with 3 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Holotype M: Yemen, Sana'a, VIII.1991, Light trap, N. 428, A. Van Harten coll. (OL); 4 paratypes MM: same locality labels (OL); 17 paratypes MM: same locality labels, VII.1991, N. 377 (OL); 1 paratype M: same locality label, VII.1991, N. 377 (AL); 2 paratypes MM: same locality label, VII.1991, N. 377 (OT); 3 paratypes MM: same locality label, VII.1991, N. 377 (B); 1 paratype M: same locality label, VII.1991, N. 377 (LA); 1 paratype M: same locality label, VII.1991, N. 377 (LE).

ETYMOLOGY: the species is dedicated to Mr. Anthony van Harten, collector of the typical series.

REMARKS: *Embolemus harteni* n. sp. and the previous *E. huberi* n. sp. differ from other species of *Embolemus*, mainly by their fully smooth, shiny and without sculpture propodeum. In other species the propodeum is fully or mostly rugose. Another interesting characteristic of *E. harteni* concerns the 1DC and 1SDC cells: they are not visible, because not enclosed by pigmented veins. The forewing of *E. harteni,* thus, has only the usual CC, BC and SBC cells fully enclosed by pigmented veins. For this aspect (unusual in the Embolemidae, which usually show at least 1 DC cell fully enclosed by pigmented veins, besides the three basal cells) *E. harteni* is very close to the fossil genus *Baissobius* Rasnitsyn 1975 (Rasnitsyn, 1996). In *E. huberi*, on the contrary, the 1DC cell is regularly visible. For the palpal formula (3/2) *E. harteni* and *E. huberi* are near *E. africanus* (Risbec 1957). In the key to *Embolemus* published by Olmi (1995a), *E. harteni* and *E. huberi* can be inserted at couplet 1 (see the present key).

Embolemus pecki n. sp.

FEMALE: unknown.

DESCRIPTION OF THE MALE: fully winged; length 2.18-4.31 mm (holotype: 4.31 mm); head black or brown, with clypeus and mandibles testaceous; antennae testaceous or testaceous-brown; mesosoma fully testaceous-brown (in two small paratypes from Mt. Tachibanayama) or with prothorax and scutum brown, scutellum and metanotum testaceous-brown, propodeum black (in the holotype and a large paratype from Omogo Valley); gaster brown or testaceous; legs testaceous; antennae filiform, not geniculate, not thickened distally, without rhinaria, articulated to prominent contiguous processes; antennal sockets very far from the upper margin of the clypeus; antennal segments in following proportions: 10-3-32-31-30-28-26-25-23-24; head shiny, smooth, very finely punctate, without sculpture between punctures, covered with fine short hairs; dorsal side of head swollen; occipital carina complete; ocelli distinct; POL = 3; OL = 2.5; OOL = 7; OPL = 8; TL = 13; frons with a track of median furrow only visible in front of anterior ocellus and near antennal sockets; eyes large, much shorter than head (13:29); frons between clypeus and antennal sockets with two complete longitudinal and median sutures, the sutures much closer together at antennal sockets than at clypeus; pronotum very short, partly hidden behind the occiput, with a complete median longitudinal furrow; pronotal tubercles reaching tegulae; scutum and scutellum shiny, smooth, finely punctate, without sculpture between punctures, covered with fine short hairs; notauli incomplete, extending approximately 0.2 length of scutum; metanotum very short, medially rugose; propodeum rugose, dull, without longitudinal or transverse keels; mesopleura and metapleura shiny, smooth, without sculpture or finely punctate; forewing hyaline, without dark transverse bands, with four cells fully enclosed by pigmented veins (CC, BC, SBC, 1DC); marginal cell open; distal part of stigmal vein longer than proximal part (41:26); genitalia (figs. 10, 11, 12) with a proximal membranous process, the process with numerous papillae distally; maxillary palpi with 6 segments; labial palpi with 2-3 segments; tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Holotype M: Japan, Shikoku, Ishizuchi Mt. Nat. Park, Omogo Valley, 700 m, 21.VIII.1980, S. Peck coll. (OT); 1 paratype M, same label data (OT); 1 paratype M, Japan, Fukuoka, Mt. Tachibanayama, 12.VIII.1980, C.M. Yoshimoto coll. (OT); 1 paratype M, same label data (OL); 2 paratypes MM, Ryukyu Islands, Ishigaki Island, Kara-yama, 14.III.1964, C.M. Yoshimoto & J. Harrell (B); 1 paratype M, Taiwan, Tainan Hsien, Kwantzeling, 250 m, 6-7.IV.1965, C.M. Yoshimoto coll. (B); 1 paratype M, Taiwan, Arisan, 2130 m, 17.VIII.1947, J.L. Gressitt coll. (B); 1 paratype M, same label data (OL); 1 paratype M, Taiwan, Wushe, 1150 m, 13.IV.1983, H. Townes coll. (OT); 1 paratype M, same label locality data, IX.1983 (OT); 2 paratypes MM, Indonesia, Sula Islands, Mangole Island, near Buya, Malaise trap 9, 480 m, 12.X - 2.XI.1993, C. van Achterberg coll., RMNH 1993 (LE); 2 paratypes MM, same label locality data, Malaise trap 10, 480 m, 12.X - 2.XI.1993 (LE); 1

paratype M, same label data (OL); 2 paratypes MM, same label locality data, Malaise trap 11, 460 m, 12.X - 2.XI.19943 (LE); 2 paratypes MM, same label locality data, Malaise trap 12, 495 m, 12.X - 2.XI.1993 (LE); 1 paratype M, same label data (OL); 2 paratypes MM, same label locality data, Malaise trap 13, 465 m, 13.X - 2.XI.1993 (LE); 1 paratype M, same label data (OL); 2 paratypes MM, same label locality data, Malaise trap 14, 450 m, 13.X - 2.XI.1993 (LE); 1 paratype M, same label data (OL); 2 paratypes MM, same label locality data, Malaise trap 15, 445 m, 13.X - 2.XI.1993 (LE); 2 paratypes MM, same label locality data, Malaise trap 16, 450 m, 13.X - 2.XI.1993 (LE); 4 paratypes MM, same label locality data, Malaise trap 17, 440 m, 13.X - 2.XI.1993 (LE); 2 paratypes MM, same label data (OL); 4 paratypes MM, same label locality data, Malaise trap 18, 430 m, 13.X - 2.XI.1993 (LE).

ETYMOLOGY: the species is dedicated to Prof. Stewart B. Peck, collector of the holotype.

REMARKS: because of the presence of numerous papillae on distal apex of proximal membranous processes of parameres (figs. 10, 11, 12) *Embolemus pecki* n. sp. is a very characteristic species; the two male paratypes of *E. krombeini* Olmi 1995 from Mangole Island (Indonesia) designated by Olmi (1995a) and kept in LE are here attributed to *E. pecki* for the presence of papillae in proximal membranous processes of parameres; they were attributed to *E. krombeini* by mistake. In the key to the males of *Embolemus* proposed by Olmi (1995a), *E. pecki* can be inserted at couplet 3, near *E. angustipennis* (Kieffer 1912) and *E. nearcticus* (Brues 1922) (see the present key).

Embolemus sanbornei n. sp.

FEMALE: unknown.

DESCRIPTION OF THE MALE: fully winged; length 3.66 mm; head brown, with mandibles, clypeus and anterior region of face testaceous; antennae testaceous-darkened; mesosoma brown, with sides of pronotum testaceous; gaster brown; legs testaceous; antennae filiform, not geniculate, not thickened distally, without rhinaria, articulated to prominent contiguous processes; antennal sockets very far from upper margin of clypeus; antennal segments in following proportions: 12-3-18-17-16-16-16-15.5-14-16; head shiny, smooth, very finely punctate, without sculpture between punctures, covered with fine short hairs; dorsal side of head swollen; occipital carina complete; ocelli distinct; POL = 3; OL = 3; OOL = 6; OPL = 6; TL = 9; frons with a track of median furrow, only visible near antennal sockets; eyes large, much shorter than head (9:22); frons between clypeus and antennal sockets with two complete longitudinal and median sutures, the sutures much closer together at antennal sockets than at clypeus; pronotum crossed by a strong transverse impression, rugose, with a complete median longitudinal furrow; pronotal tubercles reaching tegulae; scutum dull, granulated and punctate, covered with fine short hairs; notauli very short, incomplete, exten-

ding approximately 0.2 length of scutum; scutellum shiny, punctate, without sculpture between punctures; metanotum very short, rugose; propodeum reticulate-rugose, dull, without longitudinal or transverse keels; mesopleura and metapleura dull, rugose; forewing weakly entirely darkened, with four cells fully enclosed by pigmented veins (CC, BC, SBC, 1DC); 1SDC cell open, only partly enclosed by pigmented veins; marginal cell open; distal part of stigmal vein longer than proximal part (25:13); genitalia (fig. 13) with a proximal membranous process, the process with numerous papillae distally; maxillary palpi with 6 segments; labial palpi with 3 segments; tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Holotype M: South Africa, Transvaal, Malta Forest, 20 km W of Trichardtsdal, 940 m, Malaise trap, 22-28.XII.1985, M. Sanborne coll. (OT).

ETYMOLOGY: the species is dedicated to Mr. M. Sanborne, collector of the holotype.

REMARKS: because of its short petiole, distivolsella with a series of teeth, proximal membranous process of parameres with papillae distally (Fig. 13), *Embolemus sanbornei* n. sp. is very similar to the previous *E. pecki* n. sp. The main differences between these two species concern the sculpture of the pleura and scutum: the mesopleura and metapleura are dull and rugose in *E. sanbornei*, shiny and without sculpture in *E. pecki*; the scutum is dull and granulated in *E. sanbornei*, shiny and finely punctate in *E. pecki*. In the key to the males of *Embolemus* proposed by Olmi (1995a), *E. sanbornei* can be inserted at couplet 3, near *E. angustipennis* (Kieffer 1912) and *E. nearcticus* (Brues 1922) (see the present key).

Embolemus capensis n. sp.

FEMALE: unknown.

DESCRIPTION OF THE MALE: fully winged; length 2.43 - 2.87 mm (holotype: 2.87 mm); head brown, with mandibles, clypeus and anterior region of face testaceous; antennae testaceous-darkened or brown; mesosoma brown, with prothorax testaceous; gaster brown; legs testaceous; antennae filiform, not geniculate, not thickened distally, without rhinaria, articulated to prominent contiguous processes; antennal sockets very far from upper margin of clypeus; antennal segments in following proportions: 13.5-4-13-13-13-12-11-11-10-13; head dull, granulated, covered with fine short hairs, with dorsal side swollen; occipital carina complete; ocelli distinct; POL = 2; OL = 2.5; OOL = 6; OPL = 5; TL = 6; frons with a track of a complete median furrow; eyes large, much shorter than head (8:20); frons between clypeus and antennal sockets with two complete longitudinal and median sutures, the sutures much closer together at antennal sockets than at clypeus; pronotum only partly visible, hidden behind the occiput, rugose, with a complete median longitudinal furrow; pronotal tubercles

reaching tegulae; scutum and scutellum dull, granulated, covered with fine short hairs; notauli very short, incomplete, extending approximately 0.2 length of scutum; metanotum very short, rugose; propodeum reticulate rugose, dull, with a strong transverse keel between dorsal and posterior surface; dorsal surface of propodeum with two median and longitudinal keels from anterior margin to posterior surface, the keels forming a basal rectangular areola near anterior margin; posterior surface of propodeum with two complete longitudinal keels; mesopleura and metapleura dull, granulated; forewing weakly entirely darkened, with four cells fully enclosed by pigmented veins (CC, BC, SBC, 1DC); 1SDC cell open, only partly enclosed by pigmented veins; marginal cell open; distal part of stigmal vein longer than proximal part (16:14); genitalia (fig. 14) with a proximal membranous very short process; maxillary palpi with 5 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Holotype M: South Africa, Cape Province, Knysna, Diepwalle, 6-30.XII.1981, S.B. Peck coll. (OT); 3 paratypes MM, same label data (OT); 1 paratype M, same label data (OL).

REMARKS: because of its short petiole, distivolsella with a series of teeth and a very short distal apex without teeth, proximal membranous process of parameres very short and with a few hairs on inner side (Fig. 14), *Embolemus capensis* n. sp. is very similar to *E. neotropicus* Olmi 1995; the main differences concern the sculpture of the pleura (mesopleura and metapleura dull and granulated in *E. capensis*, shiny and unsculptured in *E. neotropicus*) and the length of the dorsal membranous process of parameres (longer in *E. neotropicus* (fig. 30 B in Olmi, 1995a), very short in *E. capensis* (fig. 14)). In the key to the males of *Embolemus* proposed by Olmi (1995a), *E. capensis* can be inserted at couplet 7, near *E. neotropicus* (see the present key).

Embolemus bestelmeyeri n. sp.

DESCRIPTION OF THE FEMALE: brachypterous; length 1.56 mm; totally yellow-testaceous, with eyes brown; antennae geniculate, not distally thickened, without rhinaria; antennal segments in following proportions: 10.5-4-3.5-5-4-4.5-3.5-4-3.5-6; antennae shorter than body, articulated to two strong contiguous frontal processes; antennal sockets very far from upper margin of clypeus; head pyriform, shiny, alutaceous, smooth, with dorsal side flat, covered with fine short hairs; occipital carina complete; ocelli absent; frontal line absent; eyes very small, much shorter than head (3:16); frons between clypeus and antennal sockets with two convergent, incomplete longitudinal and median sutures, the sutures not visible near antennal sockets; pronotum shiny, alutaceous, covered with fine short hairs, crossed by a strong transversal impression; anterior collar of pronotum very short, hidden behind the occiput; disc long; pronotal tubercles reaching tegulae; posterior margin of pronotum curved (fig. 15); pronotum slightly longer than scutum (5:4); scutum shiny, alutaceous, covered with fine short hairs, as

broad as scutellum (5:5); notauli not visible; parapsidal lines present, but short; scutellum shiny, alutaceous, as broad as metanotum (5:5), twice as broad as long (5:2.5); metanotum shiny, alutaceous, transverse, distinctly developed, much shorter than scutellum (1:2.5); meso-metapleural suture complete; mesopleura and metapleura dull, rugose; metapleura fused with propodeum; propodeum shiny, with little prominent spiracles, without two lateral pointed apophyses; dorsal surface of propodeum separated from posterior surface by a transverse keel; dorsal surface of propodeum weakly rugose, shiny; posterior surface of propodeum rugose and transversely striate; forewing very reduced, approximately five times as long as tegulae (15:5); hind wings absent; petiole short; maxillary palpi with 3 segments; 3rd segment of maxillary palpi not very broad (fig. 16); labial palpi with 2 segments; tibial spurs 1, 2, 2.

MALE: unknown.

MATERIAL EXAMINED: Holotype F: Argentina, Salta, Chaco Occidental, Los Colorados, approximately 50 km NE of Joaquin V. Gonzales, MR 4-5, 4.III.1992, B. Bestelmeyer coll. (LA).

ETYMOLOGY: the species is dedicated to Mr. Brandon Bestelmeyer, collector of the holotype.

REMARKS: because of its brachypterism *E. bestelmeyeri* n. sp. is similar to the Australian species *E. notogeicus* Olmi 1995 and *E. zealandicus* Olmi 1995; because of the absence of notauli and the breadth of the scutellum (approximately twice as broad as long) *E. bestelmeyeri* is similar to *E. zealandicus*. In the key to the females of *Embolemus* proposed by Olmi (1995a), *E. bestelmeyeri* can be inserted at couplet 2, near *E. zealandicus* Olmi and *E. notogeicus* Olmi (see the present key).

Embolemus andersoni n. sp.

DESCRIPTION OF THE FEMALE: micropterous; length 2.12 mm; totally testaceous; antennae geniculate, not distally thickened, without rhinaria; antennal segments in following proportions: 14-4-5-6.5-6-6.5-6-6-6-10.5; antennae slightly shorter than body, articulated to two strong frontal contiguous processes; antennal sockets very far from upper margin of clypeus; head pyriform, shiny, covered with fine short hairs, alutaceous, with dorsal side flat; occipital carina complete; ocelli absent; frontal line absent; eyes very small, much shorter than head (2:21); frons between clypeus and antennal sockets with two convergent, median and longitudinal sutures, the sutures not visible near antennal sockets; pronotum shiny, alutaceous, covered with fine short hairs, crossed by a strong transversal impression; anterior collar of pronotum very short, hidden behind the occiput; disc long; pronotal tubercles reaching tegulae; posterior margin of pronotum weakly curved; pronotum much longer than scutum (11:4);

scutum shiny, alutaceous, covered with fine short hairs, broader than scutellum (6:4); notauli incomplete, extending approximately 0.4 length of scutum; parapsidal line invisible; scutellum rugose, dull, as broad as metanotum (4:4), four times as broad as long (4:1); metanotum very reduced, almost invisible, transverse; meso-metapleural suture complete; mesopleura and metapleura dull, rugose; metapleura fused with propodeum; propodeum shiny, with two prominent spiracles, with two lateral pointed apophyses; dorsal surface of propodeum shiny, weakly rugose, separated from posterior surface by a transversal keel; posterior surface of propodeum rugose and transversely striate; forewing very reduced, approximately as long as tegulae (3:3); hind wings absent; petiole short; maxillary palpi with 4 segments (fig. 17); labial palpi with 2 segments; tibial spurs 1, 2, 2.

MALE: unknown.

MATERIAL EXAMINED: Holotype F: Guatemala, El Progresso, 19,6 km N of Estancia La Virgen, Finca La Illuciones, 2000 m, cloud forest litter, 93-13, R. Anderson coll. (OT).

ETYMOLOGY: the species is dedicated to Mr. R. Anderson, collector of the holotype.

REMARKS: because of its palpal formula *E. andersoni* n. sp. is very similar to *E. ruddii* Westwood 1833; however, the two species have a different fourth segment of maxillary palpi (fig. 21 B in Olmi, 1995a; fig. 17). In the key to the females of *Embolemus* proposed by Olmi (1995a), *E. andersoni* can be inserted at couplet 4, near *E. ruddii* Westwood (see the present key).

REVISED KEY TO THE WORLD SPECIES OF *EMBOLEMUS* WESTWOOD

Females

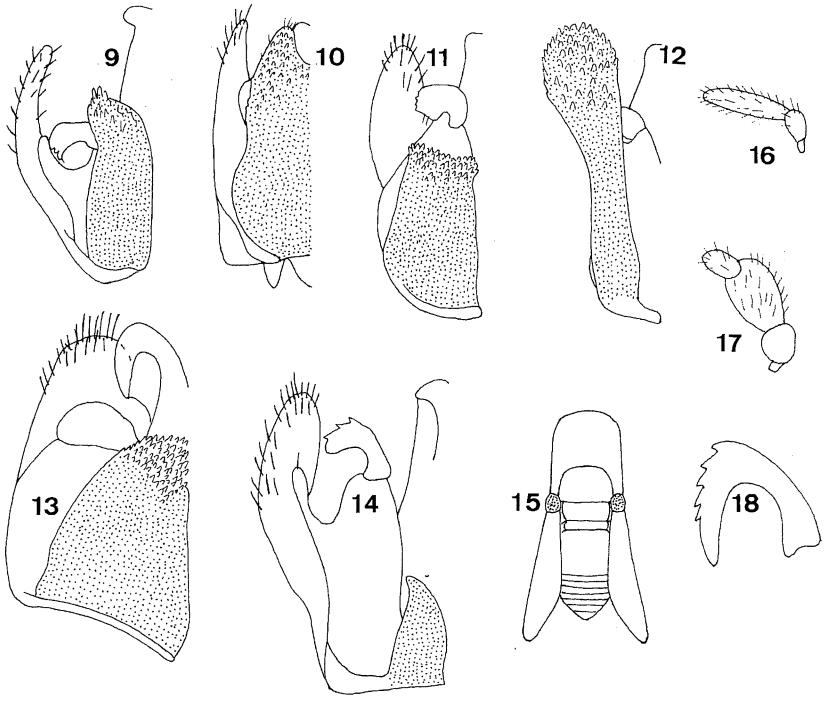
1 Forewing at least twice as long as tegulae (fig. 27 in Olmi, 1995a; fig. 15); metanotum distinctly developed (fig. 27 in Olmi, 1995a; fig. 15) 2
– Forewing shorter, approximately as long as tegulae (fig. 5 in Olmi, 1995a); metanotum less developed, invisible or hardly visible (fig. 5 in Olmi, 1995a) 4
2 Metanotum as broad as scutellum (fig. 15); 3rd segment of maxillary palpi less broad (fig. 16); palpal formula 3/2 ..... *bestelmeyeri* n. sp. (Neotropic)
– Metanotum broader than scutellum (fig. 27 in Olmi 1995a); 3rd segment of maxillary palpi broader (fig. 28 C in Olmi, 1995a); palpal formula 4/2, 5/2 or 6/2 3
3 Palpal formula 5/2 or 6/2; notauli at least partly visible (fig. 27 in Olmi, 1995a); scutellum approximately as long as broad; hind wings absent ..... *zealandicus* Olmi (Australian)
– Palpal formula 4/2; notauli absent; scutellum approximately twice as broad as long; hind wings present and reduced ..... *notogeicus* Olmi (Australian)

4 Eyes very small, less than 0.20 as long as head 5
– Eyes larger, 0.20 or more than 0.20 as long as head 7
5 Palpal formula 5/2 ..... *angustipennis* (Kieffer) (Neotropic)
– Palpal formula 4/2 6
6 Fourth segment of the maxillary palpi very slender (fig. 21 B in Olmi, 1995a) ..... *ruddii* Westwood (Palaearctic)
– Fourth segment of the maxillary palpi less slender (fig. 17).... *andersoni* n. sp. (Neotropic)
7 Eyes approximately 0.25 as long as head; palpal formula 4/2 *nearcticus* (Brues) (Nearctic)
– Eyes approximately 0.20 as long as head 8
8 Segment 1 of fore tarsi longer (segment 2 approximately 0.30 as long as segment 1) ..... *africanus* (Risbec) (Ethiopian)
– Segment 1 of fore tarsi shorter (segment 2 approximately 0.38 as long as segment 1) ..... *krombeini* Olmi (Oriental)

Males

1 Propodeum fully smooth, shiny and without sculpture (at the most only a small area near anterior margin is rugose) 2
– Propodeum dull, more or less rugose 3
2 Dorsal process of parameres with papillae and bristles distally (fig. 9); forewing with 1DC cell invisible ..... *harteni* n. sp. (Yemen)
– Dorsal process of parameres only with bristles, without papillae (fig. 7); forewing with 1DC cell visible ..... *huberi* n. sp. (Iran)
3 Petiole very long, longer than hind trochanters (fig. 26 in Olmi, 1995a); distivolsellæ without a series of teeth (fig. 29 C in Olmi, 1995a) ..... *subtilis* Olmi (Neotropic)
– Petiole short, much shorter than hind trochanters (fig. 25 in Olmi, 1995a); distivolsella with a series of teeth (figs. 23 A, B, C, and 29 A, B, D in Olmi, 1995a) 4
4 Proximal membranous process of parameres with distal apex densely hairy (figs. 29 A, B in Olmi, 1995a) or with papillae (figs 10, 11, 12, 13) distally 5
– Proximal membranous process of parameres with hairless distal apex (figs. 23 A, B; 29 D; 30 A, B, in Olmi, 1995a) or with a few hairs on the inner side (fig. 23 C in Olmi, 1995a) 8
5 Proximal membranous process of parameres with papillae distally (figs. 10, 11, 12, 13). 6
– Proximal membranous process of parameres with a densely hairy distal apex (figs. 29 A, B in Olmi, 1995a), without papillae 7
6 Mesopleura and metapleura shiny, smooth and without sculpture; scutum shiny, finely punctate, without sculpture between punctures ..... *pecki* n. sp. (Japan, Taiwan)
– Mesopleura and metapleura dull, rugose; scutum dull, granulated ..... *sanbornei* n. sp. (Ethiopian)
7 Distivolsella with a very long distal apex without teeth (fig. 18) ..... *angustipennis* (Kieffer) (Neotropic)
– Distivolsella with a very short distal apex without teeth (fig. 29 A, in Olmi, 1995a) ..... *nearcticus* (Brues) (Nearctic, Neotropic)
8 Distivolsella with a very long distal apex without teeth (fig. 29 D and 30 C in Olmi, 1995a) 9
– Distivolsella with a very short distal apex without teeth (fig. 23 A; 30 A, B, in Olmi, 1995a) 10

9 Head with TL slightly longer than OPL; stigmal vein with distal part slightly longer than proximal part. ..... *notogeicus* Olmi (Australian)
– Head with TL approximately 1.5 times as long as OPL; stigmal vein with distal part almost twice as long as proximal part ..... *zealandicus* Olmi (Australian)
10 Proximal membranous process of parameres with distal inner side with a few hairs (fig. 23 C in Olmi, 1995a)..... *krombeini* Olmi (Oriental)
– Proximal membranous process of the parameres with hairless distal apex (figs. 23 A, B; 30 A, B, in Olmi, 1995a; fig. 14) 11
11 Proximal membranous process of parameres very short (fig. 30 B in Olmi, 1995a)..... 12
– Proximal membranous process of parameres long (figs. 23 A, B; 30 A in Olmi, 1995a) 13
12 Proximal membranous process of parameres longer (fig. 30 B in Olmi, 1995a); mesopleura and metapleura shiny, without sculpture ..... *neotropicus* Olmi (Neotropic)
– Proximal membranous process of parameres very short (fig. 14); mesopleura and metapleura dull, granulated..... *capensis* n. sp. (Ethiopian)



Figs. 9-18 - Genitalia (left half) of males of *Embolemus harteni* n. sp. (fig. 9) (paratype from Sana'a, Yemen); *pecki* n. sp. (fig. 10: paratype from Mt. Tachibanayama, Japan; figs. 11-12: paratypes from Wushe, Taiwan); *sanbornei* n. sp. (fig. 13) (holotype) and *capensis* n. sp. (fig. 14) (holotype). - Mesosoma (in dorsal view) of female holotype of *Embolemus bestelmeyeri* n. sp. (fig. 15). - Maxillary palpi of female holotypes of *Embolemus bestelmeyeri* n. sp. (fig. 16) and *andersoni* n. sp. (fig. 17). - Male distivolsella (fig. 18) of *Embolemus angustipennis* (Kieffer) (from Pucará, Argentina).

13 Distal region of proximal membranous process of parameres with a number of scales (fig. 30 A, in Olmi, 1995a) ..... *stangei* Olmi (Neotropic)
– Distal region of proximal membranous process of parameres without scales (figs. 23 A, B in Olmi, 1995a) 14
14 Dorsal membranous process of parameres very near parameres (fig. 23 A in Olmi, 1995a) ..... *ruddii* Westwood (Palaearctic)
– Dorsal membranous process of parameres very far from the parameres (fig. 23 B in Olmi, 1995a) ..... *africanus* (Risbec) (Ethiopian)

Family DRYINIDAE

Genus *Dryinus* Latreille 1804

Dryinus fullertoni n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 4.37-5.62 mm (holotype: 4.37 mm); testaceous-reddish, with petiole black, gaster brown and antennal segments 6-10 darkened; antenne clavate, with rhinaria visible in segments 6-10; antennal segments in following proportions: 19-7-33-14-12-11-9-7.5-6.5-10; head weakly excavated, dull, granulated and weakly rugose; frontal line complete; occipital carina incomplete, only visible near posterior ocelli, laterally not reaching eyes; POL = 2; OL = 3; OOL = 11; posterior ocelli touching occipital carina; temples short, but distinct; pronotum dull, granulated, weakly humped, crossed by an anterior and a posterior transverse impression; posterior collar of pronotum very short; pronotal tubercles not reaching tegulae; scutum dull, granulated and weakly rugose; notauli apparently present, complete and posteriorly separated, but hardly visible among the rugosities; scutellum dull, granulated, very slightly rugose; metanotum rugose; propodeum dull, with dorsal surface sculptured by many parallel longitudinal keels; posterior surface of propodeum rugose, with two longitudinal keels; median area as rugose as lateral areas; forewing with three dark transverse bands; marginal cell open; distal part of stigmal vein longer than proximal part (14:9); fore tarsal segments in following proportions: 28-4-7-18-27; enlarged claw (Fig. 19) with two subapical teeth and a row of 8 lamellae; segment 5 of front tarsus (Fig. 19) with two rows of approximately 32 lamellae; distal apex with a group of at least 25 lamellae; tibial spurs 1, 1, 2.

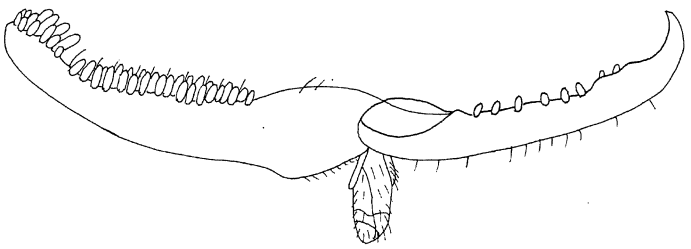


Fig. 19 - Chela of *Dryinus fullertoni* n. sp. (holotype).

MALE: unknown.

MATERIAL EXAMINED: Holotype F: U.S.A., Florida, Orange Co., Orlando, University of Central Florida (UCF) Campus, Malaise trap, Long Leaf Pine - Sand Pine, 3.VIII.1993, S.M. Fullerton coll. (DE); 1 paratype F, same label data, Sand Pine - Rosemary Scrub, 19.X. 1992, (OL); 1 paratype F, same label data, Long Leaf Pine - Sand Pine, Turkey Oak, 15.III.1993 (OL); 1 paratype F, same label data, Sand Pine - Rosemary Scrub, 18.IX.1992 (OL); 1 paratype F, same label data, Sand Pine - Rosemary Scrub, 13.III.1992 (WA); 1 paratype F, same label data, Sand Pine - Rosemary Scrub, 11.IV.1993 (DE); 1 paratype F, same label data, Long Leaf Pine - Saw Palmetto, 28.IX.1991 (FU).

ETYMOLOGY: the species is dedicated to Mr. Stuart M. Fullerton, collector of the type series.

REMARKS: in his proposal of a new generic classification for Thaumatodryininae and Dryininae, Olmi (1993) unified these two subfamilies and reduced the number of genera of Dryininae to five (*Dryinus* Latreille 1804; *Thaumatodryinus* Perkins 1905; *Megadryinus* Richards 1953; *Gonadryinus* Olmi 1989; *Pseudodryinus* Olmi 1989). Only *Dryinus* and *Thaumatodryinus* are present in the Nearctic region (Olmi, 1984, 1989). The main differences between these two genera concern the female antennae (with tufts of long hairs in *Thaumatodryinus*, without tufts in *Dryinus*) and the number of male mandible teeth (3 in *Dryinus*, 4 in *Thaumatodryinus*) (Olmi, 1993). Because of its morphological characteristics *Dryinus fullertoni* n. sp. belongs to the genus *Dryinus* Latreille.

According to the new classification of Olmi (1993), the genus *Dryinus* is the result of the synonymy of some classic old genera (*Chelothelius* Reinhard 1863, *Mesodryinus* Kieffer 1906, *Perodryinus* Perkins 1907, *Tridryinus* Kieffer 1913, *Bocchoides* Benoit 1953, *Alphadryinus* Olmi 1984). These genera, in fact, were recognizable only on the basis of female specimens, whereas the males did not exhibit differences of generic value.

Whereas the key to the males of the Nearctic *Dryinus* leads directly to the species (Olmi, 1995b), for convenience the key to the females is based initially on species groups corresponding to the old classic genera above. For the Nearctic females the following key is proposed:

1 Enlarged claw very reduced, as long as or slightly longer than arolium (fig. 707 in Olmi, 1984) ..... 4. *Dryinus amoenus* (Perkins) group (formerly *Perodryinus* Perkins)

– Enlarged claw much longer than arolium, not reduced (Fig. 19) 2

2 Enlarged claw without subapical tooth (fig. 694 in Olmi, 1984), or with at least 2 subapical teeth (fig. 19); rarely with one subapical tooth, but in this case with a very broad apical lamella (fig. 697 in Olmi, 1984)..... 3. *Dryinus inconsultus* (Olmi) group (formerly *Mesodryinus* Kieffer)

– Enlarged claw with 1 subapical tooth, never with a broad apical lamella (fig. 556 in Olmi, 1984)..... 3
3 Notauli at least partly visible..... 1. *Dryinus mexicanus* (Perkins) group (formerly *Dryinus* Latreille)
– Notauli not visible..... 2. *Dryinus serratus* (Olmi) group (formerly *Tridryinus* Kieffer)

Because of its morphological characteristics *Dryinus fullertoni* n. sp. belongs, according to the above key, to *Dryinus inconsultus* (Olmi) group. Because of its incomplete occipital carina, rugose scutum, the presence of 2 teeth in the enlarged claw (Fig. 19), *D. fullertoni* is similar to *D. favreauae* (Olmi). It differs mainly for the mesosoma colour (black in *D. favreauae,* testaceous-reddish in *D. fullertoni*) and the length of the occipital carina (longer in *D. favreauae*). *D. fullertoni* can be inserted in the key to the females of the Nearctic species of this group proposed by Olmi (1989) as follows:

1 Occipital carina complete..... 5. *californicus* (Olmi)
– Occipital carina incomplete..... 2
2 Scutum granulated, not reticulate-rugose..... 3. *solaris* (Olmi)
– Scutum totally reticulate-rugose (strongly or hardly)..... 3
3 Enlarged claw with 2 subapical teeth (fig. 698 in Olmi, 1984; fig. 19)..... 4
– Enlarged claw without subapical teeth (figs. 694, 696 in Olmi, 1984)..... 5
4 Occipital carina laterally almost reaching the posterior edges of the eyes; mesosoma black .....4. *favreauae* (Olmi)
– Occipital carina laterally reaching approximately 0.5 length of OOL; mesosoma testaceous-reddish..... 6. *fullertoni* n. sp.
5 Marginal cell broad (fig. 695 A in Olmi, 1984)..... 2. *dorsalis* (Olmi)
– Marginal cell narrow (fig. 695 B in Olmi, 1984)..... 1. *inconsultus* (Olmi)

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