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Description of two new species of *Ampulicomorpha* (Hymenoptera Embolemidae)

Abstract - *Ampulicomorpha madecassa* n. sp. from Madagascar and *A. costaricana* n. sp. from Costa Rica are described. A new key to the world species of the genus *Ampulicomorpha* Ashmead 1893 is given.

Riassunto - *Descrizione di due nuove specie di* Ampulicomorpha *(Hymenoptera Embolemidae).*

Vengono descritte due nuove specie del genere *Ampulicomorpha* Ashmead 1893. Si tratta di *A. madecassa*, del Madagascar (Provincia di Tamatave) e di *A. costaricana*, di Costa Rica (Province di S. José e Puntarenas). A seguito della descrizione di queste due specie viene proposta una nuova versione della chiave dicotomica delle specie mondiali di *Ampulicomorpha.*

Key words: Taxonomy, new species, *Ampulicomorpha madecassa, Ampulicomorpha costaricana.*

The genus *Ampulicomorpha* Ashmead 1893 (Hymenoptera Embolemidae) is composed of species parasitoids of Homoptera Achilidae living beneath loose bark of rotting logs (Olmi, 1995a). According to the revisions of Olmi (1994, 1995a, 1997, 1998) and after more recent researches of the author, the genus is worldwide distributed and composed of the following species:

1) *hachijoensis* (Hirashima & Yamagishi)(Russia, Japan);
2) *nepalensis* Olmi (Nepal);
3) *magna* Olmi (Zambia, Zimbabwe, South Africa);
4) *pecki* Olmi (South Africa);
5) *collinsi* Olmi (Indonesia, Malaysia, Philippines);
6) *taiwanensis* Olmi (Taiwan, Malaysia);
7) *confusa* Ashmead (Canada, U.S.A.);
8) *schajovskoyi* De Santis & Vidal Sarmiento (Argentina);
9) *wilkersoni* Olmi (Colombia);
10) *gilli* Olmi (Venezuela);

11) *suavis* Olmi (Costa Rica);
12) *australis* Olmi (Australia, Sula Islands);
13) *gressitti* Olmi (New Guinea).

A further fossil species is known from Baltic amber: *Ampulicomorpha succinalis* Brues (Olmi, 1995b).

In the above list there are the following new records:
1) *A. taiwanensis* Olmi: Malaysia (Sarawak, SW Gunung Buda, 64 Km S Limbang, 04°13'N 114°56'E); specimens in the collections of the author and the Department of Entomology, University of California, Davis (U.S.A.).
2) *A. australis* Olmi: Sula Islands (Mangole Island, near Buya); specimens in the collections of the author and the Natural History Museum of Leiden (The Netherlands).

In addition, after the description of *A. taiwanensis* I examined again the specimens of *A. hachijoensis* (Hirashima & Yamagishi) previously recorded from Taiwan (Olmi, 1995a). They have now to be considered as *A. taiwanensis*. For this reason, *A. hachijoensis* is only listed here from Japan and Russia.

Recently I examined two small collections of Embolemids kept in the Natural History Museum of London, England, and in the Department of Entomology, University of California, Davis, and I recognized two new species of *Ampulicomorpha* described as follows.

MATERIALS AND METHODS

This paper is based on the study of specimens kept in the following collections:
BM: The Natural History Museum, London, England.
DA: Department of Entomology, University of California, Davis.

The new species were compared with the type specimens of all the known species of *Ampulicomorpha*. The collections where the types are deposited are listed in the previous revisions of Olmi (1995a, 1997, 1998).

The terminology is that of Olmi (1994, 1995a). Particularly, I remember the following abbreviations: POL = distance between the inner edges of the two lateral ocelli; OL = distance between the inner edges of a lateral ocellus and the median ocellus; OOL = distance from the outer edge of a lateral ocellus to the compound eye; OPL = distance from the posterior edge of a lateral ocellus to the occipital carina; TL = distance from the posterior edge of an eye to the occipital carina.

SYSTEMATIC ACCOUNT

Ampulicomorpha madecassa n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 5,62-6,00 mm; head brown, with clypeus and mandibles lighter; mouthparts testaceous; antennae brown; mesosoma brown; gaster brown or brown-testaceous; legs testaceous-brown; antennae not distally

thickened, without rhinaria; antennal segments in the following proportions: 39-10-19-19-17-16-16-16-14-19; antennae shorter than the body, articulated to two strong frontal processes; antennal toruli very far from the upper margin of the clypeus; head pyriform, dull,granulated covered with short hairs; occipital carina complete; ocelli distinct; POL = 4; OL = 5; OOL = 14; OPL = 7; TL = 20; eyes very small, approximately 0,3 as long as head (10:35); region of frons from clypeus to antennal toruli with two longitudinal and median sutures very convergent; these sutures are complete or almost complete and much nearer at the antennal toruli than at the clypeus; region from anterior ocellus to frontal processes flat, with a frontal line complete or incomplete; pronotum dull, granulated, covered with short hairs, with a strong complete median longitudinal furrow; posterior surface of pronotum shorter than scutum (13:28); pronotal tuberlces reaching the tegulae; scutum dull, granulated, covered with short hairs; notauli very short, incomplete, hardly visible near the anterior margin of the scutum; they are approximately 0,20 length of scutum; parapsidal furrows distinct; scutellum dull, granulated, covered with short fine hairs; metanotum very reduced, short, transverse, without sculpture; mesopleura and metapleura dull,granulated; meso-metapleural suture complete; propodeum reticulate-rugose, with a strong transversal keel between dorsal and posterior surface; dorsal surface of propodeum reticulate rugose, with two median longitudinal subparallel keels beginning at the anterior margin of the propodeum, where a rectangular basal areola is visible (as in fig. 1); posterior surface of propodeum reticulate rugose, without longitudinal keels; forewing completely darkened, with marginal cell (= radial cell) open; distal part of stigmal vein (= radial vein) longer than proximal part (27:19); 1SDC cell almost fully enclosed by pigmented veins; 1DC cell fully enclosed by pigmented veins; hind wing fully developed, hyaline; petiole much shorter than gaster (4:93) and slightly shorter than hind trochanter (4:7); maxillary palpi with 5 segments; labial palpi with 2 segments; third segment of the maxillary palpi broadened; tibial spurs 1, 2, 2.

DESCRIPTION OF THE MALE: fully winged; length 3,75-4,56 mm (holotype 4,56 mm); head brown, with clypeus and mandibles lighter and mouthparts testaceous; antennae testaceous; mesosoma black; gaster brown; legs testaceous, with hind clubs of femora and hind tibiae darkened; antennae not distally thickened; antennal segments in the following proportions: 20-5-23-22-21-21-18-17-17-20; head dull, granulated, convex, covered with fine short hairs; occipital carina complete; frontal line absent; POL = 3; OL = 3; OOL = 8; OPL = 8; TL = 11; region from anterior ocellus to frontal processes with a short median furrow located near the antennal toruli; region of face from clypeus to the antennal toruli with two median longitudinal sutures very convergent; they are nearer at the antennal toruli than at clypeus; eyes small, shorter than the head (13:28); pronotum dull, granulated, covered with fine short hairs, with a complete median longitudinal furrow; pronotum very short, much shorter than scutum (10:24); scutum dull, granulated; notauli incomplete, very short and hardly visible near the anterior margin of the scutum; they are approximately 0,20 length of scutum; scutellum dull, granulated; metanotum very short, transverse, without sculpture; propodeum dull,

reticulate rugose, with a strong transverse keel between dorsal and posterior surface; dorsal surface of propodeum with two subparallel median longitudinal keels forming a basal rectangular areola (Fig. 1); posterior surface of propodeum reticulate rugose, without longitudinal keels; forewing completely darkened; marginal cell open; distal part of stigmal vein as long as proximal part (26:26); 1Dc and 1SDC cells fully enclosed by pigmented veins; petiole very short, much shorter than gaster (2:72) and hind trochanter (2:10); dorsal membranous process of the parameres shorter than the volsellae (Fig. 5); maxillary palpi with 5 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

MATERIAL EXAMINED: Male holotype, Madagascar, Tamatave Prov., 6.9 Km NE Ambanizana, Ambohitsitondroina, 15°34'S 50°00'E, 750 m, 2-9.XII.1993, Malaise trap, 973, B. Fisher coll. (DA); 1 female paratype, same locality label (DA); 1 female paratype, same locality label (in the author's collection); 1 male paratype, same locality label (in the author's collection).

REMARKS: because of the pronotum with a complete median furrow, the palpal formula 5/2, OOL twice as long as OPL, the dorsal surface of propodeum with two strong median subparallel longitudinal keels and with a basal rectangular areola (as in Fig. 1), the female of *A. madecassa* is similar to that of *A. hachijoensis* (Hirashima & Yamagishi). However, in *A. madecassa* the forewing is completely darkened, whereas in *A. hachijoensis* it is completely hyaline.
About the male, because of the petiole shorter than hind trochanter, the palpal formula 5/2, the head brown, the pronotum completely visible in dorsal view, the dorsal surface of propodeum with two median subparallel and longitudinal keels (Fig. 1), the dorsal process of the parameres shorter than the volsellae (Fig. 5), the male of *A. madecassa* is similar to that of *A. costaricana*. However, in *A. costaricana* the basal areola of the dorsal surface of the propodeum is trapezoid (Fig. 3), whereas in *A. madecassa* it is rectangular (Fig. 1).

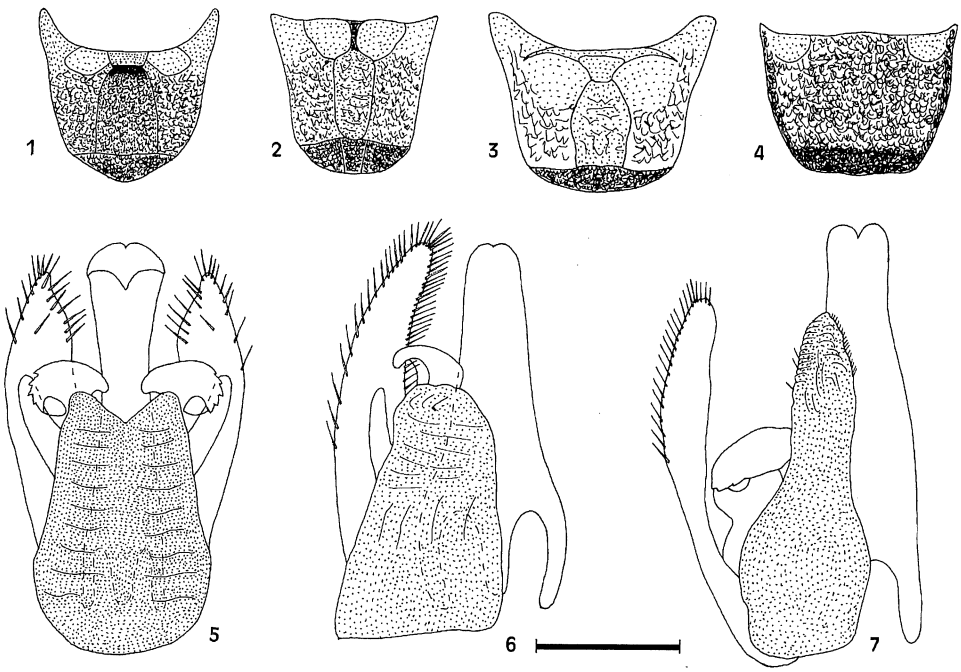
Ampulicomorpha costaricana n. sp.

DESCRIPTION OF THE FEMALE: fully winged; length 4,50 mm; head brown - black, with palpi testaceous; antennae brown, with distal apex of segment 10 testaceous; mesosoma brown-black; gaster brown, with 2 lateral testaceous spots located on the sides of the second tergite near the posterior margin of this tergite; legs brown; antennae geniculate, not distally thickened, articulated to two conical frontal contiguous processes; antennal segments in the following proportions: 33-9-13,5-15-14-14-13-13-12-17; antennae without rhinaria; head pyriform, shiny, smooth, alutaceous, finely covered with short hairs; occipital carina complete; genal carina complete; POL = 3,5; OL = 4,5; OOL = 11; OPL = 3; TL = 14; frontal line absent; frons near the conical processes with an incomplete median longitudinal furrow; frons between clypeus and the conical

processes with two convergent longitudinal and median sutures, the sutures much closer together at antennal toruli than at clypeus; clypeus with margins rounded; subocular sulcus absent; eyes small; head more than twice as long as eyes (31:9); pronotum dull, granulated, covered with fine short hairs, crossed by a strong transverse impression, with anterior collar hardly visible, because partly hidden behind the occiput; posterior surface of pronotum shorter than scutum (9:21), flat, with a complete strong median longitudinal furrow; pronotal tubercles reaching the tegulae; scutum dull, covered with fine short hairs, granulated; notauli incomplete, reaching approximately 0,3 length of scutum; scutellum and metanotum dull, granulated; scutellum covered with fine short hairs; metanotum hairless; propodeum with a transverse keel between dorsal and posterior surface; dorsal surface of propodeum shiny, rugose, with 2 median parallel and longitudinal keels; these two keels join near the anterior margin of propodeum and form only one keel (Fig. 2); on the sides of this only keel there are 2 large oval, shiny and smooth areolae (Fig. 2); posterior surface of propodeum dull and completely reticulate rugose, without longitudinal keels; mesopleura and metapleura shiny, smooth, without sculpture, covered with fine short hairs; forewing totally darkened, 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 longer than proximal part (26:19); petiole short, much shorter than gaster (4:80), slightly shorter than hind trochanter; maxillary palpi with 5 segments; labial palpi with 2 segments; tibial spurs 1, 2, 2.

DESCRIPTION OF THE MALE: fully winged; length 4,62 mm; head black, with palpi testaceous; antennae brown; mesosoma black; gaster brown-testaceous, with 2 lateral testaceous spots located on the sides of the second tergite near the posterior margin of this tergite; legs brown-testaceous; antennae not distally thickened, articulated to two conical frontal contiguous processes; antennal segments in the following proportions: 20-6-20-16-16-15-14-14-12-16; antennae without rhinaria; head convex, dull, completely granulated,finely covered with short hairs; occipital carina complete; genal carina complete; POL = 4,5; OL = 3; OOL = 7; OPL = 8; TL = 11; a track of frontal line is visible from anterior ocellus to the antennal toruli; frons near the conical processes with an incomplete median longitudinal furrow; frons between clypeus and the conical processes with two convergent longitudinal and median sutures, the sutures much closer together at antennal toruli than at clypeus; clypeus with margins rounded; subocular sulcus absent; eyes small; head rounded, less than twice as long as eyes (29:17); pronotum dull, granulated, covered with fine short hairs, crossed by a strong transverse impression, with anterior collar hardly visible, because partly hidden behind the occiput; posterior surface of pronotum shorter than scutum (17:31), flat, with a complete strong median longitudinal furrow; pronotal tubercles reaching the tegulae; scutum dull, covered with fine short hairs, granulated; notauli incomplete, reaching approximately 0,2 length of scutum; scutellum dull, granulated, covered with fine hairs; metanotum hairless, shiny, smooth, without sculpture, except for a small rugose central area; propodeum with a transverse keel between dorsal and posterior surface; dorsal

surface of propodeum shiny, rugose, with 2 strong median parallel and longitudinal keels (Fig. 3); these two keels join near the anterior margin of propodeum and form a basal trapezoid area (Fig. 3); on the sides of this trapezoid area there are 2 large oval, shiny and smooth areolae; posterior surface of propodeum dull and completely reticulate rugose, with 2 complete longitudinal keels; mesopleura and metapleura shiny, smooth, finely granulated, covered with fine short hairs; forewing totally darkened, with a darker area on the marginal cell, with 5 cells fully enclosed by pigmented veins (CC, BC, SBC, 1DC; 1SDC); 1 DC and 1SDC cell enclosed by less pigmented veins; marginal cell open; distal part of stigmal vein slightly shorter than proximal part (21:22); petiole short, much shorter than gaster (8:76), slightly shorter than hind trochanter (8:9); dorsal membranous process of the parameres shorter than the volsellae (Fig. 6); maxillary palpi with 6 segments; labial palpi with 3 segments; tibial spurs 1, 2, 2.



Figs. 1-7: Propodeum in dorsal view of *Ampulicomorpha madecassa* n. sp. (fig. 1: male paratype), *A. costaricana* n. sp. (fig. 2: female paratype; fig. 3: male holotype) and *A. confusa* Ashmead (fig. 4: male specimen from Latimer, Oklahoma, U.S.A.); male genitalia of *Ampulicomorpha madecassa* n. sp. (fig. 5: holotype), *A. costaricana* n. sp. (fig. 6: holotype; left half) and *A. confusa* Ashmead (fig. 7: specimen from Latimer, Oklahoma, U.S.A.; left half). Scale bar = 0.94 mm (Figs. 1-4); 0.18 mm (Figs. 5-7).

MATERIAL EXAMINED: Male holotype, Costa Rica, Puntarenas Prov., Monteverde, 5-8.V.1972, H.M. Powell coll. (DA); 1 female paratype, Costa Rica, San José Prov., Zurquí de Moravia, 1600 m, VII.1991, Paul Hanson coll. (BM).

REMARKS: because of the complete median longitudinal furrow of pronotum, the palpal formula 5/2, OOL more than twice as long as OPL, the dorsal surface of propodeum with two strong median and parallel longitudinal keels, the female of *A. costaricana* is similar to those of *A. magna* Olmi, 1995, *hachijoensis* (Hirashima & Yamagishi, 1975) and *nepalensis* Olmi, 1997. From these species *A. costaricana* may be distinguished for the absence of a basal areola; this areola is substituted by a short longitudinal keel (Fig. 2).

Because of the petiole shorter than hind trochanter, the head black and the pronotum completely visible in dorsal view, the male of *A. costaricana* is similar to that of *A. confusa* Ashmead, 1893. From this species *A. costaricana* may be distinguished for the presence on the dorsal surface of propodeum of two strong median and parallel longitudinal keels (Fig. 3) and for a shorter dorsal process of the parameres (Fig. 6).

After the descriptions of *A. costaricana* and *A. madecassa*, the keys to the world species of *Ampulicomorpha* can be modified as follows.

REVISED KEY TO THE WORLD SPECIES OF *AMPULICOMORPHA* ASHMEAD

Females

1 Pronotum with an incomplete median longitudinal furrow (Fig. 9 by Olmi, 1995a); palpal formula 5/2 2
– Pronotum with a complete median longitudinal furrow (Fig. 10 by Olmi, 1995a); palpal formula 4/2, 5/2 or 6/3 3
2 Posterior surface of propodeum with two complete and strong longitudinal keels..... ..... *collinsi* Olmi
– Posterior surface of propodeum without two complete and strong longitudinal keels .... *gressitti* Olmi
3 Ocelli very far from the occipital carina; OOL as long as, or slightly shorter than OPL (Fig. 1 by Olmi, 1995a); labial palpi 3-segmented 4
– Ocelli very near the occipital carina; OOL almost twice or more than twice as long as OPL (Fig. 11 by Olmi, 1995a); labial palpi 2-segmented 6
4 Petiole very long, longer than hind trochanters (Fig. 12 by 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
– Petiole very short, as long as, or shorter than hind trochanters (Fig. 2 by Olmi, 1995a); posterior surface of propodeum with no longitudinal keels (at most with two oblique and subtransversal keels) and sculptured by very small areolae; areolae much smaller than 1DC cell. 5
5 Dorsal surface of propodeum without longitudinal keels (Fig. 1 by Olmi, 1995a); petiole much shorter than hind trochanters ..... *confusa* Ashmead

– Dorsal surface of propodeum with two subparallel median longitudinal keels forming a basal areola (Fig. 6 by Olmi, 1997); petiole as long as, or slightly shorter than hind trochanters.. ..... *suavis* Olmi
6 Palpal formula 4/2..... *pecki* Olmi
– Palpal formula 5/2 7
7 Dorsal surface of propodeum with two tracks of median longitudinal keels..... 8
– Dorsal surface of propodeum with two distinct median longitudinal keels converging near the metanotum, where they form or not a basal areola (Figs. 13, 14 by Olmi, 1995a)..... 9
8 Dorsal surface of propodeum smooth, without sculpture, except for two basal areolae surrounded by keels and two tracks of longitudinal keels; scutellum shiny, without sculpture ..... *gilli* Olmi
– Dorsal surface of propodeum rugose, not smooth; scutellum dull, granulated .... *taiwanensis* Olmi
9 Dorsal surface of propodeum with two median longitudinal keels not forming proximally a basal areola; proximally they join forming only one keel (Fig. 2)..... *costaricana* Olmi
– Dorsal surface of propodeum with two median longitudinal keels proximally forming a basal areola (Figs. 13, 14 by Olmi,1995a)..... 10
10 Dorsal surface of propodeum with two median longitudinal keels quite converging near the metanotum and forming a basal square shaped areola (Fig. 13 by Olmi, 1995a) *magna* Olmi
– Dorsal surface of propodeum with two median longitudinal keels more (Fig. 1 by Olmi, 1997) or less (Fig. 14 by Olmi, 1995a) converging near the metanotum and forming a rectangular (Fig. 14 by Olmi, 1995a) or trapezoid (Fig. 1 by Olmi, 1997) basal areola.. 11
11 Dorsal surface of propodeum with two median longitudinal keels more converging near the metanotum and forming a trapezoid basal areola (Fig. 1 by Olmi, 1997) .. *nepalensis* Olmi
– Dorsal surface of propodeum with two median longitudinal keels less converging near the metanotum and forming a rectangular basal areola (Fig. 14 by Olmi, 1995a; as in Fig. 1)12
12 Forewing hyaline, not darkened..... *hachijoensis* (Hirashima & Yamagishi)
– Forewing completely darkened ..... *madecassa* Olmi

The females of *Ampulicomorpha schajovskoyi* De Santis & Vidal Sarmiento and *wilkersoni* Olmi are unknown.

Males

1 Petiole very long, as long as, or slightly longer than hind trochanters (Fig. 15 by Olmi, 1995a); palpal formula 6/3 2
– Petiole short, shorter than hind trochanters (Fig. 4 by Olmi, 1995a); palpal formula 5/2, 6/2 or 6/3 3
2 Petiole longer, slightly longer than hind trochanters (Fig. 15 by Olmi, 1995a); temples longer, more than three times as long as POL ..... *australis* Olmi
– Petiole shorter, approximately as long as hind trochanters; temples shorter, approximately as long as POL ..... *wilkersoni* Olmi
3 Head reddish-testaceous or testaceous .....*schajovskoyi* De Santis & Vidal Sarmiento
– Head black or brown, with or without testaceous genal spots 4
4 Pronotum completely visible in dorsal view (Fig. 3 by Olmi, 1995a)..... 5
– Pronotum partly visible in dorsal view, because partly hidden behind the occiput..... 7
5 Dorsal surface of propodeum completely or almost completely reticulate rugose, without

median and parallel longitudinal keels (Fig. 4); dorsal membranous process of the parameres much longer than volsellae (Fig. 7) ..... *confusa* Ashmead
– Dorsal surface of propodeum with two strong median and parallel longitudinal keels (Figs. 1, 3); dorsal membranous process of the parameres shorter than volsellae (Figs. 5, 6) 6
6 Dorsal surface of propodeum with a trapezoid basal areola (Fig. 3) and with stronger median longitudinal keels ..... *costaricana* Olmi
- Dorsal surface of propodeum with a rectangular basal areola (Fig. 1) and with less strong median longitudinal keels..... *madecassa* Olmi
7 Dorsal membranous process of the parameres completely without hairs or papillae (Figs. 1 by Olmi, 1998; Fig. 8 by Olmi, 1997) 8
– Dorsal membranous process of the parameres at least partly with hairs or/and papillae (Fig. 19 by Olmi, 1995a; Fig. 2 by Olmi, 1997) 10
8 Dorsal membranous process of the parameres very long (Fig. 8 by Olmi, 1997) .... *collinsi* Olmi
– Dorsal membranous process of the parameres very short (Fig. 1 by Olmi, 1998; Fig. 5 by Olmi, 1997)..... 9
9 Palpal formula 6/3..... *taiwanensis* Olmi
– Palpal formula 5/2 ..... *magna* Olmi or *pecki* Olmi
10 Dorsal membranous process of the parameres with a few papillae in the proximal region (Fig. 19 by Olmi, 1995a), without hairs and papillae in the distal region .... *hachijoensis* (Hirashima & Yamagishi)
– Dorsal membranous process of the parameres with numerous hairs and papillae in the distal region (Fig. 2 by Olmi, 1997) ..... *nepalensis* Olmi

The males of *Ampulicomorpha gilli* Olmi, *pecki* Olmi (or *magna* Olmi: maybe the male described by Olmi, 1995a, as the opposite sex of *A. magna* is the male of *A. pecki*), *gressitti* Olmi and *suavis* Olmi are unknown.

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