Review of the generic level classification of New World Mantispidae (Neuroptera)

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Abstract

The higher classification of New World Mantispidae is reviewed. Keys are provided to subfamilies, tribes and genera for the New World. The genus *Fusa* is synonymized with *Gerstaeckerella*, *Nobrega* with *Climaciella*, *Bellarminus* with *Nolima*; *Anchieta* is resurrected. The genus *Mantispa* is divided into four species groups, and the genus *Entanoneura* is redefined.

INTRODUCTION

Mantispidae are distinctive members of the Neuroptera, with elongate pronota and raptorial forelegs. In these respects they closely resemble praying mantids, but the wing venation and complete life cycle readily identify them as neuropterans. All mantispids are parasitic on other arthropods, from spider eggs to aculeate wasps to scarab beetles and lepidopterous larvae.

Eggs are laid on short stalks in large numbers on tree trunks. Upon hatching, the young larvae will hide under bark seeking out suitable hosts (McKeown & Mincham, 1948).

SYSTEMATICS

There never has been a modern, comprehensive treatment of the whole family, although the basic classification was first proposed by Enderlein (1910). Rehn (1939) reviewed the higher classification for North America and Williner & Kormilev (1959) described the species from Argentina. Handschin (1960) described some species of Mantispinae for South America, while Parker & Stange (1965) reviewed the status of the Platymantispini. Stange (1968) listed the species from Argentina, and Penny (1977) listed 111 species in 15 genera for South and Central America.

Family MANTISPIDAE Leach, 1815


**Type Genus:** *Mantispa* Illiger (1798).

Adult Mantispidae are separated from other neuropterous families by the short antennae, numerous unbranched costal cross-veins of the wing, elongate prothorax and raptorial forelegs. Larvae are scarabaeiform with short mandibles not bearing internal teeth. The family is found throughout temperate and tropical America, although they are much more common in the tropical zone. The family is usually divided into two subfamilies, although Lambkin (personal communication) indicates that a new study, soon to be published, will break the Platymantispinae into three subfamilies.

KEY TO SUBFAMILIES OF MANTISPIDAE

1a. Anterior tarsi each with only one claw and without arolia (Fig. 2) . . . . Mantispinae

1b. Anterior tarsi each with two claws and an arolium (Fig. 1) . . . . Platymantispinae

Subfamily PLATYMANTISPINAe Rehn, 1939b


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(2) — The name Platymantispinae would also be invalid because the type genus name *Platymantispa* is a junior synonym of *Anchieta*. However, Article 40 of the International Code of Zoological Nomenclature indicates that the name Platymantispinae must be retained, as the invalidity of its type genus was not recorded before 1961.

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Type Genus: *Platymantispa* Rehn, now considered a synonym of *Anchieta*.

This subfamily is the smaller in number of species, and is confined to Australia and the Americas. There are two claws on the fore tarsi. Although the *Platymantispinae* are easily identified, much confusion has existed as to the name. For a fuller discussion of synonymy, see the sections on *Trichoscelia* and *Anchieta*.

The *Platymantispinae* are generally divided into four American tribes: Platymantispini, Theristriini, Drepanicini and Nolimini.

**KEY TO TRIBES OF PLATYMANTISPINAEE**

1a. Anterior first tarsal segment with a dentiform process (Fig. 1); adult female bearing ovipositor (Fig. 4); male penisfilum coiled (Fig. 3) ............... Plattymantispini

1b. Anterior first tarsal segment without dentiform process; adult female not bearing ovipositor; male penisfilum not coiled ............................ 2

2a. Subcosta of forewing entering costal margin far anterior to pterostigma (Fig. 8); fore tarsal claws bifid .................. Nolimini

2b. Subcosta of forewing entering costal margin in area of pterostigma (Fig. 9); fore tarsal claws not forked .............. 3

3a. Pterostigma of forewing isolated from R; only one Sc crossvein (Fig. 9)  . Drepanicini

3b. Pterostigma filling costal area between R and forewing margin; two Sc crossveins (Fig. 7) ...................... The istriini

Tribe Drepanicini Enderlein


**Type Genus:** *Drepanicus* Blanchard (1851), designated by Enderlein (1910).

There is only one known genus of this tribe in the New World: *Drepanicus* Blanchard from Chile and Argentina.
Figure 3 — Abdomen of *Trichoscelia santaremi* Navas. A. Lateral view. B. Dorsal view, epr = ectoproct, gs = gonarcus, gcx = gonocoxite, pf = penisfilum.

Figures 4-5 — Lateral view of abdomen of 4) *Trichoscelia varia* (Walker) (female), and 5) *Mantispa flavomaculata* Latreille (female). epr = ectoproct, gl = gonapophyses laterales, spm = spermatheca.

**Genus Drepanicus** Blanchard


**Type Species:** *Drepanicus gayi* Blanchard, designated by Enderlein (1910).

This genus is only known from two species, *D. gayi* and *D. chrysopinus* Brauer. All specimens are large and green, and *Drepanicus gayi* appears very similar to the leaf-mimicking katydids (Orthoptera: Tettigoniidae). The genus *Molinella* Navás was synonymized with *Drepanicus* by Banks (1913).
Tribe Theristriini Enderlein


Type Genus: Theristria Gerstaecker, designated by Enderlein (1910).

This tribe has a distinctly longer subcostal vein and completely free medius vein of the wing, lacking in the related tribe Nolimini. Only one genus is recognized in this tribe from the Americas, Gerstaeckerella from South America.

Genus Gerstaeckerella Enderlein


Type Species: Gerstaeckerella gigantea Enderlein, by original designation.
Type species of Fusa is Fusa pirioni Navás, by monotypy.

This is the only South American genus of Theristriini. The genus Fusa was described by Navás (1925) without giving differentiating characters. However, it is synonomous with Gerstaeckerella chilensis (Hagen). This species does not differ markedly from others of the genus, although it is the smallest species. Penny (1977) mentioned seven species in the two genera, ranging from Chile and Argentina north to Colombia. The only specimen of this genus known from outside southern South America is the type specimen of Gerstaeckerella gigantea Enderlein. The Colombia record is probably erroneous.

Tribe Nolimini Navás


Type Genus: Nolima Navás, by original designation.

As presently constituted, this tribe consists of one Australian genus, Calomantispa, and one Central American genus, Nolima. The character separating the two nominal American genera is a very weak one (relative length of the pronotum), and the two genera are presently being synonymized.

Figure 6 — Abdomen of Mantispa flavomaculata Latreille (male). A. Lateral view. B. Dorsal view. epr = ectoproct, gs = gonarcus, gcx = gonocoxite, med = mediuncus.
Genus *Nolima* Navás


*Type Species:* *Nolima victor* Navás, by original designation.

This genus has been separated from *Bellarminus* by the shorter, wider pronotum. After examining the type species of *Bellarminus* in the Paris Museum, no substantial differences could be noted, except that *B. pugnax* is the smallest known species of this genus, and the pronotum is proportionally somewhat narrower. This author does not feel that these differences are sufficient for generic recognition.

**Tribe Platymantispini Rehn**

*Symphrasis* Navás, 1909, Mem. R. Acad. cienc. artes Barcelona, 7 (10): 464. (invalid name, based on a synonymized generic name).


Type Genus: Platymantispa Rehn, designated by Rehn (1939b).

Because of the considerable generic homonymy and synonymy in this tribe, the name has changed several times, although Platymantispini is easily characterized by the large first tarsal segment, the elongate terminal process of this tarsal segment, and the insertion of the second tarsal segment before the apex of the first. Males have a coiled penisfilum, while female bear a long ovipositor. As presently constituted, the Platymantispini contains only three American genera, ranging from Argentina north to the United States.

KEY TO GENERA OF PLATYMANTISPINI

1a. Subbasal spine of fore femur present (Fig. 11, 12) .......................... 2
1b. Subbasal spine of fore femur absent (Fig. 10) ...................... Trichoscelia

2a. Forewing with five radial veins originating from second radial cell; second radial cell of forewing straight; first and second radial cells of forewing frequently bearing setae on the membrane (Fig. 14) . Ancheta
2b. Forewing with two radial veins originating from second radial cell; second radial cell curving around wing apex; first and second radial cells of forewing devoid of setae on the membrane (Fig. 13) ....... Plega

Genus Plega Navás


Type Species: Symphrasis signata Hagen, by original designation.

This genus was synonymized with Symphrasis by Tjeder (1959), but Parker & Stange (1965) found Symphrasis to be a synonym of Trichoscelia (confirming the synonymy originally proposed by Gerstaecker, 1888). However, Parker and Stange found several consistent differences between the type species of Plega and Trichoscelia, thus reestablishing the former generic name. The morphological features of Plega include, on the fore femur a “distal median row of sharp tubercles that splits into two rows near the basal one-half. Lateral of the tubercles is a row of setae restricted to the distal half of the femur”. Additionally, Plega has a subbasal spine on the fore femur and the second tarsomere of the fore tarsus is longer than in Trichoscelia. Penny (1977) recorded six species of Plega from Brazil north to Mexico. Three additional species were described by Rehn (1939a) from the United States.

Genus Trichoscelia Westwood

Trichoscelia Westwood, 1852, Trans. R. ent. Soc. Lond., (2) 1: 269.

Type Species: of Trichoscelia is Mantispa fenella Westwood, designated by Enderlein (1910) and of Symphrasis is Rhaphia varia Walker, designated by Enderlein (1910).

The synonymy and homonymy in this genus has led to various tribal and subfamily names, but the current synonymy is as follows: Trichoscelia and Symphrasis were synonymized with Anisoptera Schneider by Gerstaecker (1888). The synonymy of Trichoscelia with Anisoptera Schneider was confirmed by Banks (1913) and of Symphrasis with Trichoscelia by Parker & Stange (1965). However, Anisoptera Schneider is an Ancheta, with a subbasal spine on the fore femur and other distinctive morphological features. Thus, only Symphrasis is presently a synonym of Trichoscelia.

Trichoscelia was separated from Plega by Parker & Stange (1965) on the structures of the fore femur- “a submedian double row of setae mesad of which is a double row of minute tubercles, so that there are four parallel rows of setae and tubercles extending along most of the length of the closing face”. Trichoscelia also lacks a subbasal spine on the fore femur and the first and second tarsomeres of the foreleg are relatively equal in size.

Penny (1977) recorded 14 species from South and Central America, although several of these species must be transferred to the genus Ancheta. The known range of Trichoscelia is from Argentina north to Mexico.
Figures 10-12 — Fore femur of 10) Trichoscelia varia (Walker) (left), 11) Plega hagenella (Westwood) (right), and 12) Anchieta nobilis Navás right.
Genus Anchieta Navás

*Anisoptera* Schneider, 1843, Mon. Raphidiae, p. 32 (preoccupied by *Anisoptera* Berthold, 1827, and *Anisoptera* Herrich-Schaeffer, 1840).


Type Species: of *Anisoptera* Schneider is *Anisoptera notha* Erichson (1839), designated by Enderlein (1910); of *Anchieta* is *Anchieta nobilis* Navás, by monotypy.

The generic name *Anchieta* was synonymized with *Anisoptera* by Enderlein (1910) and

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this synonomy was confirmed by Banks (1913). It is here reconfirmed. The names *Platyman-tispina* Rehn (1939b) and *Anisopterana* Strand (1942) are unnecessary additions to the literature when it was independently realized that Anisoptera Schneider was a junior homonym.

This genus possesses the subbasal fore femoral spine of *Plega*, but the longitudinal row of denticles is reduced to a single row in *Anchieta*. The majority of differences are found in the radial cells of the forewing. Both *Trichoscelia* and *Plega* have the second radial cell curved around the wing apex, with two or three veins originating from this cell, and without setae on the membrane. *Anchieta* has the forewing second radial cell straight, with five veins originating from the cell, and with both radial cells containing some setae on the membrane. Additionally, *Anchieta* has a long tuft of hairs emanating laterally to the male genitalia in the single male in the INPA Systematic Entomology Collections. This genus is known from southern Brazil northward to the Amazon Basin and French Guiana. In addition to *A. notha* and *A. nobilis*, *A. fumosella* (Westwood, 1867), *A. partheniella* (Westwood, 1867), *A. eurydella* (Westwood, 1867) and *A. bella* (Westwood, 1867) are all members of this genus.

Subfamily Mantispinae Leach


*Type Genus:* *Mantispa* Illiger (1798).

The Mantispinae are frequently larger than Platymantispinae, have only one tarsal claw, and usually thicker, longer antennae.

This subfamily contains the vast majority of American mantispids. Enderlein (1910) included four genera and a subgenus (*Mantis-pilla*) within this subfamily in his revision. Navás subsequently described two new genera, *Necyla* and *Nobrega*, and Williner & Kormiiev (1959) synonomized the subgenus and added a new genus. Thus, there has been until now seven American genera in the Mantispinae, for which no tribal separation has ever been made.

The characters traditionally used for generic separation in this subfamily are generally weaker than those of the Platymantispinae, making proper identification of this subfamily more difficult. The genera *Entanoneura*, *Necyla* and *Mantispilla* appear to be size variants within the *Mantispa* complex, and indeed there is a direct relationship between wing length, length of the third radial cell, and number of radial veins (Graphs 1 and 2). Color patterns indicate that the *Entanoneura* probably are sister species (as herein defined), and the size reduction in *Necyla* and *Mantis-pilla* could also be an evolutionary development of sister groups, although it is not difficult to find specimens of "Mantispa" having the loss of one radial vein of "Mantis-pilla". Because this character state is so instable, the generic synonomy of *Mantispilla* and *Mantispa* is upheld here.

The single described species of *Necyla* from the New World, *Necyla uniformis* Navás, has male genitalia quite unlike African and Asian species of this genus, but quite similar to several species of "Mantispa". As was pointed out in graph 1, the number of radial
veins seems to be a function of size, so that the genus *Necyla*, as originally delimited, would contain the smallest members of any evolutionary sequence within the Mantispinae. Thus, the true *Necyla*, with elongate male ectoprocts, does not occur in the New World.

The genera *Paramantispa*, *Climaciella* and *Entanoneura*, as constituted in this study, are felt to be natural groupings showing uniting apomorphic character states. However, their exclusion from the genus "Mantispa" would leave this genus in a paraphyletic state, unless other natural groupings were also separated as distinct genera. I have chosen to do this in the presentkeys, but without giving these groups formal names, due to some parallel results being obtained and published upon in Australia (Lambkin, personal communication). Thus, the "gracilis" group has a distinctive double projection on the medial surface of male ectoprocts. *Mantispa phthisica* Gerslack was placed by Handschin (1960) in the genus *Entanoneura*. However, the elongate, pointed male ectoprocts and dark-tipped wings indicate a closer relationship to some African species of *Pseudoclimaciella* than to any other American group, and thus is placed in a group by itself. All of the preceding species, and
Mantispa costalis Erichson, have well developed hypomeres, and all the preceding except M. costalis have a heavily sclerotized membrane (mp of Tjeder, 1963) between the gonarcus and penisfilum of the male genitalia. M. costalis must form a group by itself due to presence of these characters, and lack of the distinctive characters mentioned for the "gracilis" and "phthisica" groups. Additionally, there is a group of small species which lack the sclerotized mp, and the hypomeres, but which have a well-developed medial process of the gonarcus. These species also generally have the male ninth sternite apically constricted. The species M. januaria Navás and M. brunneonigra (Handschin), placed by Handschin (1960) in Entanoneura do not show close relationships with this genus, and probably form a group of their own, but until male specimens can be examined, their placement is uncertain. Thus, American Mantispinae can be placed in the following groups: Entanoneura, Climaciella, Paramantispa, "gracilis" group, "phthisica" group, "costalis" group, "flavomaculata" group, and perhaps the "januaria" groups.

Nobrega Navás is only a specimen of Climaciella semihyalina lacking much of costal coloration. Thus, this name is herein synonymized.

The Mantispinae range from Argentina north to the United States. No members of this subfamily are known from Chile.

**KEY TO AMERICAN GENERA AND SPECIES GROUPS OF MANTISPINAE**

1a. Cubitus of hindwing nearly straight and never coming close to first anal vein (Fig. 20) ................. Climaciella
1b. Cubitus of hindwing bending sharply towards first anal vein, then bending sharply away again (Fig. 19) .... 2

2a. Cubitus of hindwing only briefly touching first anal vein, then angling sharply away again; occipital margin of head often wide (Fig. 22) ............ Paramantispa

2b. Cubitus of hindwing joined to first anal vein for a short distance, then angling sharply away again; occipital margin of head always absent, with eyes reaching hind margin (Fig. 21) .. 3

3a. Crescent or semicircular marks on prozonal region of pronotum .... Entanoneura

3b. Prozonal region of pronotum with longitudinal stripes or small transverse marks, but without semicircular yellow markings ............ 4

4a. Male ectoprocts bearing two elongate medial projections ........... "gracilis" group

4b. Male ectoprocts bearing at most one medial projection .................. 5

5a. Male ectoprocts elongate and pointed; hypomeres very thin and elongate ........... "phthisica" group

5b. Male ectoprocts extending only slightly beyond ninth sternite, and apically rounded; male hypomeres, if present, not thin and elongate .................. 6

6a. Male ectoprocts bearing medial pointed projection; hypomeres present, but small; medial process of gonarcus absent ............ "costalis" group

6b. Male ectoprocts bearing low, flat medial field of spines; hypomeres absent; medial process of gonarcus well developed ............ "flavomaculata" group

**Genus Climaciella Enderlein**


*Nobrega* Navás, 1914b, Broteria, 12: 233, new synonymy

**Type Species:** of *Climaciella* is *Mantispa brunnea* Say, by original designation; of *Nobrega* is *Nobrega tinctus* Navás, by original designation.

*Climaciella* is similar to larger species of *Entanoneura* in having a very elongate third radial cell. However, the hindwing of *Clima-

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**Genus Paramantispa Williner and Kormilev**


**Type Species:** *Mantispa decorata* Erichson, by original designation.

This genus is closely related to some of the larger "Mantispas" and *Entanoneura* in having hypomeres absent, no development of the medial lobe of the gonarcus, but with a well-developed projection on the medial surface of the male ectoprocts. Some of these species are also among the most colorful of American mantispids, with large areas of the wing fully darkened. Four species are known from Argentina, Paraguay, Bolivia and southern Brazil, with one doubtful record from Surinam.

This genus was originally erected by Williner & Kormilev (1959) for two dark-winged species which had a large occipital area behind the compound eyes. Handschin (1960) expanded the definition of the genus to include two other species much closer to other "Mantispas" based on the brief contact of the cubitus and first anal vein of the hindwing. This has made the genus harder to characterize, although these four species probably do form a natural lineage.

Genus Entanoneura Enderlein


Type Species: Mantispa limbata Gerstaecker, by original description.

This genus has had a variable history due to the weak nature of separating characters. Banks (1913) synonomized Entanoneura with Mantispa, while Williner & Kormilev (1959) accorded it subgeneric status, and Handschin (1960) described many of the South American species, giving it generic status once again. Penny (1977) listed eight species ranging from Argentina north to Costa Rica.

As defined in this study, M. costalis, M. phthisica, and probably M. januaria and M. brunneonigra are not closely related to other species of Entanoneura, based on the male genitalia, especially the hypomeres and mp. Thus, the genus Entanoneura has a much more restricted number of included species, although the geographical distribution is not changed.

“phthisica” species group

Among all American Mantispinae, this group stands farther apart than the rest, because of the distinctive form of the male genitalia. At present, only one species is included in this group. The male hypomeres and sclerotized area (mp) between the mediuncus and gonarcus indicate a primitive position for this species. However, among the American species, none has such elongate hypomeres, nor such elongate, pointed ectoprocts. Some African species appear to have this general configuration of the ectoprocts, but without more detailed study of the genitalia, no closer associations can be determined.

“gracilis” species group

Like the “phthisica” group, this species group has well-developed hypomeres and a sclerotized mp. However, unlike the “phthisica” group, the “gracilis” group has very distinctive projections on the medial surface of the ectoprocts, in some species becoming quite elaborate. Included in this group are M. gracilis, M. moulti, M. lineaticollis and at least one species from North America. The geographical distribution of this group is from Argentina to the United States.

“flavomaculata” species group

This group is characterized as having very stout male ectoprocts with a low, flat field of medial spines; no hypomeres; no sclerotized area between the gonarcus and mediuncus; reduced size; and often a constricted apex to the ninth sternite. However, the characteristic feature is the development of a medial projection on the apex of the gonarcus which often shows externally above the mediuncus. Many of the species are pale yellow to green in color, although dark species also occur. Thus, the pale green, small species occurring over most of South America, which have been

Review of...
identified as *flavomaculata, viridula*, and the North American species called *viridis* are included in this group, as are several species from Australia. The geographical distribution thus includes Australia, and in the New World from Argentina north to Wisconsin.

"costalis" species group

This group is intermediate between the first two groups and the "*flavomaculata*" group, having hypomeres present, but no mp in the male genitalia. Only one species is presently included in this group, *M. costalis*, which also has a number of dense spines on the apex of the ninth sternite. This species is only known from southern Brazil.

Many species of Mantispinae from Central America and some of the North and South American species are still known only from females, or from markings of the wing and body. As these become better known, the present concepts can be better refined, or modified. Then, more considerations on zoogeography can be attempted with the African and Asian species, which also are very poorly known, especially with respect to male genitalia.

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