

A NEW GENUS AND SPECIES OF DAMSELFLY FROM
GUATEMALA AND CUBA (ODONATA:
COENAGRIONIDAE)

THOMAS W. DONNELLY, AND PASTOR ALAYO D.
Dept. of Geology, Rice University, Houston, Texas, and
Inst. de Biología, Acad. de Ciencias, La Habana, respectively

The almost simultaneous discovery in Guatemala and Cuba of the remarkable damselfly described herein is a very interesting coincidence. In July 1962 one of us (TD) found this species in fair abundance at Tikal, in the Petén district of Guatemala; in August the other (PA) found it near Guane in the Pinar del Rio province of Cuba, about 500 miles from the Guatemalan locality. Unfortunately it is not known when this species might first have occurred at Tikal; although the new insect was not found during a biological survey from January to May of 1956 (Kormondy 1959), the Odonata were collected by non-specialists, and Donnelly has been able in less than thirteen days during the summers of 1962, 1963, 1964, and 1965 to more than triple their list of species. The new species could well have been overlooked by these collectors.

Four male specimens taken in two states of Mexico during the summer of 1965 by Dennis Paulson suggest that this species might be quite widespread. It is difficult to understand why this insect has been so long overlooked.

During our preliminary separate analyses of this new species, we were each initially under the impression that it belonged to the genus *Enallagma*. However, Donnelly had been engaged in studies in this genus and found that the penis of the new species was radically different from any New World member of the genus, and indeed was distinctive enough to warrant the establishment of a new genus. Erection of this new genus, however, has not helped to untangle the rather complicated skein of inter-generic relationships among the Neotropical damselflies of the *Acanthagrion-Enallagma* group. Examination of a number of species in this group during this study has revealed relationships between species hitherto thought not to be closely related and important differences between species thought to be closely related. The development of this problem is beyond the scope of the present paper, however, and only relationships between the new genus and other genera can be discussed.

Enacantha, new genus

Head: Postocular spots prominent, narrowly connected across rear of head; frons rounded. *Prothorax*: Hind lobe, small, slightly elevated, entire. *Pterothorax*: Mesostigmal laminae small, narrow, elongate; mes-episternal fossae absent. *Wings*: Stigma surmounting one cell, longer than wide, in shape of rounded parallelogram; petiolation distinctly proximal to Ac; 9 to 10 postnodals in fore wing, 8 to 9 in hind wing; anterior side of quadrangle one-third in fore wing, three-fifths in hind wing length of posterior side. *Abdomen*: Female with prominent spine on eighth tergite; male with dorsum of 10th segment indented and with slightly ele-

vated, forked process in that indentation. Superior appendages straight, as long as the 10th segment, slightly forcipate in dorsal view, with pointed inferior arm and with pad located on mesal surface at base of this arm. *Penis*: Third segment with small internal and external folds, terminating in a prominent hooked, T-shaped process. Medial, internal process on this segment widely forked. First segment lacking setae.

The new genus *Enacantha* is quite clearly related to the Nearctic *Enallagma* and the Neotropical *Acanthagrion* sensu lato, which includes *Cyanallagma* Kennedy 1920 and *Argentagrion* Fraser 1948. One of us (Donnelly 1963) has studied the New World species of the genus *Enallagma* rather thoroughly and concludes that *Enacantha* cannot be included within any of the various groups of that genus. Although *Enallagma* is quite variable in color and morphology, the penis is homogeneous throughout, and homologies among the species are immediately evident, even between species with greatly differing external morphology. The genus *Enallagma* is not, however, readily distinguished on external characters from a number of Neotropical genera, in spite of the fact that there exist many keys which might give that impression.

Kennedy (1920) erected the genus *Cyanallagma* to include those species formerly placed in *Acanthagrion* but distinguished by the male superior appendages, which extend directly to the rear and are forked, rather than being decurved. Kennedy designated the species *interruptum* (Selys) as the type, and included additionally *laterale* (Selys), *acutum* (Ris), and "perhaps *cheliferum* (Selys)". The original description of this genus is so inadequate that it, along with the other genera and subgenera erected in that unfortunate paper, should have been discarded long ago. However, Racenis (1958) has redefined the genus recently, excluding *cheliferum*, and including *bonariense* (Ris). The species *acutum* and *bonariense* have not been examined during this study, but we conclude that *interruptum* and *laterale* are worthy of generic recognition. The penes (Fig. 3) are similar, except that *interruptum* has a pronounced internal hook on the terminal segment, whereas *laterale* has only small prominence here. The expanded, squared end of the terminal segment sets these species quite apart from *Acanthagrion* sensu stricto.

Fraser (1948) placed *Acanthagrion ambiguum* Ris in a new genus *Argentagrion* on the basis of reduced venation and the male superior appendage, which is not at all typical of most of the species of *Acanthagrion*. Racenis (1958) discussed this genus further and added the species *cheliferum* and *lindneri* (Ris), emphasizing the criteria of reduced venation, the small size of the insect, and the reduced male inferior appendages. The penes of *cheliferum* and *ambiguum* (Fig. 3) are fairly close (*lindneri* has not been examined), and we concur with Racenis' analysis of the genus, though with slightly more misgivings than with his analysis of the previous genus, because these species are not as close as are the two *Cyanallagma*. An additional species, Selys' (1876) *Agrion? nepos*, which was placed by Calvert (1909) in *Ischnura?* and by Kennedy (1916) as the type and only species of his very poorly characterized genus *Homeoura*, is very close to *cheliferum*, both on external morphology and venation, and especially on the basis of penile morphology. Both species have a most distinctive hollow structure on the terminal segment which receives a bladed prominence on the inside of the second segment. If these two

closely related species are to be eventually split from *Argentagrion* on other grounds, then a new name, rather than Kennedy's *Homeoura* should be used; the only part of Kennedy's generic diagnosis that could be considered definitive appears to be incorrect (spines on basal segment of penis)! The species *cheliferum* was placed by Santos (1956) in *Enallagma* because of the petiolation of the wings and the spine at the base of the male superior appendage. The North and Central American *Enallagma* (Donnelly 1963) have a remarkably homogeneous penile morphology, and it would be most unwise to include *cheliferum*, in spite of the characters to which Santos has called attention (Many genera other than *Enallagma* incidentally, have a spine or similar projection at the base of the male superior appendage.).

On the basis of penile morphology, *Enacantha* would appear to be closer to the *Acanthagrion* complex than to *Enallagma*. The form of the superior appendage of *Enacantha* is somewhat closer to *Enallagma* (especially the *praevarum* group), but this appendage is quite variable throughout all of these genera, and similarities with *Argentagrion* and *Cyanallagma* could equally well be cited. The distinctive penis of *Enacantha* is similar to that of only one other damselfly yet examined: *Tigriagrion aurantinigrum* Calvert (Fig. 3), which would itself appear to be set off by its orange coloration, its reduced venation, and its peculiarly rounded stigmatae. It would be futile to speculate further on the relationships among these genera, but examination of a greater number of species might show that *Enacantha* occupies a transitional position between the *Enallagma* group (possibly the *Enallagma praevarum* stem) and the *Acanthagrion* group (possibly with *Tigriagrion*, *Argentagrion*, or *Cyanallagma* as annectant genera).

The establishment of inter-generic relationships on the basis of one morphological character is not easily defended. However, the comparative morphology of the penis within the *Acanthagrion-Enallagma* genera of New World damselflies shows a combination of reasonable morphological diversity (so that differences between species can be noted in most cases) and conservatism (so that homologies, which in many cases are related by homologies in other morphological features or color pattern, can be established) such that this character must be given heavy weight. Williamson (1924) remarked on the hazards inherent in reliance on wing venation for establishing phylogenetic relationships; some of these hazards (such as extent of petiolation) will be evident to anyone who has worked within North American *Enallagma*. The form of the male abdominal appendages must also be regarded as hazardous, because in addition to the presumably primitive forcipate form well developed, for example, in *Enallagma* and *Argentagrion*, there is a bewildering variety of other forms, many of which are quite distinct in two species, which otherwise on overwhelming evidence are closely related. Color has been used to separate *Oxyagrion* from *Acanthagrion*, but this character will probably not stand more critical evaluation. Finally, the structures of nymphs might be helpful in establishing relationships, except that relatively few species are known from immature stages, and those that are known do not appear to possess reliable characters which might have a phylogenetic rather than an adaptive significance.

Enacantha caribbea, new species

(Fig. 1-3)

MALE: *Head*: Black, with pale blue. Labium pale; mandibles pale with black tips; labrum blue; anteclypeus pale with black, laterally indented basal stripe; postclypeus, frons, and genae pale; vertex black, with prominent pale postocular spots narrowly connected medially by an occipital pale stripe. *Prothorax*: Pale blue, black as follows: dorsum of central lobe, except for lateral spots narrowed anteriorly; hind lobe, except for border. Hind lobe entire, rounded. *Pterothorax*: Pale blue, black as follows: Mid-dorsal stripe covering one-third of mesepisternum; black line on humeral suture, which is two-fifths the width of the antehumeral pale stripe; very short black dash on second lateral suture. *Legs*: Pale, with dorsa of femora black. Black lines on tibiae: complete on fore leg, less prominent on middle leg, and short on hind leg. Spines short, black. Tarsal claws black. *Wings*: Venation discussed below. Stigma acute, bi-colored: Black, with anterior third pale. *Abdomen*: Pale blue, black as follows: Basal spot on dorsum of segment 1; sub-apical triangular spot on dorsum of 2; apical bands on 3-6; dorsal line on apical two-thirds of 4, seven-eighths of 5, all of 6; basal third of 7, narrowed apically; dorsum of 10. Small forked dorsal process on apex of 10. *Appendages*: Superior appendage straight, the length of segment 10, with blunt ends, and slightly curved in dorsal view; inferior branch pale, triangular, terminating ven-

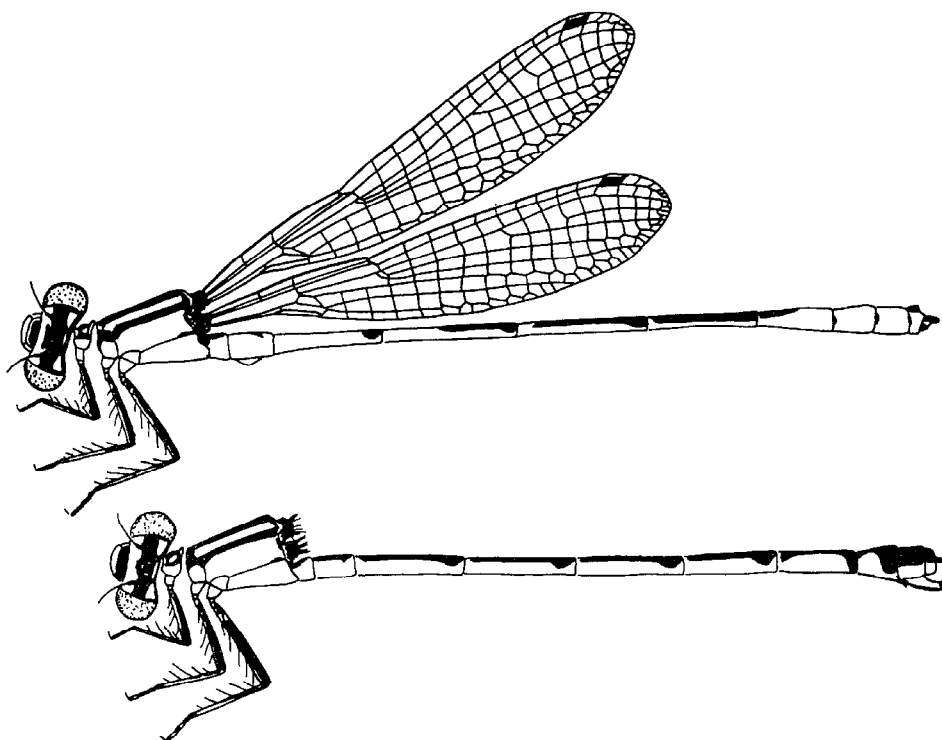


Fig. 1. Lateral views of male and female of *Enacantha caribbea* showing venation and color patterns.

trally in a sharp point; mesal pad near base of inferior branch. Inferior appendage slightly less than half the length of superior, rounded.

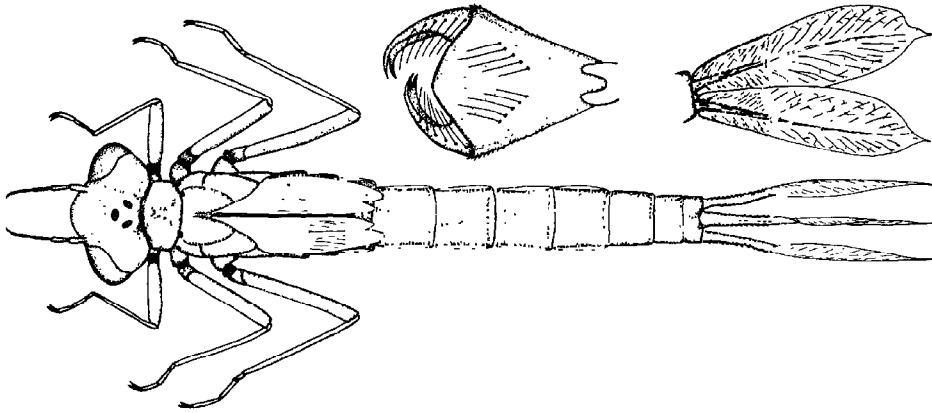


Fig. 2. Dorsal view of nymph believed to be *Enacantha caribbea*, with lateral view of gills and ventral view of labium.

FEMALE: Similar in color pattern to male, but with pale color brownish-blue to greenish-blue. Without lateral indentations in pale color of basal dark stripe on anteclypeus, and with dorsum of abdomen black interrupted by narrow basal pale rings on segments 4-7. Mesostigmal laminae small, narrow, elongate, not conspicuously erect. Mesepisternal fossae absent. Spine on venter of segment 8 well developed.

VENATION: Postnodal cells of fore wing 9 or 10 (a very few 11), of hind wing 8 or 9 (a very few 10). The distance between the origins of M_3 and R_s ranges from nearly zero to an extreme of one and one-half times the length of the cell between the bases of these veins, and in most cases is between one-half and one times this length. Petiolation distinct.

DIMENSIONS: *Abdomen:* two-thirds of the male specimens range from 22.5 to 24 mm, with extremes 20 to 24.5 mm. For females the normal range is 21.5 to 22.5 mm, with extremes between 21 and 24 mm. *Hind wing:* nine-tenths of the males range from 15.5 to 16.5 mm, with extremes 15 to 17 mm, and for females 16 to 17 mm, with extremes 15.8 to 18 mm.

VARIATIONS AMONG THE PARATYPE SERIES: In a long series of male specimens, the only noteworthy variation aside from dimensions is the extent of indentation in the black border of the anteclypeus. More than half the specimens have the lateral indentations distinctly connected with the pale anterior portion of this sclerite, but one-third of the specimens have one or both indentations isolated as spots by a continuous, thin, black border, and a very few have solid black borders, as in the female. No consistent regional variations were found.

NYMPH: Pale colored, apparently lacking any dark pigmentation, except for finely scattered spots on gills. Eyes prominent; posterolateral margins of head rounded, with small spines; ratio of antennae segment lengths; 5: 8: 9: 7: 5: 5. Distal width of mentum five-sixths of length; width at base one-third of distal width; lateral margins straight, with small setae in distal half; distal margin sharply rounded, entire;

lateral setae 6, with notch separating end hook from inner margin; mental setae 5. Wing cases reaching fourth segment, apically rounded; lateral keels on 1-8 well developed, rounded apically, without spines or setae. Gills rounded with acuminate apices, lacking pigment except for small scattered spots along veins, these spots more abundant proximal to nodus; margins of gills proximal to nodus lined with short setae.

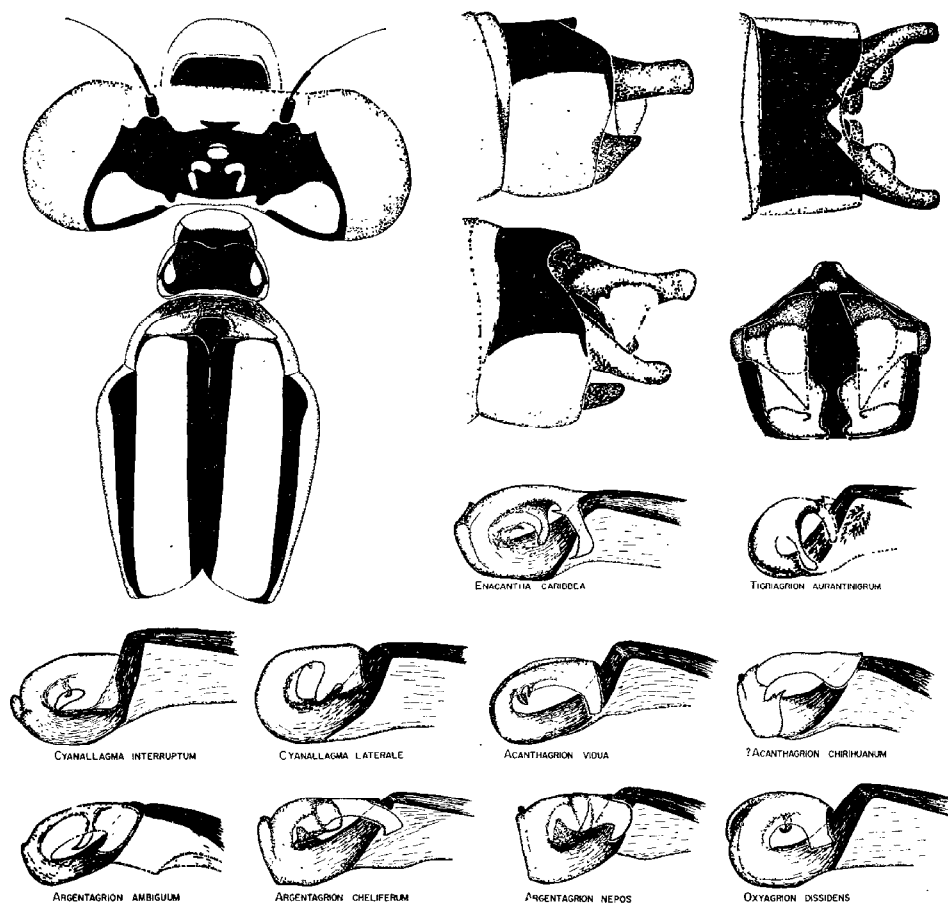


Fig. 3. Dorsal view of female thorax and head, and four views of male abdominal appendages of *Enacantha caribbea*. Drawings of penes as follows: *Enacantha caribbea* (Tikal, Guatemala); *Tigriagrion aurantinigrum* Calvert, Dept. Santa Cruz, Bolivia, coll. Cumming; *Cyanallagma interruptum* (Selys) "Brazil", Univ. Florida Collection; *C. laterale* (Selys), Quetama, Colombia (type of *Agria ternaria* Navas), from Gloyd collection; *Acanthagrion vidua* Selys, Edo. Cojedes, Venezuela, coll. Donnelly; *?Acanthagrion chirihuanum* Calvert, Chaco, Brazil, coll. Benitez, U. Fla. Collection; *Argentagrion ambiguum* (Ris), Ubuvevo, Paraguay, coll. Förster, from U. of Fla. Collection; *A. cheliferum* (Selys), Corrientes, Argentina, U. of Fla. Collection; *A. nepos* (Selys), Aracataca, Colombia, coll. Williamson, U. of Fla. Collection; *Oxyagrion dissidens* Selys, U. of Fla. Collection.

This description is based on two mature nymphs collected at the ponds at Tikal. These are assigned by supposition to *Enacantha* both because of their association and because they can be reasonably excluded from other

species occurring there (see below). These nymphs are 18.5 mm. long, and the gills are 5 mm. long.

MATERIAL STUDIED: Tikal, Dept. El Petén, Guatemala, 52 males and 30 females, collected 23-25 July 1962, and 27-29 July 1963. The precise locality is the series of ponds at the main camp. At this locality this species was the dominant coenagrionine during 1963, when the level of the ponds was rather low due to a prolonged drought. It was also conspicuous during 1962, but was much less so during 1964, when the ponds were visited well after the start of the rainy season. The species was not seen in September 1965. Other damselflies occurring more or less commonly at this pond include *Argia gaumeri* Calvert, *Acanthagrion quadratum* Selys, *Telebasis filiola* (Perty), *T. salva* (Hagen), *T. digiticollis* Calvert, *Leptobasis vacillans* Hagen, *Neoerythromma cultellatum* (Hagen), *Ischnura ramburii* (Selys), *Ischnura (Ceratura) capreola* (Selys), *Ischnura (Ischnuridia) acicularis* Donnelly, *Protoneura corculum* Calvert, and *Lestes forficula* (Rambur).

Laguna de los Negros, El Beral, Guane, Prov. Pinar del Rio, Cuba, 19 males and 1 female collected during August 1962.

Pond 6.3 miles south of Ixtapa, Chiapas, Mexico, 2 males, 17 July 1965, collected by D. R. Paulson and F. G. Thompson.

Ponds 0.7 miles east of Ich-Ek, Campeche, Mexico, 2 males, 8 July 1965, collected by D. R. Paulson.

The holotype male was collected 24 July 1962, and the allotype female 23 July 1962, both at Tikal. The holotype and allotype have been deposited in the University of Florida collection. Paratypes have been deposited in this collection, and in the collection of the U. S. National Museum, the Academy of Natural Sciences, Philadelphia, and the University of Michigan Museum of Zoology, Ann Arbor.

ACKNOWLEDGEMENTS: We are grateful to Prof. Minter Westfall for calling to our mutual attention that both of us were about to describe this species independently. Prof. Westfall has also loaned specimens of *Argentagrion*, *Acanthagrion*, *Tigriagrion*, *Cyanallagma*, among other genera, for comparative examinations. We appreciate the opportunity to examine the Mexican specimens collected by Dennis Paulson. We also appreciate the loan of Navas' type of *Argia ternaria* (a synonym of *Cyanallagma laterale*) from Mrs. Leonora Gloyd.

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NEW EDITORS APPOINTED

The Executive Committee recently named the editors of THE FLORIDA ENTOMOLOGIST for 1967-1969. Dr. S. H. Kerr will serve as Editor and Dr. J. L. Nation as Associate Editor. Although their terms begin 1 January 1967, they have already begun their duties and are handling the manuscripts which will be published during their terms. With the possible exception of paid papers, all manuscripts received later than April 1966 will be published after January 1967.