A NEW SPECIES OF *ENALLAGMA* FROM CENTRAL AMERICA (ODONATA: COENAGRIONIDAE)[1]

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ABSTRACT

Enallagma rua n. sp., from the highlands of southern Mexico, Guatemala, and Honduras, is most closely related to the more northerly *Enallagma praevarum* (Hagen), from which it differs principally by the shape of the male appendages. The two species do not appear to intergrade in southern Mexico.

The species of *Enallagma* herein described has a wide distribution in the mountainous region between southern Mexico (Chiapas) and Honduras. It is very closely related to *E. praevarum* (Hagen), which ranges from the southwestern states of the United States south to Oaxaca, Mexico. The lowland region of Tehuantepec may effectively separate the two species, though there might be an effective ecological barrier should they be found to occur in the same region: *E. praevarum* prefers high, rather dry regions and the new species is found in more moist habitats.

Enallagma rua, new species

HOLOTYPE MALE: Head blue, black as follows: dorsal surface of anteclypeus, dorsum of head posterior to bases of antennae, except for broad, rounded postocular spots and isolated, elongate spot connecting these spots. Rear of head pale.

Prothorax: Black on dorsum except for comma-shaped, blue, lateral spots on middle lobe and obscure transverse band on fore lobe. Propleura blue.

Pterothorax: Black mid-dorsal, blue antehumeral, and black humeral stripe, the pale antehumeral stripe 1 1/3 times as broad as the pale mid-dorsal (to mid-dorsal carina only), and 3 times as broad as the humeral stripe, at mid-height. Sides and venter of thorax pale blue, except for black dash at posterior end of 2nd lateral suture. Mesostigmal laminae subrectangular, with rounded tip and raised, somewhat flattened apical portion.

Legs: Black on dorsum of femora and outer surface of tibiae, except for pale lines partially encircling bases of femora. Apices of tibiae pale, grading proximally into the black color. Spines and tips of tarsal claws black. Pale color of legs obscure bluish-brown.

Wings: Veins and stigmata black. 10 1/2 postnodal crossveins in fore wing; 9 1/2 in hind wing. M_2 originating 5 1/2 cells from nodus in fore wing; 4 in hind wing, Subnodal cell bounded by M_1, Rs_3, and M_3 dis-

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tinctly broader than high; that is, the M_1 side is broader than the Rs_3 side. Wings stalked distinctly proximal to Ac.

Abdomen: Blue, except for black markings on apical half of 1; distal third of 2, fifth of 3, half of 4, two-thirds of 5, four-fifths of 6, seven-eights of 7; and dorsum of 10. Black of distal fifth of 3 - 6 extending ventrally to lateral mid-line of segments. Superior appendage dark, elongate, equal in length to the 10 segment at mid-height, slightly curved mesally, with broad ventral projection bearing a small, raised, subterminal pad. Inferior appendage pale with dark tip, pointed, extending two-thirds the length of the superior.

Genitalia: Penis very similar to that of *E. praevarum* (as figured by Donnelly 1963).

ALLOTYPE FEMALE: Pale color obscure brownish-green (brown in dried specimens). Generally similar to male, except that the proximal black color on the femora is more restricted. The dorsum of the abdomen is black, with pale color limited to distal half of 1, proximal eighth of 4 and 5, seventh of 6, and sixth of 7. The dark color tapers on each segment to a rounded point proximally and expands abruptly at distal fifth of 3 - 7. Segments 8 - 10 black dorsally, with dark color narrowed very slightly distally on 9 and 10.

Mesostigmal laminae very similar to those of male, with anterior margin bilobed and centrally excavated, and tip curving abruptly posteriorly.

DIMENSIONS AND VARIATIONS AMONG THE TYPE SERIES: Abdomen of holotype male 24 mm; allotype female, 23 mm. Hind wing of holotype male 17.5 mm; allotype female, 18.5 mm. Abdomens of paratypes vary from 22.5 to 25.5 mm (32 males), and from 22.5 to 25.5 mm (3 females). Hind wings vary from 15.5 to 18 mm (32 males), and from 16.5 to 19.5 mm (3 females). There is some variation in the relative extent of dark and pale colors: many specimens have the central spot between the pale postocular spots reduced, and a few have this spot enlarged to connect the postocular spots across the center of the head. Ten males have more dark color on the abdomen, with the distal three-fifths of 4 and four-fifths of 5 black. The four female specimens vary greatly in size but show little color variation. One female has the dark color at the base of the 8th segment narrowed abruptly to a rounded point.

MATERIAL EXAMINED: Holotype male and allotype female: Los Aposentos, near Chimaltenango, Guatemala, 12 Sept. 1964, coll. T. and A. Donnelly. Paratypes: 4 ♂♂, 8.6 mi. N.W. of Comayagüela, Prov. Francisco Morazán, Honduras, 27 Aug. 1964, coll. F. G. Thompson (in collection of D. R. Paulson); 1 ♂, "along small stream near R.R., near Guatemala City", Guatemala, 30 Jan. 1905, coll. E. B. Williamson; 10 ♂♂, Santa Cruz de Verapaz, Dept. Alta Verapaz, Guatemala, 4 July 1962, coll. T. Donnelly; 8 ♂♂, Caldera Lake near San Francisco de Sales, Volcán Pacaya, Guatemala, 22 Aug. 1964, coll. T. Donnelly; 5 ♂♂, 1 ♀, Los Aposentos (same locality and date as holotype); 2 ♂♂, stream and pond, 9.2 mi. N. of Jitotol, Chiapas, Mexico, 16 July 1965, coll. D. R. Paulson; 2 ♂♂, 2 ♀♀, reservoir at San Cristobal de las Casas, Chiapas, Mexico, 13 July 1965, coll. D. R. Paulson.

The holotype and allotype are deposited in the Florida State Collection

of Arthropods. Paratypes will be deposited in the Museum of Zoology, University of Michigan; the United States National Museum, and several other collections.

A total of 79 ♂ ♂ and 9 ♀ ♀ of *E. praevarum* from central and southern Mexico, as well as many from the United States, were examined. These specimens were all borrowed from the Williamson collection at the University of Michigan, and are distributed approximately as follows: Specimens from Oaxaca, Michoacán, Querétaro, Distrito Federal, and San Luis Potosí, all collected between 1890 and 1903, principally by Deam and by Adams; specimens from Guerrero and Guanajuato collected in 1932 by Smith and Taylor; and specimens from Jalisco collected in 1923 by J. H. Williamson.

The new species bears approximately the same relationship to *E. praevarum* in the southern part of its range as does *E. anna* Williamson in the north. *E. praevarum* is a remarkably stable species throughout a wide range and occurs with a large variety of other Odonata species at most of the places it is found. Both *anna* and *rua* live in marginal areas which must be considered harsher, judged by the relatively more restricted faunas with which they coexist. *E. rua* was found in one locality (Santa Cruz de Verapaz) flying virtually alone, with only one specimen of another species (*Anomalagrion hastatum* (Say)). Seen at Caldera Lake, it was found along with *Libellula foliata* (Kirby), *Aeshna jalapensis* Williamson, *Sympetrum illotum* (Hagen), and *Argia fissa* Selys. At Los Aposentos it flew with *A. jalapensis, Coryphaeschna luteipennis* (Burmeister), *S. illotum* and *Enallagma civile* (Hager). At none of the three Guatemala localities was the Odonata fauna especially rich, nor were specimens abundant. No information is available on the Honduras and southern Mexico occurrences.

All of the localities at which *E. rua* were found were at fairly high elevations. At the Honduras locality the elevation is given as 5800 feet; at Santa Druz de Verapaz it is about 4900 feet; at Caldera Lake, 5900 feet; at Los Aposentos, 6500 feet; at Jitotol, 5800 feet; and at San Cristobal de las Casas, 7400 feet.

Morphologically *rua* and *anna* differ from *praevarum* in about the same way. Both species have distinctly longer superior appendages then does *praevarum,* though *anna* is a relatively stout species, with heavy appendages, and *rua* is more delicate. *E. rua* is distinguished from *praevarum* by its longer superior appendages, with the mesal-ventral projection far less prominent in lateral view than is that of *praevarum.* The lateral aspect of the appendage of *praevarum* is that of a blunt appendage, as high as long, and distinctly shorter than the tenth segment. The appendage of *rua* is thinner and distinctly longer than high in lateral view. The females are not easily distinguished. The mesostigmal laminae of *rua* have the mesal lobe of the anterior margin more prominent than that of *praevarum,* and the tip of the laminae less tapered and more abruptly rounded.

Though the species *rua* and *praevarum* are obviously close, both appeared to be internally consistent, and there was no tendency towards gradation between the two species. The northern species *anna* is closer

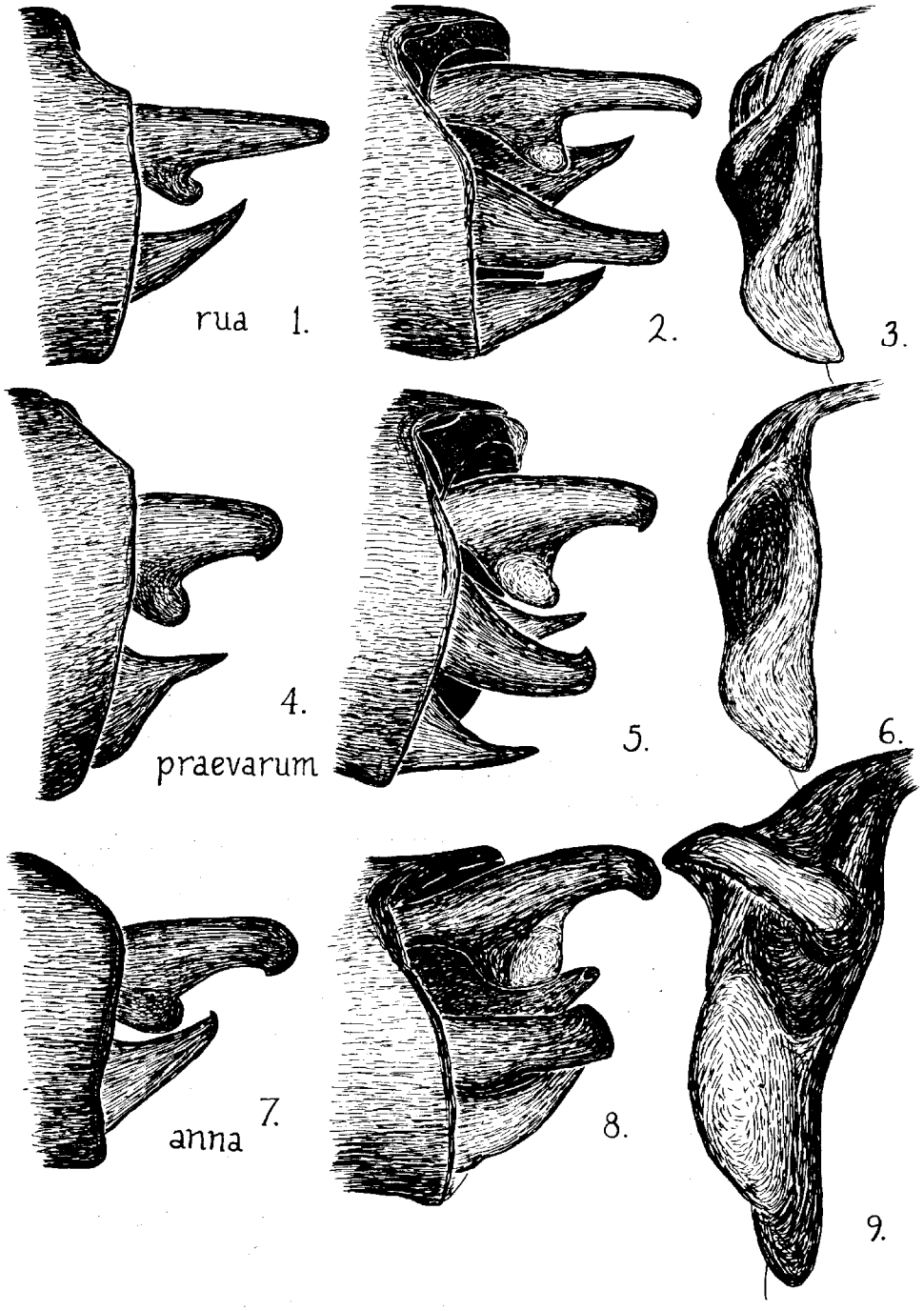

Fig. 1-3, *Enallagma rua*, n. sp.; Fig. 4-6, *E. praevarum*; Fig. 7-9, *E. anna*. Fig. 1, 4, 7, lateral view of male appendage; Fig. 2, 5, 8, inclined view of male appendage; Fig. 3, 6, 9, dorsal view of mesostigmal lamina of female.

to *rua* in appearance, though it is stockier than that species and is separated from *rua* by the much heavier superior appendage of the male by the different form of the mesostigmal laminae, by its yellow costa, and by the fact that the range of the two species are separated by about 2000 miles. Very possibly both *anna* and *rua* are only slightly derived from an ancestral form which *praevarum* effectively displaced in the major part of the range of that hypothetical species.

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LITERATURE CITED

Donnelly, T. W., 1963. Possible phylogenetic relationships among North and Central American *Enallagma*. Proc. North Central Branch, Entomol. Soc. Amer., 18: 116-119.