NOTES ON THE GENUS METALEPTOBASIS WITH THE DESCRIPTION OF A NEW SPECIES FROM PANAMA
(ODONATA: COENAGRIIDAE)

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While on a collecting trip to the Canal Zone and the Republic of Panama in the summer of 1950, I visited the Canal Zone Biological Area, Barro Colorado Island, several times. On July 22, 1950, in collecting on one of the back trails at a small rain pond, I found that a long, dainty, orange-yellow damselfly with prominent mesothoracic horns was quite abundant. I collected a small series including three pairs in tandem without realizing that these specimens represented an undescribed species of Metaleptobasis. Some time later an additional male was taken in the Pacora region of the Republic of Panama, and still later another male was taken at the Canal Zone Experimental Gardens at Summit C. Z. In view of the dearth of Metaleptobasis material in collections, and the scanty knowledge of the zoogeographical and phylogenetic relationships within the genus, a study of this material adds substantially to our understanding of the genus. It therefore seemed desirable, along with the description of this new species, to review the previous work on the genus and to investigate the relationships which might be suggested by the information available to date.

The genus Metaleptobasis was set up by Dr. Phillip P. Calvert in “Biologia Centrali-Americana, Odonata,” (1907:386) for his new species, M. bovilla, described from a single male from Nicaragua and a single female from Guatemala. Generic characters were listed which would separate the genus from its nearest relative, Leptobasis. Of these the following still apply:

$M_2$ arising nearest the fifth or sixth postnodal on the hind wings, the sixth or more remote on the front wings; tarsal claws toothless; superior appendages of the male not bent down almost at a right angle in their apical half; genital valves of the females not reaching far beyond the level of the tips of the abdominal appendages.

When he originally established the genus, Calvert (loc. cit.) pointed out that it would also include Leptobasis diceras Selys, and suggested that it might also include the other species asso-
associated therewith by de Selys (L. bicornis and L. quadricornis.) He then (Calvert, 1909:197-200), in a further discussion of Metaleptobasis, definitely included in the genus L. bicornis Selys and described a new species, M. cornicauda. Calvert suggests here that the genus would probably also include L. macilenta Rambur 1 which he lists as the closest relative of his cornicauda. This brought the number of species definitely ascribed to the genus to four with two more which had been suggested as probably Metaleptobasis. The genus received further additions when E. B. Williamson (1915:601-608) described three new species from Trinidad, M. brysonima, M. mauritia, and M. manicarina. Williamson (1916) later corrected this first name to byrsonima, as the generic name of the plant after which it is named is so spelled. It is evident from his correction that the error is not of a typographical nature. I do not, therefore, believe that the correction is valid according to the current interpretation of the rules, and I shall retain the original spelling of the name in this paper. Another species was added by Ris (1918:130) when he described M. foreli from Colombia, and still another in the same year by Sjöstedt (1918:19-21) when he described M. amazonica from western Brazil. Another species was added by Calvert (1948:60-61) when he described M. tetragea from Kartabo, British Guiana. It is again strongly implied by Calvert in this paper that L. quadricornis Selys is actually a Metaleptobasis when he lists it as the closest relative of tetragea. Ten species have then actually been called Metaleptobasis in the literature and two others, L. quadricornis Selys and L. macilenta Rambur, have been suggested by Calvert as likely Metaleptobasis. Both of these species are to my knowledge still only known from the single specimens from which they were described. In the descriptions characters which would definitely separate Metaleptobasis from Leptobasis are not given. However, on the basis of other characters each of these species seems to be the closest relative of a species which is unquestionably Metaleptobasis. I therefore include these two species in this paper as Metaleptobasis with the hope that material will come to light which will settle the matter one way or the other.

My discovery of a new species of this genus from Panama brings the number of known species to thirteen and helps to fill what was previously a large gap in the known distribution of Metaleptobasis.

1 In Selys (1877:106, reprint p. 12).
Metaleptobasis westfalli sp. nov.

*M. westfalli* is more closely related to *brysonima* than any other known species, but it may be easily separated from *brysonima* on the basis of the following characters: The mesothoracic horns of *westfalli* are convergent throughout most of their length, while those of *brysonima* diverge and are farthest apart at the tips. The superior abdominal appendages of *brysonima* in dorsal view are curved lateral at the extreme tips to form hooks, while those of *westfalli* are straight at the tips. *M. brysonima* is also somewhat smaller than *westfalli*. *M. westfalli* is also closely related to *bovilia*, from which it can be separated by the shape of the mesothoracic horns and the shape of the abdominal appendages.

**MALE:** Head. Dorsal surface of the head black; orange behind and with some faint brown markings on the frons and vertex. Labrum dark flesh color with the dorsal and lateral borders edged in dark brown. Labium yellow.

Thorax. Generally bright orange with lighter yellowish shades ventrally and becoming darker dorsally with a black or metallic green middorsal stripe about 0.5 mm. wide. Mesothoracic horns light in color, becoming dark at the tips. They are slender, sharp pointed and convergent throughout most of their length so that the tips are quite close together. There is some variation in the form of the horns in the series of eight males which I have. Five of them approach the drawings of the horns (figs. 4 and 5) very closely. In two specimens, the tips of the horns are closer Together and almost touch. In one specimen the tips of the horns actually cross. Wings hyaline; important venational characters summarized in the table.

Abdomen. Segment one yellow with a narrow brown line around its posterior border. Segment two yellow anteriorly becoming brown posteriorly. Segments three, four, and five yellow ventrally, each with a yellow spot on the lateral surface of the anterior end, dark brown dorsally and laterally; each segment becoming successively darker. Segments six through ten dark brown with yellow markings on the ventral surface. Abdominal appendages light brown proximally, becoming dark brown to black distally, shaped as figured.

**FEMALE:** Differs from the male as follows: Colors generally more subdued. The thorax in two of my three specimens is much darker than the male with which it is associated and shows traces of a thoracic color pattern. This pattern may be an artifact of drying as it is not constant where it occurs and in one of my three females does not occur at all. With respect to color this third female is almost identical with the male with which it is associated. The mesothoracic horns of the females seem to be much more variable than those of the males. In one of my three specimens, the horns are missing entirely, being represented by small stumps. In another of the females there is an abnormality in that about one-third of the right horn is bent back on itself in a tight elbow, and in the third specimen the right horn is bent forward much more than
All figures are of *Metaleptobasis westfalli* sp. nov.

Fig. 1. Male abdominal appendages, profile view.
Fig. 2. Male abdominal appendages, dorsal view.
Fig. 3. Female, tip of abdomen, profile view.
Fig. 4. Mesothoracic horns of male, dorso-caudal view.
Fig. 5. Mesothoracic horns of male, profile view, from right side.
its fellow of the opposite side. In the two females which have horns it is apparent that, aside from the abnormalities, the horns are very similar in basic pattern to those of the males. It may be in this genus that horn characters are in general more variable in the females than in the males. There is no question about the association of all of these females with this species. They were all taken in tandem and in most important structural characters resemble each other closely. This series of three females represents the greatest number of known specimens of that sex reported in the literature for any one species of the genus except _M. mauritia_ Williamson. Geliskes (1932) described three females of this species, and one of _M. manicaria_ Williamson, basing his determinations chiefly on wing venation. The females of five other species are known from a single specimen; of one species from two specimens; and four species, not at all. The genital values are figured and are quite constant in the specimens I have. Measurements and important venational characters are given in the table.

**HoLOTYPE** (male) and **ALLOTYPE** (female).—Barro Colorado Island, Panama Canal Zone; July 22, 1950; (R. B. Cumming), [University of Michigan, Museum of Zoology].

**Paratypes** (7 ♂ ♂ and 2 ♀ ♀ all taken by the author) as follows:


**Republic Of Panama.** 5 mi. W. of Pacora, Prov. de Panama: 1♂, Aug. 26, 1950 [R.B.C.].

**Table Of Counts and Measurements**

Each specimen is identified by my original catalogue number, locality of capture, and place of deposition. All measurements are in millimeters. The origin of the M₃ is with respect to the postnodals. Abbreviations: RBC is Robert B. Cumming; MJW is Minter J. Westfall, Jr.; UMMZ is Univ. of Michigan, Museum of Zoology; USNM is U. S. National Museum; FSM is Fla. State Museum.

**A Key To The Known Males Of The Genus Metaeleptobasis**

The following key is designed to separate the known males of the genus. It does not seem practical to include the females in a key at this time; the females of four of the thirteen known species remain unknown (brysonima, cornicauda, diceras, and macilenta). Also the best indicator of phylogenetic relationships on the basis of the present knowledge seems to be the form of the male abdominal appendages, and characters involving them are used a great deal in this key. _M. foreli, quadricornis_, and _tetragena_ are not included in this key as each of these species is known from a single female specimen. These three species seem
**Type Series: Counts and Measurements**

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<th>Sex</th>
<th>Locality</th>
<th>Deposited</th>
<th>Hind Wing</th>
<th>Front Wing</th>
<th>Abdomen</th>
<th>Postnudals Hind Wing</th>
<th>Postnudals Front Wing</th>
<th>Origin of M_2 Hind L. R.</th>
<th>Origin of M_2 Front L. R.</th>
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*Mean for the ♂ ♂ .............................................................. 21.12 | 21.71 | 37.65 | 12.44 | 13.06 | 6.08

| RBC 51   | ♀    | BCI      | UMMZ*     | 23.3      | 23.9       | 38.7    | 12          | 12               | 13          | 13        | 6          | 6          | 6          | 6          |
| RBC 53   | ♀    | BCI      | USNM      | 22.7      | 23.4       | 35.8    | 12          | 12               | 12          | 12        | 6          | 6          | 6          | 6          |
| RBC 55   | ♀    | BCI      | RBC       | 21.5      | 22.8       | 35.7    | 12          | 12               | 12          | 12        | 6          | 7          | 6          | 6          |

*Mean for the ♀ ♀ .............................................................. 22.5 | 23.2 | 36.73 | 12.0 | 12.5 | 6.08

*Holotype ♂ and Allotype ♀.*
to form a natural group which is discussed below under phylogenetic relationships. *M. bicorns* is separated off first on the basis of its rather unusual mesothoracic horns, but this is a matter of expediency rather than an indication of actual degree of relationship. The only known male of *bicorns* lacks its last four abdominal segments. Otherwise the key should be indicative of actual relationships within the genus.

1 Each mesepisternum with a slender straight horn directed laterad and hardly at all cephalad or dorsad ........................................... *bicorns*
1' Each mesepisternum with a horn directed dorsad and cephalad or with the mesothoracic horns entirely absent .................................. 2
2 Superior abdominal appendages longer and extending farther caudad than the inferiors (*diceras* group) ........................................ 3
2' Inferior abdominal appendages longer and extending farther caudad than the superiors (*bovilla* group) ........................................ 5
3 Mesothoracic horns present .............................................. *diceras*
3' Mesothoracic horns absent ............................................. 4
4 Superior abdominal appendages thicker at the bast than elsewhere. Postnodals 12-13 ..................................................... *macilenta*
4' Superior abdominal appendages in dorsal view each of subequal width in the proximal two-thirds and widened in the distal third, especially on the mesial side. Postnodals 14-16 ......................... *cornicauada*
5 Superior abdominal appendages in dorsal view, long, gently curved, and subequal in width for their entire length; in profile view, extending beyond the basal two-thirds of the inferiors (*manicaria* subgroup) .... 6
5' Superior abdominal appendages in dorsal view, over twice as wide at their bases as in their distal third; in profile view, not extending beyond the basal two-thirds of the inferiors (*bovilla* subgroup) ............. 8
6 Superior abdominal appendages in profile view, slender, curved down at their apices to form sharp hooks ..................................... *amazonica*
6' Superior abdominal appendages in profile view, stout and straight with rounded tips ............................................. 7
7 Middorsal thoracic stripe black and about 0.5 mm. wide. Mesothoracic horns in profile view of subequal width for their entire length. Superior abdominal appendages in profile view shorter than segment 10 measured along the dorsal surface including the apex .................................. *mauritius*
7' Middorsal thoracic stripe metallic green and 0.25 mm. wide or less. Mesothoracic horns in profile view widest subapically. Superior abdominal appendages in profile view longer than segment 10 measured along the dorsal surface including the apex .................................. *manicaria*
8 Mesothoracic horns stout, each subparallel with its fellow of the opposite side for half of its length, then strongly diverging and curving laterad to a rounded tip ......................................................... *bovilla*
8' Mesothoracic horns slender, with no strong divergence at the apices and with sharp tips ................................................... 9
9 Mesothoracic horns gently diverging throughout their length, farthest apart at their tips. Superior abdominal appendages in dorsal view curving outward at the extreme tips to sharp points directed straight laterad ................................................ *brysonima*
Mesothoracic horns gently converging throughout most of their length, quite close together at their tips. Superior abdominal appendages in dorsal view with no lateral divergence at the tips. westfalli

Phylogenetic Relationships

Several clear-cut groups can be recognized in *Metaleptobasis* on the basis of the morphology of the known species. While I hesitate to propose taxonomic categories with such meager material available, I feel that these suggested relationships should be pointed out. I shall therefore propose a hypothetical grouping within the genus, which can be tested with information as it becomes known. The shape of the abdominal appendages in the males seems to offer indications of phylogenetic relationship in nine of the thirteen species. One of the species for which this evidence is not available is *bicorns* in which the only male known lacks its last four abdominal segments. The affinities of this species within the genus remain obscure, and they will not be considered in this discussion. Three other species, *quadricornis*, *foreli*, and *tetragea*, are each known only from a single female specimen. It is interesting that these three species seem to fall into a single group on the basis of horn characters.

The Quadricornis Group

Members of the *quadricornis* group can be distinguished from other *Metaleptobasis* by their having four thoracic horns, a pair on the prothorax and a pair on the mesothorax. As males are unknown in all of the included species, the degree of relationship of this group with other groups of *Metaleptobasis* cannot be determined. The geographical distribution of the *quadricornis* group seems to be from central to northern South America. *M. quadricornis* is from Brazil at about 20 degrees south latitude. *M. foreli* is from Colombia, and *tetragea* is from British Guiana.

Two groups can be set up on the basis of the morphology of the male abdominal appendages, and one of these can be divided into two subgroups. Though these groupings are based on abdominal appendages, other morphological characters and zoogeographical considerations can be found which tend to indicate that they are natural.

The Diceras Group

In the *diceras* group the superior abdominal appendages are longer than the inferiors. This group contains three species,
diceras, cornicauda, and macilenta. M. diceras and cornicauda are both taken from Southeastern Brazil between 10 and 20 degrees south latitude. To date the only Metaleptobasis outside of this group known from as far south as 10 degrees south latitude is quadricornis. The locality on macilenta is no more definite than Brazil. Unfortunately material is scarce; females are not known for any of the species. Selys described the male and female of diceras but Williamson (1915) states, “It is not impossible that the type female (of diceras) in De Selys’ collection will prove unidentifiable through inability to associate it certainly with the proper male of any one of possibly two or more closely related species.”

THE BOVILLA GROUP

In the bovilla group the inferior appendages are longer than the superiors. This is apparently a larger group both geographically and with respect to number of species than the diceras group. The group consists of six known species, and can be divided into two subgroups of three species each.

THE MANICARIA SUBGROUP

The manicaria subgroup contains manicaria, mauritia, and amazonica. Its distribution is somewhat intermediate between the diceras group and the bovilla subgroup, and all of the specimens known come from between 10 degrees south latitude and 11 degrees north latitude. Both manicaria and mauritia have been taken in Trinidad which is the most northern known locality for this subgroup though mauritia has also been taken in British Guiana. One of the species of the bovilla subgroup, brysonima, is also from Trinidad, and another, westfalli, is from about two degrees south of Trinidad in Panama so the ranges as to latitude of the two subgroups as they are now understood overlap to some extent. In the manicaria subgroup the superior abdominal appendages in dorsal view are slender, curved, and subequal in width for their entire length.

THE BOVILLA SUBGROUP

The bovilla subgroup contains bovilla, brysonima, and westfalli. Geographically it has a more northern distribution than the manicaria subgroup. Its known range extends from about 9 to 16 degrees north latitude from Guatemala down through Panama to Trinidad. The bovilla subgroup can be separated
from the *manicaria* subgroup morphologically by the superior abdominal appendages which are shorter relative to the inferiors (less than two-thirds) and which, in dorsal view, are more than twice as wide at the bases as in the distal third.

**ACKNOWLEDGMENTS**

I am particularly indebted to Dr. Minter J. Westfall, Jr., who has been my counselor on Odonatological matters for several years. It was at his suggestion that I did the collecting in Panama which led to the discovery of the species described in this paper, and it is for him that the species is named. I also wish to thank Dr. Lewis Berner for his many helpful suggestions and criticisms. I am indebted to James Zetek, resident manager of the Canal Zone Biological Area, whose thoughtfulness made collecting in Panama more pleasant and profitable than it otherwise would have been. The figures are the work of Miss Esther Google, staff artist for the Department of Biology at the University of Florida.

**LITERATURE CITED**


