

Revision of the Genus *Metalepta* Brunner von Wattenwyl (Orthoptera; Acrididae; Hyalopterygini)

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ABSTRACT

In this study *Metalepta* is redescribed based on characters from the external morphology and genitalia. The two known subspecies proposed by Rehn (1944) for *M. brevicornis* (*M. b. brevicornis* and *M. b. adspersa*) are considered separate species based on characters found in the male genitalia and female subgenital plate. To analyze if these species show geographic variation in body size, measurements of morphological characteristics were made on adults collected from different localities over the known distributions. Multivariate analyses results showed that there is no evidence of direct relationship between the body size variation and the geographic distribution of specimens, although the species are highly variable in size and color patterns.

INTRODUCTION

Metalepta was proposed by Brunner von Wattenwyl (1893) for the "American species of the genus *Truxalis* Fabricius" and included in the genera group Hyalopteryges. Giglio-Tos (1894) associated the name *brevicornis* of Linnaeus with *Metalepta* and subsequently considered *Truxalis adspersa* Blanchard to be a synonym of *M. brevicornis* (Giglio-Tos 1897a).

Rehn (1944) in his revision of the genera group Hyalopteryges revaluated the name *adspersa* of Blanchard as a subspecies of *M. brevicornis*. Rehn (1944) considered differences in the size of the male subgenital plate and the relation between the male subgenital plate and male cerci to separate the subspecies *M. brevicornis brevicornis* from North and Central America and *M. brevicornis adspersa* from South America. He also observed that both subspecies showed a considerable amount of individual variation in certain features and analyzed the geographic size variation under each taxon (Rehn 1944). Based on body measurements Rehn (1944) divided *M. b. brevicornis* into three groups: typical *M. b. brevicornis* (mostly distributed in Canada, USA and Mexico), atypical *M. b. brevicornis* (mostly from Mexico) and intermediate *M. b. brevicornis* (from Mexico, Central America and Colombia).

Hebard (1922) in his paper on North American Acrididae, observed in

M. brevicornis an average increase in size southwards. He also compared North American individuals of *M. brevicornis* with material from Mexico, Costa Rica, British Guyana, Paraguay and Argentina and believed there was no evidence of racial differentiation (Hebard 1922). Rehn (1944), according to Hebard (1922), also mentioned that the maximum size attained by individuals of *M. b. brevicornis* was found in individuals from the southern and southeastern United States. The geographic size variation analysis in *M. b. adspersa* revealed that the maximum size of this taxon was found in individuals from Mato Grosso and Rio Grande do Sul, Brazil, Paraguay and northeast and central Argentina (Rehn 1944).

Examination of the material studied by Hebard (1922) and Rehn (1944) and new material from the distribution range of *M. b. brevicornis* and *M. b. adspersa* revealed differences in the male genitalia and the female subgenital plate between these two taxa that we believe deserve specific status.

The objectives of this paper are as follows: (1) to clarify the limits and status of these taxa and (2) to analyze the geographic variation of body size found in the species.

MATERIALS AND METHODS

Depositories.—Specimens examined for this study are deposited in the following institutions (the name of the corresponding city identifies the collections in the text):

BUENOS AIRES	Museo de Ciencias Naturales "Bernardino Rivadavia", Argentina
GENEVE	Museum d' Histoire Naturelle, Switzerland
LA PLATA	Facultad de Ciencias Naturales y Museo, Argentina
LONDON	The Natural History Museum, United Kingdom
MONTEVIDEO	Facultad de Ciencias, Universidad de la Repùblica, Uruguay
PARIS	Museum National d'Histoire Naturelle, France
PHILADELPHIA	Academy of Natural Sciences of Philadelphia, USA
STOCKHOLM	Naturhistoriska Riksmuseet, Sweden

Male genitalia.—Museum specimens were softened with ammonia before dissection of the phallic complex; phallic complexes were then cleared in potassium hydroxide and stored in glycerin.

Measurements.—An ocular micrometer in a dissecting microscope was used to take the following measures: total body length from the fastigium apex to the end of tegmina (BL), in lateral view; length of pronotum (PL) was measured along the midline; length of tegmina (LT) was taken from the proximal visible end of the costal margin to its apex; length of hind femur (LF) was measured from the dorso-proximal lobe to the distal extremity; the length of male cercus was taken from the base to its apex and the length of the male subgenital plate was taken from the junction of the preceding sternite and the epiproct to its apex.

Illustrations.—The phallic complex of the male and the female subgenital plate were illustrated using an ocular grid. A camera lucida

was used for those of external morphology.

Multivariate analysis.—This study was based on museum material from the Museo de La Plata (LA PLATA), Museo de Ciencias Naturales "Bernardino Rivadavia" (BUENOS AIRES), Facultad de Ciencias, Universidad de Montevideo, Uruguay (MONTEVIDEO) and the Academy of Natural Sciences of Philadelphia (PHILADELPHIA).

A total of 244 specimens (145 males and 99 females) were examined for the two species. We have performed separate analysis for males and females. In both analyses only one specimen from each locality was used because no intra-locality variation was observed in the material examined. Number of specimens, locality, collection data and acronyms are listed in Appendix I and II.

The characters used in the analysis were those that best differentiated the material examined. Characters used by Rehn (1944) to separate the two subspecies were also included.

A total of 6 characters were used in the analysis of males (Appendix I). Five characters were quantitative: Body length (BL); length of pronotum (LP); length of the tegmen (LT) and length of hind femur (LF). One ratio was used: length of male cercus/ length of male subgenital plate (CS). One qualitative character was included: Epiphallus (EPI), coded as a binary character [internal and external lobes of lophi small (1); internal and external lobes of lophi big (2)].

A total of 5 characters were used in the analysis of females (Appendix II). Four characters were quantitative: Body length (BL); length of pronotum (LP); length of the tegmen (LT) and length of hind femur (LF). One qualitative character was included: Female subgenital plate (FSP), coded as a binary character [posterior margin of female subgenital plate rounded (1); posterior margin of female subgenital plate trapezoid (2)].

From various multivariate techniques we selected an ordination method (principal component analysis, PCA, Blackith and Reyment 1971) because it has the advantage of indicating the relative contribution of each character to each vector. PCA was based on the Pearson product-moment correlation coefficient (Michener and Sokal 1957). The NT-SYS pc program, version 2.0 (Rohlf 1998) was used in the analysis.

SYSTEMATICS

Genus **METALEPTEA** Brunner von Wattenwyl 1893

Type species: *Gryllus brevicornis* Linnaeus, 1763

Truxalis Fabricius 1775: 279; Stål 1873: 104; Rehn 1905: 802, 1906: 16; Kirby 1910: 103; Bruner 1911: 9; Liebermann 1939: 149; Roberts 1941: 12.

Metalepta Brunner von Wattenwyl 1893: 118; Giglio-Tos 1894: 22 (associated the name *Metalepta* with *brevicornis* of Linneo & Stål), 1897a: 1, 1897b: 22; Gurney 1940: 92 (designated the type species); Jago 1971: 215; Otte 1981: 216.

Metalepta Sharp 1893 (non *Metalepta* Baly 1861: 205); Bruner 1895: 63; Hebard 1937: 224 (probably misprinted).

Metalepta was proposed by Brunner von Wattenwyl (1893) for the "American species of the genus *Tryxalis* Fabricius" and included in the genera group Hyalopteryges, without mentioning its type species. At the time Brunner von Wattenwyl proposed the name *Metalepta*, the genus *Truxalis* included only two species: *T. brevicornis* from the American continent and *T. nasutus* from Africa. Because Giglio-Tos (1894) was the first to associate the name *brevicornis* Linnaeus with *Metalepta*, Rehn (1944) considered him to be the author of the generic name. According to Gurney (1940) and following the ICZN [Art. 11c (i)] Brunner von Wattenwyl should be considered the author of *Metalepta*. Besides, Gurney (1940) following the Opinion 46 of the International Commission on Zoological Nomenclature considered *M. brevicornis* (Linnaeus) as the type species.

Re-description.—Male: Body compressed with opaque tegument, medium sized insects (from about 22 mm in smallest males to 39 mm in largest females). Head with fastigium elongated (as long as the interocular distance), shallowly excavated dorsally, apex rounded, median ridge does not extend back beyond the eyes; lateral foveolae absent. Eyes little prominent. Antennae subensiform, width of scape less than two times the width of first segment of flagellum. Pronotum smooth, sides of pronotum parallel; pronotal disk flattened and rectangular, with median carinae cut by principal sulcus, lateral carinae distinct and parallel cut by principal and secondary sulci; anterior margin of pronotum straight, posterior margin of pronotum slightly angulate. Abdomen, male subgenital plate conical pointed at the end, with variable length (mean= 2.5, S. D. ± 0.46 , minimum length= 1.1 mm, maximum length= 3.8 mm). Hind femora elongated; hind knees with pointed upper and lower lobes, lower lobes more produced than the upper lobes. Hindwings with 9 or 11 (exceptionally 14) large oblong-shaped cells between Cu_1 and Cu_2 veins; end of fore wings obliquely truncated and with distal extremity pointed. Phallic complex: as shown in Figs. 2 and 3 A; J. Endophallic plates with anterior expansions well developed; aedeagal valves straight and robust, arch of dorsal valves robust and rounded at the apex; sheath of pennis slightly expanded laterally and denticulate. Cingulum with apodemes wide; ectophallic membrane with lateral sclerite well sclerotized. Epiphallus fenestrated, variably shaped, anterior projections of lateral plates globe-shaped, posterior projections acute and expanded laterally; anchorae constituting independent sclerites, curved inwards, with acute apices; lophi trilobated with median lobe less sclerotized than external and internal lobes; bridge narrow and concave, sub-quadratae or sub-circular.

Female: similar to male but larger and more robust. Ovipositor valves short and curve; female subgenital plate with posterior margin rounded or trapezoid. Internal genitalia: spermathecae provided with both apical and preapical diverticula. The apical diverticulum rounded at the apex. The preapical diverticulum longer than the apical diverticulum.

Coloration.—Male: face, dorsal surface of head, disk of pronotum, disk of tegmina and fore and middle legs green. Sides of head and lateral lobes of pronotum brown; sides of tegmina brown, turning pale posteriorly. Hind wings with anal field usually greenish. Abdomen, hind femora and

ventral surface of body brown; some specimens with hind femora greenish. Some specimens with a dark brown post-ocular stripe extending on to the lateral lobe of pronotum and up to the anterior portion of tegmina, along the A₁ vein.

Female: homogeneously green or brown. Some specimens with a brown post-ocular stripe extending on the anterior portion of tegmina, where it turns into dark brown spots; dorsal surface of body brown.

Distribution.—The genus *Metaleptea* is found in Eastern United States, Mexico, Central America and South America up to Central Argentina. This genus is not found in the Pacific slopes of the Andes. Bruner (1900) and Vickery (1989) reported the extreme northern distribution in Ontario (Canada).

Generic relationships.—Because *Metaleptea* has the hind femora in males without stridulatory pegs, the forewings of both sexes are obliquely truncated at the apex and the hindwings of males always have enlarged cells, we agree with Otte (1981) in placing this genus in the tribe Hyalopterygini.

Metaleptea is closely related to *Allotruxalis* Rehn based on the following characters: fastigium elongated, antennae subensiform, lateral carinae not divided in metazona, tegmina narrow and hindwings elongated, male subgenital plate shorter than the two preceding sternites, hind femora with dorso-genicular lobes short; but it can be easily recognized from it based on characters listed on Table 1.

KEY TO THE SPECIES OF THE GENUS METALEPTEA

- 1 Male subgenital plate short (the length of male cercus less than two times the length of male subgenital plate); epiphallus of males with internal and external lobes of lophi small, lateral plates less expanded; posterior margin of female subgenital plate rounded. Distributed in Eastern United States and Central America up to Costa Rica *Metaleptea brevicornis* (Linnaeus 1763)
- 1' Male subgenital plate long (the length of male cercus equal or more than two times the length of male subgenital plate); epiphallus of males with internal and external lobes of lophi big, lateral plates more expanded; posterior margin of female subgenital plate trapezoid. Distributed in South America up to Panama *Metaleptea adspersa* (Blanchard 1846)

Metaleptea brevicornis (Linnaeus 1763) n. status

Figs. 1, 2, 3 A-E, 4

Gryllus brevicornis Linnaeus 1763: 398. [Type lost, North America].

Acrydium ensicornu De Geer 1773: 499. [Type female, Pennsylvania, USA, STOCKHOLM]; Stal 1873: 104 (syn. of *Truxalis brevicornis*).

Truxalis brevicornis: Fabricius 1775: 279; Stal 1873: 104; Rehn 1905a: 400, 1905b: 802, 1906: 16 (because the material cited in this paper comes from British Guyana and Brazil, this citation probably belongs to *M. adspersa*); Kirby 1910: 103; Bruner 1911: 9 (because the material cited in this paper comes from Brazil, this citation probably belongs to *M. adspersa*); Rehn 1913: 313

(because the material cited in this paper comes from Argentina, this citation probably belongs to *M. adspersa*); Rehn and Hebard 1916: 155; Rehn 1917: 344 (because the material cited in this paper comes from Brazil, this citation probably belongs to *M. adspersa*), 1918: 194 (because the material cited in this paper comes from Brazil, this citation probably belongs to *M. adspersa*); Hebard 1922: 104, 1923: 197 (because the material cited in this paper comes from Colombia, this citation probably belongs to *M. adspersa*); Liebermann 1939: 149; Slifer 1939: 462 (drawing of spermathecae); Liebermann 1939: 149 (because the material cited in this paper comes from Argentina, this citation probably belongs to *M. adspersa*); Rehn 1944: 223; Otte 1981: 217.

Truxalis notochlorus Palisot de Beauvois 1805: 80 [Type lost, Central America, Caribbean: Hispaniola]; Kirby 1910: 103 (syn. of *Truxalis brevicornis*); Rehn 1944: 225 (suggested an error in type locality).

Truxalis viridulus Palisot de Beauvois 1807: 81 [Type lost, "Santo Domingo", Central America, Caribbean]; Kirby 1910: 104 (syn. of *Truxalis brevicornis*); Rehn 1944: 225 (suggested an error in type locality).

Opsomala punctipennis Serville 1839: 590. [Type lost, North America]; Kirby 1910: 104 (syn. of *Truxalis brevicornis*).

Oxycoryphus burkhartianus Saussure 1861: 314. [Type female, Mexico, GENEVE]; Kirby 1910: 104 (syn. of *Truxalis brevicornis*).

Opomala stenobothroides Walker 1871: 52. [Holotype female, Chontales, Nicaragua, LONDON]; Kirby 1910: 104 (syn. of *Truxalis brevicornis*).

Metalepta brevicornis: Giglio-Tos 1894: 8, 1897a: 1, 1897b: 23; Gurney 1940: 92; Rehn 1944: 223; Liebermann 1946: 9, 1947: 165, 1948: 56, 1951: 42, 1958: 5; Gangwere and Ronderos 1975: 179 (because the material cited in this paper comes from Argentina, this citation probably belongs to *M. adspersa*); Descamps 1975: 39; Otte 1981: 216, 1995: 250.

Metalepta notochloris Bruner 1895: 63; Kirby 1910: 103 (syn. of *Truxalis brevicornis*).
Metalepta brevicornis Rehn 1944: 224. New status.

Types examined.—Of *Opomala stenobothroides*, a female in LONDON. Type of *Oxycoryphus burkhartianus*, a female in GENEVE labeled "Saussure type, Mexico", this type specimen has been studied by photos. Type of *Acrydium ensicornu*, a female in STOCKHOLM only labeled "27. 10. A." (no locality label), this type specimen has been studied by photos.

Re-description.—*Male*: Subgenital plate short; epiphallus with internal and external lobes of lophi small and its dorsal surface globe-shaped, lateral plates a little expanded.

Female: posterior margin of female subgenital plate rounded.

Variation.—The males of this species show high variability in body length (BL) (mean= 28.5 mm, S. D. \pm 2.38, minimum length= 24 mm, maximum length= 33.5 mm), length of femur (LFe) (mean= 13.6 mm, S. D. \pm 1.9, minimum length= 13 mm, maximum length= 16 mm) and length of tegmen (LT) (mean= 20.5 mm, S. D. \pm 1.8, minimum length= 16 mm, maximum length= 25 mm). The females shows high variability in body length (BL) (mean= 41.5 mm, S. D. \pm 3.95, minimum length= 31 mm, maximum length= 51 mm), length of femur (LFe) (mean= 20.7 mm, S. D. \pm 2.1, minimum length= 17 mm, maximum length= 27 mm) and length of tegmen (LT) (mean= 30.6 mm, S. D. \pm 3.38, minimum length= 19 mm, maximum length= 39 mm).

Distribution.—This species is found along the Atlantic side of United

States, Mexico to Central America up to Costa Rica.

Observations.—Some authors (Rehn 1944; Otte 1981, 1995) assigned the name *Gryllus brevicornis* to Johansson, instead of Linnaeus. However and according to Carbonell (*pers. com.*), until 1850 it was very common that the introduction of most Swedish professors' papers were written by their students. The name *G. brevicornis* was published in Linnaeus' "Centuria Insectorum" (1763) paper which was presented by his student, Boas Johansson. Based on this argument, the International Commission on Zoological Nomenclature considered Linnaeus as the author of *G. brevicornis* (Melville, 1969; Carbonell *pers. com.*).

Material examined.—COSTA RICA: 1 male, Chitaria, 1929; 1 female, La Palma, 1600 m, V-1905, R. Biolley (PHILADELPHIA); 3 males, Carrillo (PHILADELPHIA). GUATEMALA: 1 Female, Chiquimula, XI. 1930, J. J. White (PHILADELPHIA); 2 males, 2 females, Morales, VIII-1929, J. J. White (PHILADELPHIA). HONDURAS: 1 male, 1 female, Puerto Castilla, 26-III-1924, J. Bequaert (PHILADELPHIA). MEXICO: 4 males, 2 females, Swamp County, 6 mi. N. C. Victoria, Tampl., 21-VII-1936 (PHILADELPHIA); 1 male, Horsetail Falls, Monterrey, Nuevo Leon, 2. 200 ft., 27-VII-1938, H. R. Roberts (PHILADELPHIA); 4 males, 4 females, Tianguistengo, Hidalgo, 5. 500 ft., 13-VIII-1938, H. R. Roberts (PHILADELPHIA); 4 males, Necaxa, Puebla, 28-VII-1926, H. B. Baker (PHILADELPHIA); 1 male, Xico, VIII, O. W. Barret (PHILADELPHIA); 2 males, Atoyac, Veracruz, IV, H. H. S. (PHILADELPHIA); 2 males, 2 females, Orizaba, XII-1887, H. S. & F. D. G. (PHILADELPHIA); 1 male, San Rafael, Veracruz, Townsend (PHILADELPHIA); 1 female, Jalapa, Veracruz (PHILADELPHIA); 1 female, Fortin, Km 329 W Cordoba, Veracruz, 2. 500 ft., 27-VIII-1936, H. R. Roberts (PHILADELPHIA); 3 males, 4 females, Frontera, Tabasco, 8-VI-1928, A. Dampf (PHILADELPHIA); 2 males, 3 females, Villa Hermosa, Tabasco, 18-VI-1928, A. Dampf (PHILADELPHIA); 1 male, Teapa, Tabasco, II, H. H. S. (PHILADELPHIA); 1 nymph, San Quintin, Jatare R., Chiapas, 750ft., 15-III-1935, D. W. Amram jr. NICARAGUA: 1 nymph, Great Falls, Pis Pis River, 10 miles NW of Eden, 23-IV-1922, W. Huber (PHILADELPHIA); 1 male, B. Schimek (PHILADELPHIA). USA: 15 males, 4 females, San Antonio, Bexar Co. Texas, 15/ 16-VIII-1912, Rehn & Hebard (PHILADELPHIA); 1 male, Nome, Texas, 30-VI-1916, share with Clark & A. N. S. P. (PHILADELPHIA); 1 male, Dallas, Texas, Ball's No. (PHILADELPHIA); 1 female, Dallas, Texas, Ball's No, 21-VIII (PHILADELPHIA); 3 males, 1 female, Beaumont, Jefferson Co., Texas, 23-VIII-1912 (PHILADELPHIA); 1 male, 2 females, An Co., Texas, 1-IX-1933, F. H. Isely (PHILADELPHIA); 2 males, Houston, Texas, 12-VIII-1935, Rehn & Hebard (PHILADELPHIA); 2 males, Smh Co., Texas, 2-VIII-1935, F. B. Isely (PHILADELPHIA); 2 males, Dickinson, Galveston Co., Texas, 20-VII-1912, Hebard (PHILADELPHIA); 1 female, Harrisburg, Texas, 13-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 female, Schaupp., Bumet Co., Texas, IX-1884 (PHILADELPHIA); 2 males, Vz. Co., Texas, 2-VIII-1935, F. B. Isely (PHILADELPHIA); 1 male, Tyler, Texas, 2-VIII-1933, F. B. Isely (PHILADELPHIA); 4 males, 1 female, Milneburg, N O, Louisiana, 22-VII-1905, A. P. Morse (PHILADELPHIA); 1 female, Lake Maurepas Reserve Canal, Louisiana, 31-VII-1963, Roback (PHILADELPHIA); 2 males, 4 females, Morgan City, Louisiana, 8-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 male, Arcadia, Louisiana, 20-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 female, Spanish Fort, 5/ 7-VIII-1915, Rehn & Hebard (PHILADELPHIA); 4 males, 3 females, Orleans Canal near Spanish Fort, Louisiana, 5/ 7-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 male, 1 female, New Orleans, Louisiana, 6-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 male, 1 female, Lafayette, Louisiana, 9-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 male, 2 females, 1 nymph, Lake Charles,

Louisiana, 10-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 female, Havahan, Louisiana, 7-VIII-1915, Rehn & Hebard (PHILADELPHIA); 4 males, 2 females, 1 nymph, Dillard, Georgia, 3/ 4-IX-1917, 2200 ft, Rehn & Hebard (PHILADELPHIA); 2 males, 6 females, Cape May, New Jersey, 28/ 31-VIII-1917, Witmer Stone (PHILADELPHIA); 3 males, Cape May, New Jersey, 18/ 21-VIII-1917, Witmer Stone (PHILADELPHIA); 2 males, Cape May, New Jersey, VIII-1917, Witmer Stone (PHILADELPHIA); 1 female, Cape May, New Jersey, 19-VIII-1917, Witmer Stone (PHILADELPHIA); 1 male, Cape May, New Jersey, 24-VIII-1934, Witmer Stone (PHILADELPHIA); 2 females, Cape May, Court House, New Jersey, 8-IX-1944, H. Fox (PHILADELPHIA); 1 female, Cape May, Court House, New Jersey, 21-VIII-1914, Hebard (PHILADELPHIA); 1 female, May's Landing, New Jersey, 29-VIII-1914, Hebard (PHILADELPHIA); 3 males, 2 females, Anglesea, New Jersey, 9-IV (PHILADELPHIA); 1 female, Anglesea, New Jersey, 14-IX (PHILADELPHIA); 2 males, 3 females, Anglesea, New Jersey, 9-V (PHILADELPHIA); 1 female, Eldora, Cape May Co., New Jersey, 4-IX-1907, B. Long (PHILADELPHIA); 1 male, 4 females, Tuckahoe, New Jersey, 26-VIII-1914, Hebard (PHILADELPHIA); 1 male, Ocean View, New Jersey, 4-IX-1922 (PHILADELPHIA); 2 males, Cedar Spring, New Jersey, 14-VIII-1914, Hebard (PHILADELPHIA); 1 male, Sea Isle Junction, Cape May Co., New Jersey, 28-IX-1927, H. Fox (PHILADELPHIA); 2 males, Vincentown, New Jersey, 1921 (PHILADELPHIA); 1 male, 1 female, West Creek, Ocean Co., New Jersey (PHILADELPHIA); 1 male, near West Creek, New Jersey, 6-IX-1903, Rehn (PHILADELPHIA); 2 males, Eyma, New Jersey, 18-VIII-1923, H. Fox (PHILADELPHIA); 1 female, Tappahannock, Virginia, 2-VIII-1916, H. Fox (PHILADELPHIA); 1 male, Tappahannock, Virginia, 23-VIII-1915 (PHILADELPHIA); 1 female, Natural Bridge, Virginia, 12/ 13-IX-1902, B. Long (PHILADELPHIA); 1 male, 1 female, Sexton, Surrey Co., Virginia, 8-IX-1941, B. Long (PHILADELPHIA); 1 female, S E Cherry Grove, Nansemond Co., Virginia, 15-X-1939, B. Long (PHILADELPHIA); 1 female, Blackwater Rat, Milk Landing, Nansemond Co., Virginia, 22-IX-1939, B. Long (PHILADELPHIA); 2 females, S E Reed's Ferry, Nansemond Co., Virginia, 23-VII-1941, B. Long (PHILADELPHIA); 1 female, Ware's Wharf, Virginia, 3-X-1915 (PHILADELPHIA); 2 females, Rappahannock R., N E Loretto, Essex Co., Virginia, 15-X-1941, B. Long (PHILADELPHIA); 1 female, Fontaine Creek, S W of Haley's Bridge, Greensville Co., Virginia, 14-X-1941, B. Long (PHILADELPHIA); Kimages Creek, S W Kimages, Charles City Co., Virginia, 18-IX-1939, B. Long (PHILADELPHIA); 5 males, 2 females, Bottomland swales, Three Creek, near Drewyville, Southampton Co., Virginia, 14-IX-1941, B. Long (PHILADELPHIA); 1 male, 1 female, Chickahoming R., Lanexa, New Kent Co., Virginia, 12-X-1941, B. Long (PHILADELPHIA); 1 male, Chickahoming R., at Graves Landing, N Holdcroft, Charles City Co., Virginia, 10-IX-1941, B. Long (PHILADELPHIA); 1 female, Paminkey R., S E White House, New Kent Co., Virginia, 14-X-1939, B. Long (PHILADELPHIA); 1 female, Pennsylvania (PHILADELPHIA); 2 females, Chestertown, Maryland, 6-VIII-1904 (PHILADELPHIA); 3 females, Goshen, Pennsylvania, 27-VIII-1912 (PHILADELPHIA); 1 male, Washington D. C., IX-1883 (PHILADELPHIA); 5 males, 1 female, New Castle, Delaware, 6. VIII-1911, H. Fox (PHILADELPHIA); 1 male, Odessa, Delaware, 13-VIII-1940, D. MacCreary (PHILADELPHIA); 1 female, Odessa, Delaware, 6-IX-1940, D. MacCreary (PHILADELPHIA); 1 male, Wilmington, Delaware, 9-VIII-1923, H. Fox (PHILADELPHIA); 1 male, Churchland, Norfolk Co., Virginia, 16-IX-1914, H. Fox (PHILADELPHIA); 2 males, Mattapony R., Horse Landing, E King Wm. Co., Virginia, 16-X-1939, B. Long (PHILADELPHIA); 2 males, 3 nymphs, Fredericksburg, Virginia, 20-VII-1913, Rehn & Hebard (PHILADELPHIA); 1 male, James R. at Bailey's Beach, Isle of Wight Co., Virginia, 10-X-1941, B. Long (PHILADELPHIA); 1 male, Virginia, A. P. Morse (PHILADELPHIA); 1 male, James River, Hog Island, Surrey Co., Virginia, 7-IX-1941, B. Long (PHILADELPHIA); 1 male,

Dardens Pond, S E of Collosse, Isle of Wight Co., Virginia, 7-VII-1941, B. Long (PHILADELPHIA); 9 males, 3 females, 1 nymph, Asheville, North Carolina, 18-IX-1904, M. Hebard (PHILADELPHIA); 1 male, Hendersonville, North Carolina, 21-VI-1924, H. Fox (PHILADELPHIA); 2 males, 2 females, Raleigh, North Carolina, 9-IX-1904 (PHILADELPHIA); 1 male, Fayetteville, Cumberland Co., North Carolina, 9-IX-1911, Rehn & Hebard (PHILADELPHIA); 3 males, Florence, Florence Co., South Carolina, 6. IX-1911, Rehn & Hebard (PHILADELPHIA); 1 nymph, Rubun Co., Georgia, T. Davis (PHILADELPHIA); 1 nymph, Spartisburg, South Carolina, 6-VIII-1913, M. Hebard (PHILADELPHIA); 1 male, 2 females, 3 nymphs, Vicinity of Stone Mountain, Georgia, 3-VIII-1913, Rehn & Hebard (PHILADELPHIA); 1 male, Macon, Georgia, 25-VII-1930, L. D. Tuthill (PHILADELPHIA); 3 males, Macon, Georgia, 25-IX-1919 (PHILADELPHIA); 1 male, Macon, Georgia, 30-IX-1920 (PHILADELPHIA); 1 female, Macon, Georgia, 24-IX-1919 (PHILADELPHIA); 1 male, Okfenokee Swamp, Georgia, 5-IX-1913 (PHILADELPHIA); 1 male, Lakeside near Macon, Georgia, 1-X-1921 (PHILADELPHIA); 1 male, Billy's Island, Okefenokee Swamp, Georgia, 16/ 19-VII-1919 (PHILADELPHIA); 1 male, Atlanta, Georgia, 2-VIII-1913, Rehn & Hebard (PHILADELPHIA); 3 males, Marietta, Georgia, 27-VII-1903, A. P. Morse (PHILADELPHIA); 1 female, Locust Grove, Georgia, 13-X-1923, H. Fox (PHILADELPHIA); 2 males, 1 female, Fort Myers, Lee County, Florida, 13/ 15-IX-1917, Rehn & Hebard (PHILADELPHIA); 1 male, 1 female, Marianna, Florida, 6-VIII-1903, A. P. Morse (PHILADELPHIA); 4 males, Atlantic Beach, Duval Co., Florida, 24/ 25-VII-1911, Rehn & Hebard (PHILADELPHIA); 1 male, Chocoloskee, Florida, Hebard Coll (PHILADELPHIA); 1 female, Alabama, 1910 (PHILADELPHIA); 1 female, Opelika, Alabama, 2-VIII-1915, M. Hebard (PHILADELPHIA); 2 males, Crawford, Alabama, 24-VII-1930, L. D. Tuthill (PHILADELPHIA); 4 males, 1 female, Greenville, Alabama, 3-VIII-1915, M. Hebard (PHILADELPHIA); 1 male, 1 female, Flomaton, Alabama, 27-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 male, Evergreen, Alabama, 4-VIII-1915, M. Hebard (PHILADELPHIA); 2 males, 1 female, Montgomery, Alabama, 8-IX-1915, Rehn & Hebard (PHILADELPHIA); 2 males, Mobile, Alabama, 26/ 27-VIII-1915, Rehn & Hebard (PHILADELPHIA); 2 males, 2 females, Tuscaloosa, Alabama, 15-VII-1915, A. P. Morse (PHILADELPHIA); 1 female, Decatur, Alabama, Schimek (PHILADELPHIA); 1 male, Billet, Illinois, 7-IX-1933, Rose & Townsend (PHILADELPHIA); 1 male, Havanna, Illinois, 23-VIII-1910 (PHILADELPHIA); 2 males, 2 females, Havanna, Illinois, 14-VIII-1907 (PHILADELPHIA); 1 male, 1 female, Havanna, Illinois, 22-VIII-1910 (PHILADELPHIA); 1 female, Havanna, Illinois, 11-VIII-1910 (PHILADELPHIA); 2 males, Wolf Lake, Illinois, 10-IX-1898 (PHILADELPHIA); 1 female, Wolf Lake, Illinois, 10-IX-1899 (PHILADELPHIA); 1 male, Muncie, Illinois, 24-VII-1932, A. R. Park (PHILADELPHIA); 1 male, Pounds Hollow Recreation Area, Gallatin Co., Illinois, 15-X-1966, J. Sheldon (PHILADELPHIA); 2 males, 2 females, Indiana, 7-X-1893, Blatchley (PHILADELPHIA); 1 female, Kvo Co., Indiana, 8-II-1902, V. S. B. (PHILADELPHIA); 1 female, Marshall Co., Indiana, 17-VIII-1893, Blatchley (PHILADELPHIA); 1 male, Vigo Co., Indiana, 18-IX-1894 (PHILADELPHIA); 2 males, Vigo Co., Indiana, W. S. Blatchley (PHILADELPHIA); 1 male, Indiana, 9-VIII-1913 (PHILADELPHIA); 1 female, Putnam Co., Indiana, 21-VIII-1893, Blatchley (PHILADELPHIA); 1 female, Johnson City, Tennessee, 27-VIII-1903, A. P. Morse (PHILADELPHIA); 1 female, Chattanooga, Tennessee, 24-VIII-1903, A. P. Morse (PHILADELPHIA); 1 male, 1 female, Chattanooga, Tennessee, B. Schimek (PHILADELPHIA); 1 male, Fond du Lac, Wisconsin, Mitchell (PHILADELPHIA); 1 male, Queen Ann Co., Maryland, 7-VIII-1902 (PHILADELPHIA); 1 male, Baltimore, Maryland (PHILADELPHIA); 1 male, Chestertown, Maryland, 27-VIII-1899, E. G. Vanatta (PHILADELPHIA); 1 male, idem except 22-VIII-1899 (PHILADELPHIA); 1 female, idem except 23-VIII-

1899 (PHILADELPHIA); 1 female, idem except 12-VIII-1902 (PHILADELPHIA); 1 female, idem except 16-VIII-1901 (PHILADELPHIA); 2 females, idem except 17-VIII-1901 (PHILADELPHIA); 1 female, idem except 12-VIII-1901 (PHILADELPHIA); 1 female, idem except 10-VIII-1902 (PHILADELPHIA); 1 female, Columbus, Ohio (PHILADELPHIA); 1 male, Warrien Woods, Berrien Co., Michigan, 7-IX-1920, T. H. Hubell (PHILADELPHIA); 1 female, Three Oaks, Berrien Co., Michigan, 4-IX. 1920, T. H. Hubell (PHILADELPHIA); 1 male, 1 female, Meridian, Missouri, 10-IX-1915, Rehn & Hebard (PHILADELPHIA); 1 male, 1 female, Winona, Missouri, 15-IX. 1915, Hebard (PHILADELPHIA); 1 female Houma, Louisiana, 8-VII-1911 (PHILADELPHIA); 1 female, Harahan, Louisiana, 7-VIII-1915, Rehn & Hebard (PHILADELPHIA); 1 male, Rhoda, St. Mary Parish, Louisiana, 8-VIII-1915, Rehn & Hebard (PHILADELPHIA); 6 males, 3 mi S Wasiota Bell Co., Kentucky, 1050 ft, 3-VIII-1939, Rehn & Hebard (PHILADELPHIA).

Metaleptea adspersa (Blanchard 1843) n. status

Figs. 3 F-J, 5

Truxalis adspersa Blanchard 1843: 216. [Lectotype: a female, Santa Cruz de la Sierra, Bolivia, D'Orbigny, 1834, PARIS; paralectotypes: three males, province of Corrientes, Brazil, D'Orbigny, 1834, PARIS. Selected by Amedegnato 2000, here designated]; Giglio-Tos 1897a: 1 (syn. of *Metaleptea brevicornis*), 1897b: 23; Bruner 1906: 625 (syn. of *Truxalis brevicornis* Linnaeus); Kirby 1910: 104 (syn. of *Truxalis brevicornis* Linnaeus.).

Metaleptea brevicornis: Giglio-Tos 1894: 8, 1897a: 1; Bruner 1906: 625; Descamps & Amedegnato 1970: 865 (because the material cited in this paper comes from Guyane Française, this citation probably belongs to *M. adspersa*).

Metaleptea brevicornis adspersa: Rehn 1944: 229; Liebermann & Ruffinelli 1946: 10; Liebermann 1947: 165; 1948: 56; Silveira Guido *et al.* 1958: 273; Liebermann 1958: 21. New status.

Types examined.—Of *Truxalis adspersa*, a lectotype female and three paralectotypes males in PARIS, the female with wings spread, without legs and the abdomen broken and fixed with the ventral side up; the three males with wings spread.

Re-description.—*Male*: Subgenital plate long; epiphallus with internal and external lobes of lophi big and its dorsal surface concave, lateral plate more expanded.

Female: Posterior margin of female subgenital plate trapezoid.

Variation.—The males of this species show high variability in body length (BL) (mean= 29.3 mm, S. D. \pm 2.86, minimum length= 25 mm, maximum length= 36 mm), length of tegmen (LT) (mean= 21.6 mm, S. D. \pm 2.4, minimum length= 18 mm, maximum length= 29 mm) and length of femur (LFe) (mean= 14.3 mm, S. D. \pm 1.3, minimum length= 12 mm, maximum length= 18 mm). The females of this species show high variability in body length (BL) (mean= 42.1 mm, S. D. \pm 3.34, minimum length= 36 mm, maximum length= 48 mm), length of tegmen (LT) (mean= 31.1 mm, S. D. \pm 2.9, minimum length= 26 mm, maximum length= 36 mm) and length of femur (LFe) (mean= 20.6 mm, S. D. \pm 1.23, minimum length= 18 mm, maximum length= 23 mm).

Distribution.—The species *M. adspersa* is found from Panama south to Central Argentina, except on the western side of the Andes.

Observations.—Some females show the anterior field of tegmina and the tip of hind wing with a red-wine color.

Material examined.—ARGENTINA: 2 males, Bernardo de Irigoyen, Misiones, 16-III-1965, C. S. Carbonell, A. Mesa, M. A. Monné (MONTEVIDEO); 39 males, 1 female, Volcan Jujuy, Jujuy, 2100 m, 12-III-1960, R. Golbad (LA PLATA); 1 male, Campo Alegre, Salta, 22-III-1969, R. A. Ronderos (LA PLATA); 1 male, Rio Pescado, Salta, 23-III-1969, R. A. Ronderos (LA PLATA); 2 males, Ituzaingo, Corrientes, 25-XII-1989, Balatti (LA PLATA); 3 females, Ituzaingo, Corrientes, 24-III-1989, Balatti (LA PLATA); 3 males, General Mansilla, Buenos Aires, III-1998, M. Donato (LA PLATA); 2 males, Reserva Punta Lara, La Plata, Buenos Aires, 28-II-1998, M. Donato (LA PLATA); 1 male, 1 female, Estancia San Isidro, Magdalena, Buenos Aires, M. Donato (LA PLATA); 1 male, Estacion Bavio, Buenos Aires, 26-III-1998, M. Donato (LA PLATA); 2 females, Estancia San Isidro, Magdalena, Buenos Aires, XII-1996, M. Donato (LA PLATA); 4 males, 5 females, Manatiales, Corrientes, II-1946, M. Biraben (LA PLATA); 1 male, Manatiales, Corrientes, 1/ 10-III-1959, De Apostol (LA PLATA); 1 male, M. Mercedes, Dto Santa Paula, Jujuy, 21-IV-1968, A. Willink; 1 male, 7 females, Corrientes, 15/ 30-II-1959, M. Biraben (LA PLATA); 1 female, Isla Oca, Zona 9, Formosa, 5-I-1938, Denier (LA PLATA); 1 female, Quilmes, Buenos Aires, 2-II-1919 (LA PLATA); 1 male, Brazo Largo, I-1942, S. R. Castillo (LA PLATA); 1 male, Chascomus, Buenos Aires, II-1966, R. A. Ronderos (LA PLATA); 2 males, Jose C. Paz, Buenos Aires, 24-I-1962, Ezquivel (LA PLATA); 1 female, Tanti, Cordoba, J. Llano (LA PLATA); 1 male, 1 female, Tanti, Cordoba, II-1968, Bulla & Grossi (LA PLATA); 1 male, Arroyo Valdez, 10-V-1965, Grossi (LA PLATA); 1 male, Paranacito, Entre Rios, III-1940, S. R. Castillo (LA PLATA); 1 male, Formosa, 24-XII-1938, Denier (LA PLATA); 1 female, Punta Tiyol, Chaco, 30-III-1940, J. A. R. C. (LA PLATA); 1 female, Colonia Aborigen "Bartolome de las Casas", Formosa, II-1970 (LA PLATA); 1 male, Resistencia, Chaco, 14-XII-1971, C. Cesari (LA PLATA); 1 male, Tala, Jujuy, 12-III-1959, Biraben & Scott (LA PLATA); 1 female, Buenos Aires, J. Bosq (LA PLATA); 1 female, Jujuy, 23-II-1945, M. Biraben (LA PLATA); 1 male, 1 female, Pocitos, Salta, XII-1939, M. Biraben (LA PLATA); 22 males, 16 females, Colonia Mascias, Dto Garay, Santa Fe, M. J. Viana (BUENOS AIRES); 1 male, Colonia Mascias, Dto Garay, Santa Fe, XI-1942, M. J. Viana (BUENOS AIRES); 4 males, 2 females, Santa Maria, Dto Concepcion, Misiones, M. J. Viana (BUENOS AIRES); 2 males, 7 females, Ituzaingo, Corrientes, III-1979, M. J. Viana (BUENOS AIRES); 7 males, Veronica, Buenos Aires, IV-1939, J. B. Daguerre (BUENOS AIRES); 1 male, Punta Chica, Buenos Aires, II-1938, J. B. Daguerre (BUENOS AIRES); 1 male, Isla de Oro, Formosa, II-1941, Hepper (BUENOS AIRES); 3 males, El Sauce, Calamuchita, Cordoba, XII-1938, M. J. Viana (BUENOS AIRES); 3 male, Formosa, 1941 (BUENOS AIRES); 1 male, Zelaya, Buenos Aires, Dr. Pereyra (BUENOS AIRES); 2 males, Buenos Aires (BUENOS AIRES); 1 male, Resistencia, Chaco, 19-IV-1942, M. A. Freiberg (BUENOS AIRES); 1 male, Dto Resistencia, Chaco, X/ XII-1935, J. B. Daguerre (BUENOS AIRES); 4 males, Dto Resistencia, Chaco, T. Meyer (BUENOS AIRES); 1 male, Chaco (BUENOS AIRES); 2 females, Lomas, Buenos Aires, III-1920 (BUENOS AIRES); 2 males, Rio Oro, Chaco, IX-1961, I. Apostol (BUENOS AIRES); 2 males, Manatiales, Corrientes, 1960, Apostol (BUENOS AIRES). BOLIVIA: 1 male, Lagunillas, XI-1917 (PHILADELPHIA); 1 male, Cuatro Ojos, XI-1917, Lizer & Celetang (PHILADELPHIA); 1 male, Rurrenabaque, Beni, 227 m, 1/ 10-X-1956, L. E. Peña (LA PLATA); 1 female, Reyes, Beni, 2/ 20-XII-1956, L. E. Peña; 1 male, 1 female, Santa Cruz, III-1962, Apostol (BUENOS AIRES). BRAZIL: 1 female, Santo Antonio do Ica, Amazonas, 20/ 30-VIII-1948, C. S. Carbonell (MONTEVIDEO); 2 females, Petropolis, 12/ 14-IV-1913, M. Burr (PHILADELPHIA); 1 female, Obidos, Para, 22-IX-1919, H. S. Parish (PHILADELPHIA); 1 male, Para, Para, 8-VIII-1919, H. S. Parish (PHILA-

DELPHIA); 1 male, Para, Para, 7-VIII-1919, H. S. Parish (PHILADELPHIA); 1 male, Para, Para, 9-III-1924 (PHILADELPHIA); 2 males, Uruguayan, Rio Grande do Sul, 10-I-1920, R. G. Harris (PHILADELPHIA); 1 male, Piracicaba, São Paulo (PHILADELPHIA); 1 male, 1 female, São Paulo (PHILADELPHIA); 1 female, São Paulo, 24-IV, R. Spitz (PHILADELPHIA); 1 male, Diamantina, Minas Gerais, 14/18-XI-1913, Cornell Univ. Exp. (PHILADELPHIA); 1 male, Rio de Janeiro, VI-1930, Corkenly (PHILADELPHIA); 1 female, Santa Rosa de Descalvados, Mato Grosso, 14-VII-1931, J. A. G. Rehn (PHILADELPHIA); 1 female, Pirapora, Minas Gerais, 12/13-XI-1919, Cornell Univ. Exp. (PHILADELPHIA); 1 male, Corumbá, Mato Grosso (PHILADELPHIA); 1 female, Corumbá, Mato Grosso, 14/23-XII-1919, R. G. Harris (PHILADELPHIA); 1 female, Obidos, Para, 19-IX-1919, H. S. Parish (PHILADELPHIA); 1 male, Urucum, Corumbá, 23/29-XII-1919, Cornell Univ. Exp. (PHILADELPHIA); 1 female, Teffe, Amazonas, 27-XII-1929, H. S. Parish (PHILADELPHIA); 1 male, Teffe, Amazonas, 16-XII-1929, H. S. Parish (PHILADELPHIA); 1 male, 1 nymph, Rio Autaz, Amazonas (PHILADELPHIA). BRITISH GUYANA: 1 female, Bartica, 1901, J. A. G. Rehn (PHILADELPHIA); 2 females, Bartica, 17-II-1913, H. S. Parish (PHILADELPHIA); 1 female, Kartabo, Bartica, W. Beebe (PHILADELPHIA). COLOMBIA: 1 male, Boca Murindo, 9-II-1918, M. A. Carriquer jr (PHILADELPHIA). ECUADOR: 1 female, Rio Napo, Linoncocha, 15/22-VII-1983, R. Riede (LA PLATA). PANAMA: 2 males, 1 nymph, Gatun, 17/23-VII-1916, D. E. Harrower (PHILADELPHIA); 2 females, Gatun, 12/15-VII-1916, D. E. Harrower (PHILADELPHIA); 1 female, Gatun, 28-VII-1916, D. E. Harrower (PHILADELPHIA). PARAGUAY: 1 male, Villa Rica, 15-I-1921, P. Jörgensen (PHILADELPHIA); 1 male, Sapucay, 2-III-1905, Foster (PHILADELPHIA); 1 male, Sapucay, 10-III-1905, Foster (PHILADELPHIA); 1 female, Sapucay, 11-III-1905, Foster (PHILADELPHIA); 1 female, Sapucay, 21-III-1905, Foster (PHILADELPHIA). PERU: 1 male, Iquitos, Loreto, 4-V-1920, H. S. Parish (PHILADELPHIA); 3 males, 1 female, Santa Cecilia, Rio Maniti, Maynas, Loreto, 125 m, 3°36'S, 72°58'W, 4/17-VIII-1983, T. D. Pedersen (PHILADELPHIA); 1 male, 1 female, Quince Mil, Cuzco, 17-II/3-III-1983, B. Kalinowski (PHILADELPHIA); 1 male, Quince Mil, Cuzco, 760 m, 16/31-IX-1959 (LA PLATA); 1 female, Quince Mil, Cuzco, 760 m, 14/31-VIII-1962 (LA PLATA). SURINAM: 1 female, Zanderij I, Boven, Para dist., 19-IV-1927, Cornell Univ. URUGUAY: 1 male, Arroyo Tres Cruces Grande (Timbauba), 18-II-1955, C. S. Carbonell (MONTEVIDEO); 1 male, Arroyo Pinto, Paso Pinto, Flores, 18-III-1960, Fac. Hum. y Ciencias (MONTEVIDEO); 1 female, Bañados de Zanja Honda (Tranqueeras), Rivera, 26-II-1955, C. S. Carbonell (MONTEVIDEO).

MULTIVARIATE ANALYSIS RESULTS

In the principal component analysis of male specimens, the first two components accounted for 85.38 % of the total variation (57.8 and 27.5%, respectively). Component I had significant representation from characters length of tegmina (LT), length of body (BL) and length of pronotum (LP). The qualitative characters epiphallus (EPI) and the ratio length of male cercus / length of male subgenital plate (CS) showed strong association with the second component. Figure 6 showed that two major groups were formed when the first and second components were plotted: group A contains the *adspersa* specimens and group B consisted of the *brevicornis* specimens. Internal dispersion of the groups is observed mostly along the first component. Specimens showing larger size are mostly plotted on the upper section of both groups, and those showing smaller size are plotted

on the lower portion.

There is no evidence of direct relation between the body size gradient found and the geographic distribution of the specimens. *M. brevicornis* specimens mostly from South East USA are plotted on the upper sector of group B, but some others from South East USA are associated with specimens collected in North East USA and Central America, plotted on the lower sector of group B. *M. adspersa* specimens collected southward the species distribution are plotted on the upper sector of group A; but some other specimens collected in southern localities are associated with specimens collected from northern localities plotted on the lower sector of group A.

For female specimens, the principal component analysis showed that the first two components accounted for 87.56 % of the total variation (67.1 and 20.3 %, respectively). Component I had significant representation from characters length of body (BL), length of tegmina (LT) and length of pronotum (LP). The qualitative character female subgenital plate (FSP) showed strong association with the second component. Two major groups were formed when the first and second components were plotted: group A contains the *adspersa* specimens and group B consisted of the *brevicornis* specimens (Fig. 7). Internal dispersion of the groups was also observed as discussed for male's analysis.

DISCUSSION

The morphological analysis conducted in this study revealed differences in the epiphallus and size of male subgenital plate correlated with differences in the posterior margin of the female subgenital plate between the two subspecies delimited by Rehn (1944).

Taxonomists who work with insects and other arthropods have traditionally relied heavily on differences in genitalic characters to separate species, even though very little is known about why these differences exist (Shapiro & Porter 1989; Porter & Shapiro 1990). The lock-and-key hypothesis (Dufour 1844) proposes a mechanical isolating function for these differences. Although some entomologists think that genitalic differences can be effective reproductive isolating mechanisms in Orthoptera, whether the genitalia serves as true lock-and-key mechanism is still problematical (Otte 1981; see Cohn 1994 and Lockwood 1996 for a discussion).

Ronderos (1987) suggested that the epiphallus and the female subgenital plate are counterparts in the mechanical isolation of the species of the Melanoplinae genus *Pseudoscopas*. He based this hypothesis on the observed morphological correspondence between the shape of the posterior margin of the female subgenital plate and the lophi of epiphallus (Ronderos 1987). He also suggested that these structures would couple during courtship due to the hanging posture of the male during copulation observed in *P. nigrigena*. Whether the differences found in the male genitalia and female armature of *M. brevicornis* and *M. adspersa* serve as counterparts in the mechanical isolation of these taxa is out of the scope of this study. However, we consider that the morphological differences

found in the male genitalia and female armature justified the specific status proposed for *M. brevicornis* and *M. adspersa* in this paper.

The results obtained from the multivariate analysis showed that there is no evidence of a direct relationship between body size variation found in *M. brevicornis* and in *M. adspersa* and their geographic distribution. Both species are highly variable in size and color patterns, but no geographic gradient was detected. Besides, results obtained showed that specimens of *M. brevicornis* could not be divided into groups as it was suggested by Rehn (1944).

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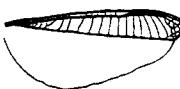
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Table 1. Comparison of *Metalepta* with its closest relative, *Allotruxalis*.

	<i>Metalepta</i>	<i>Allotruxalis</i>
Body Shape	robust	slender
Apex of fastigium	subconical	rounded
Face	less retreated	retreated
Lateral carinae cut by principal sulcus only	No	Yes
Hindwing		
Color of Hindwing	pale green	pale red

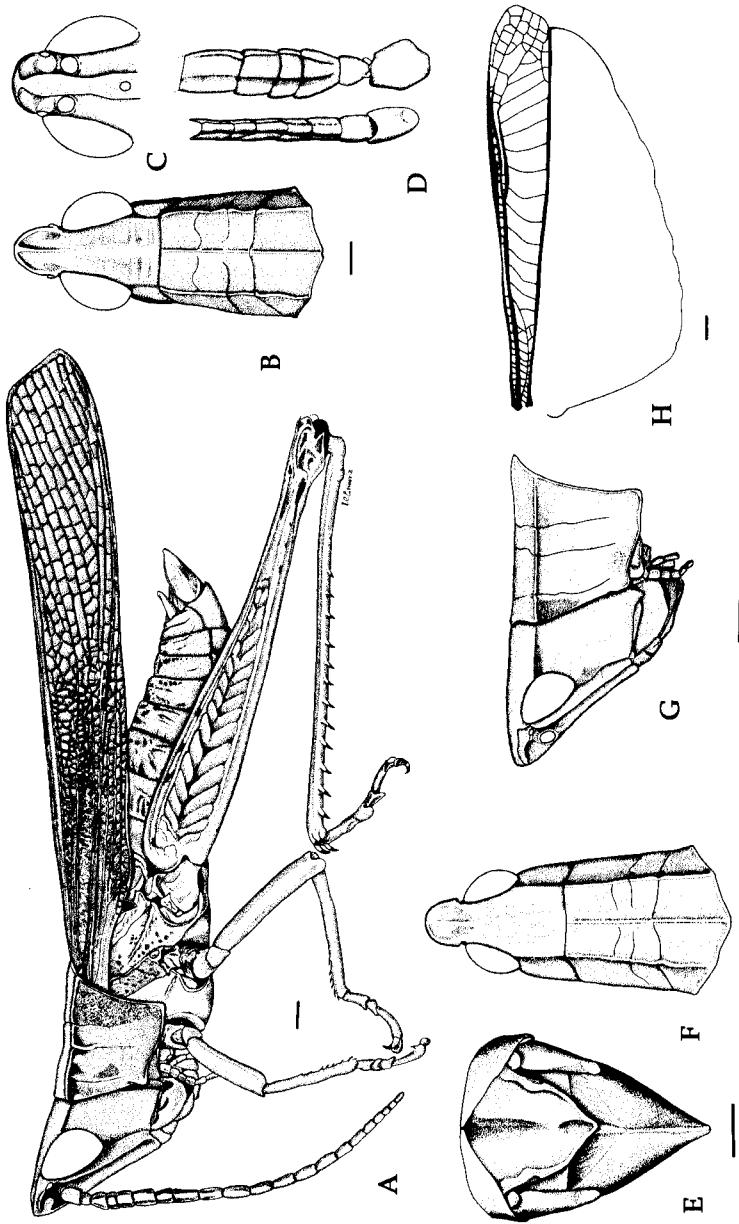


FIG. 1. *Metalepta brevicornis* (Linnaeus). A, male, lateral view; B, head and pronotum, dorsal view; C, fastigium, frontal view; D, antenna of male, lateral and dorsal view; E, male terminalia, dorsal view; F-G, female, head and pronotum, dorsal and lateral view; H, hind wing of male.

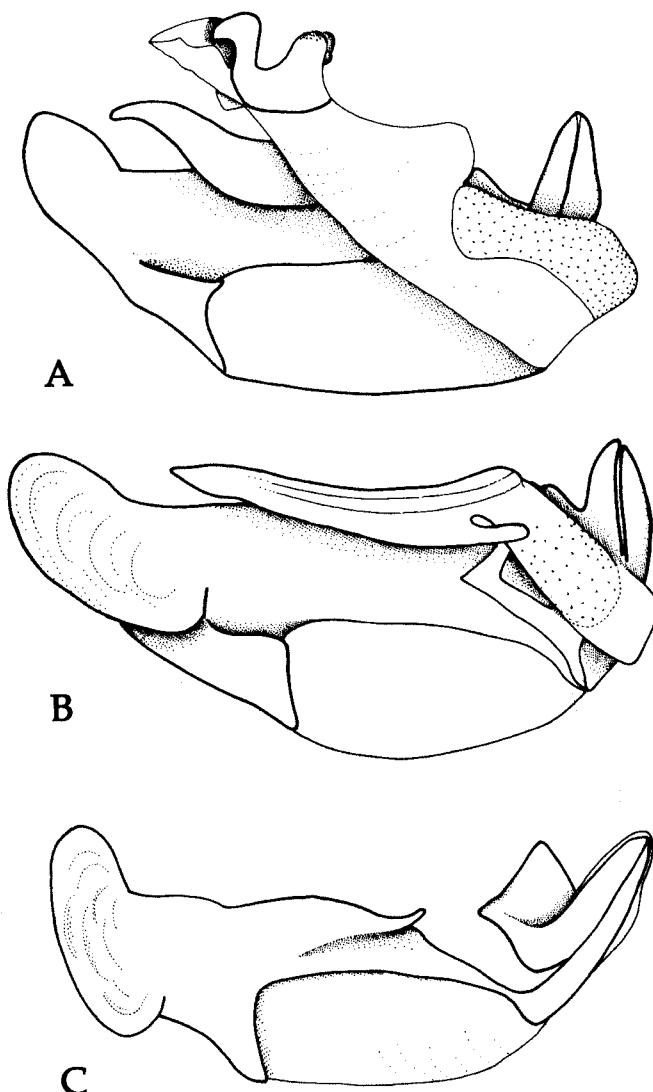


FIG. 2. *Metalepta brevicornis* (Linnaeus). Phallic complex: A, whole complex, lateral view; B, whole complex without epiphallus and ectophalllic membrane, lateral view; C, endophallus and arch, lateral view.

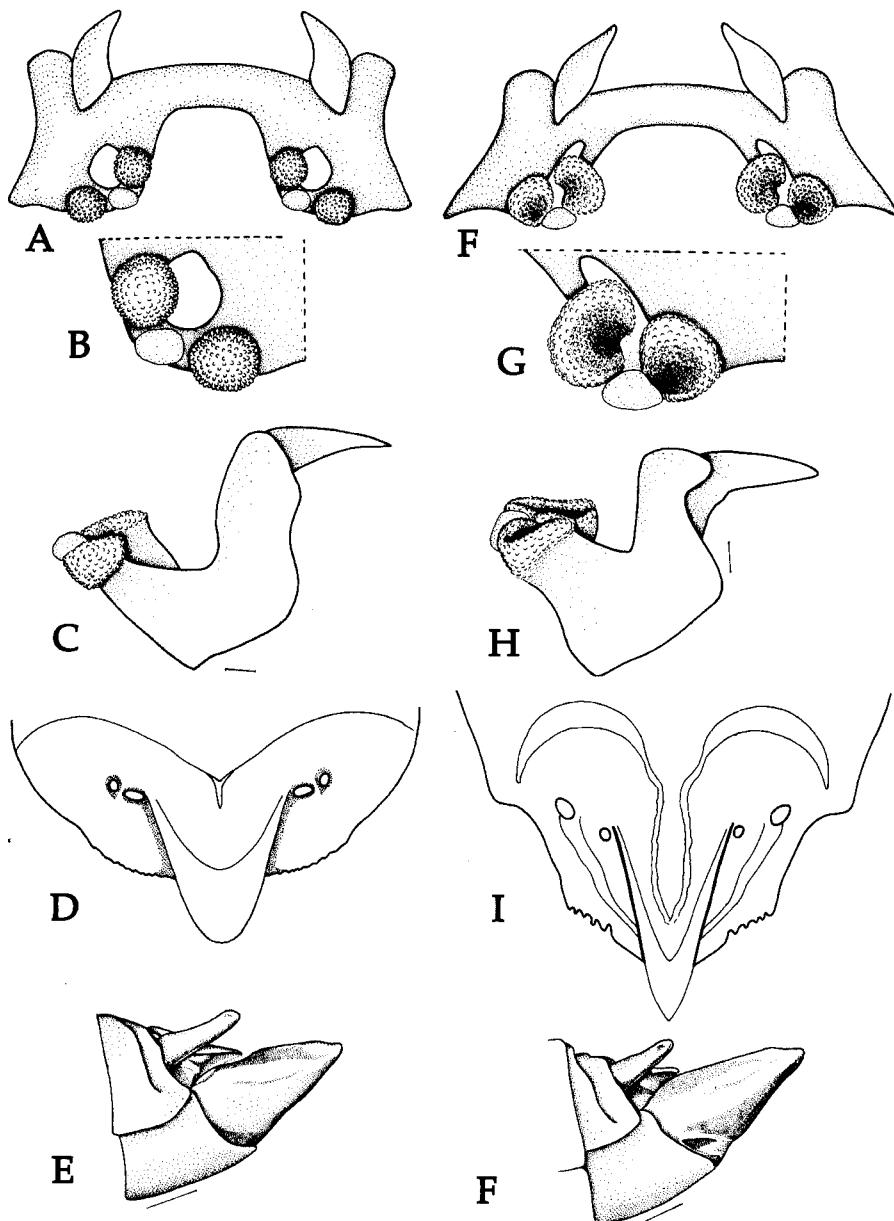


FIG. 3. *Metalepta brevicornis* (Linnaeus) A-E. A, epiphallus, dorsal view; B, lophi of epiphallus, dorsal view; C, epiphallus, lateral; D, female subgenital plate, dorsal view; E, male terminalia, lateral view. *Metalepta adspersa* (Blanchard) F-J. F, epiphallus, dorsal view; G, lophi of epiphallus, dorsal view; H, epiphallus, lateral view; I, female subgenital plate, dorsal view; J, male terminalia, lateral view.

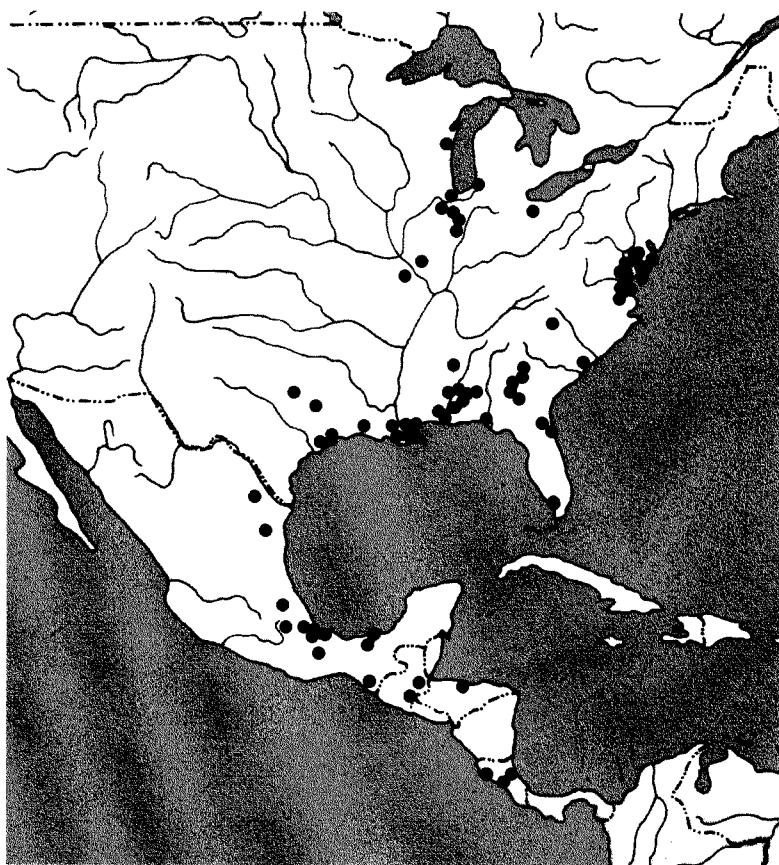


FIG. 4. Known geographic distribution of *Metaleptea brevicornis* (Linnaeus).

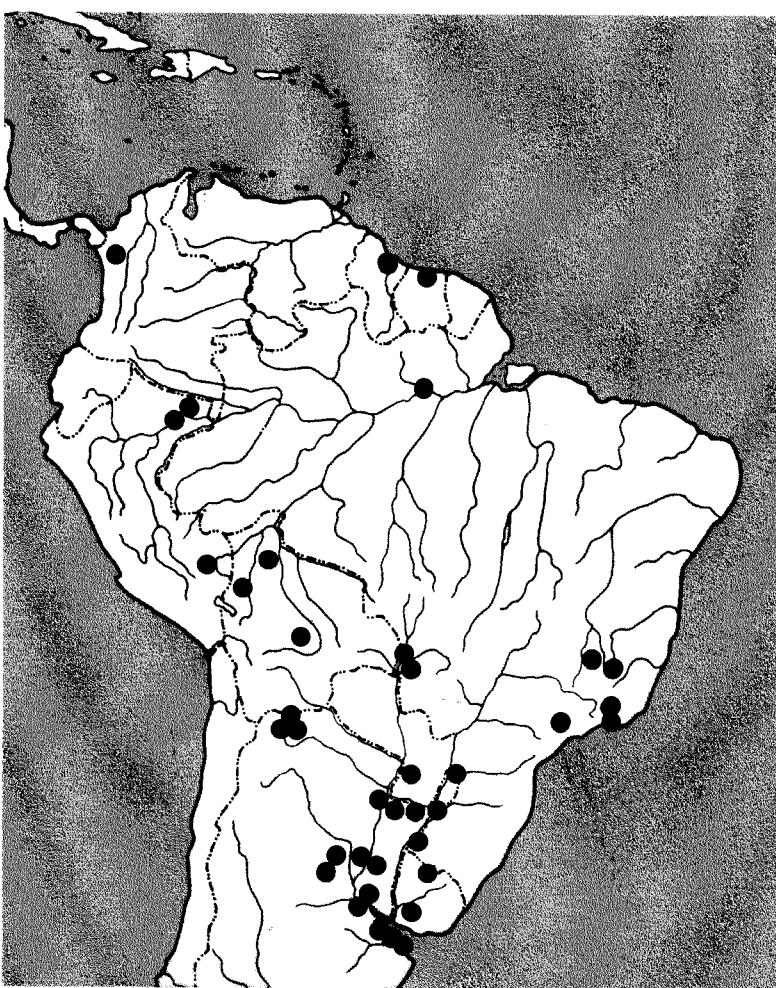


FIG. 5. Known geographic distribution of *Metaleptea adspersa* (Blanchard).

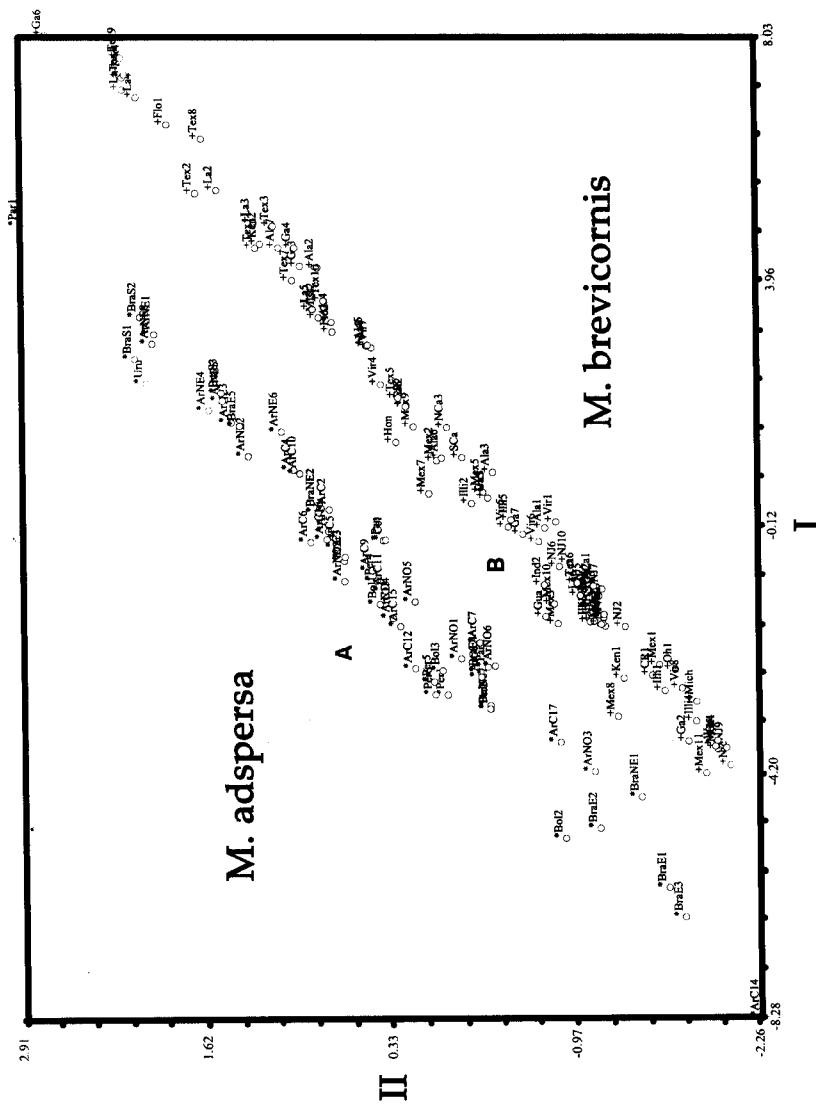


FIG. 6. Ordination of male specimens on principal components I and II. A, *Metaleptea adspersa* (Blanchard). B. *Metaleptea brevicornis* (Linnaeus). Specimens are identified in Appendix I.

Appendix I. Character-state matrix for males in a revision of *Metaleptea* Brunner von Wattenwyl. Characters are explained in text. Measurements are in millimeters.

Specimen number: BL—LP—LT—LFe—CS—Epi / Locality—Acronyms

- Sp-1: 29.8—4.9—20.2—15—2.66—1 / Argentina, Santa Fe, dep. Garay—*ArC1
 Sp-2: 30.6—4.8—21—14—2.41—1 / Argentina, Córdoba, dep. Calamuchita—*ArC2
 Sp-3: 33.2—5.4—23—15—2.54—1 / Argentina, Formosa, Isla de Oro—*ArNE1
 Sp-4: 31.3—5.2—21—15—2.72—1 / Argentina, Misiones, dep. Concepción—*ArNE2
 Sp-5: 29.6—5.2—20—14—2.72—1 / Argentina, Buenos Aires, La Plata—*ArC3
 Sp-6: 31.7—5.9—21—15—2.58—1 / Argentina, Chaco, dep. Resistencia—*ArNE3
 Sp-7: 32.2—5.3—22—14.5—2.66—1 / Argentina, Corrientes, Ituzaingó—*ArNE4
 Sp-8: 32—5.3—22—15—2.5—1 / Argentina, Formosa—*ArNE5
 Sp-9: 30.7—5.2—21—15—2.46—1 / Argentina, Córdoba, Calamuchita—*ArC4
 Sp-10: 29.4—4.9—19—14—2.72—1 / Bolivia, Lagunillas—*Bol1
 Sp-11: 25.6—4.6—17—12—3—1 / Bolivia, Cuatro Ojos—*Bol2
 Sp-12: 27.7—4.6—18—14—2.9—1 / Peru, Iquitos—*Per1
 Sp-13: 27.1—4.6—18—14—2.66—1 / Peru, dep. Cuzco—*Per2
 Sp-14: 29.9—5—20—14—2.66—1 / Peru, dep. Loreto—*Per3
 Sp-15: 30—5.2—23—15—2.37—1 / Argentina, Chaco, Resistencia—*ArNE6
 Sp-16: 29—4.2—20—15—2.66—1 / Peru, dep. Loreto, río Manáti—*Per4
 Sp-17: 33.5—6.2—25—16—3—1 / Paraguay, Villa Rica—*Par1
 Sp-18: 24—4.3—17—12—2.54—1 / Brazil, São Paulo—*BraE1
 Sp-19: 25—4.4—18—12—2.66—1 / Brazil, Piracicaba—*BraE2
 Sp-20: 24—4.3—16—12—2.6—1 / Brazil, Diamantina—*BraE3
 Sp-21: 25—4.4—17—14—2.08—1 / Brazil, Para Para—*BraNE1
 Sp-22: 26—5.2—20—13—1.83—2 / Mexico, Necaxa, Puebla—+Mex1
 Sp-23: 29—5.6—22—15—999—2 / Mexico, Xico—+Mex2
 Sp-24: 27—5—20—14—2.41—2 / Mexico, Veracruz, Atoyac—+Mex3
 Sp-25: 25—4.4—19—13—2—2 / Mexico, Orizaba—+Mex4
 Sp-26: 29—5.4—21—15—2—2 / Mexico, Veracruz, San Rafael—+Mex5
 Sp-27: 28—4.8—20—13—1.83—2 / Mexico, Tabasco, Villa Hermosa—+Mex6
 Sp-28: 29—5.5—22—14—2.5—2 / Mexico, Tabasco, Frontera—+Mex7
 Sp-29: 26—4.8—19—13—2.6—2 / Mexico, Tabasco, Teara—+Mex8
 Sp-30: 26—4.9—19—999—2—2 / Costa Rica, Chitaría—+CR1
 Sp-31: 30—5.4—23—15—2—2 / Costa Rica, Carrillo—+CR2
 Sp-32: 28—5.1—20—13—2.36—2 / Guatemala, Morales—+Gua
 Sp-33: 30—5.3—22—15—2.36—2 / Honduras, Puerto Castilla—+Hon
 Sp-34: 29—5.3—21—14—2.27—1 / Panama, Gatún—*Pan
 Sp-35: 29—5.3—21—14—2.25—1 / Colombia, Boca Murindo—*Col
 Sp-36: 27—4.9—20—13—2.38—1 / Paraguay, Sapucay—*Par2
 Sp-37: 25—4.4—18—13.5—2—2 / Nicaragua, B. Schimer—+Nic
 Sp-38: 27—4.9—19—14—2.5—1 / Brazil, Rio de Janeiro—*BraE4
 Sp-39: 32—6—23—15—3—1 / Brazil, Corumbá—*BraS1
 Sp-40: 32—5.4—24—16—2.69—1 / Brazil, Urucum—*BraS2
 Sp-41: 31—5.5—24—14—2.53—1 / Brazil, Uruguayana—*BraS3
 Sp-42: 31—5.5—22—15—2.61—1 / Brazil, Teffe—*BraE5
 Sp-43: 30—5.7—22—15—2.07—2 / Mexico, N. C. Victoria—+Mex9
 Sp-44: 28—5—20—13.5—999—2 / Mexico, Horsetail falls—+Mex10
 Sp-45: 25—4.7—18—13—2.27—2 / Mexico, Tianguistengo—+Mex11
 Sp-46: 30—5.4—21—14—2.58—1 / Brazil, Para—*BraNE2
 Sp-47: 27—5—20—13—2.83—1 / Bolivia, dep. Beni—*Bol3
 Sp-48: 27—4.7—20—13—3—1 / Peru, Cuzco—*Per5
 Sp-49: 28—5.1—20—12—2.45—1 / Argentina, Salta, Campo Alegre—*ArNO1
 Sp-50: 29—5.3—21—14—2.75—1 / Argentina, Buenos Aires, José C. Paz—*ArC5
 Sp-51: 29—5.1—21—13—2.91—1 / Argentina, dep. Santa Paula—*ArNO2
 Sp-52: 29—4.7—21—15—3—1 / Argentina, Buenos Aires, Estación Bavio—*ArC6
 Sp-53: 28—5—20.5—13—1.81—2 / USA, New Jersey, Cape May—+NJ1

- Sp-54: 27—4.6—20—14—1.81—2 / USA, New Jersey, Anglesea—+NJ2
 Sp-55: 28—4.6—20—14—1.75—2 / USA, New Jersey, Cold Spring—+NJ3
 Sp-56: 27—4.7—20—14—2—2 / USA, New Jersey, Tucahoe—+NJ4
 Sp-57: 28—4.9—20—14—1.81—2 / USA, New Jersey, Ocean View—+NJ5
 Sp-58: 28—4.7—21—14—1.9—2 / USA, New Jersey, Cedar Spring—+NJ6
 Sp-59: 28—4.8—20—14—1.66—2 / USA, New Jersey, Sea Isle—+NJ7
 Sp-60: 28—5—20—13—1.91—2 / USA, New Jersey, Vincentown—+NJ8
 Sp-61: 25—4.4—19—13—1.9—2 / USA, New Jersey, West Creek—+NJ9
 Sp-62: 29—4.6—21—13—1.66—2 / USA, New Jersey, Eyma—+NJ10
 Sp-63: 25—4.5—19—13—2—2 / USA, Washington D. C.—+Was
 Sp-64: 26—4.6—19.5—14—1.75—2 / USA, Ohio, New Castle—+Oh1
 Sp-65: 28—4.5—21—13—1.83—2 / USA, Delaware, Odessa—+Del
 Sp-66: 28—4.8—20—14—1.75—2 / USA, Ohio, Wilmington—+Oh2
 Sp-67: 28—5.1—22—14—1.61—2 / USA, Virginia, Tappahannock—+Vir1
 Sp-68: 28—5—19—14—1.81—2 / USA, Virginia—+Vir2
 Sp-69: 29—5.2—21—15—2—2 / USA, Virginia, Churchland—+Vir3
 Sp-70: 31—5.1—23—15—2—2 / USA, Virginia, Chickahominy—+Vir4
 Sp-71: 29—5.1—21—14—2—2 / USA, Virginia, Mattapony—+Vir5
 Sp-72: 29—4.4—22—13—1.81—2 / USA, Virginia, Fredericksburg—+Vir6
 Sp-73: 31—5.4—23—16—1.83—2 / USA, Virginia, James River—+Vir7
 Sp-74: 26—4.5—19—14—1.81—2 / USA, Virginia—+Vir8
 Sp-75: 27—5—21—14—1.81—2 / USA, North Carolina, Asheville—+Nca1
 Sp-76: 27—4.8—20—14—2—2 / USA, North Carolina, Hendersonville—+Nca2
 Sp-77: 30—5.3—24—13—1.75—2 / USA, North Carolina, Raleigh—+Nca3
 Sp-78: 30—5.4—22—14—1.83—2 / USA, South Carolina, Florence—+Sca
 Sp-79: 26—4.6—18—13—1.83—2 / USA, Georgia, Stone Mountain—+Ga1
 Sp-80: 26—4.6—19—12—2.1—2 / USA, Georgia, Dillard—+Ga2
 Sp-81: 32—5.2—25—16—1.83—2 / USA, Georgia, Macon—+Ga3
 Sp-82: 32—5.9—24—17—1.75—2 / USA, Georgia, Okfenokee—+Ga4
 Sp-83: 29—5.2—21—15—2—2 / USA, Georgia, Lakeside near Macon—+Ga5
 Sp-84: 36—6.4—27—17—2.16—2 / USA, Georgia, Billy's Isle—+Ga6
 Sp-85: 29—4.7—22—13—1.9—2 / USA, Georgia, Atlanta—+Ga7
 Sp-86: 31—5.3—22—15—1.91—2 / USA, Georgia, Marietta—+Ga8
 Sp-87: 35—6—26—16—1.75—2 / USA, Florida, Fort Myers—+Flo1
 Sp-88: 33—5.6—24—13—1.83—2 / USA, Florida, Duval Co., Atlantic Beach—+Flo2
 Sp-89: 29—4.9—21—14—1.66—2 / USA, Alabama, Crawford—+Ala1
 Sp-90: 33—4.9—25—15—1.57—2 / USA, Alabama, Greenville—+Ala2
 Sp-91: 30—4.8—22—14—1.66—2 / USA, Alabama, Flomaton—+Ala3
 Sp-92: 32—5.2—24—15—1.91—2 / USA, Alabama, Evergreen—+Ala4
 Sp-93: 32—5.3—23—15—1.75—2 / USA, Alabama, Montgomery—+Ala5
 Sp-94: 31—5.3—22—13—1.91—2 / USA, Alabama, Mobile—+Ala6
 Sp-95: 33—5.8—24—16—1.78—2 / USA, Alabama, Tuscaloosa—+Ala7
 Sp-96: 26—4.5—19—14—2—2 / USA, Illinois, Billet—+Illi1
 Sp-97: 29—5—22—14—2.18—2 / USA, Illinois, Havana—+Illi2
 Sp-98: 27—4.8—21—13—2.09—2 / USA, Illinois, Wolf Lake—+Illi3
 Sp-99: 26—4.3—19—13—1.9—2 / USA, Illinois, Muncie—+Illi4
 Sp-100: 29—5.3—21—14—1.91—2 / USA, Illinois, Gallatin Co., Pounds Hollow —+Illi5
 Sp-101: 30—4.6—18—13—1.75—2 / USA, Indiana—+Ind1
 Sp-102: 28—5.2—20—14—2.16—2 / USA, Indiana, Vigo—+Ind2
 Sp-103: 26—4.9—19—13—1.75—2 / USA, Michigan, Berrien—+Mich
 Sp-104: 28—4.6—20—13—1.9—2 / USA, Missouri, Meridian—+Miss1
 Sp-105: 32—5.4—24—15—2—2 / USA, Missouri, Winona—+Miss2
 Sp-106: 35—6.4—26—17—1.92—2 / USA, Louisiana, Rhoda—+La1
 Sp-107: 34—5.8—25—16—1.85—2 / USA, Louisiana, Lake Charles—+La2
 Sp-108: 33—5.8—24—17—1.85—2 / USA, Louisiana, Spanish Fort—+La3
 Sp-109: 35—6.1—26—17—1.85—2 / USA, Louisiana, Orleans Canal—+La4
 Sp-110: 32—5.8—23—16—2—2 / USA, Louisiana, Morgan—+La5
 Sp-111: 28—4.7—20—14—1.91—2 / USA, Louisiana, Arcadia—+La6
 Sp-112: 27—5—18—14—2.18—2 / USA, Kentucky—+Ken1
 Sp-113: 33—6—24—16—1.92—2 / USA, Kentucky, 3 mi. S Wasioto Bell Co.—+Ken2

- Sp-114: 35—5.9—26—18—1.86—2 / USA, Texas, San Antonio—+Tex1
 Sp-115: 34—5.8—25—16—2.07—2 / USA, Texas, Nome—+Tex2
 Sp-116: 33—5.5—25—16—1.69—2 / USA, Texas, Dallas—+Tex3
 Sp-117: 36—5.8—26—17—1.71—2 / USA, Texas, Beaumont—+Tex4
 Sp-118: 31—5.6—22—15—1.91—2 / USA, Texas, An Co.—+Tex5
 Sp-119: 28—5.1—20—14—1.84—2 / USA, Texas, Houston—+Tex6
 Sp-120: 32—5.9—23—17—2—2 / USA, Texas, Smh Co.—+Tex7
 Sp-121: 32—5.6—29—16—1.84—2 / USA, Texas, Dickinson—+Tex8
 Sp-122: 35—6.4—27—17—1.71—2 / USA, Texas, Harrisburg—+Tex9
 Sp-123: 32—6—23—16—1.83—2 / USA, Texas, Vz. Co.—+Tex10
 Sp-124: 33—5.9—24—16—2—2 / USA, Texas, Tyler—+Tex11
 Sp-125: 31—5.5—23—16—1.84—2 / USA, Louisiana, Milreburg—+La7
 Sp-126: 27—4.8—20—14—2.3—1 / Argentina, Buenos Aires, Punta Chica—*ArC7
 Sp-127: 25—4.3—19—13—2.33—1 / Argentina, Jujuy, Volcan Jujuy—*ArNO3
 Sp-128: 27—4.7—19—13—2.63—1 / Argentina, Misiones, Bernardo de Irigoyen—*ArNE7
 Sp-129: 26—4.8—20—14—2.63—1 / Argentina, Buenos Aires, Veronica—*ArC8
 Sp-130: 27—4.6—19—13—2.66—1 / Bolivia, Beni, Rurrebanaque—*Bol4
 Sp-131: 27—4.3—20—13—3.09—1 / Peru, Cuzco, Quince Mil—*Per6
 Sp-132: 28—4.8—21—13—2.83—1 / Argentina, Jujuy, M. Mercedes—*ArNO4
 Sp-133: 28—4.6—21—15—2.72—1 / Argentina, Buenos Aires, Estacion Bavio—*ArC9
 Sp-134: 30—4.7—23—14—2.5—1 / Argentina, Buenos Aires, General Mansilla—*ArC10
 Sp-135: 32—5.4—24—15—2.75—1 / Argentina, Corrientes, Manantiales—*ArC11
 Sp-136: 28—4.8—21—14—2.72—1 / Argentina, Buenos Aires, Zelaya—*ArC12
 Sp-137: 27—4.2—21—13—3.1—1 / Argentina, Buenos Aires, Estancia San Isidro—*ArC13
 Sp-138: 28—5.2—21—13—2.5—1 / Argentina, Jujuy, Tala—*ArNO5
 Sp-139: 28—4.8—21—13—2.83—1 / Argentina, Salta, Rio Pescado—*ArNO6
 Sp-140: 26—4.2—20—13—2.23—1 / Argentina, Buenos Aires, Reserva Punta Lara—*ArC14
 Sp-141: 27—4.9—20—13—2.3—1 / Argentina, Salta, Pocitos—*ArNO7
 Sp-142: 28—4.4—22—12—2.81—1 / Argentina, Arroyo Valdez—*ArC15
 Sp-143: 29—4.6—22—14—2.81—1 / Argentina, Brazo Largo—*ArC16
 Sp-144: 26—4.2—20—12—2.33—1 / Argentina, Buenos Aires, Chascomus—*ArC17
 Sp-145: 32—5.2—23—15—3.09—1 / Uruguay, Arroyo Tres Cruces Grande—*Uru

Appendix II. Character-state matrix for females in a revision of *Metaleptea* Brunner von Wattenwyl. Characters are explained in text. Measurements are in millimeters.

Sp-number BL-LP-LT-LF-FSP / Locality-Acronyms

- Sp-1: 44-8-33-22-1 / USA, Alabama, Tuscaloosa—Ala1
 Sp-2: 44-8.1-31-20-1 / USA, Alabama, Montgomery—Ala2
 Sp-3: 47—8.2—35—23—1 / USA, Alabama, Decatur—Ala3
 Sp-4: 38—7.3—28—19—1 / USA, Illinois, Billet—Illi1
 Sp-5: 41—7.6—30—19—1 / USA, Illinois, Havana—Illi2
 Sp-6: 35—6.6—25—18—1 / USA, Illinois, Wolf Lake—Illi3
 Sp-7: 41—7.8—30—20—1 / USA, Tennessee, Johnson City—Tenn1
 Sp-8: 41—7.7—30—19—1 / USA, Tennessee, Chatanooga—Tenn2
 Sp-9: 36—6.3—27—17—1 / USA, Maryland, Chestertown—Md1
 Sp-10: 37—6.8—26—19—1 / USA, Michigan, Berrien Co.—Mich1
 Sp-11: 42—7.3—32—20—1 / USA, Mississippi, Meridian—Miss1
 Sp-12: 42—7.5—30—19—1 / USA, Mississippi, Winona—Miss2
 Sp-13: 47—8.2—35—23—1 / USA, Louisiana, Houma—La1
 Sp-14: 47—8.4—35—23—1 / USA, Louisiana, New Orleans —La2
 Sp-15: 49—8.7—36—23—1 / USA, Louisiana, Lafayette—La3
 Sp-16: 44—8.4—34—22—1 / USA, Louisiana, Havaahan—La4
 Sp-17: 46—8.4—35—22—1 / USA, Louisiana, Lake Charles—La5

- Sp-18: 51—9.3—39—24—1 / USA, Louisiana, Spanish Fort—La6
 Sp-19: 50—9.1—38—23—1 / USA, Louisiana, Orleans Canal near Spanish Fort—La7
 Sp-20: 47—8.6—35—22—1 / USA, Louisiana, Morgan City—La8
 Sp-21: 41—7.2—30—19—1 / USA, New Jersey, Cape May—NJ1
 Sp-22: 38—7.1—28—18—1 / USA, New Jersey, May's Landing—NJ2
 Sp-23: 37—7.5—26—17—1 / USA, New Jersey, Anglesea—NJ3
 Sp-24: 38—7.5—28—19—1 / USA, New Jersey, Eldora—NJ4
 Sp-25: 35—6.8—26—18—1 / USA, New Jersey, Cold Spring—NJ5
 Sp-26: 42—8.2—31—21—1 / USA, New Jersey, Tuckahoe—NJ6
 Sp-27: 44—8—32—20—1 / USA, New Jersey, West Creek—NJ7
 Sp-28: 40—7.7—31—20—1 / USA, Virginia, Tappahannock —Va1
 Sp-29: 43—7.8—32—20—1 / USA, Virginia, Natural Bridge—Va2
 Sp-30: 44—7.9—33—21—1 / USA, Virginia, Sexton—Va3
 Sp-31: 45—8.1—35—21—1 / USA, Virginia, SE Reed's Ferry—Va4
 Sp-32: 38—7.7—29—19—1 / USA, Virginia, Ware's Wharf—Va5
 Sp-33: 40—7.3—29—18—1 / USA, Virginia, Rappahannock—Va6
 Sp-34: 41—7.8—30—19—1 / USA, Virginia, Fontaine Creek—Va7
 Sp-35: 39—7.8—29—19—1 / USA, Virginia, Kimagies Creek—Va8
 Sp-36: 42—8.2—31—24—1 / USA, Virginia, Bottomland Swales, Three Creeks, near
 Drewyville—Va9
 Sp-37: 41—7.8—30—22—1 / USA, Virginia, Chickahomming—Va10
 Sp-38: 40—8—29—21—1 / USA, Virginia, Pamunky—Va11
 Sp-39: 42—7.9—31—20—1 / USA, Pennsylvania—Pa1
 Sp-40: 37—6.8—27—20—1 / USA, Pennsylvania, Goshen—Pa2
 Sp-41: 40—8—28—20—1 / USA, Delaware, New Castle—Del1
 Sp-42: 41—7.8—31—21—1 / USA, Delaware, Odessa—Del2
 Sp-43: 38—7.4—19—19—1 / USA, North Carolina, Asheville—NC1
 Sp-44: 42—7.3—31—22—1 / USA, North Carolina, Raleigh—NC2
 Sp-45: 31—6.6—22—19—1 / USA, North Carolina, Fayetteville—NC3
 Sp-46: 41—7.4—30—20—1 / USA, Georgia, Vicinity of Stone Mountain—Ga1
 Sp-47: 37—7.2—29—19—1 / USA, Georgia, Dillard—Ga2
 Sp-48: 38—8.1—32—22—1 / USA, Georgia, Macon—Ga3
 Sp-49: 43—7.8—32—23—1 / USA, Georgia, Locust Grove—Ga4
 Sp-50: 44—8.2—33—25—1 / USA, Florida, Fort Myers—Flo1
 Sp-51: 44—8.1—34—25—1 / USA, Florida, Marianna—Flo2
 Sp-52: 44—8.1—33—23—1 / USA, Alabama—Ala4
 Sp-53: 42—8—31—21—1 / USA, Alabama, Opelika—Ala5
 Sp-54: 47—8.5—31—24—1 / USA, Alabama, Greenville—Ala6
 Sp-55: 41—7.9—30—23—1 / USA, Alabama, Flomaton—Ala7
 Sp-56: 50—9.9—36—27—1 / USA, Texas, Beaumont—Tex1
 Sp-57: 47—9.3—35—22—1 / USA, Texas, Dallas—Tex2
 Sp-58: 43—8.8—30—23—1 / USA, Texas, Ann Co.—Tex3
 Sp-59: 46—9.4—35—23—1 / USA, Louisiana, Milneburg—La9
 Sp-60: 44—8.8—33—23—1 / USA, Louisiana, Lake Maurepas—La10
 Sp-61: 41—8.5—31—21—1 / Mexico, N. C. Victoria, Swamp County—Mex1
 Sp-62: 34—6.6—25—17—1 / Mexico, Tianguistengo—Mex2
 Sp-63: 39—7.9—28—20—2—Brazil, Petropolis—BraE1
 Sp-64: 44—8—34—22—2—Brazil, Uruguayana—BraS1
 Sp-65: 38—7.1—28—20—1 / Mexico, Orizaba—Mex3
 Sp-66: 37—7—28—19—1 / Mexico, Jalapa—Mex4
 Sp-67: 39—7.4—29—20—1 / Mexico, Cordoba, Fortin—Mex5
 Sp-68: 41—7.5—30—19—1 / Mexico, Tabasco, Frontera—Mex6
 Sp-69: 39—6.8—29—18—1 / Mexico, Tabasco, Villa Hermosa—Mex7
 Sp-70: 38—7.2—29—19—1 / Guatemala, Chiquimula—Gua1
 Sp-71: 45—8.1—33—21—1 / Guatemala, Morales—Gua2
 Sp-72: 44—8—32—22—1 / Honduras, Puerto Castilla—Hon1
 Sp-73: 41—7.8—30—21—2 / Panama, Gatun—Pan1
 Sp-74: 40—6.9—28—20—2 / Surinam, Zanderij—Su1
 Sp-75: 42—7.3—31—21—2 / Paraguay, Sapucay—Par1

- Sp-76: 37—7—26—18—2 / British Guiana, Bartica—BG
Sp-77: 39—7.5—29—18—2 / Brazil, Sao Paulo—BraE2
Sp-78: 40—7—30—21—2 / Brazil, Mato Grosso, Santa Rosa de Descalvados—BraS2
Sp-79: 39—7—28—999—2 / Brazil, Pirapora—BraW1
Sp-80: 48—9—35—22—2 / Brazil, Corumba—BraW2
Sp-81: 43—7.8—31—22—2 / Brazil, Para, Obidos—BraE3
Sp-82: 40—7.6—30—20—2 / Brazil, Teffe—BraE4
Sp-83: 40—7.4—29—20—2 / Argentina, Magdalena, Ecia San Isidro—ArgC1
Sp-84: 46—8.7—34—22—2 / Argentina, Corrientes, Ituzaingo—ArgNE1
Sp-85: 36—6.8—26—19—2 / Peru, Cuzco, Quince Mil—Per1
Sp-86: 38—7—27—20—2 / Ecuador, Limnococha—Ec1
Sp-87: 41—7.8—30—20—2 / Bolivia, Beni, Reyes—Bol1
Sp-88: 40—8—29—19—2 / Argentina, Salta, Pocitos—ArgNO1
Sp-89: 45—8.6—33—22—2 / Argentina, Formosa, Colonia Aborigen "Bartolome de las Casas—ArgNE2
Sp-90: 45—7.7—34—21—2 / Argentina, Buenos Aires, Quilmes—ArgC2
Sp-91: 46—7.8—35—21—2 / Argentina, Formosa, Isla de Oro—ArgNE3
Sp-92: 46—7.8—36—21—2 / Argentina, Corrientes—ArgNE4
Sp-93: 45—8—34—21—2 / Argentina, Corrientes, Manantiales—ArgNE5
Sp-94: 46—7.5—35—20—2 / Argentina, Santa Fe, Dto Garay—ArgC3
Sp-95: 44—8—32—21—2 / Argentina, Misiones, Dto Concepcion—ArgNE6
Sp-96: 45—7.8—33—21—2 / Bolivia, Santa Cruz—Bol2
Sp-97: 37—8—30—21—2 / Argentina, Buenos Aires, Lomas—ArgC4
Sp-98: 44—8—32—23—2 / Brazil, Amazonas, Rio Autaz—BraC
Sp-99: 41—7.4—29—21—2 / Peru, Santa Cecilia, Rio Maniti—Per2