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REVISION OF THE NEOTROPICAL GENUS *MICRELEPHAS* (LEPIDOPTERA: PYRALIDAE: CRAMBINAE)

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ABSTRACT.— The Neotropical genus *Micrelephas* Dognin (type species, *Micrelephas crassipalpis* Dognin) is redescribed and redefined to include *Diptychophora pictella* Schaus, *Argyria kadenii* Zeller, as well as four new species, *M. chalybeus*, *M. gaskini*, *M. pseudokadenii* and *M. helenae*. A lectotype is designated for *Diptychophora examinalis* Meyrick which is synonymized with *M. pictella*, and for *Argyria kadenii* Zeller. The caterpillar of *M. pictella* bores the bark of *Hyeronima alchorneoides* Allemao (Euphorbiaceae).

RESUMEN.— Se describe y redefine el género neotropical *Micrelephas* Dognin (especie-tipo, *Micrelephas crassipalpis* Dognin) y se incluyen *Diptychophora pictella* Schaus, *Argyria kadenii* Zeller, y cuatro especies nuevas: *M. chalybeus*, *M. gaskini*, *M. pseudokadenii* y *M. helenae*. Se designa un lectotipo para *Argyria kadenii* Zeller y para *Diptychophora examinalis* Meyrick, un sinonimo de *M. pictella*. La larva de *M. pictella* es un barrenador de la corteza de *Hyeronima alchorneoides* Allemao (Euphorbiaceae).

KEY WORDS: *Argyria*, Argyriini, *Diptychophora*, Diptychophorini, Crambidae, Crambini, Crambinae, Euphorbiaceae, INBio, *Micrelephas chalybeus* n.sp., *Micrelephas gaskini* n.sp., *Micrelephas pseudokadenii* n.sp., *Micrelephas helenae* n.sp., Neotropical, Pyralidae, Pyraustinae, South America, taxonomy.

Being involved in a faunal survey of the Crambinae of Costa Rica, I started to investigate the important collection of the "Instituto Nacional de Biodiversidad" (INBio) in 1995. This collection yielded two strikingly colored species that were unknown to me and clearly related on the basis of wing pattern and male genitalia. Further study at the National Museum of Natural History (USNM) (Smithsonian Institution, Washington, DC), and the Canadian National Collection (CNC) (Agriculture and Agri-Food Canada, Ottawa, Canada), showed that one of these was *Diptychophora pictella* Schaus, placed by Munroe (1995) in the genus *Argyria* Hübner. The USNM collection and the CNC also included respectively one (from Venezuela) and two (from Ecuador and Bolivia) other species of the same group, representing a total of four specimens, along with several specimens of *D. pictella*. I sent photographs of three of these species with a request for specimens to various curators worldwide and received the largest number of specimens (47) and the highest diversity of taxa (6) from the Natural History Museum (BMNH), London, England.

Stanislas Bleszynski, who published extensively on Crambinae of the world, especially in the 1960s, had been through these specimens in London, dissecting many, and selected new names which were never published due to his accidental death in 1969. Bleszynski had also associated these new names, as well as *D. pictella* and *Argyria kadenii* Zeller, to the then monotypic genus *Micrelephas* Dognin, of which the type species is *M. crassipalpis* Dognin. I found this surprising at first, given the dissimilarity in wing shape and pattern between *M. crassipalpis* and the other species, but a dissection of the male genitalia of a specimen of *M. crassipalpis* in the CNC revealed that indeed Bleszynski was right.

Bleszynski did not recognize *Micrelephas* to be a crambine at the time his checklist of Neotropical Crambinae was published (Bleszynski, 1967), possibly because Dognin (1905) had described the genus in the Pyraustinae. It was Munroe (1995) who first published the placement of the genus in its proper subfamily, assigning it to the Crambini, a decision with which I fully agree. Some authors have elevated the Crambiformes (a subgroup of Pyralidae that includes Crambinae) to family status (Crambidae), a decision that I do not follow as I believe it reduces the usefulness of the classification.

Two synapomorphies recognized by Landry (1995) to define the

Crambini are present in *Micrelephas*: the apex of the gnathos directed downward or straight behind, and the female anal papillae disconnected dorsally. *Micrelephas* has other morphological features which are present in all Crambini, although not exclusive to them, but absent in Argyriini and Diptychophorini: the long labial palpi, and the elongate forewings. *Micrelephas kadenii* and *M. pictella* have characters that have not traditionally been ascribed to Crambini, namely their richly patterned and colored forewing, as well as the emarginate forewing outer margin. However, the two known synapomorphies for the Crambini are strong (Landry 1995), and the Argyriini are still undefined by synapomorphies, although they have some characteristics pointing to common ancestry (short palpi, short and broad forewings, and mostly satiny white forewings) (Landry, 1995; Munroe, 1995).

MATERIAL AND METHODS

The descriptions are composite, based on available specimens. The length of the labial palpus is compared to the diameter of the head in side view where this value reaches its maximum. In the sections on type material the descriptions of labels assume that the labels are rectangular, white, and that the text is in black ink unless otherwise indicated in square brackets. A question mark between square brackets indicates that some information was not clearly readable.

All specimens studied here came from the following collections: American Museum of Natural History, New York, New York, USA (AMNH); The Natural History Museum, London, England, UK (BMNH); Canadian National Collection of Insects, Ottawa, Canada (CNC); "Instituto Nacional de Biodiversidad", Santo Domingo, Costa Rica (INBio); "Museo del Instituto de Zoología Agrícola", Maracay, Venezuela (MIZA); "Museo de Historia Natural, Universidad Nacional Mayor de San Marcos", Lima, Peru (MUSM); "Staatliches Museum für Tierkunde", Dresden, Germany (SMTD); "Universität Bayreuth", Bayreuth, Germany (UBC); National Museum of Natural History, Washington, DC, USA (USNM); and collection of Vitor O. Becker, Planaltina, Brazil (VOBC). The acronyms of these collections were taken from the list provided by the Bernice Bishop Museum of Hawaii on the internet (www.bishopmuseum.org/bishop/ento/codens-r-us.html), except for

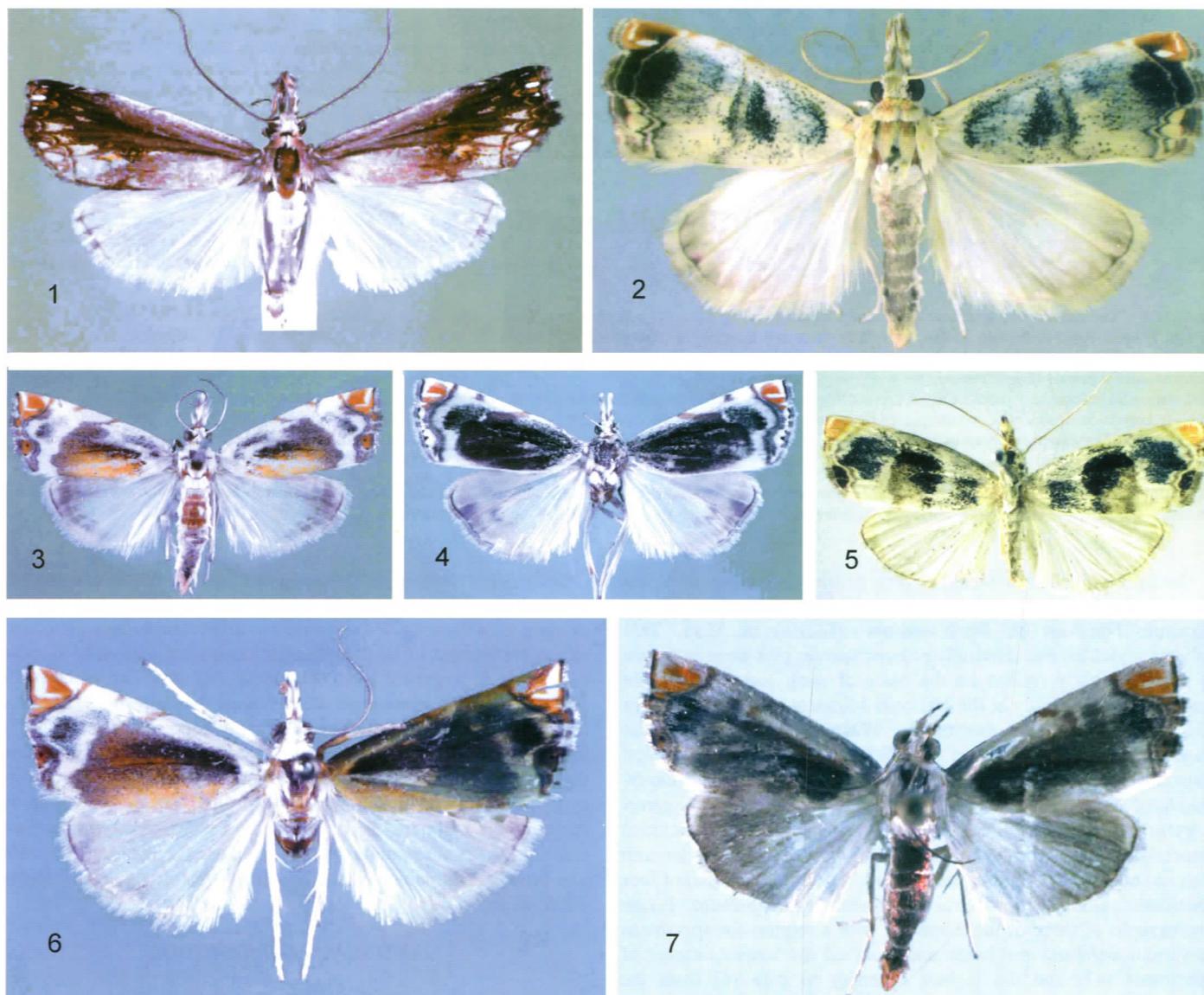


Fig. 1-7. Adult maculation of *Micrelephas*: 1. *M. crassipalpis* Dognin, Ecuador, Napo, Baeza [VOBC]. 2. *M. pictellus* (Schaus), Brazil, Bahia, Camacan [VOBC]. 3. *M. kadenii* (Zeller), Venezuela, Aragua, Rancho Grande [USNM]. 4. *M. gaskini* B. Landry n. sp., paratype ♀, Colombia, Narino, Reserva Natural La Planada [SMTD]. 5. *M. chalybeus* B. Landry n. sp., paratype ♂, Costa Rica, La Trinidad [BMNH; copyright of the Trustees BMNH]. 6. *M. pseudokadenii* B. Landry n. sp., paratype ♂, Ecuador, Napo, near San Rafael Falls [AMNH]. 7. *M. helenae* B. Landry n. sp., holotype ♂, Costa Rica, Guanacaste, Volcan Cacao [INBio].

UBC, which is not on that list, and INBio, which I use to replace INBC to avoid confusion.

In the distribution sections, a question mark in front of the name of a state or province indicates that the information was not on the label and is uncertain.

Genus *MICRELEPHAS* Dognin, 1905

Micrelephas Dognin, 1905; Munroe 1995.

Type species.—*Micrelephas crassipalpis* Dognin, 1905.

Diagnosis.—A possible synapomorphy for the species of *Micrelephas* is the presence of short fine spines on the apex of the gnathos (see Fig. 19). A distinct character of all species except *M. helenae* and *M. chalybeus* is the presence in the males of a furrow containing long, presumably androconial scales on the upper surface of the hindwing along the basal half of M1 (Fig. 8-9): these characters are not known in other Crambinae. Also, the abdominal intersegmental membrane VIII-IX (Fig. 13-18) is adorned dorsally with a bundle of long filiform scales medially in all species except *M. helenae*, although the structure is less elaborate in *M. kadenii* and *M.*

chalybeus. The similarity of the wing pattern is strong in all species except *M. crassipalpis* (Fig. 1-7), and the male (Fig. 19-36) and female (Fig. 37-42) genitalia show comparatively little variation between species.

Redescription.—**Head.** Ocelli and chaetosemata present. Frons usually produced slightly, apically rounded. Antennal flagellomeres simple to shortly laminate, ciliation short, with two sets of equally short appressed scales, usually with medium-sized sensory pits. Labial palpus disheveled or not, correct, 2.0-2.6 X diameter of head in length. Maxillary palpus disheveled apically. **Thorax.** Legs with full complement of spurs. Male frenulum simple; female frenulum with 3 acanthae. Male frenulum hook present. Forewing length 2.0-2.6 X its maximal width. Forewing length: 6.0-17.0mm in males; 7.5-19.0mm in females. Wing venation (Fig. 8-10) based on *M. crassipalpis*, *M. pictellus* and *M. helenae*: Forewing R1, R2, and R5 free; R3 connected to R4. M1 free; M2 and M3 not stalked. Cubitus with CuA1 and CuA2. 1A + 2A strong; with a faint indication of 3A in *M. pictellus* and *M. helenae*. Hindwing Sc + Rs stalked at 1/3 wing length. M1 in males forming a fold dorsally for about 1/2 to 2/3 of length, in which lies a series of elongate modified scales in all species except *M. chalybeus* and *M. helenae*. Cell open. M2, M3, CuA1, CuA2, 1A, 2A and 3A all present. Forewing terminal margin (more distinctly modified in *M. crassipalpis*):

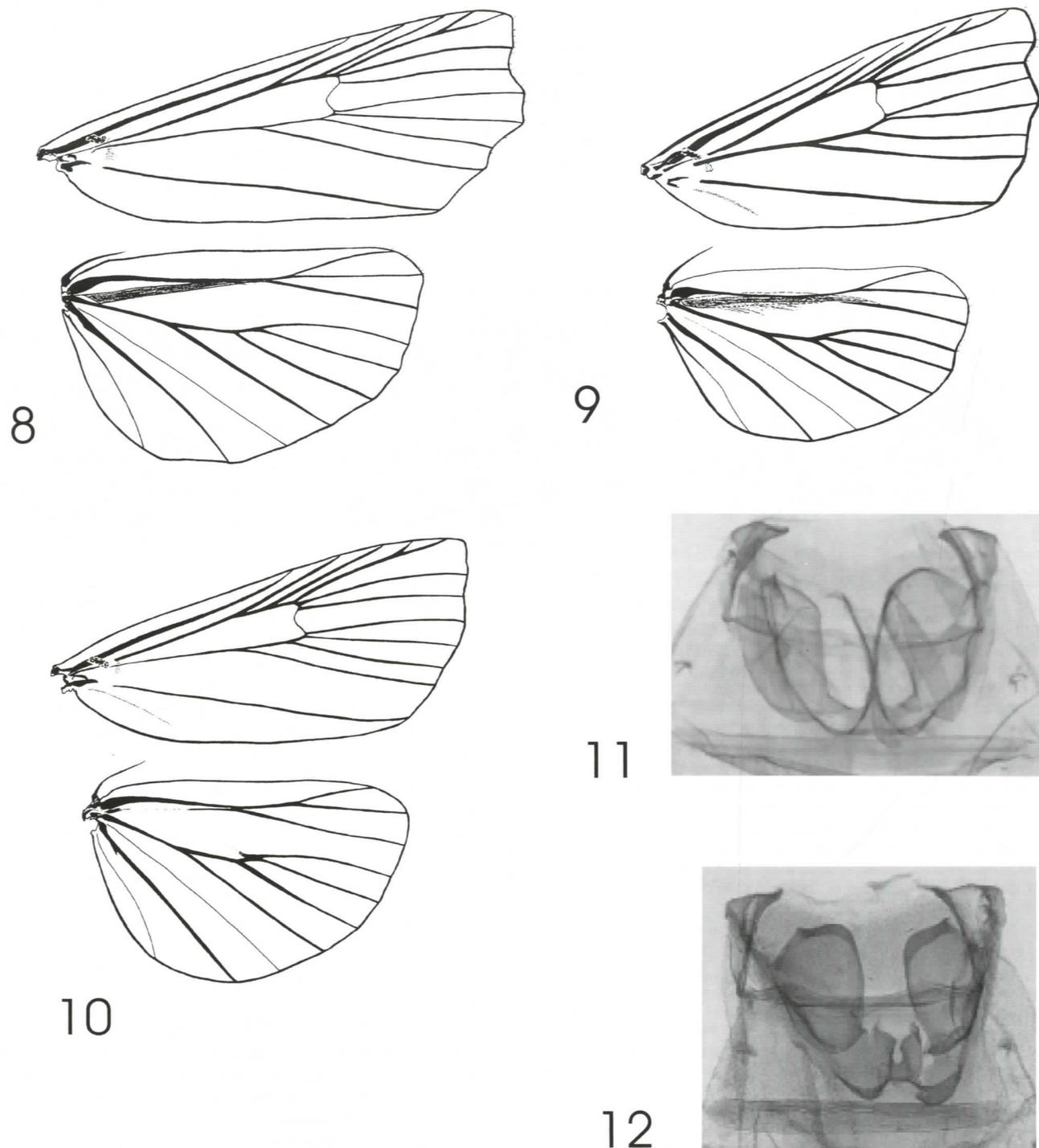


Fig. 8-12. Male wing venation (Fig. 8-10) and tympanal organs in ventral view (Fig. 11-12) in *Micrelephas*: **8.** *M. crassipalpis* Dognin, Bolivia, Cochabamba, EL Limbo, slide BL 1120 ♂ [CNC]. **9.** *M. pictellus* (Schaus), Bolivia, Cochabamba, Chapare, slide BL 1104 ♂ [CNC]. **10.** *M. helenae* B. Landry n. sp., paratype ♂, Costa Rica, Cartago, Tapanti, slide BL 1121 ♂ [VOBC]. **11.** *M. pictellus* (Schaus), ♀, Panama, Barro Colorado Island, slide BL 1096 ♀ [USNM]. **12.** *M. chalybeus* B. Landry n. sp., holotype ♂, Costa Rica, Cartago, Orosi, slide BM Pyralidae 21103 ♂ [BMNH].

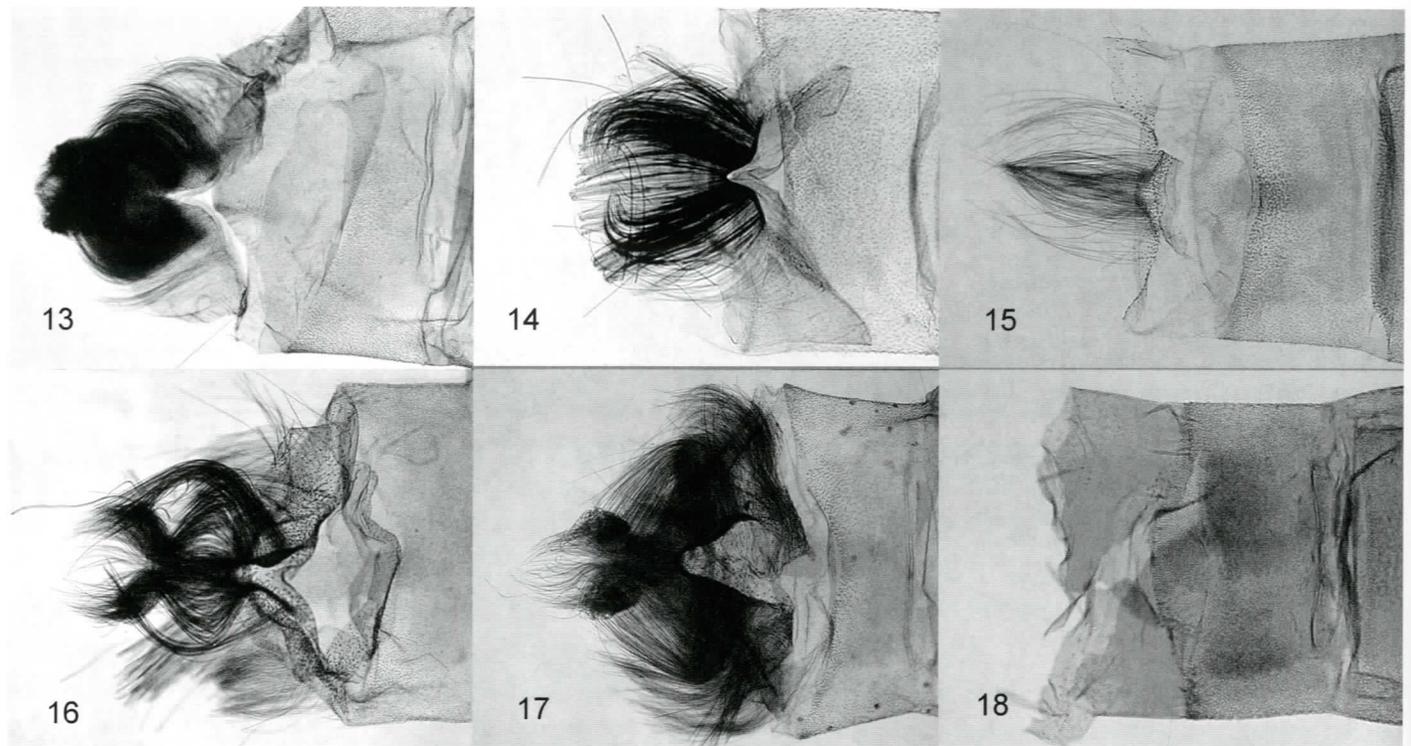


Fig. 13-18. Male coremata in *Micrelephas*, ventral view: **13.** *M. crassipalpis* Dognin, Colombia, West Cordillera, Rio Aguacatal, slide BM Pyralidae 21105 ♂ [BMNH]. **14.** *M. pictellus* (Schaus), Bolivia, Cochabamba, Chapare, slide PYR 292 ♂ [CNC]. **15.** *M. kadenii* (Zeller), Venezuela, Aragua, Rancho Grande, slide BL 1100 ♂ [USNM]. **16.** *M. gaskini* B. Landry n. sp., paratype, Ecuador, Quito, 50 km W Quito, slide PYR 294 ♂ [CNC]. **17.** *M. pseudokadenii* B. Landry n. sp., paratype, Bolivia, Cochabamba, Siberia/San Mateoito, slide PYR 293 ♂ [CNC]. **18.** *M. helenae* B. Landry n. sp., holotype ♂, Costa Rica, Guanacaste, Volcan Cacao, slide BL 1224 ♂ [INBio].

slightly produced at R5, concave at M1, produced at M2-M3 and sometimes at CuA2. Forewing pattern (Fig. 1-7) mostly brown (*M. crassipalpis*) or white with brown and orange scaling in the other species; subterminal line present. *Tympanal organs* (Fig. 11-12): venulae primae joined to form a complete sclerotized ring; transverse ridge present; tympanic pockets small; venulae secundae absent or very faint; tympanic bridge not distinctly produced ventrally, connected medially; praecinctorium simple, usually with dorsal margin sclerotized for support; tympanic frame slightly projected ventrally beyond venulae primae; tympanic crest well-formed, situated near middle of drum, slightly variable in size and shape; tympanum at 90° to sternal plane or slightly less; tympanic drum large, slightly variable in shape and size; spinula visible. *Male abdominal intersegmental membrane VIII-IX* (Fig. 13-18) dorsally with elaborate tuft of long filiform scales medially in all species except *M. helenae*, but this structure less elaborate in *M. chalybeus* and *M. kadenii*. *Male genitalia* (Fig. 19-36). Uncus generally long and narrow, pointed downward apically; shaft straight or concave in middle, with short, and sometimes long, setae. Anal tube sclerotized ventrally at connection with gnathos. Gnathos arms usually long, apically sometimes forming a plate and always bearing spinules. Tegumen arms long, with short connection dorsally. Valva with mediobasal setose hump; costa with short setae before 1-2 strongly sclerotized free projections, with spiculate membrane around medial projection or free when medial projection absent; cucullus usually long, with longitudinal ridges on medial surface, abundantly setose, especially at apex, and sometimes along ventral margin. Juxta a dorsoventrally flattened plate with basal half at about 45° from distal half directed horizontally, usually with sclerotized downward pointed apex. Pseudosaccus absent. Vinculum usually slightly enlarged laterally, produced anteriorly in the middle along ventrocephalic margin, with a short narrow crest ventromedially. Aedeagus narrow, usually with a slight curve at 1/3, apex usually directed upward and unsclerotized dorsally; coecum penis of medium length, usually not distinctly swollen, with or without short lateral projections; vesica scobinated, with a single cornutus only in *M. crassipalpis*. *Female genitalia* (Fig. 37-42). Anal papillae not separated into lobes, with basal band of sclerotization. Posterior apophyses mostly straight, variable in length. Anterior apophyses short. Segment VIII large and well sclerotized, with dorsal connection of medium width, with row of long setae

on apical margin dorsally. Ostium bursae in a more or less sclerotized projecting structure. Ductus bursae usually unsclerotized, narrow, scobinated apically. Corpus bursae rounded, usually well differentiated from corpus bursae, scobinated, without signum.

Distribution.— From Costa Rica (about 10°N) to Santa Catarina, Brazil (about 28°S), between sea level to 2400m, although specimens collected below 700m were strictly *M. pictellus*, with the exception of one specimen of *M. crassipalpis*.

Biology.— The biology of this genus was unknown until two reared specimens of *M. pictellus* were deposited at INBio by Marcela Arguedas who reared them from the bark of *Hyeronima alchorneoides* Allemao (Euphorbiaceae). This is the first time that a Crambinae species is reported mining the bark of a tree, and the first time a member of the Euphorbiaceae is reported as a host in the subfamily.

Phylogenetic relationships.— The evolutionary affinities of *Micrelephas* are unknown. The only phylogenetic framework available in Crambinae is that of Landry (1995) on adult morphology. This study did not take *Micrelephas* into account and it is almost completely unresolved within Crambini. Other character systems are needed to solve this problem.

Micrelephas crassipalpis Dognin, 1905

Fig. 1, 8, 13, 19, 20

Micrelephas crassipalpis Dognin, 1905: 77; Munroe, 1995: 38.

Type material.— The species was described from one male.

Holotype ♂ (examined), with the left antenna broken at the scape, the left labial palpus broken at the first segment, the right anterior leg, the left middle leg and the right posterior leg broken at the trochanter, and the right middle leg broken at the third tarsomere. Labeled: "Environs de Loja/ Equateur" [printed in capitals]; "gen. nov./ (*Micrelephas*)/ sp. nov./ (*crassipalpus*) [sic] [handwritten]; "gen. nov./ sp. nov. ♂/ Warren [?] 94 [?] 04" [handwritten]; "*Micrelephas*/"

crassipalpis/ type ♂ Dgn. [?] [handwritten]; "Type No./ 33004/ U.S.N.M." [red, printed except for the number]; "Dognin/ Collection" [printed]; "GS-6729-SB/ *Micrelephas/ crassipalpis/ Dognin/ det. Bleszynski, 1969*" [handwritten except for "GS-", "-SB", "det. Bleszynski, 19"]; (USNM).

Diagnosis.— This species is unique in the genus by virtue of its forewing pattern and coloration (compare Fig. 1 to Fig. 2-7). Its labial palpi are also the most strongly discheveled of all *Micrelephas* species.

Redescription.— MALE (n=18) (Fig. 1). Forewing length: 14.0-17.0mm. *Head* off-white, with pale-brown scales in middle of frons and upper part of postgena; frons shortly produced, somewhat conical but rounded apically. Antenna with brown scales on scape and base of flagellum, otherwise off-white; flagellomeres simple to shortly laminate toward apex, with 1-5 sensory pits on each side (one-two on basal flagellomeres, 4-5 on longer distal flagellomeres). Labial palpus 2.6 X diameter of head in length, strongly discheveled apically, white on medial side, otherwise mostly brown with beige and white scales. Maxillary palpus beige to pale brown with white scales medially and apically. *Thorax* pale beige to white along median line, darker beige to brown laterally and on tegula. Foreleg white on coxa, medially on femur and tibia, and tip of tarsomeres, otherwise brown. Midleg and hindleg white, except on last tarsomere, brown. *Forewing* length 2.6 X its maximal width, produced at M2-M3, slightly concave at M1 and CuA1, and slightly produced at CuA2; mostly dark brown on costal half, except for white costa until postmedian line and three white spots subterminally (the most apical one being more like a streak), and yellowish-orange scales below each of these; inner half mostly white at base, dark brown toward middle with a post median pair of small yellowish-orange patches usually partly on or on each side of CuA2, and yellowish-beige in postmedian area; with subterminal line made of crescent-shaped markings filled with yellowish-beige or orange except for diagonal white line on costa at 4/5 and mostly straight basal margin near anal angle, mostly following terminal margin except near anal angle where it is directed at 90° from inner margin before curving toward terminal margin; fringe scales dark brown or off-white tipped with brown or dark brown. *Hindwing* white with colorous fringe; furrow of androconia extending slightly beyond middle. Abdomen uniformly off-white. *Tympanal organs* (n = 2): venulae secundae very faint; transverse ridge rather large, apical margin almost straight; tympanic pockets very slightly projected beyond transverse ridge, narrowly rounded; praecinctorium dorsal margin sclerotized; tympanic crest slightly smaller than average; tympanum at 90°; tympanic drum elongate, nearly reaching apical edge of transverse ridge. *Abdominal intersegmental membrane VIII-IX* (n=2) (Fig. 13) dorsally with large crown of long and curved filiform scales on a ridge: ventral scales directed outward and apically at about 45°, curved at 90° in their middle, pointed medially, apically and slightly downward; dorsal scales shorter, forming a median bundle of which the median scales are directed apically and dorsally and the lateral scales are subapically curved toward apex, dorsally and medially. *Male genitalia* (n=5) (Fig. 19, 20). Uncus of medium girth; shaft short and straight; apical spine at almost 90°; basal arms long (about 1/2 length of shaft); connection of arms and shaft broadly rounded; with very few dispersed slender and short setae dorsally on shaft, a patch of 3-5 short thicker setae at base of each arm ventrally, and a pair of long ones subapically on each side of shaft. Gnathos thinly sclerotized, with narrow arms; apical plate elongate (about as long as free arms), swollen and rounded apically, with spinules only dorsally. Tegumen arms rather large, enlarged beyond middle, ventral margin expanded beyond middle, dorsal margin straight; dorsal connection large, close to 1/3 length of arms. Valva with mediobasal sclerotized and setose hump; costal margin with about a dozen short setae mostly where it makes a downward angle, before free projections; two projections strongly sclerotized: lateral projection variable in width and thickness, reaching last third of length of valva, apically rounded and concave or flat and square, curved toward medial side; medial projection shorter, pointed, directed almost directly upward, with spiculate membranous sheath; cucullus rather short, narrowing apically, ventral margin slightly expanded before middle, dorsal margin slightly curved dorsally, medial surface with diagonal ridges at base and longitudinal ridges along costa, with very long setae on ventral margin mostly toward apex, setae also quite long on dorsal margin, slightly more concentrated at apex. Juxta short, broad, rounded, apically v-shaped and down curved with a short sharp point. Vinculum of medium width laterally, slightly produced cephalad; ventrocephalic margin rounded; with a low narrow crest medially. Aedeagus short and stout, as long as valva, slightly constricted medially in dorsal view, with slight downward curve at 1/3, distal 1/3 slightly bent upward and unsclerotized dorsally; coecum penis about 1/3 length of sclerotized part of aedeagus, slightly bulged, without

lateral projections; vesica scobinated and with one large blade-like, shortly serrated cornutus.

FEMALE: unknown.

Distribution.— BOLIVIA: El Limbo, 1680-2000m (Cochabamba); COLOMBIA: western Cordillera, Rio Aguacatal, 2000m (?Huila), Jimenez, 480m (?Norte de Santander); ECUADOR: near Loja [probably between 1000-3000m] (?Loja), Estación Científica San Francisco, 1780-2250m (Loja), Baeza, 2000m (Napo); PERU: Cerro de Pasco, 1920m (Pasco). Specimens examined: 18 ♂♂ (BMNH, CNC, UBC, USNM, VOB).

Flight period.— Ten specimens with collecting dates in January, March, April, May and December.

Biology.— Adults come to light.

Notes.— The sensory pits on the male antennal flagellomeres when viewed under the stereo-microscope are similar to those found on the male antennae of *Fissicrambus fissiradiellus* (Walker) and *Parapediasia teterrilla* (Zincken) as shown in Landry (1995, Fig. 61 and 57, respectively).

Micrelephas pictellus (Schaus, 1922)

Fig. 2, 9, 11, 14, 21-23, 37

Diptychophora pictella Schaus, 1922: 131; Bleszynski, 1963: 299; *Argyria pictella*, Bleszynski, 1967: 96; Munroe 1995: 35.

Diptychophora examinalis Meyrick, 1931: 109; *Argyria examinalis*, Bleszynski, 1963: 213; Bleszynski, 1967: 96; Munroe 1995: 35, **syn. nov.**

Type material.— *Diptychophora pictella* Schaus, 1922. Described from one type specimen deposited in the USNM. Holotype ♂ (examined) missing midlegs and left hindleg beyond trochanter. Labeled: 1- "Rio de Janeiro." [faded white, printed]; 2- "Collection/ Wm Schaus" [upside down, faded white, printed]; 3- "Type No./ 25534/ U.S.N.M." [square, red, printed except for number]; 4- "Slide ♂/ SB/ No. 4611" [blue, printed except for male sign, initials and number]; 5- "Diptychophora/ pictella/ type Schs" [faded white, handwritten]; 6- "Genitalia Slide/ By SB ♂/ USNM 108,733" [green with black box, typed except as in label # 4]; 7- "2008981" [typed]. The abdomen and genitalia are stained purple, mounted in Canada balsam on slide and in reasonably good condition except for the broken tympanal organs.

Diptychophora examinalis Meyrick, 1931. Described from eight specimens. Lectotype ♂ (examined and here designated) not missing any appendages and otherwise in good condition except for big gash in left hindwing. Labeled: 1- "LECTO- / TYPE" [round, white with blue border, typed]; 2- "Bartica/ Brit[ish]. Guiana/ P[arish]. .1.[19]13" [faded white, handwritten]; 3- "Meyrick Coll./ B.M. 1938-290." [upside down, typed]; 4- "♂/ Pyralidae/ Brit. Mus./ Slide No./ 11247" [square, typed in red ink except for black handwritten male sign and number]; 5- "Diptychophora/ examinalis Meyr." [faded white, handwritten]; 6- "= *Micrelephas/ pictella* Schaus" [handwritten]; 7- "*Micrelephas/ pictellus* (Schaus)/ det. B. Landry 1999" [last line except last digit typed, rest handwritten]; 8- "LECTOTYPE/ designated by/ B. Landry" [red, handwritten]. The depository of the lectotype is the BMNH. The mounted genitalia and abdomen are not stained, not well cleaned and the abdomen is damaged in many places. Seven specimens are designated as paralectotypes: 3 ♀♀, 2 ♂♂ (one dissected, BMNH slide no. 7891) with same data as the lectotype; one ♀ from Sta. Catherina [sic], Brazil (BMNH slide no. 7830); and one ♀ from Teffe [sic], Brazil (BMNH slide no. 11307). The genitalia on BMNH slide 7830 are of a male of an unknown species. The lectotype is provided to clearly fix the application of the name to this taxon.

Diagnosis.— This is the smallest species of the genus, the most commonly encountered and the most widespread. It can be separated from the other species of *Micrelephas* by the large patch of dark brown scales on each side of the forewing postmedian line in the median sector. The other species of *Micrelephas*, except *M. crassipalpis*, have a dark patch (sometimes bluish-grey) in that sector of the forewing, but it is only present anterior to the postmedian line.

Redescription.— MALE (n=55) (Fig. 2). Forewing length: 6.0-8.5mm. *Head* with yellowish-beige and white scales; frons slightly produced, broadly rounded. Antenna white on scape, beige on flagellum; flagellomeres simple, sensory pits not seen. Labial palpus 2X diameter of head, discheveled apically, mostly white ventrally and on medial side, with dark brown on first segment, basal half and apex of second, and apex of third, yellowish-brown at apex of second segment and on third. Maxillary palpus mostly white with few dark brown and yellowish-beige scales. *Thorax* yellowish-beige, with few brown and dark brown scales. All legs with dark brown scales on last tarsomere. Foreleg white with dark brown and brown scaling on medial side of femur, tibia, and first tarsal segment. Midleg white except for yellowish-beige dorsally on first half of tibia. Hindleg white. *Forewing* length 2.0-2.2

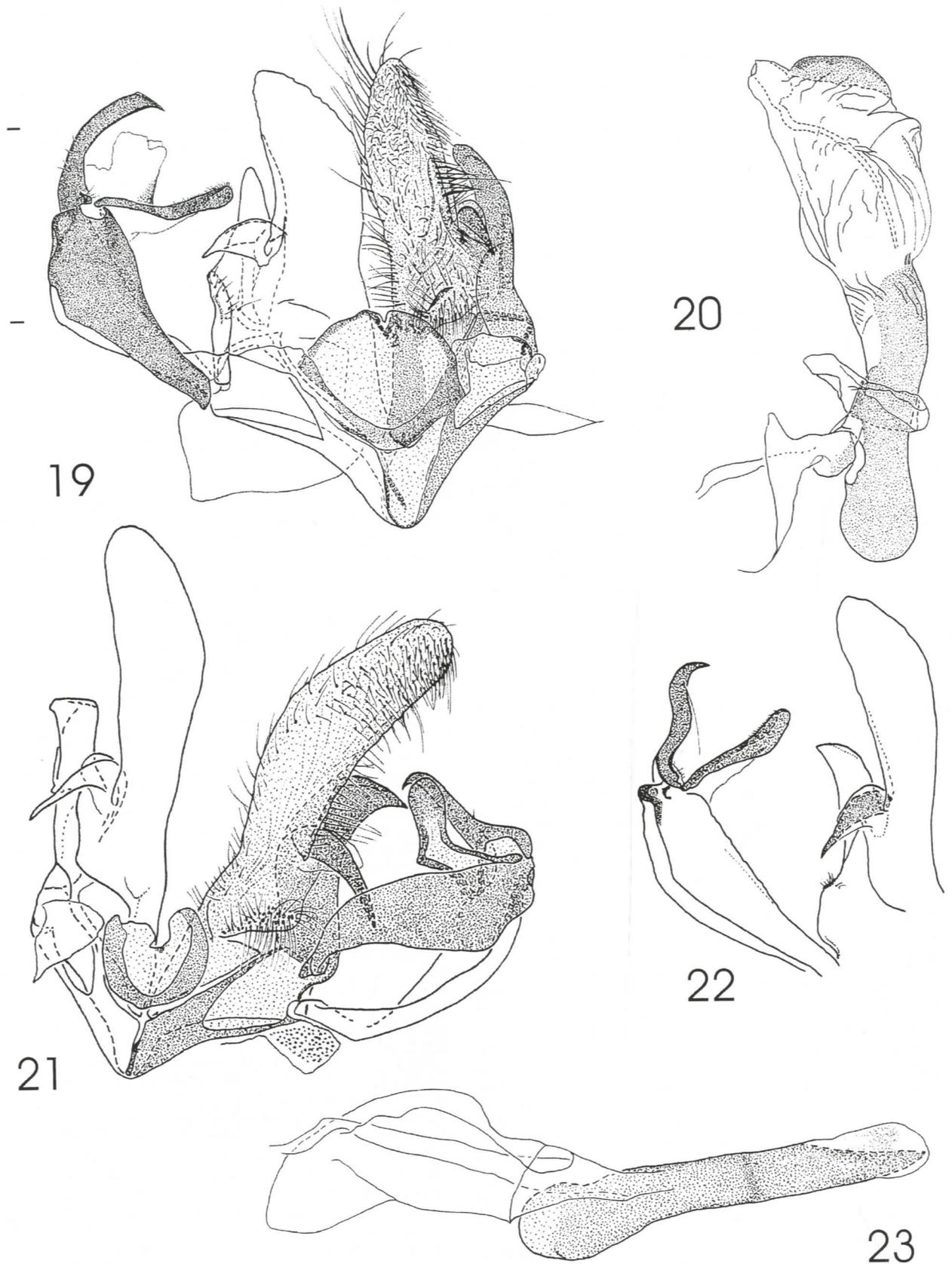


Fig. 19-23. Male genitalic features of *Micrelephas*: 19-20. *M. crassipalpis* Dognin, Bolivia, Cochabamba, EL Limbo, slide PYR 330 ♂ [CNC]. 19. Genitalia without aedeagus, scale bar = 1.0 mm. 20. Aedeagus in lateral view. 21-23. *M. pictellus* (Schaus), holotype, Brazil, Rio de Janeiro, slide # 25534 [USNM]. 21. Genitalia without aedeagus, scale bar = 0.5 mm. 22. Specimen from Trinidad, Arima Valley, Simla, slide BL 1099 ♂ [USNM], lateral view of uncus, gnathos, tegumen and left valva. 23. Aedeagus in ventral view.

X its maximal width; slightly produced at R5, M3 and CuA2, slightly concave at M1; general ground color white to yellowish-beige, with a wide dark brown and steel-blue more or less diffuse band from base to outer margin between M1 and CuA1, sometimes with darker scaling more extensive; steel-blue scaling usually more distinct in postmedial sector below costa and in antemedial sector; costa yellowish-beige on basal half, white until subterminal line, orange beyond subterminal line, and as small patches at median line, and between median and subterminal lines; basally pale yellowish-beige, mostly without irroration; usually with indication of basal line because of the presence of a dark brown patch on its outer side; median line indicated by medium-sized dark brown patch on its inner side in the middle and a dark brown line sometimes reaching costa and/or inner margin on its outer side; subterminal line from anal angle, sharply pointed inward at CuA2, less strongly pointed inward at CuA1, straight until M1, curved at 45° inward to end on costa at 4/5; with large dark brown patch on both sides of subterminal line between M1 and CuA1; apex orange, sometimes with dark brown scales along subterminal line, with two white streaks, one close to outer margin and along side it, the other perpendicular to the first and located near its base; beyond subterminal line and below dark patch usually pale yellowish-beige with dark brown scales along outer margin except at CuA2; fringe basal scales shining silver, apical scales dark brown. *Hindwing* white with pale brown area apically and sometimes along outer margin until 1A, with row of short dark brown scales along outer margin in same area; fringe pale brown at apex to pale yellowish-beige in anal sector, both rows of scales with darker brown apex in apical sector; furrow of androconiae extending to 2/3 wing length. Abdomen white ventrally, except at apex, first two segments dorsally white with yellowish-beige and pale brown scales, segments III-VIII dorsally dark brown, apex pale yellowish-brown dorsally and ventrally. *Tympanal organs* (n = 7) (Fig. 11): venulae secundae absent; transverse ridge of variable size, apical margin straight to distinctly concave; tympanic pockets projecting beyond transverse ridge, conical to broadly rounded, variable in length; praecinctorium dorsal margin strongly sclerotized; tympanic crest medium-sized, slightly variable in shape; tympanum at 90° or slightly more; tympanic drum slightly elongate, sometimes reaching apical margin of transverse ridge. *Abdominal intersegmental membrane VIII-IX* (n=4) (Fig. 14) dorsally with a dorsal fan of medium-length scales directed toward apex and apically down curved; a ventromedian ridge with medium-length scales medially directed toward apex and laterally directed outward and toward apex, curved at 90° in their middle or subapically to point inward and apically; also with distinct patch of long filiform scales at junction of tegumen with valva and vinculum. *Male genitalia* (n=9) (Fig. 21-23). Uncus narrow, shaft slightly concave and larger medially, apical spine at 90° downward, short arms at about 45° from shaft, with few short and slender setae dispersed on shaft, a patch of about 5 short setae at base of each arm ventrally, and a pair of very long setae situated subapically and lateroventrally. Gnathos well sclerotized, narrow arms joined shortly beyond mid-length; apical plate about 1/3 length of arms, with shallow anterior depression, slightly swollen and narrowly rounded apically, with short spinules dorsally. Tegumen arms narrow at base, enlarged from base to about 2/3, ventral margin straight, dorsal margin bent at about 60° toward apex; dorsal connection very narrow, about 1/7 length of arms, with a short bump medially. Valva with mediobasal setose hump toward costa; with patch of 6-12 short setae on unridged costal margin basally, before two strongly sclerotized projections: lateral projection flat, directed dorsally, variable in shape from narrow, apically pointed on outer side and rather elongate, to twice the width, blunt apically and short, with intermediates; inner projection about same length as dorsal, horn-shaped, pointing upward and cephalad, with spiculate membranous sheath ventrally; cucullus narrow, last third curved upward, rounded at apex, medial surface with few longitudinal ridges, with some longer setae on ventral margin; with shorter setae elsewhere but slightly more concentrated apically. Juxta only basally well-sclerotized, horse-shoe shaped, thickly sclerotized along margin cephalad and laterally, less so caudally, without apicoventral point medially, but usually with some sclerotization. Vinculum enlarged laterally and shortly produced anteriorly in the middle; ventrocephalic margin rounded; with a distinct narrow median crest. Aedeagus narrow, slightly shorter than valva, with only a slight curve at 1/3, last 1/4 unsclerotized dorsally, ventrally narrowing to long point at apex; coecum penis about 1/3 length of whole sclerotized part of aedeagus, slightly bulged, without lateral projections; vesica scobinated, without cornutus.

FEMALE (n=29). Forewing length: 7.5-10.0mm. *Female genitalia* (n=4) (Fig. 37). Papillae anales well sclerotized, gradually enlarged toward dorsum, with longitudinal ridges laterally, sparsely setose, with longer setae

along base. Posterior apophyses enlarged subbasally, extended to middle of segment VIII, apically with or without short knob. Segment VIII large, about 2X wider ventrally, with setae of medium length on most of dorsal margin, sometimes less sclerotized in middle ventrally, sometimes with pair of small rounded unsclerotized dents ventrally at dorsal margin of ostium bursae. Ostium bursae surrounded by short projecting sclerotized structure of which the longer ventral side is broadly rounded. Ductus bursae narrow, slightly larger and sclerotized at base, lightly spiculate distally. Ductus seminalis connecting slightly posterior to middle of ductus bursae. Corpus bursae rather small, circular, well differentiated from ductus bursae, lightly spiculate on anterior half.

Distribution.— BOLIVIA: 40 km E San Borja (Beni), Chapare, 300m (Cochabamba), Buena Vista, 750m (Department unknown); BRAZIL: Ibatiguara, 400m (Alagoas), Tefé (Amazonas), Camacán, 400-700m (Bahia), Nova Lima, 850m (Minas Gerais), Guaraqueçaba, Marumbí (500 m) (Paraná), Cach. do Macacu (600m), Magé (400m), Nova Friburgo (600-1100m) (Rio de Janeiro), Brusque (100m), Joinville (100m) (Santa Catarina); COSTA RICA: 2 km SW Dos Rios, 600m (Alajuela), Estacion Pitilla, 400m (Guanacaste), Cahuita (Límon); FRENCH GUIANA: St-Jean-du-Maroni (St-Laurent-du-Maroni); GUYANA: Bartica (Mazaruni-Potaro); PANAMA: Barro Colorado Island; PERU: Buenos Aires (2280), Pilcopata (600m) (Cuzco), SW Iquitos on Rio Nanay, 120m (Loreto), Avispas (400m), Manu (250m), Rio Tambopata Reserve (250m) (Madre de Dios), San Juan de Cacazu (Pasco), Rio Huacamayo, 600m (Puno), Rio Colorado, 750m (Department unknown); SURINAM: Suriname (Carbo [sic]); TRINIDAD: Simla; VENEZUELA: Rio Surukum, 850m (Bolívar), Base of Cerro de la Neblina, 140m (Amazonas). Specimens examined: 55 ♂, 29 ♀, 2 of sex undetermined (BMNH, CNC, INBio, MIZA, MUSM, USNM, VOBC).

Flight period.— Specimens have been collected in all months of the year except April and July.

Biology.— The following is mostly from Marcela Arguedas (pers. comm.) who discovered the host plant association and studied the species' life cycle in Costa Rica. Caterpillars of *M. pictellus* bore the bark of *Hyeronima alchorneoides* Allemao (Euphorbiaceae). The tree, called "pilón" in Costa Rica produces a good strong, durable and heavy wood used in heavy constructions, such as structures of bridges, posts, and railway cross-ties, as well as furniture, cabinet work, decorative veneers, flooring, turnery and joinery (see <http://beachshack.ai/woods.html>). It has been planted with commercial success for about 10 years in Costa Rica. It is widely distributed, occurring from southern Mexico to southern Brazil, Peru and Colombia, and throughout the Antilles. It is found in wet to very wet tropical forests between 20m and 900m elevation. The trunk is straight, can reach up to one meter or more in diameter, and specimens can reach up to 50m in height. Caterpillars were observed in Sixaola de Limón and Pital de San Carlos (Alajuela) in plantations less than three years old. They are whitish and reach a length of approximately 1.5cm in the last instar. They feed on the internal tissues of the bark, which breaks and cracks; sawdust and silk can be observed in the cracks. When the attacks are severe, the tree can die. Adults come to light.

Micrelephas kadenii (Zeller, 1863), new comb.

Fig. 3, 15, 24-26, 38

Crambus kadenii Zeller, 1863: 16; *Argyria kadenii*, Bleszynski, 1963: 213; Bleszynski, 1967: 96; Munroe, 1995: 35.

Type material.— Described from two females. Lectotype ♀ (examined, here designated) only missing the right midleg beyond the trochanter, but the metathorax was glued back and there are remnants of an abdomen glued to the metathorax. Labeled: 1- "Type" [round, red-bordered, typed]; 2- "Crambus/kadenii Z." [faded white, hand-written]; 3- "Zell. Coll./ 1884" [faded white, typed]; 4- "160/ Bleszynski 195" [typed]; 5- "Pyrallidae/ Brit. Mus./ Slide No./ 5644" [typed in red ink except for handwritten number in black]; 6- "Micrelephas/kadenii (Zeller)/ det. B. Landry, 1999" [last line except last digit typed, rest handwritten]; 7- "LECTOTYPE/ designated by/ B. Landry" [red, handwritten]. The lectotype is deposited in the BMNH. The corresponding genitalia slide has male genitalia of a *Diatraea* species on it. The proper genitalia were not found. The other syntype was not located either. A male specimen of this species in the BMNH has an old handwritten label with just the name of the species and a male

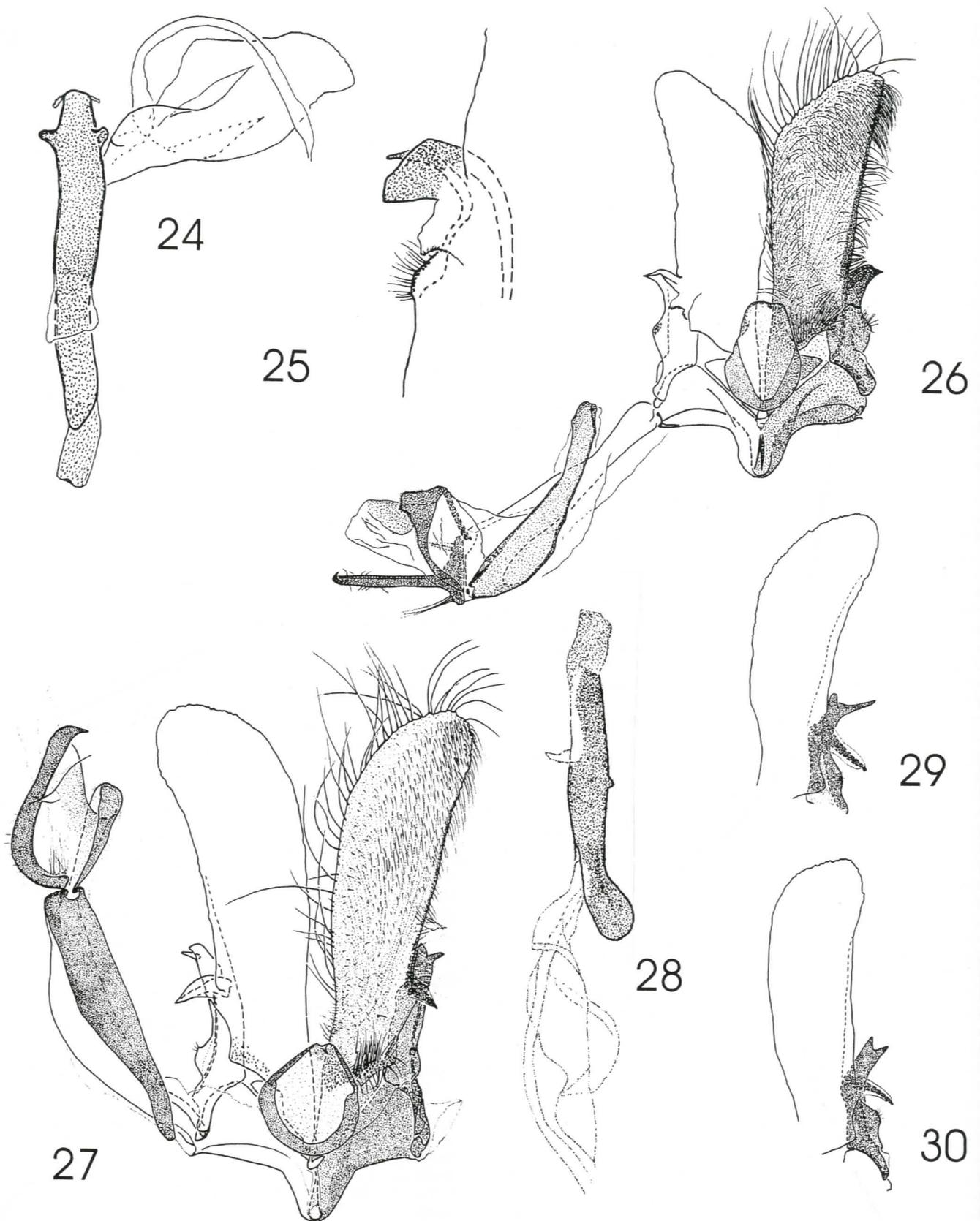


Fig. 24-30. Male genitalia of *Micrelephas*: 24-26. *M. kadenii* (Zeller). 24, 26. Specimen from Venezuela, Aragua, Rancho Grande, slide BL 1100 ♂ [USNM]. 24. Aedeagus in ventral view. 25. Specimen from Venezuela, slide BM Pyralidae 17707 ♂ [BMNH], detail of more flattened left valva. 26. Genitalia without aedeagus. 27-30. *M. gaskini* B. Landry n. sp. 27-28. Paratype from Ecuador, 50 km W Quito, slide PYR 294 ♂ [CNC]. 27. Genitalia without aedeagus, scale bar = 1.0 mm. 28. Aedeagus in lateral view. 29. Paratype from Colombia, Cali, slide BM Pyralidae 15274 ♂ [BMNH], right valva. 30. Paratype from Ecuador, Baeza, slide BM Pyralidae 7840 ♂ [BMNH], right valva.

sign on it (maybe written by Zeller). Because the description mentions two females, this specimen is not believed to be the other syntype. The lectotype is provided to clearly fix the application of the name to this taxon.

Diagnosis.— In *Micrelephas*, only *M. kadenii* and *M. pseudokadenii* have orange scaling on the forewing along the inner margin from about 1/5 to 3/4 (Fig. 3, 6). Usually, *Micrelephas kadenii* can be separated from *M. pseudokadenii* by the absence on the forewing of a connection between the dark patch anterior to the subterminal line in the median sector and the larger dark area anterior to it. However, some *M. kadenii* specimens may appear to have the connection. The best diagnostic characters are in the male genitalia. The two species can be separated most easily by the shape of the projection on the costa of the valva (Fig. 25-26, 33). Also diagnostic in *M. kadenii* are the poorly modified and scaled abdominal intersegmental membrane VIII-IX (Fig. 15) and the presence of short lateral projections at the base of the male coecum penis (Fig. 24).

Redescription.— MALE (n=5) (Fig. 3). Forewing length: 10.5-12.0mm. *Head* mostly white, with small patch of yellowish scales at dorsal corner of postgena; frons not produced, broadly rounded. Antenna white at base, flagellum gradually darkening from dirty white to brown from basal 1/3; flagellomeres simple, sensory pits not seen. Labial palpus 2X diameter of head, slightly disheveled apically; white medially, ventrally and at apex of segment III, brown laterally on first segment and base of second, with yellowish-orange and dark brown at middle and apex of segment II, and dark brown at apex of segment III. Maxillary palpus white with yellowish-brown scaling laterally in the middle. *Thorax* mostly white, with beige, brown, dark brown and yellowish-orange scales at base and middle of tegula, and dorsomedially. Foreleg white except for beige tarsomeres, a few yellow or brown scales at tip of coxa, and brown on medial side of femur and tibia. Midleg white except for few brown or yellowish scales at tip of femur and tip of last tarsomere dorsally, and beige ventrally on last 2-3 tarsomeres. Hindleg white with beige on last tarsomere and brown on tip of femur and last tarsomere. *Forewing* 2.3 X its maximal width; slightly concave at M1, slightly produced at M2; largely white along costa and before subterminal line as a large band reducing in width toward inner margin; brown to greyish-brown speckled in white area at base on costa, as a large patch in middle of wing, as a diffuse spot in middle of postmedian white band, and on each side of line of paler scales forming the subterminal line which starts at anal angle, follows the terminal margin except for an inward curve between CuA1 and CuA2, and ends on costa at 3/4 after a 45° inward bend at M1; dark brown in a streak basally along cubital stem, speckled before and below streak, as a thin line along terminal margin in radial sector, and as small dots on terminal margin between veins in median and cubital sectors, and subterminally between CuA1 and CuA2; yellowish-orange to orange mostly basally on dorsal half, as three small diagonal streaks on costa sub- and postmedially as well as costal end of subterminal line, as a roundish apical patch marked by a white L-shaped mark, and terminally between M2-M3, M3-CuA1, and CuA1-CuA2, the latter being the largest spot of the three; fringe shining, basal scales mostly white between apex and M2, mostly pale brown below. *Hindwing* mostly white except for pale brown subterminal medium-sized band stronger apically, and thin terminal brown line in same area; fringe white to off-white (damaged in available specimens); furrow of androconia extending beyond middle of wing. *Abdomen* mostly white, but beige around genitalia. *Tympanal organs* (n=2): venulae secundae not visible; transverse ridge medium-sized, apical margin straight; tympanic pockets only very slightly reaching beyond transverse ridge, broadly rounded; praecinctorium dorsal margin sclerotized; tympanic crest rather large, bell-shaped; tympanum at almost 90°; tympanic drum rounded, not reaching transverse ridge. *Abdominal intersegmental membrane VIII-IX* (n=2) (Fig. 15) dorsally with only a small median bunch of long filiform scales concentrated in a u-shaped pattern but membrane not modified to form a ridge. *Male genitalia* (n = 3) (Fig. 24-26). Uncus narrow, straight for most of length, slightly enlarged and shortly crested before apex; apical spine directed at right angle ventrally; with a series of about a dozen short and slender setae along dorsal edge mostly on distal half and in a single row, also with one short knob bearing about 5 long setae ventrally at base of each short arm, without longer setae on shaft. Gnathos with narrow arms, broadly curved toward middle; apical plate about 1/3 length of arms, semicircular, slightly swollen, slightly curved upward and rounded or obtuse apically, with spinules dorsally and ventrally. Tegumen arms narrow on basal 1/4, only slightly enlarging toward apex; dorsal margin very slightly curved; ventral margin curving outward slightly beyond middle; dorsal connection about 1/4 length of arms. Valva with bunch of setae mediobasally on a short and slightly elevated edge; costal margin at base with short

triangular bump adorned with short setae; single sclerotized costal projection forming a bifid plate pointing dorsally and ending in a small flat spine laterally and in a flat cone medially, also with median membranous triangular or thumb-like projection pointing dorsobasally and with tiny spicules; cucullus dorsal margin straight, ventral margin slightly expanded ventrally toward apex, apically rounded and narrower, most of median surface ridged longitudinally, with evenly spaced long setae on ventral and apical margins, with shorter setae elsewhere, but in higher concentration dorsally at apex. Juxta circular on basal half, slightly narrower on distal half, apically rounded and with a very short spine pointing downward in the middle. Vinculum a rather narrow band distinctly produced cephalad; ventrocephalic margin rounded; with short median and rounded narrow crest. Aedeagus narrow, about 2/3 length of valva, distal 1/3 slightly bent upward (about 30°) and unsclerotized dorsally, apex rounded; coecum penis about 1/4 length of sclerotized part of aedeagus, narrower than middle of shaft, with two short and flattened rounded projections near base laterally; vesica scobinated, without cornutus.

FEMALE (n=3). Forewing length: 13.0-15.0mm. *Female genitalia* (n=2) damaged specimens in BMNH) (Fig. 38). Papillae anales mostly membranous, apparently of equal width dorsally and ventrally (damaged on available specimens), strongly setose, with longer setae along base. Posterior apophyses narrow on whole length, slightly curved, extended to middle of segment VIII, apically not pointed. Segment VIII medium sized, about 2X wider ventrally, with setae of medium length on apical margin dorsally and laterally, partly desclerotized around ostium. Ostium bursae in small projecting conical and sclerotized structure. Ductus bursae narrow, not apparently sclerotized at base (damaged on available specimens). Ductus seminalis connecting posteriorly to mid-length of ductus bursae. Corpus bursae probably circular (observed only on mounted specimens).

Distribution.— VENEZUELA: Rancho Grande, 1100m (Aragua); ?PERU: Cachabé (Puno). Specimens examined: 5♂♂, 3♀♀ (BMNH, MIZA, USNM).

Flight period.— Available specimens were collected in September, October and January.

Biology.— Unknown.

Notes.— The locality of Cachabé could not be traced. The moth was collected by W. F. H. Rosenberg and is in the BMNH. Kevin Tuck, curator of microlepidoptera at the BMNH believes that this locality is probably in Peru since Rosenberg financed the collecting expedition of G. E. Ockenden in Peru (pers. comm.). This Peruvian specimen is a female that may in fact belong to another species, possibly *M. pseudokadenii*, described below. Its genitalia are in poor condition.

Micrelephas gaskini B. Landry, sp. nov.

Fig. 4, 16, 27-30, 39, 42

Type material.— Holotype ♂ (SMTD): 1- "S[outh]W[est] COLOMBIA, dep[artmen]t. Nariño/ Reserva Natural La Planada/ western Cordillera: western slope/ 1850m, humid premontane forest/ 3.-7.viii.1994, light trap/ leg. Julian Salazar, coll. M. Nuss" [green, typed]; 2- "genitalia slide/ BL 1159 ♂" [green, typed except for male sign]; 3- "HOLOTYPE/ gaskini/ B. Landry" [red, hand-written]. The type is not spread and slightly flattened, but it is not missing any appendages; the right forewing has a small gash below apex.

Paratypes: 16♂♂, 1♀. COLOMBIA: 5♂♂, 1♀ (slide no. BL 1160) with same data as holotype (SMTD, CNC); 1♂ (Slide no. BMNH 15274), [Valle del Cauca] Cali (BMNH). ECUADOR: 2♂♂ (BMNH slide nos. 7840 and 11300), [Napo] Baeza, March 1915; 1♂, Carchi, Maldonado, 2200 m, 9-11.i.1993, V.O. Becker Col., Coll. Becker no. 105056 (VOBC); 1♂ (CNC slide no. PYR 294), [Quito] Road to Santo Domingo, 50 km W of Quito, 2400 m, 24-25.ii.1965, L.E. Peña (CNC); 6♂♂ (BL slide no. 1251), Loja, Estación Científica San Francisco, 3° 58' S, 79° 04' W, 2240-2330 m, 5, 6, 9.v.1999, leg. D. Süßenbach & G. Brehm (UBC).

Diagnosis.— In wing pattern and color, *M. gaskini* (Fig. 4) can be mostly similar to *M. helena* (Fig. 7), *M. pseudokadenii* (Fig. 6), and perhaps also *M. kadenii* (Fig. 3). From *M. pseudokadenii* and *M. kadenii* it can be separated by the absence of orange scaling on the forewing inner margin between about 1/5 and 3/4. The brown base of the forewing in many specimens, along with the mostly white hindwing, will separate *M. gaskini* from *M. helena*, which has a predominantly greyish-brown hindwing. The bifid dorsocostal projection of the male valva (Fig. 27, 29-30) is also diagnostic.

Description.— MALE (n = 17) (Fig. 4). Forewing length: 12.0-15.0mm. *Head* pure white except for a patch of few brown scales on upper part of postgena and sometimes in middle of frons; frons slightly produced, conical, apically rounded. Antenna white on basal 1/3, gradually becoming greyish-

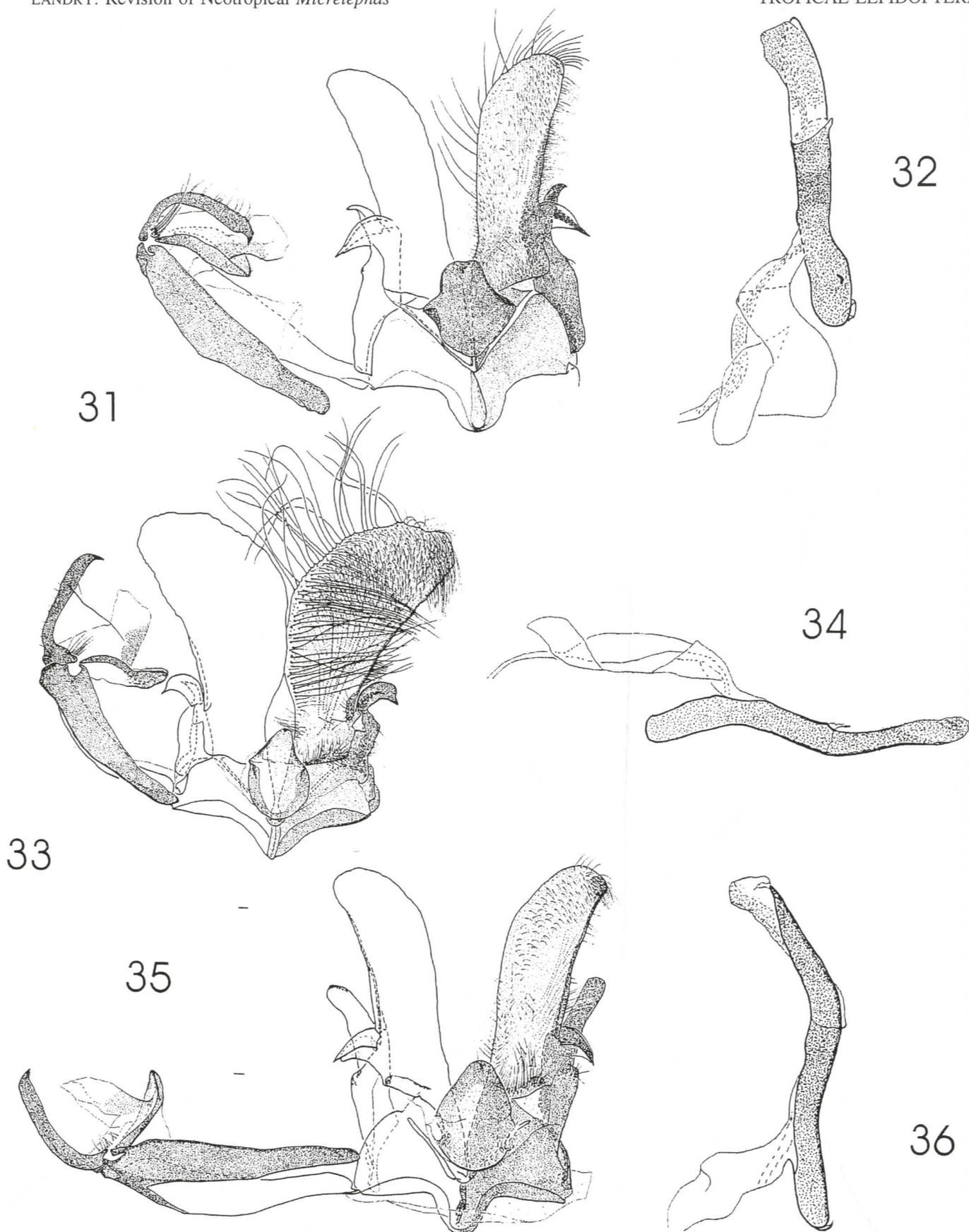


Fig. 31-36. Male genitalia of *Micrelephas*: 31-32. *M. chalybeus* B. Landry n. sp., paratype, Peru, Puno, Carabaya, slide BM Pyralidae 21101 ♂ [BMNH]. 31. Genitalia without aedeagus, scale bar = 1.0 mm. 32. Aedeagus in lateral view. 33-34. *M. pseudokadenii* B. Landry n. sp., paratype, Bolivia, Cochabamba, Siberia/San Mateoito, slide PYR 293 ♂ [CNC]. 33. Genitalia without aedeagus. 34. Aedeagus in lateral view. 35-36. *M. helenae* B. Landry n. sp., holotype ♂, Costa Rica, Guanacaste, Volcan Cacao, slide BL 1224 ♂ [INBio]. 35. Genitalia without aedeagus, scale bar = 1.0 mm. 36. Aedeagus in lateral view.

brown; flagellomeres simple, apical scales darker, each flagellomere with 1-4 medium-sized sensory pits. Labial palpus 2.2 X diameter of head in length, apically not disheveled, white medially and laterally at apex of segments, light greyish-brown on segment I and base of segment II, dark brown at base of segment III and sometimes middle and base of segment II. Maxillary palpus white with brown and beige laterally on basal half. *Thorax* white, usually speckled with dark brown. Foreleg white on coxa, on femur medially and ventrally, and medially on tibia, dark brown elsewhere on tibia, brown elsewhere. Midleg white except sometimes for brown last tarsomere, and a tinge of brown at apex of femur, base of tibia, and ventral side of tarsomeres III and IV. Hindleg entirely white or sometimes with brown at apex of last tarsomere. *Forewing* 2.5 X its maximal width; slightly concave at M1 and produced at M3; variable in pattern: holotype and paratypes from type locality mostly brown and dark brown before the subterminal line with indications of light yellowish-brown median line in diagonal on costa at 1/5 and postmedian line as a brown spot at 2/3; white in narrow band before double greyish-brown subterminal line, as a small spot at upper apex of cell, along most of costa and along part of inner margin; subterminal line from anal angle, curving inward between CuA1-CuA2 and directed inward at M2 to end at 3/4 on costa almost at right angle; with an orange patch divided by a white streak at apex; dark brown along terminal margin except at M1 and toward anal angle, with most conspicuous dots between CuA1 and CuA2; fringe shining shorter basal scales light greyish-brown, longer scales white. Other paratypes have mostly whitish and less strongly marked forewings with a less wavy subterminal line, and with more extensive brown to brownish-orange scaling beyond the subterminal line. The paratypes from Estación Científica San Francisco, Loja, Ecuador, are intermediates in wing base coloration. *Hindwing* white with thin dark-brown terminal line from apex to CuA2, sometimes with faint brown scaling subterminally in median and cubital sectors; fringe shorter scales beige, longer scales white; furrow of androconiae reaching beyond middle of wing. Abdomen beige dorsally with greyish-brown in the middle on last segment and sometimes on two segments before, white ventrally, with beige to brown on genitalia. *Male tympanal organs* (n=3): venulae secundae very faint; transverse ridge narrow with apical margin concave; tympanic pockets reaching beyond transverse ridge by width of transverse ridge, broadly rounded; praecinctorium dorsal margin well sclerotized; tympanic crest medium-sized, slightly conical; tympanum at 90°; tympanic drum broadly rounded, reaching beyond transverse ridge. *Abdominal intersegmental membrane VIII-IX* (n=3) (Fig. 16) dorsally with medium-sized crown of long filiform scales on each side of a median ridge: ventral scales directed outward and apically at about 45°-90°, curved at 45°-90° in their middle to point inward and apically; median scales medially curved outward and apically pointed downward (forming a bundle); dorsal scales with a slight curve outward, subapically pointing downward. *Male genitalia* (n = 7) (Fig. 27-30). Uncus narrow; main shaft straight, at 90° from short arms; apical spine directed downward at less than right angle; with about 12-15 long setae near base of each arm ventrally, with up to about 25 mostly short and slender setae in a row from base of each arm in the middle, converging and ending near middle of shaft, also with one or two long setae laterally on each side of shaft near middle. Gnathos with narrow arms slightly enlarged before joining; apical plate narrow, forming a distinct hemicircle, slightly swollen toward apex, apically rounded and with spinules mostly dorsally. Tegumen arms narrow at base and only slightly enlarged from midlength to apex; both margins slightly curved; dorsal connection very narrow, about 1/6 length of arm. Valva with prominent elongate setose bump medially at base; costal margin strongly sclerotized before free projections, with short bump variable in shape and bearing 4-10 setae; with two costal projections: the dorsal one of variable length, apically v-shaped ending in two spines of about same length but with medial spine stouter; ventral projection a single more basal and median long and sharp spine pointing dorsally and cephalad; with spiculate membranous sheath surrounding ventral projection to apex; cucullus long and narrow, reduced in width apicodorsally, medial surface ridged longitudinally, with evenly-spaced long setae on ventral and apical margins, with shorter setae elsewhere but slightly more concentrated dorsomedially at apex. Juxta well sclerotized only along edges, rounded basally and apically, with almost parallel edges near middle in dorsal view, with sharp small spine pointed downward in middle apically. Vinculum a rather narrow band distinctly produced cephalad medially; ventrocephalic margin rounded, with short median rounded and narrow crest. Aedeagus narrow, narrower before middle in dorsal view, with shallow curve at basal 1/3, distal 1/3 slightly bent upward (about 30°) and unsclerotized dorsally, apex rounded; coecum penis

about 1/3 length of sclerotized part of aedeagus, about the same width as shaft, without lateral projections; vesica scobinated, without cornutus.

FEMALE (n = 1). Forewing length: 19.0mm. *Female genitalia* (n=1) (Fig. 39, 42). Papillae anales mostly membranous, narrow, of equal width ventrally and dorsally, with ventrally unconnected narrow basal band of sclerotization from base ventrally to beyond middle toward dorsum, without ridges laterally, abundantly setose, with longer setae along base. Posterior apophyses narrow, mostly straight, slightly constricted subapically, apically bulbous, reaching slightly beyond middle of segment VIII. Segment VIII rather large, not quite 2X wider ventrally, ventral side broadly concave, less sclerotized along median axis ventrally, with setae of medium length on apical margin dorsally and laterally, also with 3-4 setae laterally near middle and closer to apical margin. Ostium bursae protected ventrally by short apically rounded extension of segment VIII ventral margin. Ductus bursae narrow, sclerotized at base, slightly spiculate beyond inception of ductus seminalis. Ductus seminalis connected at about 1/3 length of ductus bursae. Corpus bursae mostly circular but narrower posteriorly, strongly spiculate on whole surface.

Distribution.- COLOMBIA: Reserva Natural La Planada, 1850m (Nariño), Cali (Valle del Cauca); ECUADOR: Baeza (Napo), Maldonado, 2200m (Carchi), Road to Santo Domingo, 50 km W of Quito, 2400m (Quito), Estación Científica San Francisco, 2240-2330m (Loja).

Flight period.- Specimens were collected in January, February, March, May and August.

Biology.- Adults come to light.

Notes.- This species is named in honor of Dr. David Gaskin, eminent Crambinae taxonomist of Guelph, Ontario, who died prematurely in 1998.

Micrelephas chalybeus B. Landry, sp. nov.

Fig. 5, 12, 31, 32

Type material.- Holotype ♂ ((BMNH): 1- "Orosi/ Costa Rica" [faded white, typed]; 2- "B.M. Pyralidae/ Genitalia slide/ No. 21103 ♂" [typed except for male sign]; 3- "genitalia slide/ BL 1221 ♂" [green, typed except for male sign, upside down]; 4- "HOLOTYPE/ *Micrelephas/ chalybeus/ B. Landry*" [red, handwritten]. The type is fully spread. It is missing the apex of the left antenna, most of the right antenna, the left labial palpus and all legs except for the right foreleg. The thorax is also damaged and mostly descaled.

Paratypes: 5 ♂♂. COSTA RICA: 1 ♂ (BMNH slide no. 11308), Cartago, Tapantí, 1700m, 10.vi.1998, V.O. Becker [leg.] (VOBC); 1 ♂, San Jose, Cordillera de Talamanca, Bergnebelwald, 10°35'N, 83°64'W, 2400m, 7-10.v.1999, leg. J.-P. Rudloff (SMTD); 1 ♂ (BMNH slide no. 15276), [province unknown] La Trinidad (BMNH). PERU: 2 ♂♂ (BMNH slides 11308 and 21101), [Puno] Carabaya, Rio Huacamayo, dry s[eason], 3100 ft., June [19]04, G. Oeckden [leg.] (BMNH).

Diagnosis.- This species can be distinguished from the other species of *Micrelephas* by its large black patch in the middle of the forewing, anterior to the median line, followed by a large steel blue patch on the other side of the median line, and usually by the black patch in the cubital sector between the postmedian line and the terminal margin.

Description.- MALE (n = 5) (Fig. 5). Forewing length: 10.0-12.0mm. *Head* white on frons, pale cream-colored elsewhere with small patch of more yellowish scales at dorsal corner of postgena; frons shortly produced, broadly rounded. Antenna white on scape, flagellum uniformly pale cream-colored; flagellomeres simple, with 1-4 medium-sized sensory pits. Labial palpus 2.5 X diameter of head, not apically disheveled, mostly cream-colored with brown and dark brown laterally on segment I, base of segment II, and apices of segments II and III. Maxillary palpus mostly cream-colored, with brown laterally and ventrally. *Thorax* pale cream-colored with dark brown scales at collar and near middle. Foreleg white on most of coxa and femur, dark brown along dorsal crest of femur, ventrally on tibia and tarsomere I, and on last tarsomere, pale cream-colored elsewhere. Midleg white on coxa and femur, brown at apex of femur and apex of last tarsomere, pale cream-colored elsewhere. Hindleg white on coxa and femur, cream-colored elsewhere except for pale brown at apex of last tarsomere. *Forewing* 2.2 X its maximal width; only slightly concave at M1 and slightly produced at M2; ground color pale cream on basal half, white on distal half; dark brown speckled subbasally from costa to inner margin in a wide diffuse band, on inner margin below large dark brown mid-wing patch, and along terminal margin in a large patch or three separate spots in cubital sector and as a thin line or small separate spots in the median sector; pale brown to greyish-brown below mid-wing dark brown patch, sometimes only forming a distinct median line, and along subterminal line, which starts at termen,

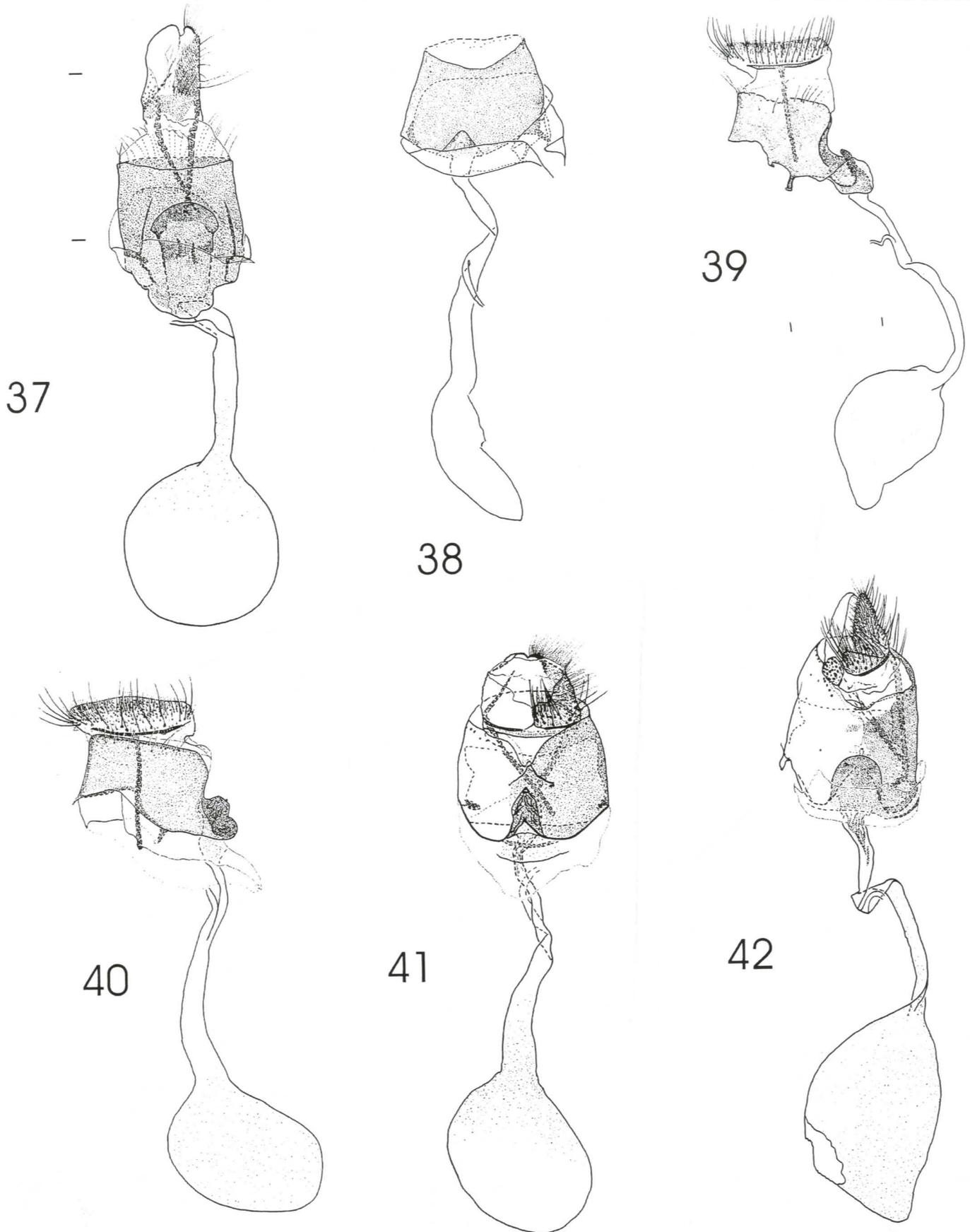


Fig. 37-42. Female genitalia of *Micrelephas*: 37. *M. pictellus* (Schaus), ventral view, Brazil, Santa Catarina, slide BL 1098 ♀ [USNM], scale bar = 1.0 mm. 38. *M. kadenii* (Zeller), Venezuela, slide BM Pyralidae 17706 ♀ [BMNH], ventral view. 39, 42. *M. gaskini* B. Landry n. sp., paratype, Colombia, Nariño, Reserva Natural La Planada, slide BL 1160 ♀ [SMTD]. 39 lateral view, scale bar = 1.0 mm. 40-41. *M. pseudokadenii* B. Landry n. sp., paratype, Peru, Puno, Santo Domingo, slide BM Pyralidae 21106 ♀ [BMNH]. 40. Lateral view. 41. Ventral view. 42. Ventral view (same specimen as Fig. 39).

curves slightly inward in cubital sector and ends on costa at 3/4 after broad inward curve; steel blue (a mixture of dark brown and shining white scales) as a patch postmedially in middle or slightly closer to costa; orange at costal end of subterminal line, as an apical patch more or less separated by a white dash, and sometimes along terminal margin; fringe shining, with both sets of scales greyish-brown at cubital sector and perhaps median sector (damaged on available specimens), white tinged with brown elsewhere. *Hindwing* usually white with thin brown terminal line from apex to 1A, sometimes with brown scaling subterminally in radial sector, sometimes whole wing pale brown; fringe uniformly pale cream-colored or slightly darker (more brown) in darker winged specimens; furrow of androconiae absent. Abdomen mostly brown to dark brown with beige or white scaling at apical margin of segments dorsally, also beige or white laterally, ventrally and around genitalia. *Tympanal organs* (n=1) (Fig. 12): reduced; venulae secundae shortly visible in middle; transverse ridge absent; tympanic pockets shallow, narrowly rounded; praecinctorium dorsal margin broken on available specimen; tympanic crest broad, very short; tympanum at about 90° but partly broken on available specimen; tympanic drum short, far from reaching edge of tympanic pockets. *Abdominal intersegmental membrane VIII-IX* (n=1) (not illustrated, as in *M. kadenii*) dorsally with only a small bunch of long and straight filiform scales on slightly more sclerotized u-shaped pattern of membrane. *Male genitalia* (n=4) (Fig. 31, 32). Uncus narrow in dorsal view, slightly enlarged near middle, slightly thicker and enlarged toward apex in lateral view, slightly constricted before apical spine; short basal arms and shaft connection not at an angle but broadly rounded; with a series of about 20 rather short slender setae dorsally on most of shaft length, also with bunch of about seven setae of variable lengths ventrobasally on each short arm, without longer setae on shaft. Gnathos poorly sclerotized, with very slender arms slightly enlarged at junction but not forming a plate, apical margin rounded and with spinules mostly ventrally. Tegumen arms of medium width, narrower on short base before slight apical bend of ventral margin, dorsal margin broadly rounded; dorsal connection narrow, about 1/5 length of arms. Valva with a short broad bump bearing setae mediobasally; costal margin before projections with a short bump variable in shape and localization, usually bearing two setae; two costal projections spine-shaped, curved, of medium length: lateral projection pointing dorsally; medial projection pointing cephalad and dorsally, surrounded by only slightly spiculate membranous sheath; cucullus rather long and narrow, medial surface ridged diagonally at base and longitudinally on distal half, dorsal and ventral margins almost straight, with a few longer setae on ventral margin, shorter setae elsewhere but slightly more concentrated dorsomedially at apex. Juxta better sclerotized and broadly rounded on basal half, apical half narrower, apex broadly rounded and with short median spine pointing downward. Vinculum rather narrow, broadly produced cephalad; ventrocephalic margin rounded; with very short and narrow median crest. Aedeagus narrow and short, with a slight curve in ventral margin at base of shaft, apex poorly sclerotized; coecum penis rather short, about 1/4 whole sclerotized portion of aedeagus, bulbous, with a short bump on each side at base; vesica strongly scobinated, without cornutus.

FEMALE: Unknown.

Distribution.— COSTA RICA: Orosi, Tapantí (1700m) (Cartago), Bergnebelwald, 2400m (San Jose), La Trinidad (Province unknown); PERU: Rio Huacamayo, 940m (Puno).

Flight period.— Moths were collected in May and June.

Biology.— Adults come to light.

Notes.— In 1995 I photographed another specimen of this species at INBio, but it could not be found later by curator E. Phillips (pers. comm.). From the picture the label data show that the specimen had been collected at 1600m in "Parque Nacional Braulio Carrillo". There are several "(La) Trinidad" in the Costa Rica gazetteer and the exact origin of the BMNH "La Trinidad" specimen is unknown. The specific epithet is from Greek and means "made of steel", in reference to the conspicuous forewing patch of steel blue color in the median sector.

Micrelephas pseudokadenii B. Landry, sp. nov.

Fig. 6, 17, 33, 34, 40, 41

Type material.— Holotype ♂ (BMNH): 1- "♂" [typed]; 2- "Holo-/ type" [round, red-bordered, typed]; 3- "[Peru] S[anto]. Domingo./ Carabaya, 6000/ ft. Nov[ember]. [19]01./ wet seas[on]./ [Ockenden] [leg.]" [typed]; 4- "Rothschild/ Bequest/ B.M. 1939-1." [upside down, typed]; 5- "11328/ Pyralidae/ Brit. Mus./ Slide No./

♂" [typed in red ink except for black handwritten number and male sign]; 6- "GS-6325-SB/ *Micrelephas/ pseudokadenii*/ det. Bleszynski, 1969" [typed except for number of first line, species name and last two digits of date]; 7- "HOLO-TYPE/ *Micrelephas/ pseudokadenii*/ B. Landry" [red, handwritten]. The type is spread but it is missing the left antenna, the left midleg, and the last four tarsomeres of the left hindleg. The hindwings are also broken slightly at the terminal margin in the cubital sector.

Paratypes: 13 ♂♂, 6 ♀♀. PERU: 4 ♂♂, 3 ♀♀ with same locality data as holotype; 1 ♂ (undissected) with same collecting date as holotype; 2 ♂♂ (BMNH slide nos. 5046 and 21104), iv.[19]02, end of wet season; 1 ♀ (BMNH slide no. 11329), v-vi.[19]01, dry season; 2 ♀♀ (BMNH slide nos. 17703 and 21106), v.[19]02, dry season; 1 ♂ (undissected), vi.[19]02, dry season; 1 ♂ (BMNH slide no. 21102), R. Huacamayo, Carabaya, [?]100 ft., vi.[19]04, dry season; 1 ♀ (BMNH slide no. 7890), Tinguri, Carabaya, 3400 ft., i.1905, wet season; 1 ♂ (BMNH slide no. 17704), S.E. Peru, La Oroya, R. Inambari, 3100 ft., x.1904, wet season (BMNH). BOLIVIA: 1 ♂ (CNC slide no. PYR 293), Dep. Cochabamba, Prov. Carrasco, Siberia/ San Mateoito, 1650m, Dec[ember]. 1962, Through F.H. Walz (CNC). ECUADOR: 1 ♂ (BL slide no. 1161), Napo, 69 km NE Baeza, 15 km SW Reventador, near San Rafael Falls, Oct[ober]., 29, 1988, 4600', coll. J.S. Miller (AMNH); 5 ♂♂ (BL slide no. 1252), 2 ♀♀, Loja, Estación Científica San Francisco, 3° 58'S, 79° 04'W, 1780-2155m, 19, 20, 26.iv. & 5, 7, 18.v.1999, leg. D. Süssenbach & G. Brehm (UBC).

Diagnosis.— *Micrelephas kadenii* and *M. pseudokadenii* are the only species of the genus with orange scaling on the forewing inner margin from about 1/5 to 3/4. Usually, *Micrelephas pseudokadenii* (Fig. 6) can be separated from *M. kadenii* (Fig. 3) by the presence on the forewing of a connection between the dark patch in the median sector anterior to the subterminal line and the larger dark area anterior to it. However, some *M. kadenii* specimens may appear to have this connection also. The best diagnostic characters are in the male genitalia; the two species can be separated most easily by the shape of the projection on the valve's costa (compare Fig. 33 to Fig. 25-26). In *M. pseudokadenii* the valva is also wider apically and with longer setae on the ventral and outer margins.

Description.— MALE (n = 14) (Fig. 6). Forewing length: 11.5-14.0mm. *Head* pure white; frons not produced, broadly rounded. Antennal scape white, flagellum gradually becoming greyish-brown; flagellomeres simple, apical scales slightly darker, sensory pits not visible. Labial palpus 2.1 X diameter of head in length, apically not disheveled, white medially, apically and laterally, with brown, orange brown and dark brown laterally on segment I, at base and apex of segment II, and in the middle on segment III. Maxillary palpus white with dark brown and orange-brown scales in the middle laterally and ventrally. *Thorax* white at collar, with brown and white scaling elsewhere. Foreleg white on coxa and most of femur, greyish-brown to dark brown along dorsal margin of femur and ventrally on tibia, dark brown at apex of femur and on last tarsomere, uniformly beige on other tarsomeres, light orange-brown laterally on tibia. Midleg white except for greyish-brown on last tarsomere and beige ventrally on last two tarsomeres. Hindleg white except for pale greyish-brown apex of last tarsomere. *Forewing* 2.2 X its maximal width; only slightly concave at M1 and slightly produced at M2; white at base, along costa, as a wide band between median and subterminal lines, and beyond subterminal line, especially on costa and as a L-shaped mark in orange apical patch; dark brown speckled in middle of wing but more concentrated toward base and along white costa, also dark brown in mouse-grey to black medium-sized patch in white post-median band, as small dots terminally between M2-M3, CuA1-CuA2 and subterminally between M3-CuA1, also as thin line terminally from apex to median sector; pale brown to greyish-brown at and before median line, especially near inner margin, also forming subterminal line which starts at anal angle, curves inward in cubital sector, almost touches terminal margin at M3, and curves inward to end on costa at 3/4; orange speckled before median line, including along inner margin, at costal end of median line, subterminal line and as a spot between them on costa, also orange at apex and as a patch on terminal margin between middle of M2-M3 and middle of CuA1-CuA2; fringe shining, shorter scales greyish-brown intersected by white scales at four spots (between M1-M2, M2-M3, M3-CuA1, CuA1-CuA2), longer scales white at short scales white spots, greyish-brown between white spots, white tipped with pale greyish-brown elsewhere. *Hindwing* mostly pale creamy white with thin terminal dark brown line mostly at apex, and pale brown scaling subterminally at apex in median sector; fringe's shorter scales greyish-brown, longer scales white; furrow of androconiae extended beyond middle of wing. Abdomen mostly beige (one old specimen) except for greyish-brown on last three segments and around genitalia. *Tympanal organs* (n=4): venulae secundae clearly visible; transverse ridge of medium width, apical margin straight; tympanic pockets only slightly reaching beyond

transverse ridge, rounded, almost conical; praecinctorium dorsal margin not distinctly sclerotized; tympanic crest medium-sized, bell-shaped; tympanum at less than 90°; tympanic drum rounded to elongate, barely reaching transverse ridge. *Abdominal intersegmental membrane VIII-IX* (n=4) (Fig. 17) dorsally with large crown of long filiform scales on a ridge: ventral scales directed outward and apically at about 45°, curved at 90° in their middle to point inward and apically; dorsal scales curved outward and downward and then apically and upward, folding upon themselves, to form a thick apical tuft in the middle. *Male genitalia* (n=6) (Fig. 33, 34). Uncus narrow, narrowest on apical third in dorsal view, main shaft only slightly larger postmedially in lateral view; apical spine and short basal arms not quite at 90° from shaft; with about ten setae of medium length at base of each arm ventrally, with about 40 short and slender setae dorsally on shaft mostly between base and before last 1/3, with one or two (sometimes asymmetrical) very long setae laterally near middle of shaft, and sometimes (n=1) with 2-3 shorter slender setae lateroventrally before apical spine. Gnathos with very narrow arms; apical plate flat, trough-shaped, about 1/3 length of arms, slightly concave at apex and with spinules longer dorsally. Tegumen arms narrow, slightly enlarged from before middle to apex and bent at about 45° toward apex; dorsal connection very narrow, about 1/6 length of arm. Valva with short setose vertical edge mediobasally; costal margin before projection with area of 15-30 short setae sometimes on a triangular ridge directed medially; single heavily sclerotized projection directed dorsally, thick, broadly rounded, with a medium-sized spine apically and a short rounded extension medially, also with accompanying short membranous and spiculate projection at base on medioventral side; cucullus rather long, enlarged beyond base, narrower apically, medial surface strongly ridged longitudinally, with abundance of very long setae especially on ventral margin, also with concentration of shorter setae dorsomedially at apex. Juxta better sclerotized along margins and apically, basal half narrowly rounded in dorsal view, apical half narrower, apex rounded with short spine directed downward. Vinculum a narrow band shortly produced cephalad; ventrocephalic margin rounded; with short median and narrow crest. Aedeagus very narrow on whole length, slightly curved downward at 1/3 and upward at 2/3, unsclerotized dorsally at apex and pointed ventrally; coecum penis 1/3 or less length of sclerotized part of aedeagus, about the same width as shaft, without lateral projections; vesica scobinated, without cornutus.

FEMALE (n = 6). Forewing length: 15.0-17.0mm. *Female genitalia* (n=2) (Fig. 40-41). Papillae anales mostly membranous, elongate, of equal size and width dorsally and ventrally in lateral view, with a ventrally unconnected narrow band of sclerotization on most of base length, without ridges laterally, abundantly setose with longer setae along base. Posterior apophyses narrow on whole length, straight, apically pointed, reaching beyond middle of segment VIII. Segment VIII rather large, only slightly wider ventrally, with setae of medium length on dorsal margin all around except in the middle ventrally, ventral side laterally flanged, basal margin slightly projected in the middle. Ostium bursae within short median projection of segment VIII's ventral margin. Ductus bursae narrow, slightly enlarging gradually and spiculate beyond inception of ductus seminalis, not sclerotized at base. Ductus seminalis connected between 1/3 and 1/2 of ductus bursae. Corpus bursae squarish with rounded corners in lateral view, circular in apical view, most evidently spiculate at base.

Distribution.— BOLIVIA: Siberia/ San Mateoito, 1650m (Cochabamba); ECUADOR: Estación Científica San Francisco, 1780-2155m (Loja), near San Rafael Falls, 1380m (Napo); PERU: Santo Domingo (1800m), Rio Huacamayo, La Oroya (930m), Tinguri (1020m) (Puno).

Flight period.— Moths were collected in all months of the year except February, July, August and September.

Biology.— Unknown.

Notes.— The thorax could not be described accurately because all available specimens are too rubbed or "greasy". The name of this species was coined, but not published, by S. Bleszynski during his studies of the BMNH specimens in the 1960s. It refers to its similarity with *M. kadenii*, "pseudo" being from the Greek "*pseudês*", for "false".

Micrelephas helenae B. Landry, sp. nov.

Fig. 7, 10, 18, 35, 36

Type material.— Holotype ♂: 1- "Est[acion] Cacao, 1000-1400 m./Lado suroeste del Volcan/ Cacao, Prov[incia]. Guan[acaste]./ COSTA RICA, C. Chaves

[collector]/ 25 set[iembre]- 11 oct[ubre] 1990./ L-N-323300, 375700" [typed]; 2- "genitalia slide/ BL 1224 ♂" [green, typed except for male sign]; 3- "COSTA RICA INBio/ CRI000/ 639768" [bar code label, upside down]; 4- "HOLOTYPE/ *Micrelephas/ helenae/ B. Landry*" [red, handwritten]. (INBio).

Paratypes: 11 ♂♂. COSTA RICA. 1 ♂, Guanacaste, P[arque] N[acional] Guanacaste, Est[acion] Pitilla, 700m, 9 km S[ur] S[anja]ta Cecilia, C. Moraga [collector], Jun[i]o 1991, INBio CRI000, 616409 (INBio); 2 ♂♂, also from Estacion Pitilla, 23-28.I.1991, E. Phillips [collector], # INBio CRI001, 102741 (INBio) and INBio CRI001, 102740 (USNM), both with genitalia on slide with INBio numbers; 2 ♂♂, Cartago, Tapantí, 1700m, L-N-18660, 562000, 10 Junio 1998, E. Phillips [collector] (INBio); 6 other ♂♂ also from Tapantí, 10.vi.1998, V.O. Becker Col[lector]., Col[eccion] Becker # 114994, one with genitalia on slide BL 1119 ♂, and one with right pair of wings on slide BL 1121 ♂ (VOBC, CNC).

Diagnosis.— *Micrelephas helenae* is most similar in pattern with *M. gaskini* but can be separated from it by the white (versus brown) base of the forewing and by the predominantly greyish-brown hindwing (versus mostly white). *M. helenae* perhaps may be mistaken for *M. kadenii* or *M. pseudokadenii*, but these two species have orange scaling on the forewing inner margin from about 1/5 to 3/4, a character absent in *M. helenae*.

Description.— MALE (n = 12) (Fig. 7). Forewing length: 9.0-11.0mm. *Head* white except for a few yellowish-white scales on upper part of postgena; frons slightly produced, broadly rounded. Antennal scape white with longitudinal brown band, flagellum scales white on basal 1/4, pale greyish-brown on last 3/4; flagellomeres simple, with at least one medium-sized sensory pit (not clearly seen). Labial palpus 2.0 X diameter of head in length, somewhat disheveled, especially on segment II, mostly with straw-colored and straw-colored tipped with brown scales laterally, white medially and at base of segment I, also with white longer scales dorsally and ventrally. Maxillary palpus with few pale straw-colored and/or straw-colored tipped with brown scales laterally in the middle, white elsewhere. *Thorax* mostly white on collar and tegula, with pale greyish-brown scaling at base of collar and dorsally in the middle. Foreleg white on coxa, laterally on femur and tibia, and ventrally on femur, greyish-brown on rest of femur medially, golden brown on rest of tibia and tarsomeres except for darker brown last tarsomere. Midleg mostly white, light beige on apex of tibia and most tarsomeres, golden brown on last two tarsomeres. Hindleg white except for golden brown last tarsomere. *Forewing* 2.0 X its maximal width; not distinctly concave at M1, slightly produced at M2; white at base, as a medium-sized band between median and subterminal lines, along most of inner margin as a narrow band, and as a L-shaped marking in apical orange patch; dark brown (almost black) as a medium-sized patch in postmedian white band, as thin line terminally from apex to median sector, as small dots terminally between M1-M2, M2-M3, and below CuA2, and as small dot subterminally between CuA1-CuA2; leather brown to dark brown speckled in large darker area before median line on inner half of wing; orange brown to orange speckled before median line on costal half of wing and at costal end of median and subterminal lines; greyish-brown on most of wing between subterminal white band and white base, and between white costal and inner margins, also greyish-brown on subterminal line which starts at anal angle, curves slightly inward between CuA1 and CuA2, and is directed inward at M2 to end on costa at 3/4; orange as a patch apically and on terminal margin at apex, M2, and between CuA1 and CuA2; fringe's shorter scales white from apex to M1, between M2-M3, M3-CuA1, and below CuA2, otherwise shining grey; longer scales mostly pale greyish-brown, but white between M1-M2, M3-CuA1, and below CuA2. *Hindwing* mostly greyish-brown, but white toward base, anal margin, and as subterminal band apically; dark brown as thin terminal line especially toward apex; fringe mostly white; furrow of androconia absent. Abdomen mostly greyish-brown except for whitish scaling at apical margin of segments dorsally and on first three segments ventrally. *Tympanal organs* (n = 3): venulae secundae slightly visible distally; transverse ridge rather large, apical margin slightly concave; tympanic pockets only slightly reaching beyond transverse ridge, broadly rounded; praecinctorium dorsal margin sclerotized shortly; tympanic crest medium-sized, bell-shaped; tympanum at close to 90°; tympanic drum rather small, not reaching anterior margin of transverse ridge. *Abdominal intersegmental membrane* (n=1) (Fig. 18) dorsally without modification. *Male genitalia* (n = 3) (Fig. 35, 36). Uncus equally narrow on whole length of shaft; short basal arms and shaft connection broadly rounded; shaft straight, subapically rugose with spinules dorsally; short apical spine not quite at 90°; with 8-15 setae of medium length at base of each arm ventrally, without setae on shaft or arms dorsally although 0-4 setal sockets were observed near middle of shaft laterally. Gnathos narrow arms slightly

larger at base and at junction; apical plate slightly longer than width of arms, slightly swollen, apical margin rounded, spinules longer dorsally. Tegumen arms narrow but slightly enlarged gradually from base to apex, ventral margin straight, dorsal margin with only a short dorsal extension subbasally; dorsal connection short, about 1/5 length of arms. Valval medio-basal setose bulge more conspicuous toward costa; costal margin before projections with bell-shaped dorsal extension close to projections and bearing 6-9 setae of medium length; two costal projections strongly sclerotized: lateral projection a narrow arm of medium length directed medially and upward, flat ventrally, slightly crested dorsally, rounded apically; medial projection a curved spine shorter than lateral projection, directed dorsally and medially, with spiculate membranous sheath ventrally; cucullus rather long, narrow on whole length, slightly curved upward at apex, medial surface with longitudinal ridges on distal half and along all of costal margin, with few well-spaced elongated setae along ventral margin, setae shorter elsewhere, slightly more concentrated at apex mediodorsally. Juxta better sclerotized on basal half and along margins on distal half, basal half broadly rounded in dorsal view, distal half cone-shaped with straight margins, apically with a short ventral spine. Vinculum broad laterally; ventrocephalic margin rather narrowly produced anteriorly; with a low and narrow crest medially. Aedeagus narrow, slightly constricted at base of coecum penis and medially in dorsal view, in lateral view with a small downward curve at 1/3, with distal 1/3 directed upward at 45° and unsclerotized dorsally, apex ventrally rounded; coecum penis as narrow as shaft, about 1/4 whole length of aedeagus sclerotized part, without lateral projections; vesica scobinated, without cornutus.

FEMALE: Unknown.

Distribution.— COSTA RICA: Estacion Cacao, Volcan Cacao (1000-1400m), Estacion Pitilla, Parque Nacional Guanacaste (700m) (Guanacaste); Tapantí, 1700m (Cartago).

Flight period.— Moths were collected in January, June, and September-October.

Biology.— Adults come to light.

Notes.— Named in honor of my wife, Hélène Trudel, for her tremendous support of my scientific endeavors.

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