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Alepia bifida, a new species of moth flies from Central America (Diptera: Psychodidae: Psychodinae)

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Abstract. A new species of moth flies, *Alepia bifida* sp. nov., is described and figured based on males, females and eggs. The type specimens were collected in central Nicaragua, Cerro Musún Mt. This new species is characterized by unique morphology of the wing, basiphallus, distiphallus and gonostyli. The genus *Alepia* Enderlein, 1937 is one of the most diverse genera of Neotropical Psychodinae (54 known species including the one described here), but it is so well characterized morphologically that no generic synonyms have been proposed.

Key words. Diptera, Psychodidae, Psychodinae, Maruinini, *Alepia*, taxonomy, new species, Cerro Musún Mt., Nicaragua, Neotropical Region

Introduction

The moth fly genus *Alepia* Enderlein, 1937 is one of the most diverse genera of Neotropical Psychodinae. A list of the world species of the genus *Alepia* (Ježek et al. 2011) includes 52 known species. Omad & Rossi (2012) added one new species from Argentina. Including herein described *Alepia bifida* sp. nov. from Nicaragua, there are currently 54 known world species of *Alepia*. The newly described *Alepia bifida* sp. nov. represents the second record of the genus for Nicaragua, the first being *Alepia eburna* (Rapp, 1945) (see Quate & Brown 2004). The subfamily Psychodinae is represented by 52 species in Nicaragua so far (Duckhouse 1973, Maes & Killick-Kendrick 1990, Collantes & Martinez-Ortega 1999, Quate & Brown 2004). The newly described species was collected in Cerro Musún Mt. in central Nicaragua.

Materials and methods

The material was collected with Centers for Disease Control miniature light traps (CDC--LT), placed 1.5 m above the ground in the forest. The trap was operated in the environs of the research station of Cerro Musún Mt. (Nicaragua, Matagalpa, Rio Blanco, 12°57′18.0″N, 85°13′48.0″W, 620 m a.s.l.). Cerro Musún Natural Reserve (La Reserva Natural del Musún, 12°58′48″N, 85°14′27.6″W), in the east of Matagalpa Department, is an isolated mountain (peak altitude 1438 m a.s.l.), southeast of the northern mountains of Nicaragua. Located in the middle of a cattle ranching landscape, the protected area is very important as a conservation site for local biodiversity. For more information about natural conditions of the collecting site please see Anonymous (2003).

Captured moth flies were preserved in 70% ethanol in the field, and mounted on classic flat slides or slides with one shallow central depression with Canada balsam in the laboratory in Prague, Czech Republic. The type specimens are deposited in the collection of the National Museum, Praha, Czech Republic (NMPC). Slides were numbered following the procedure used in Diptera collection of NMPC (see Tkoč et al. 2014) with two separate number series (Inv. No. – Inventory Slide Number of the family Psychodidae; Cat. No. – Catalogue Number of Slide). The latter series is used for numbering of the type material included in the NMPC Diptera collection.

The microphotographs were taken with a Nikon ECLIPSE TS-100F microscope equipped with digital camera DS-Fi2. Drawings and photographs were edited in CorelDRAW X6 and Corel PHOTO-PAINT X6 graphic software.

Wing indices are based on distances between the following points: A = tip of R_5, B = radial fork, C = medial fork, D = tip of CuA_2; the distances are indicated by both extreme points. Maximum wing length (approximately) equal to the distance from a line connecting the bases of basal costal node to neala and the wing apex. Fore, middle and hind leg ratios are indicated by P_1, P_2 and P_3, respectively.

Taxonomy

Maruinini Enderlein, 1937

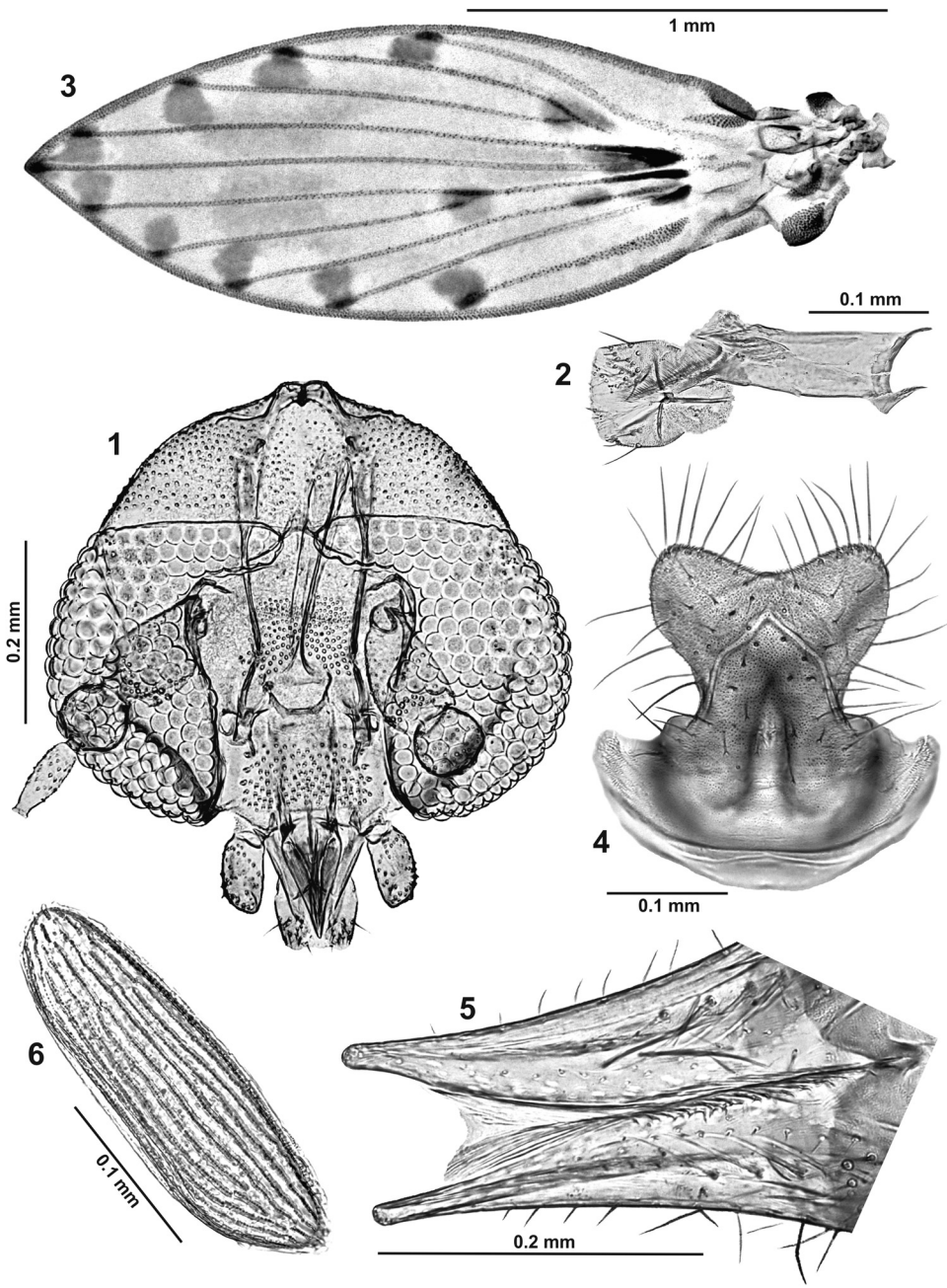
Alepia Enderlein, 1937

Alepia bifida sp. nov.

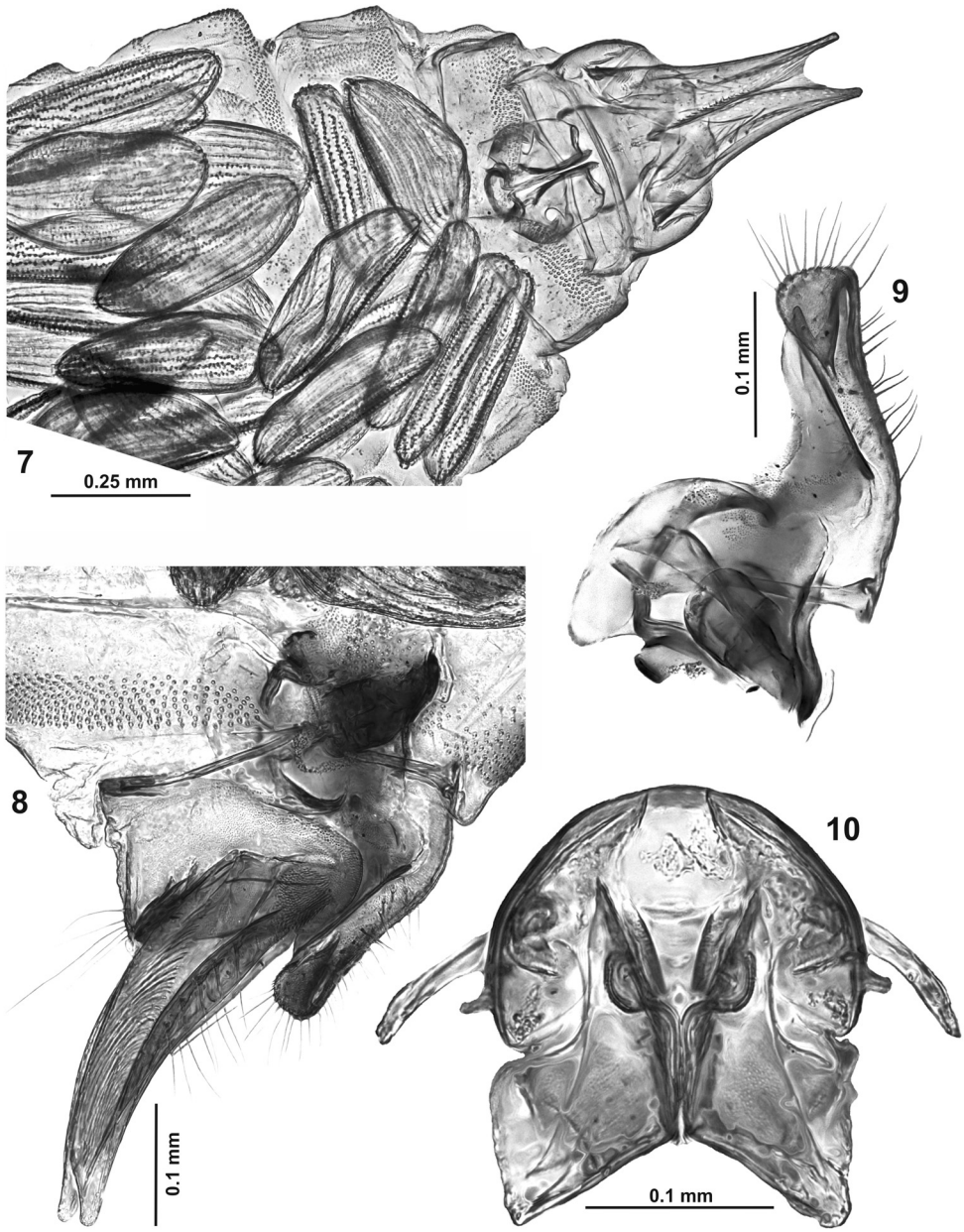
(Figs 1–27)

Type locality. Nicaragua, Matagalpa Department, Río Blanco, Cerro Musún, 620 m a.s.l., 12°57′18″N, 85°13′48″W.
Type material. Holotype: ♂, **NICARAGUA: Departamento de Matagalpa:** Río Blanco, Cerro Musún Natural Reserve, station Marena Lodge – Río Blanco road, 620 m a.s.l., 12°57′18″N, 85°13′48″W, v.–vi.2009, F. Le Pont leg. (NMPC: slide Cat. No. 34702, Inv. No. 22614, dissected). Allotype: 1 ♀, same data as holotype (NMPC: slides Cat. No. 34706, Inv. No. 22618, dissected). Paratypes: 4 ♂♂ 1 ♀, same data as holotype (NMPC: slides Cat. No. 34703–34705, 34707, Inv. No. 22615–22617, 22619, mostly dissected; number 34705/22617 = slide with one shallow depression and two non-dissected specimens).

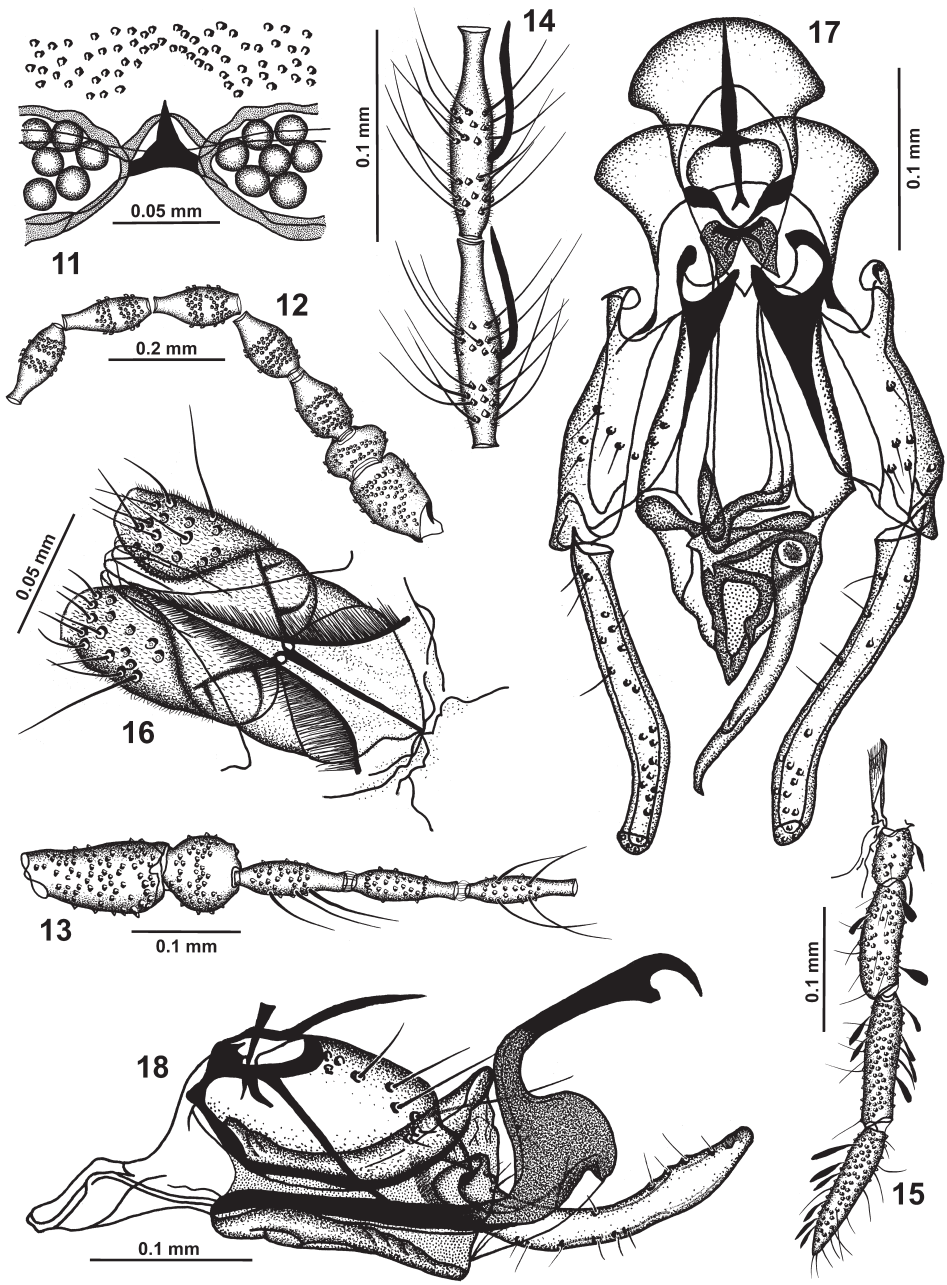
Description. ***Male.*** Eyes separated (Fig. 11), frontal suture largely U-shaped with central triangular ligament with concave sides. Eye bridge formed by three facet rows, the number of facets in the apices (not pointed as in female) is more reduced. Number of antennomeres 16.



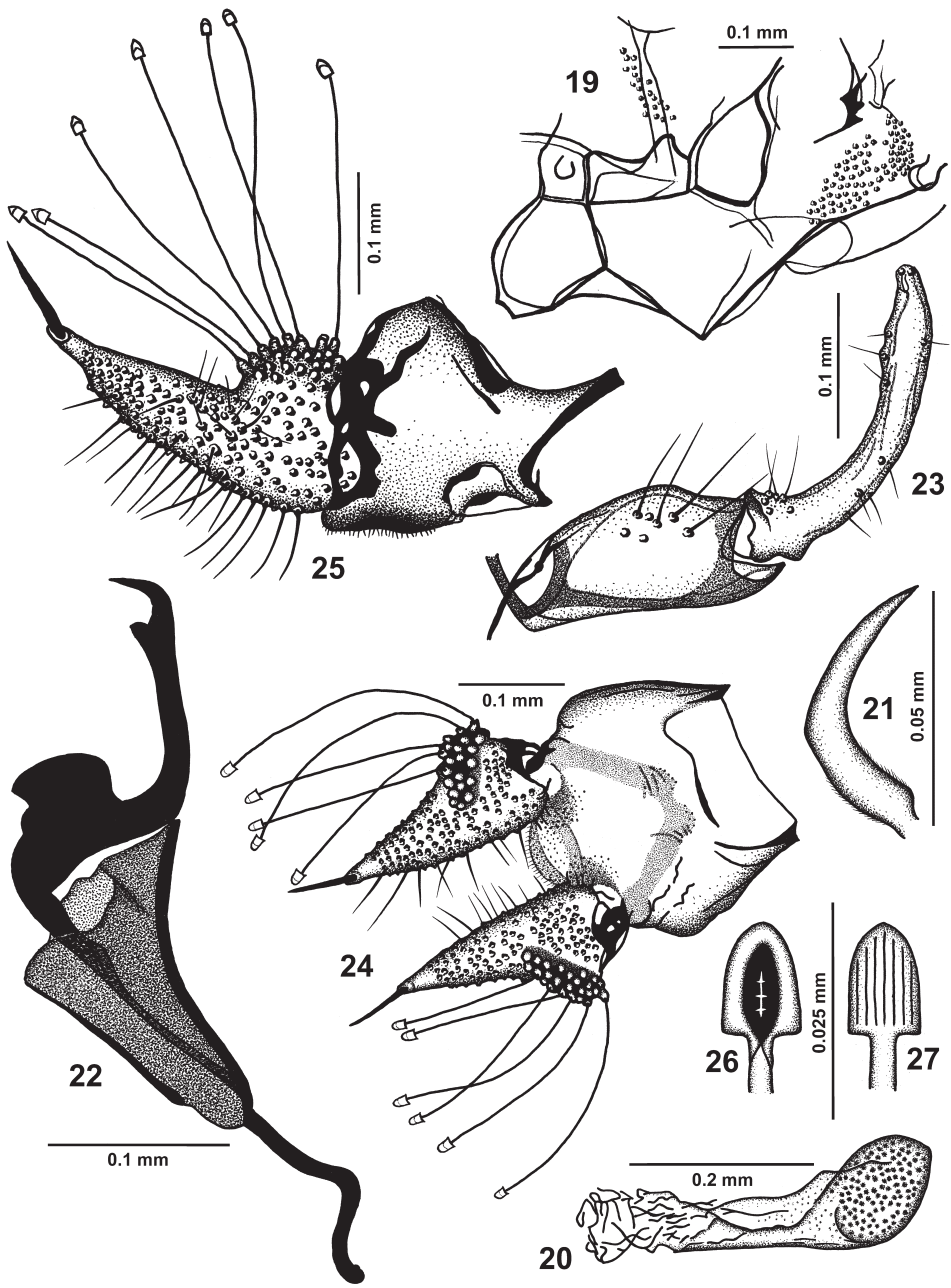
Figs 1–6. *Alepia bifida* sp. nov., male and female. 1 – head, frontal view, female; 2 – cibarium, epipharynx and labial lobes, dorsolateral view, male; 3 – wing, male; 4 – subgenital plate, dorso-subventral view, female; 5 – cerci, dorsal view, female; 6 – egg, with detail of sculpture.



Figs 7–10. *Alepia bifida* sp. nov., female. 7–8 – last abdominal segments and genitalia (7 – dorsal view, 8 – lateral view); 9–10 – genital chamber and subgenital plate in detail (9 – lateral view, 10 – caudal view).



Figs 11–18. *Alepia bifida* sp. nov., male and female. 11 – detail of frons, male; 12–13 – basal antennomeres (12 – male, 13 – female); 14 – medial antennomeres, female; 15 – maxilla and palpus maxillaris, male; 16 – labium, labial lobes and epipharynx, dorsal view, male; 17–18 – aedeagal complex and gonopods, male (17 – dorsal view; 18 – lateral view).



Figs 19–27. *Alepia bifida* sp. nov., male. 19 – thoracic sclerites, lateral view; 20 – haltere, lateral view; 21 – tarsal claw of P_1, lateral view; 22 – aedeagal complex, lateral view; 23 – gonopod, lateral view; 24–25 – epandrium and surstyli (24 – dorsal view, 25 – lateral view); 26–27 – hooded tip of accessory tenaculum in detail (26 – dorsal view, 27 – ventral view).

Scape 2.4 times as long as pedicel, cylindrical, narrower basally, pedicel almost globular, pressed in longitudinal axis (Fig. 12). Flagellomeres bowl shaped, apical ones missing. Length ratio of maxillary palpomeres 1.0 : 1.9 : 2.2 : 2.2, palpomere 4 not annulate (Fig. 15). Terminal lobes of labium, cibarium and epipharynx as in Figs 2 and 16. Thoracic sclerites as in Fig. 19. Wings sharply pointed, maculated, spots on veins as well as wing membrane very dark and conspicuous (Fig. 3), 2.1–2.5 mm long in holotype and male paratypes. Completely strengthened veins: Sc, R_1, CuA_1, CuA_2 strenghtened basally. Radial, medial and cubital veins black spotted at the end, as well as radial and medial forks, basal cell and basis of M_3 and CuA_1. Basal costal nodes well visible, Sc uninterrupted, M_3, CuA_1 and CuA_2 not touching at basis of wing. R_5 extends in the apex of the wing. Radial and medial forks complete, cross veins missing. The wing margin reaching CuA_2 is a little distad of medial fork, medial fork conspicuously distad of radial fork. Medial wing angle 222° (BCD). Wing indices: AB : AC : AD = 3.7 : 3.6 : 4.5; BC : CD : BD = 1.0 : 1.0 : 1.9; maximum wing length equal to 2.7 times its maximum width. Halteres clubbed (Fig. 20), with a maximum length equal hardly to 4.1 times its maximum width. Ratios of lengths of femora, tibiae and first tarsomeres: P_1 = 1.8 : 1.7 : 1.0; P_2 = 2.0 : 2.4 : 1.2; P_3 = 2.0 : 2.7 : 1.3; fore claws bent and pointed distad (Fig. 21). Aedeagal complex as in Figs 17, 18, 22, basiphallus almost straight and narrow from lateral view, however, with a U-shaped loop proximally before apex (Figs 18, 22). Basiphallus very widened and pressed distally, S-shaped, with small blunt teeth, backward oriented. Distiphallus prolonged by bent bifid arm, spanner- or bottle-opener shaped (Figs 18, 22), from which one protuberance is blunt in contrast to very pointed hooked tip. Aedeagal complex overlaid basally by a large hyaline bell-shaped tunica (hypandrium), distinctly narrowed in the middle (lateral view), quite bare (Figs 17, 18, 22). Tunica is articulated proximally to basiphallus and protuberances of gonocoxites. Gonocoxites almost cylindrical, only slightly expanded medially, 1.3 times shorter than gonostyli (Figs 17, 18, 23), both parts with setae. Gonostyli hardly S-shaped in dorsal view, sticky, sickle-shaped from lateral view, subapically inconspicuously inflated and tapered to a narrow, blunt tip. Epandrium bare, with an inconspicuous operculum in dorsal view (Fig. 24), well visible from lateral view (Fig. 25). Ventral plate of epandrium reduced to only two sclerotized converging ribs jointed with surstyli (Fig. 24). Hypandrium hyaline, lateral margin of 9th sternite grows together or connected with proximal border of epandrium and proximal protuberance of gonocoxite. Epiproct transversal as a fold, hardly visible, hypoproct shortly tongue-shaped, both parts with microsetae (Fig. 24). Surstyli almost circular basally, gradually tapering caudally (Figs 24, 25), with numerous accessory tenacula in a dark elliptical area near the base of surstyli (Figs 24–27), subapically with one tenaculum (Figs 24, 25).

Female. Eyes separated (Fig. 1), frontal suture triangular, frons bare, frontoclypeus with insertions of setae arranged in two oval areas touched on the level of antennal bows and divergent near tentorial pits. The minimum distance between eyes corresponds approximately to the diameter of two facets. Eye bridge formed by three facet rows, the number of facets in the pointed apices being more reduced. Vertex rounded, occipital lobe small, with a shallow indentation apically and a sclerotized rim. Scape twice as long as pedicel, cylindrical, gradually narrower basally, pedicel globular (Fig. 13). Flagellomeres spindle-shaped, narrow (Figs 13, 14), apical ones missing. Ascoids simple, paired, needle-shaped (Fig. 14). Terminal lobes of

labium, cibarium and epipharynx as in Fig. 1. Wing shape and maculation similar to male, length 2.4–2.5 mm (allotype and female paratype). Ratios of lengths of femora, tibiae and first tarsomeres: P_1 = 2.0 : 1.8 : 1.0; P_2 = 2.2 : 2.6 : 1.3; P_3 = 2.3 : 3.1 : 1.4. Genitalia as figured (Figs 4, 5, 7–10). Subgenital plate (Figs 4, 7–9) bilobed, with a shallow concavity caudally, with densely spaced microtrichia and sparsely covered by long setae. Genital chamber (Figs 7–10) with simple structures, without net- or wart-like decoration. Cerci almost triangular and slightly bent, three times longer than its bases (Figs 5, 7, 8), rounded caudally, setose, connected by a wrinkled membrane (Fig. 5).

Egg. Three times as long as maximum width, with characteristic wrinkled structures (Figs 6, 7).

Differential diagnosis. *Alepia bifida* sp. nov. is morphologically similar to *A. recurva* Bravo, Lago & Castro, 2004 from Brazil. However, wing characters, basiphallus, distiphallus and gonostyli show distinct differences (see the Table 1).

Etymology. Named after the shape of the bifurcated distiphallus (Lat. *bifidus*, *-a*, *-um* = bifid).

Biology. Unknown. Adults were collected by light trap in the forest on the slopes of Cerro Musún Mt.

Distribution. Currently recorded only from Nicaragua.

Table 1. Comparison of diagnostic characters of males of *Alepia bifida* sp. nov. and *A. recurva* Bravo, Lago & Castro, 2004. For figures of *A. recurva* see Bravo et al. (2004).

Character	*A. bifida*	*A. recurva*
Medial wing fork	with a pattern (Fig. 3)	without a pattern (Fig. 42)
CuA_2 basally	strengthened (Fig. 3)	linear (Fig. 42)
Veins R_4, R_5, M_{1+2}, M_3, CuA_1 basally	heavily marmorated (Fig. 3)	clear (Fig. 42)
Ending of R_5	with a pattern (Fig. 3)	without a pattern (Fig. 42)
Blunt teeth of basiphallus oriented	backward (Figs 18, 22)	forward (Fig. 44)
End of distiphallus	prolonged by a bent bifid arm, spanner- or bottle-opener shaped (Figs 18, 22)	cut and furrowed (Fig. 44)
Gonostyli apically	not hooked (Figs 17, 18, 23)	hooked (Figs 43, 44)

Discussion

The genesis of systematic position of *Alepia* was partially discussed by Ježek et al. (2011) and a short recapitulation is given here. Enderlein (1937) included the *Alepia* species group in the subtribe Clytocerina Enderlein, 1937 (i.e. a pericomoid taxon) of the tribe Psychodini Enderlein, 1937 with quite different wing venation in comparison with the genus *Setomima* Enderlein, 1937 placed by him in the subtribe Mormiina Enderlein, 1937 of the tribe Mormiini Enderlein, 1937. The monophyly of the tribe Setomimini Vaillant, 1982 with 15 Neotropical genera sensu Quate & Brown (2004) characterized by internal expanded anterior gonocoxal

apodemes is uncertain. Some genera (7 taxa) of Setomimini resemble Mormiini where R_4 originates in the half of prolonged and unbending R_{2+3}, in contrast to the situation in the rest of the included 8 genera incl. *Alepia*, characterized by a very short and unconnected R_{2+3}. Duckhouse (1987) treated *Setomima* and Vaillant's Setomimini as a part of Maruinini. Quate (1996, 1999) followed Duckhouse (1987) and included *Alepia* in the tribe Maruinini (placed by Enderlein in the subfamily Phlebotominae). The placement of *Alepia* in the tribe Setomimini was supported by Wagner & Hribar (2004) and Wagner et al. (2008). However, the wing venation is probably a suitable morphological character for the support of an otherwise polyphyletic group in this case (an application of Hennig 1968, 1972). Probably more new tribes or subtribes will be established in future for members of Maruinini, especially on the basis of modern phylogenetic methods, including DNA characters.

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