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TWO NEW SOUTHERN AFRICAN *APATOMYZA* WIEDEMANN (DIPTERA, BOMBYLIIDAE, CROCIDIINAE) WITH DISCUSSION ON THEIR PHYLOGENETIC POSITION

CARLOS JOSÉ EINICKER LAMAS¹
NEAL L. EVENHUIS²

ABSTRACT

Two new species of Apatomyza Wiedemann from South Africa, A. whocantell spec. nov. and A. angusticephala spec. nov., are described, illustrated, and placed within the most recent key to species. Into the data matrix recently used to infer a phylogenetic hypothesis for the subfamily, were added the two new taxa, in order to verify their position and relationships. They form the most apical clade in Apatomyza.

KEYWORDS: *Apatomyza*, *A. whocantell* spec. nov., *A. angusticephala* spec. nov., Bombyliidae, Diptera, Taxonomy, Phylogeny.

INTRODUCTION

The Afrotropical genus *Apatomyza* was erected by Wiedemann (1820) to include a single species: *A. punctipennis*.

Lamas *et al.* (2001) revised *Apatomyza* and proposed *Adelogenys* Hesse as a junior synonym. They also described three new species (*A. capensis*, *A. desertica* and *A. irvini*) which, together with the type species *A. punctipennis* and the previous species included in *Adelogenys* by Hesse (1938) (*A. braunsii*, *A. culicoides* and *A. namaquensis* – junior synonym of *A. punctipennis*), comprised a total of six species in the genus.

Lamas *et al.* (2003) described four new *Apatomyza* (*A. bethuliensis*, *A. proboscidea*, *A. aurea* and *A. glabripleura*) and presented an identification key to all included species.

Evenhuis & Greathead (2003), following the taxonomic changes proposed by Lamas *et al.* (2001, 2003), considered ten species among *Apatomyza*: *A. aurea* Lamas, Evenhuis & Couri; *A. bethuliensis* Lamas, Evenhuis & Couri; *A. braunsii* (Hesse); *A. capensis* Lamas, Evenhuis & Couri; *A. culicoides* (Hesse); *A. desertica* Lamas, Evenhuis & Couri; *A. glabripleura* Lamas, Evenhuis & Couri; *A. irvini* Lamas, Evenhuis & Couri; *A. proboscidea* Lamas, Evenhuis & Couri and *A. punctipennis* Wiedemann.

Lamas & Couri (2005) proposed a phylogenetic hypothesis for the Crocidiinae in which the subfamily was divided in two tribes (Desmatomyiini and Crocidiini), and *Apatomyza* was shown to be a monophyletic clade within the Crocidiini.

Studying a new series of unidentified material from the Natal Museum (Pietermaritzburg, South

¹ Museu de Zoologia, Universidade de São Paulo, Caixa Postal 42494-970, 04218-970, São Paulo, SP, Brasil. E-mail: einicker@usp.br

² Bishop Museum, 1525 Bernice Street, Honolulu, Hawaii, 96817-2704, USA.

Africa), the authors found two new *Apatomyza* species from Southern Africa, which are herein described and illustrated. Their position in the key of Lamas *et al.* (2003) and in the phylogenetic hypothesis of Lamas & Couri (2005) are given.

MATERIAL AND METHODS

Cladistic Analysis

Cladistic analysis was carried out using parsimony as implemented in Nona (Goloboff, 1993) version 2.0, running in Winclada (Nixon, 2002) version 1.00.08. The two new described taxa (*Apatomyza whocantell* spec. nov. and *A. angusticephala* spec. nov.) were added to the Crociidiinae data matrix of Lamas & Couri (2005), with 30 morphological characters, in order to verify their position. The cladograms were generated, as in Lamas & Couri (2005), applying successive weighting (with the macro swt.run associated to NONA) and with the characters 24, 27, 28 and 29 treated as non-additive. In an attempt to quantify the support for the clades, we have calculated the Bremer support (Bremer, 1994) for each node with Nona (Goloboff, 1993) using equally weighted characters: hold 10000, hold*, suboptimal 30, mult*1000. Branch support was also verified by using Jackknifing. The lines included in the matrix are shown in Appendix 1.

RESULTS

Apatomyza whocantell spec. nov.

(Figs. 1-4)

Diagnosis: *A. whocantell* spec. nov. is morphologically closed to *A. proboscidea* Lamas, Evenhuis & Couri, 2003, of which it can be easily distinguished by the infuscation of the wings and the color pattern of the mesonotum.

Male: Body length: 4.0 mm; wing length: 3.9 mm.

Head: eyes separated at level of anterior ocellus by about two times width of ocellar tubercle; frons gray pollinose with dark brown bristles; face gray pollinose; oral-genal cup polished dark brown with a yellow mark laterally; first palpal segment dark brown, 1/3 of proboscis length, with short light brown hairs; second palpal segment oval, length about 1/4 of first segment; proboscis dark brown; labellum about 1/5 of proboscis

length; antenna with scape dark brown, gray pollinose, 2 x longer than pedicel, with dark brown bristles; flagellum dark brown, 4 x longer than pedicel, with two flagellomeres and a short hyaline apical style; ocellar tubercle gray pollinose with dark brown bristles; occiput gray pollinose with dark brown bristles, white scales and yellow hairs.

Thorax: mesonotum (Fig. 1) gray pollinose, with sparse short dark brown bristles and yellow scales, with paired admedian dark brown stripes, and an additional lateral stripe; scutellum gray pollinose, with long yellow bristles, yellow scales and short dark brown bristles; postpronotal lobe with long yellow hairs; prealar and supra-alar bristles yellow; postalar callus with dark brown bristles; pleura gray pollinose; anepisternum with white scales and long yellow hairs on upper portion; katepisternum with white scales and hairs centrally; anepimeron, meropleurite, laterotergite, mediotergite, metepisternum and metepimeron bare; halter with stem and knob yellow, with brown marks and yellow hairs ventrally.

Legs: Coxae concolorous with pleura, with white scales and sparse white hairs; femora dark brown, gray pollinose, with white scales on anterior, dorsal and posterior surface and white hairs on ventral surface; tibiae yellow with yellow bristles; tarsi yellow; claws light brown on base and dark brown on tip; pulvilli and claws similar in length.

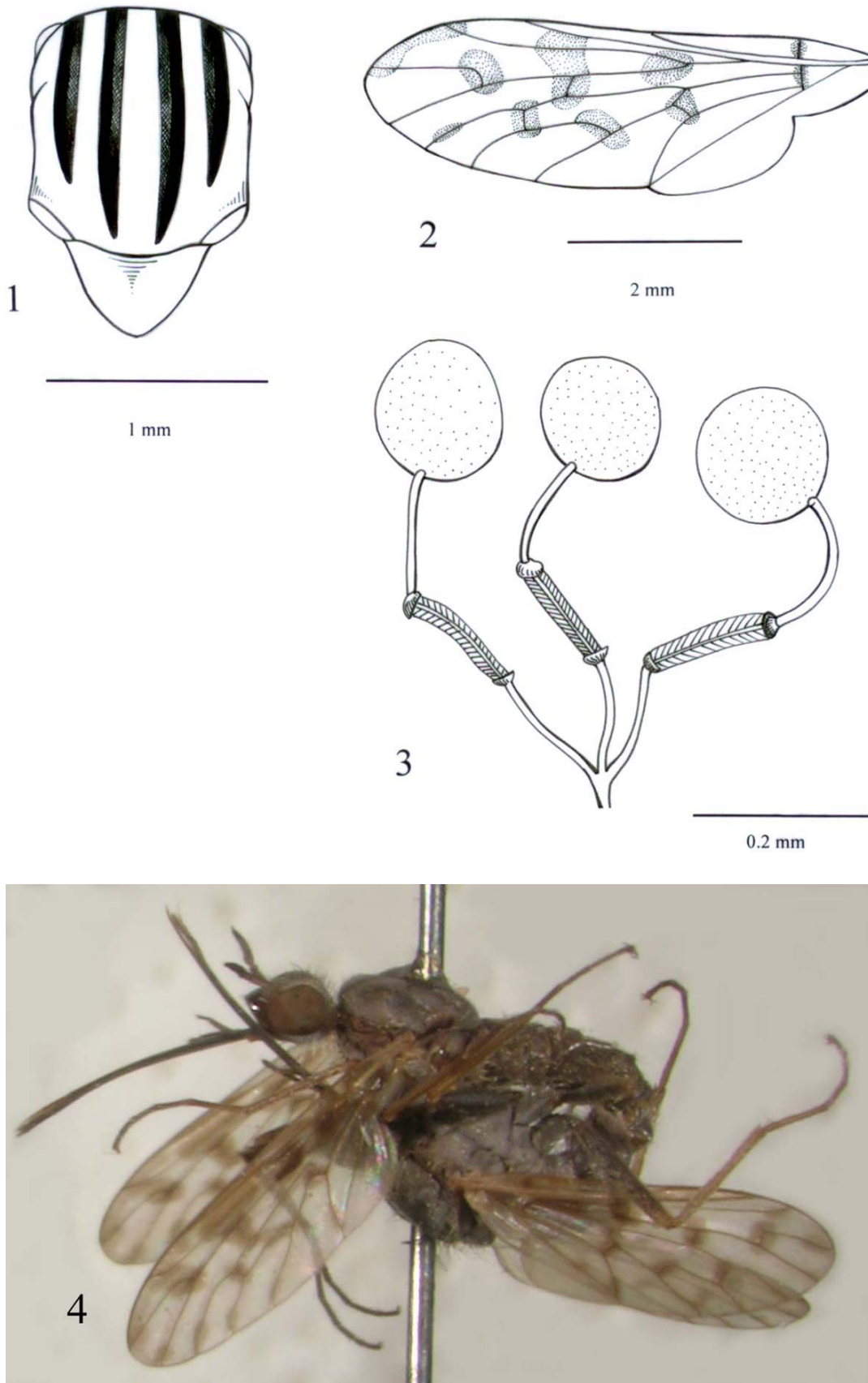
Wing (Fig. 2): hyaline, slightly infuscated, with light brown veins and dark brown areas: on humeral vein; base of r2+3, center of br and base of r1; apex of bm, base of discal and upper center of cup; center of r1, r2+3, around r-m and center of dm; lower center of dm, base of m2 and center of cua1; surrounding m-m; base of r4 and margin of r2+3; r-m crossvein beyond middle of discal cell but before end of vein Sc. Discal cell narrowed apically; anal cell closed before wing margin; squama hyaline with yellowish white fringe.

Abdomen: dark brown, with sparse yellowish white hairs, longer hairs on lateral margins.

Female: as in male, except for:

Body length: 2.9-6.6 mm; wing length: 2.8-5.8 mm.

Spermathecae (Fig. 3): spermathecal reservoir globose with diameter equal to sperm pump length; spermathecal duct short, 3 times longer than sperm



FIGURES 1-4. *Apatomyza nbocantell*: (1) mesonotum; (2) wing; (3) spermathecae; (4) Holotype male (below) and Paratype female (above) "in copula".

pump, uniting to form a short common spermathecal duct; sperm pump placed in the middle 1/3 of the spermathecal duct; sclerotized collars developed on both ends of sperm pumps; spermathecal duct with the same width throughout.

Notes: The unique male holotype is pinned *in copula* with a female paratype. In order to preserve this interesting mount (Fig. 4) the male terminalia were not dissected.

Etymology: named for the farm “Who can Tell” (Cradock, Eastern Cape) on which the type series was collected. The species epithet is treated here as a noun in apposition.

Material examined: Holotype male: SOUTH AFRICA, Eastern Cape: Cradock (E of Farm “Who can Tell”), 11 March 1972, M.E. & B.J. Irwin col., deposited in the Natal Museum, Pietermaritzburg, South Africa (NMSA). Paratypes: same data label; 2 females, deposited in NMSA, and 1 female deposited in the Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZSP).

Apatomyza angusticephala spec. nov.

(Figs. 5-9)

Diagnosis: *A. angusticephala* spec. nov. and *A. whocantell* spec. nov., key out near *A. proboscidea* Lamas, Evenhuis & Couri, 2003 and *A. bethuliensis* Lamas, Evenhuis & Couri, 2003, in the key of Lamas *et al.* (2003), as they have the second palpal segment oval. The length of proboscis indicates a close relation between *A. angusticephala* spec. nov. with *A. bethuliensis* (short proboscis) and *A. whocantell* spec. nov. with *A. proboscidea* (long proboscis). *A. angusticephala* spec. nov. could be easily segregated from *A. bethuliensis* by the dorsoventrally flattened head and color pattern of mesonotum.

Male: Body length: 2.5 mm; wing length: 1.8 mm.

Head: slightly dorsoventrally flattened (Fig. 5); eyes separated at level of anterior ocellus for about the width of ocellar tubercle; frons and face gray pollinose; oral-genal cup polished dark brown with a yellow mark laterally; first palpal segment dark brown, 1/2 of proboscis length, with short light brown hairs; second palpal segment oval, length about 1/5 of first segment; proboscis dark brown; labellum about 1/3 of proboscis length; antenna with scape dark brown gray pollinose,

3 x longer than pedicel, with dark brown bristles; flagellum dark brown, 5 x longer than pedicel, with three flagellomeres and a short hyaline apical style; ocellar tubercle gray pollinose with dark brown bristles; occiput gray pollinose with dark brown bristles.

Thorax: mesonotum (Fig. 6) dark brown, with a median longitudinal gray pollinose stripe, and two admedian dark brown stripes, with sparse short dark brown bristles; scutellum polished brown, gray pollinose, with long dark brown bristles; postpronotal lobe with long dark brown hairs; prealar and supra-alar bristles dark brown; postalar callus with dark brown bristles; pleura gray pollinose; anepisternum with sparse white hairs on upper portion; katepisternum with sparse white hairs; anepimeron, meropleurite, laterotergite, mediotergite, metepisternum and metepimeron bare; halter with stem light brown and a well developed yellow knob.

Legs: Coxae concolorous with pleura, with white hairs on anterior surface; femora dark brown, gray pollinose, with white hairs and scales; tibiae and tarsi dark brown with dark brown bristles; claws light brown on base and dark brown on tip; pulvilli and claws similar in length.

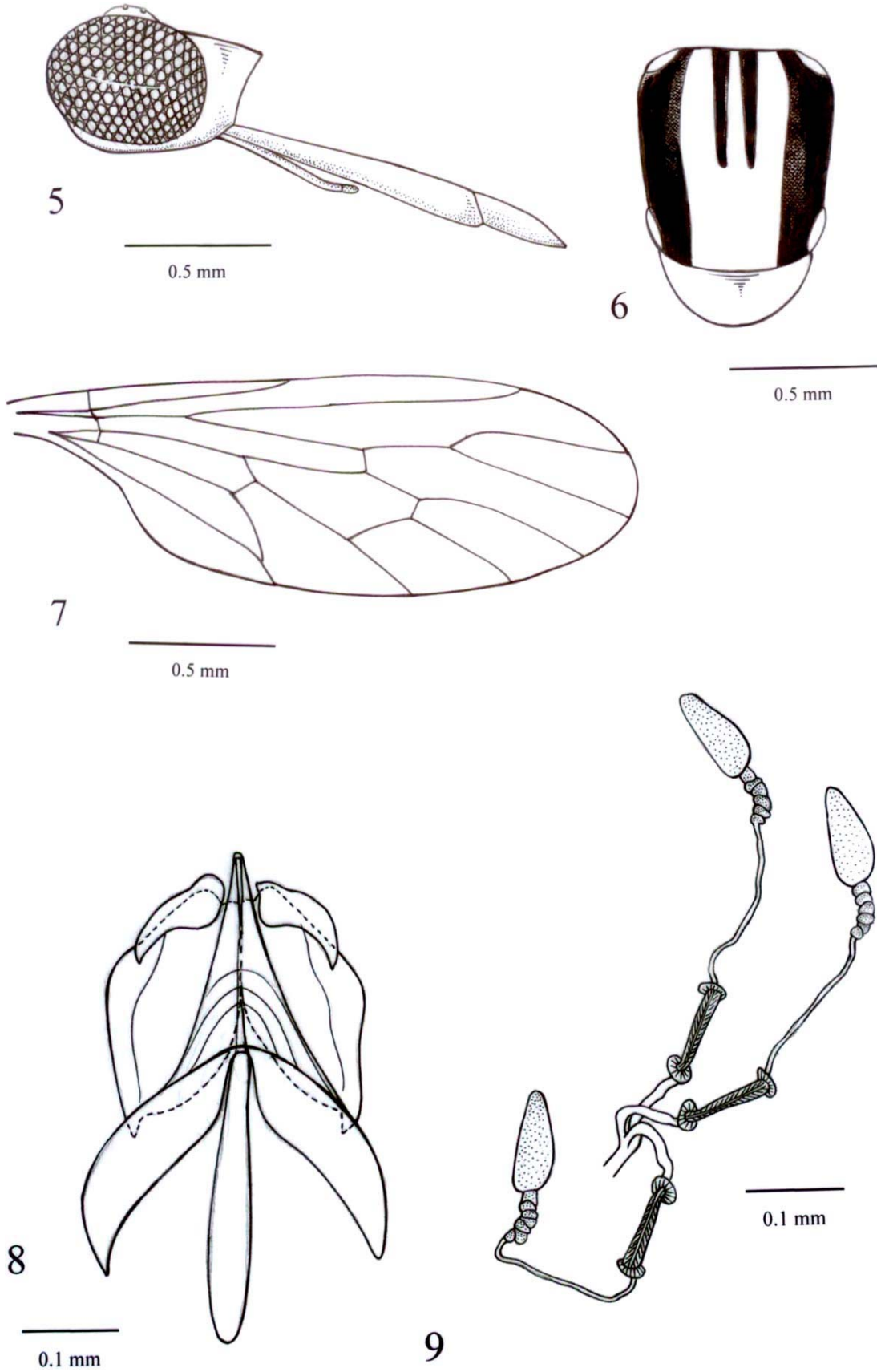
Wing (Fig. 7): slightly infuscated with light brown veins; discal cell narrowed apically; anal cell closed before wing margin; squama hyaline with yellowish white fringe.

Abdomen: dark brown, with dark brown bristles on lateral margins. Genitalia (Fig. 8): Gonocoxa short; distiphallus long, surpassing apex of posterior process of gonocoxa; lateral aedeagal apodeme very conspicuous and elongated, surpassing gonocoxal margins; gonostylus slightly hook-shaped, not bifid; ejaculatory apodeme elongated and conspicuous.

Female: as in male, except for:

Body length: 2.5 mm; wing length: 2.3 mm. Eyes separated at level of anterior ocellus for about 3 x width of ocellar tubercle.

Spermathecae (Fig. 9): spermathecal reservoir pear shaped with longitudinal axis equal to sperm pump length; spermathecal duct 4 times longer than sperm pump, uniting to form a short common spermathecal duct and with a sclerotized moniliform pattern apically, fused with the spermathecal reservoir; sperm pump



FIGURES 5-9. *Apatomyza angusticephala*: (5) head; (6) mesonotum; (7) wing; (8) male genitalia, dorsal view; (9) spermathecae.

placed in the basal 1/2 of the spermathecal duct; sclerotized collars developed on both ends of sperm pumps; spermathecal ducts wider between common duct and sperm pump.

Etymology: named for the characteristic flattened occiput (*angusti* = flat + *cephala* = head).

Material examined: Holotype male: SOUTH AFRICA, Cape Province: Pakhuis (2mi NNE in Pakhuis Farm), 14 September 1972, M.E. & B.J. Irwin col. Paratype: same data label, 1 female. Holotype and paratype both deposited in NMSA.

Identification key

Both new species were added to the key of Lamas *et al.* (2003) by modifying couplet six as follows:

6. Proboscis very long, with labellum about 1/5 to 1/9 of its length 6A
 – Proboscis not as long as the former, with labellum about 1/3 to 1/4 of its length 6B
 6A. Hyaline wings, with veins light brown on base and dark brown beyond middle; mesonotum gray pollinose, with two central dark brown stripes, and a larger one laterally
 *A. proboscidea* Lamas, Evenhuis & Couri, 2003
 – Wings slightly infuscated, with light brown veins and dark brown marks (Fig. 2); mesonotum gray pollinose, with paired admedian dark brown stripes, and a lateral one of the same width
 *A. whocantell* spec. nov.
 6B. Head slightly dorsoventrally flattened (Fig. 5); mesonotum with a median longitudinal gray pollinose stripe, and two admedian dark brown stripes *A. angusticephala* spec. nov.
 – Head not flattened, globular in lateral view; mesonotum with two central dark brown stripes and a round spot on supra-alar area
 *A. bethuliensis* Lamas, Evenhuis & Couri, 2003

DISCUSSION

The two new *Apatomyza* species are easily segregated from the 10 previously known. Despite some morphological characters indicating similarities with *A. proboscidea* and *A. bethuliensis*, this relation is not corroborated by cladistic analysis. The tree obtained by successive weighting (Fig. 10) has 81 steps

of length with a consistency index of 40 and a retention index of 74, and presents the same topology as the tree presented by Lamas & Couri (2005) except for the two new species included herein. The two new taxa (*A. angusticephala* spec. nov. and *A. whocantell* spec. nov.) appeared forming an apical clade with *A. braunsii* as its sister group (Fig. 10). This clade is supported by the reversion of character 9 (micropubescence in the laterotergite), where the apomorphic condition (presence of micropubescence) is a synapomorphy of the entire Crociidiini, and the homoplastic character 27, where the apomorphic condition is shared with the clade formed by *A. punctipennis* + *A. bethuliensis* + *A. proboscidea*. Jackknifing recovered six nodes with acceptable support in the consensus tree including 57% for the clade formed by *A. angusticephala* spec. nov. + *A. whocantell* spec. nov., from 1000 replications. Bremer support for the major nodes on this cladogram was calculated from 2870 retained trees, with length ranging from 81 to 111 steps, and the results are as follows: Desmatomyiini, 9 steps; *Desmatomyia*, 14 steps; Crociidiini, 5 steps; *Apatomyza*, 2 steps; *A. bethuliensis* + *A. proboscidea*, 2 steps; *A. whocantell* spec. nov. + *A. angusticephala* spec. nov., 3 steps; *Mallophthiria* + *Megaphthiria*, 2 steps; *Megaphthiria*, 8 steps; *Crocidium*, 4 steps; *C. lactipenne* + *C. microstictum*, 2 steps; *C. dasyposium* + *C. phaenochilum*, 18 steps (Fig. 10).

RESUMO

Dois novas espécies de Apatomyza Wiedemann da África do Sul, A. whocantell spec. nov. e A. angusticephala spec. nov., são descritas, ilustradas, e incluídas na mais recente chave para espécies. Na matriz de dados recentemente utilizada para inferir a hipótese filogenética da subfamília, foram adicionados os dois novos táxons, visando verificar sua posição e relacionamento. Elas formam o clado mais apical em Apatomyza.

PALAVRAS-CHAVE: *Apatomyza*, *A. whocantell* spec. nov., *A. angusticephala* spec. nov., Bombyliidae, Diptera, Taxonomia, Filogenia.

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spec. nov. to the MZSP collection. This study was carried out with the support of FAPESP, Fundação de Amparo à Pesquisa do Estado de São Paulo (Proc. No. 04/09431-5) and CNPq, Conselho Nacional de Desenvolvimento Científico e Tecnológico, to CJEL (Proc. No. 303820/2004-7).

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