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New Species of *Tomoplagia* Coquillett (Diptera: Tephritidae) from Capitula of Asteraceae in Brazil

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Novas Espécies de *Tomoplagia* Coquillett (Diptera: Tephritidae) de Capítulos de Asteraceae no Brasil

RESUMO - São descritas doze novas espécies de *Tomoplagia* criadas de capítulos de asteráceas, coletados no Sul e Sudeste do Brasil (*T. aczeli* n. sp., *T. achromoptera* n. sp., *T. bicolor* n. sp., *T. brasiliensis* n. sp., *T. cipoensis* n. sp., *T. dimorphica* n. sp., *T. grandis* n. sp., *T. interrupta* n. sp., *T. matzenbacheri* n. sp., *T. rupestris* n. sp., *T. variabilis* n. sp., e *T. voluta* n. sp.). Cinco espécies têm ornamentações atípicas das asas, derivadas do padrão normal para o gênero, que é de cinco faixas amarelas oblíquas. Padrões atípicos foram descritos anteriormente apenas para três espécies. Todas as espécies descritas foram criadas de capítulos de Vernonieae, o que confirma as plantas desta tribo de asteráceas como as principais hospedeiras das espécies de *Tomoplagia*. Entre as espécies de *Tomoplagia* descritas, cinco são especialistas de Lychnophorinae, uma sub-tribo das Vernonieae endêmica da vegetação de campo rupestre, que ocorre nos topos de cadeias montanhosas do Brasil central e sudeste. Estas espécies de *Tomoplagia* são, provavelmente, restritas à pequena distribuição geográfica de suas plantas hospedeiras. Um adendo à chave para espécies mais recente (Aczél 1955a) é apresentado, incluindo entradas para todas as espécies com ornamentações atípicas das asas.

PALAVRAS-CHAVE: Taxonomia, inseto endófago, planta hospedeira, cerrado, campo rupestre

ABSTRACT -Twelve new species of *Tomoplagia* reared from capitula of Asteraceae collected in southern and southeastern Brazil are described (*T. achromoptera* n. sp., *T. aczeli* n. sp., *T. bicolor* n. sp., *T. brasiliensis* n. sp., *T. cipoensis* n. sp., *T. dimorphica* n. sp., *T. grandis* n. sp., *T. interrupta* n. sp., *T. matzenbacheri* n. sp., *T. rupestris* n. sp., *T. variabilis* n. sp., and *T. voluta* n. sp.). Five of these species have highly atypical wing markings, differing from the usual pattern for the genus, which includes five oblique yellow bands. Aberrant wing patterns were previously known in only three species. All the new species were reared from capitula of Vernonieae, confirming this Asteraceae tribe as the main host group of *Tomoplagia* species. Of these new species, five are specialists on the Lychnophorinae, a Vernonieae subtribe endemic to campo rupestre vegetation, which occurs on tops of mountain chains in central and southeastern Brazil. These species of *Tomoplagia* are probably restricted to the small ranges of these host plants. An addedum to the most recent key to species (Aczél 1955a) is provided, including couplets to all of the species with modified wing patterns.

KEY WORDS: Taxonomy, endophagous insect, host plant, cerrado, campo rupestre

Tomoplagia Coquillett is a mainly neotropical genus with 45 valid species, of which 43 are restricted to Central and South America (Norrbom *et al*. 1999). Since the generic revisions by Aczél (1955a, b), no new species have been described. Larvae of most species are endophages of capitula of Asteraceae, although at least one species forms stem galls. Their host plants belong mainly to the tribe Vernonieae, although some species use plants of the tribes Mutisieae and Heliantheae (Foote *et al.* 1993, Goeden & Headrick 1991, Lewinsohn 1991, Prado & Lewinsohn 1994, Prado *et al.* 2002). In Brazil, *Tomoplagia* is the most diverse and abundant genus of the Tephritidae that breed in flower heads of Asteraceae.

We and our colleagues have reared about three thousand specimens of 25 species from capitula collected in southern and southeastern Brazil (Prado *et al*. 2002). Among these, twelve were unknown and are described in this paper.

Some of these new species appear to be endemic to the 'campos rupestres', a complex of highland grasslands that occur in the mountain chains of central Brazil, above altitudes of 900 m. Their soils are sandy and poorly developed, and the flora has a high level of species richness and endemism (Giulietti & Pirani 1988, Alves & Kolbek 1994, Giulietti *et al*. 1997). Most of the lower areas that surround the campos rupestres were covered by the 'cerrados', a savanna-like biome of grasslands and woodlands that form the second largest vegetation province in Brazil (Eiten 1993, Ratter *et al.* 1997).

Methods

Most specimens described in this paper were reared from capitula of Asteraceae collected in southern and southeastern Brazil. Flower heads were maintained in plastic pots for adult emergence, and voucher plant specimens were also collected for host identification (see Prado *et al*. 2002). Holotypes were deposited in the Museu de História Natural da Universidade Estadual de Campinas (ZUEC), Campinas, SP, Brazil, and paratypes in the National Museum of Natural History, Smithsonian Institution (USNM), Washington, DC, USA, and in the Museu de Zoologia, Universidade Estadual de São Paulo (MZSP), SP, Brazil. Several specimens from the American Museum of Natural History, New York (AMNH) were also examined. Plant voucher specimens were deposited in the Herbário da Universidade Estadual de Campinas (UEC), Campinas, SP, Brazil.

All descriptions were made from dried, mounted specimens, and characters visible only in living individuals, such as eye color were not evaluated. Morphological terminology follows McAlpine (1981) and White *et al.* (1999). Terms for the bands of the wing pattern follow Aczél (1955a, b) and are indicated in Fig. 1A. Two ratios are used in the descriptions: vein M ratio = length of vein M between BM-Cu and DM-Cu/ length of apical section of M; cell dm ratio = length of vein M between BM-Cu and DM-Cu/ length of crossvein DM-Cu. The angle between DM-Cu, which may be sinuous, and the proximal section of M is based on the entire length of DM-Cu (i.e., for a line between its terminal points, not just the part closest to M). The microtrichial color pattern on the wing is difficult to observe, even with good optics, and may not always be useful for basic identification. It is most visible in light from an angle or on slide preparations.

Tomoplagia achromoptera **n. sp.**
(Figs. 1B, 2A)
Tomoplagia trivittata (Lutz & Lima): Prado & Lewinsohn (1994): 676 [misidentification]

Diagnosis. *Tomoplagia achromoptera* differs from all other species of *Tomoplagia* by its highly reduced wing pattern, without any complete bands. *Tomoplagia matzenbacheri* n. sp., which may be the most closely related species, has a similar, although shorter, aculeus, and a vittate scutum with three black spots posteriorly. *Tomoplagia achromoptera* differs from it in wing pattern, in having the medial posterior scutal spot often paler or absent, no black spots on the thoracic pleuron, and the female abdomen with sublateral black spots only on tergite 5.

Description. Mesonotum length 2.1-3.0 mm, eye longest diameter 0.8-1.3 mm, frons width at vertex 0.5-0.6 mm. Body ground color pale yellow to yellow. Head and thoracic setae and setulae yellow. HEAD: Eye 1.2-1.7 times longer than wide. Frons orange and entirely microtrichose, microtrichia of orbital plate, broad lateral margin, and narrow medial vitta slightly grayer. Genal height 0.08-0.14 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus broad, twice longer than wide, with pale brown to brown setae of varying length. THORAX: Scutum usually with triangular brown to black spot medially on posterior margin, well separated from usual pair of sublateral oval black spots near posterior margin, which are small to moderate sized, medial spot black or often paler brown or evanescent, rarely absent; without other black markings; entirely microtrichose, predominantly yellow to brownish (color depending upon angle of view) including narrow lateral margin and broad posterior margin (to beyond acrostichal setae) and three vittae (separated by four broad gray microtrichose vittae), sublateral vitta including dorsocentral seta and broadening posteriorly to include sublateral black spot; setulae pale yellow, evenly distributed (including on vittae) except on sublateral black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose and entirely yellow, without black spots. Mediotergite microtrichose except narrowly medially and ventrally, entirely yellow to orange. Anatergite, meron and katepisternum without black spots. Anepisternum with second seta 4/5 as long as largest (dorsalmost) seta. LEGS: Male without unusual modifications. WING (Fig. 1B): Without any well developed, complete bands, only the following markings: brown spots, sometimes faint, on apex of crossvein H, on apex of vein Sc, in middle of cell r_1, bordering crossveins R-M, bordering crossvein DM-Cu and usually extending to posterior wing margin, and sometimes on margin of cell r_{2+3} and/or apex of vein R_{4+5}; cell bc, base of cell c, base of cell br, and pterostigma mostly faint yellow; sometimes other parts of apical and medial bands pale, evanescent yellow. Cell bm entirely hyaline. Vein M ratio 0.98-1.10; cell dm ratio 2.20-2.37; crossvein DM-Cu nearly straight to slightly sinuous, forming slightly obtuse angle with proximal section of M. Microtrichia white only on narrow semicircular apical spot in cell r_{4+5}. ABDOMEN: Male tergite 5 with pair of sublateral black spots; tergites 3 and 4 sometimes with small, dot-like sublateral black spots. Tergite 5 about 1.6 times longer than tergite 4. Epandrium and surstyli of usual shape for genus. Medial surstylus with both prensisetae blunt and spine-like, the medial larger. Female tergite 5 with pair of black sublateral spots; other tergites usually entirely yellow, but in some specimens with a pair of black sublateral dots on tergites 4 and 6. Oviscape 0.6-0.9 mm long, 0.7-0.8 times longer than width at base. Aculeus (Fig. 2A) about 1.3

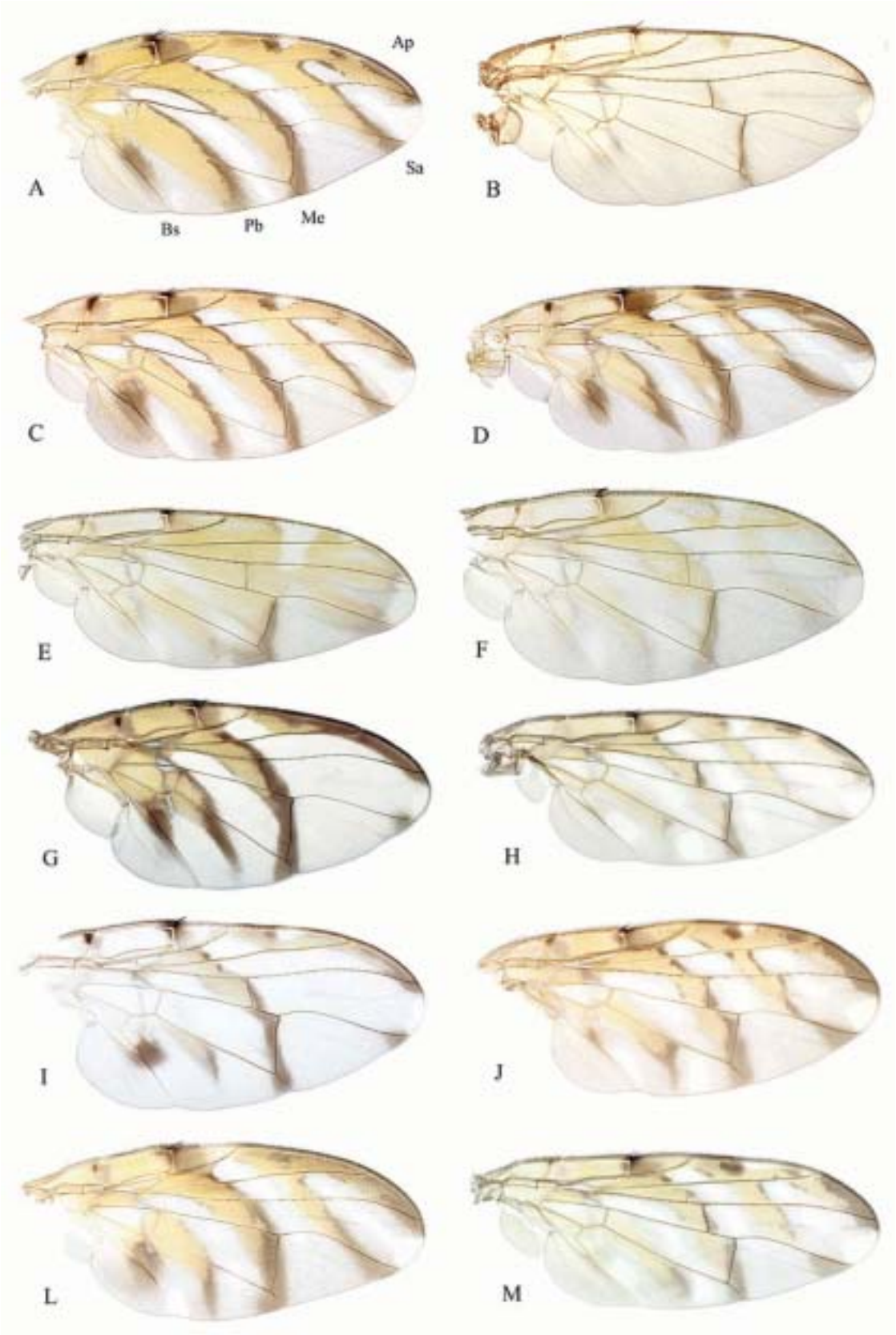

Figure 1. Wings. A, *T. aczeli;* B, *T. achromoptera;* C, *T. bicolor*; D, *T. cipoensis*; E, *T. dimorphica* (male); F, *T. dimorphica* (female); G, *T. grandis*; H, *T. interrupta*; I, *T. matzenbacheri*; J, *T. rupestris*; L, *T. variabilis*; M, *T. voluta*. Terms for the wing bands follow Aczél (1955a,b) and are depicted in A (Ap, Apical band; Sa, Subapical; Me, Median; Pb, Prebasal; Bs, Basal).

Figure 2. Female terminalia of specimens from Serra do Cipó, copied from Prado & Lewinsohn (1994). A, *T. achromoptera* (misidentified as *T. trivittata* (Lutz & Lima) in Prado & Lewinsohn 1994); B, *T. tripunctata* Hendel (specimens, determined as 'dark morphs' of *T. tripunctata* by Prado & Lewinsohn (1994) are *T. cipoensis* n. sp.; compare with Fig. 3D); C, *T. bicolor* (misidentified as *T. heringi* Aczél). Bar = 0.5 mm.

mm long, relatively stout; tip elongate triangular, in ventral view lateral margin with small tooth-like projection near midlength, extreme apex triangular.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Diamantina, 18°09.58'S 43°43.01'W, 15 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96420 [ex *Proteopsis argentea*].

Paratypes. BRAZIL, Minas Gerais, Diamantina, 18°11.96'S 43°42.56'W, 19 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96472 [ex unidentified Vernoniineae], 4♂ 1♀ (ZUEC); Serra do Cabral, Joaquim Felício, 17°42.43'S 44°11.52'W, 13 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96359 [ex *Lessingianthus coriaceus*], 2♀ (ZUEC), 1♀ (USNM); Serra do Cabral, Joaquim Felício, Fazenda da Onça 17°43.49'S 44°15.05'W, 17 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95298, [ex *Lessingianthus coriaceus*], 1♂ (ZUEC); Serra do Cipó, Santana do Riacho, 19°17.82'S 43°36.21'W, 21 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96512 [ex *Lessingianthus coriaceus*], 3♂ 4♀ (ZUEC); São Paulo, Águas de Santa Bárbara, Estação Ecológica de Águas de Santa Bárbara, 22°39.25'S 49°14.04'W, 19 Apr 2001, S. Ferreira, R. Raimundo, H. Kubota, P. Prado, P0211, [ex *Lessingianthus bardanoides*], 1♀ (ZUEC); Assis, Estação Ecológica de Assis, 22°35.96'S 50°22.28'W, 27 May 2000, P. Prado, M. Almeida-Neto, H. Kubota, D. Sudatti, G1312, [ex *Lessingianthus bardanoides*], 10♂ 13♀ (ZUEC); Assis, Estação Ecológica de Assis, 22°36.83'S 50°20.55'W, 21 May 2002, A.M. Almeida, M.R. Braun, L.A. Anjos, A.M. Rosa, PIC02202, [ex *Lessingianthus bardanoides*], 4♂ (ZUEC); Itirapina, Estação Experimental de Itirapina, 22°15.96'S 47°47.81'W, 07 May 2000, C. Fonseca, P. Prado, E. Anseloni, M. Almeida-Neto, G0612 [ex *Lessingianthus bardanoides*], 3♂ 2♀ (ZUEC); Itirapina, Estação Experimental de Itirapina, 22°13.37'S 47°55.19'W, 22 Apr 2002, A.M. Almeida, M.R. Braun, L.A. Anjos, A.M. Rosa, PIC02179, [ex *Lessingianthus bardanoides*], 2♂ 3♀ (ZUEC); Mogi-Guaçu, Reserva Biológica de Mogi-Guaçu, 22°15.37'S 47°10.72'W, 25 Apr 2000, C. Fonseca, T. Lewinsohn, P. Prado *et al*., G0215, [ex *Lessingianthus bardanoides*], 2♂ 1♀ (ZUEC); Pedregulho, estrada ligando vicinais de Estreito-Taquari, 20°14.35'S 47°23.84'W, 15 May 2000, C. Fonseca, T. Lewinsohn, M. Almeida-Neto *et al*., G0915, [ex *Lessingianthus* sp.], 2♀ (ZUEC); Rifaina, estrada vicinal do Taquari 20°07.48'S 47°20.71'W, 14 May 2000, C. Fonseca, T. Lewinsohn, M. Almeida-Neto *et al*., G0801, [ex *Lessingianthus onoporoides*], 2♂ 2♀ (ZUEC); Santa Rita do Passa Quatro, Parque Estadual do Vassununga, 21°38.24'S 47°38.56'W, 17 May 2000, C. Fonseca, T. Lewinsohn, M. Almeida-Neto *et al*., G1104, [ex *Lessingianthus* sp.], 2♂ 1♀ (ZUEC).

Distribution. Reared from flower heads collected in Joaquim Felício, Serra do Cipó and Diamantina, all in the Espinhaço Mountain Range, Minas Gerais, and also in cerrado sites in Águas de Santa Bárbara, Assis, Itirapina, Pedregulho, Rifaina, and Santa Rita do Passa Quatro, São Paulo State, Brazil. The host plants occur in campo rupestre and cerrado vegetation, mainly in southeastern and central Brazil.

Hosts. Reared from flower heads of *Lessingianthus coriaceus* (Less.) H. Rob., *L. bardanoides* (Less.) H. Rob., and *L. onoporoides* (Baker) H. Rob., probably the main hosts, and *Proteopsis argentea* Mart. & Zucc., collected in areas of campo rupestre and cerrado vegetation (see Prado & Lewinsohn 1994, Prado *et al*. 2002).

Remarks. This species was misidentified as *T. trivittata* (Lutz & Lima) by Prado & Lewinsohn (1994), who illustrated the female terminalia. The specimens from galls reported by Prado & Lewinsohn (1994) as *T. trivittata* (Lutz & Lima) have not been re-examined and their status needs confirmation.

Etymology. The specific epithet *achromoptera* (Greek noun, 'colorless wing') refers to the evanescent wing bands.

Tomoplagia aczeli **n. sp.**
(Figs. 1A, 3A, 4A)

Diagnosis. *Tomoplagia aczeli* can be recognized by the following combination of characters: subscutellum black laterally; katatergite with black spot, not extending onto anatergite; meron without black spot; mediotergite entirely yellow; abdominal syntergite 1+2 and tergites 3-5 (and 6 in female) each with one pair of sublateral black spots. Specimens without the katepisternal spot run to couplet 13 in the key of Aczél (1955a), whereas those with the spot run

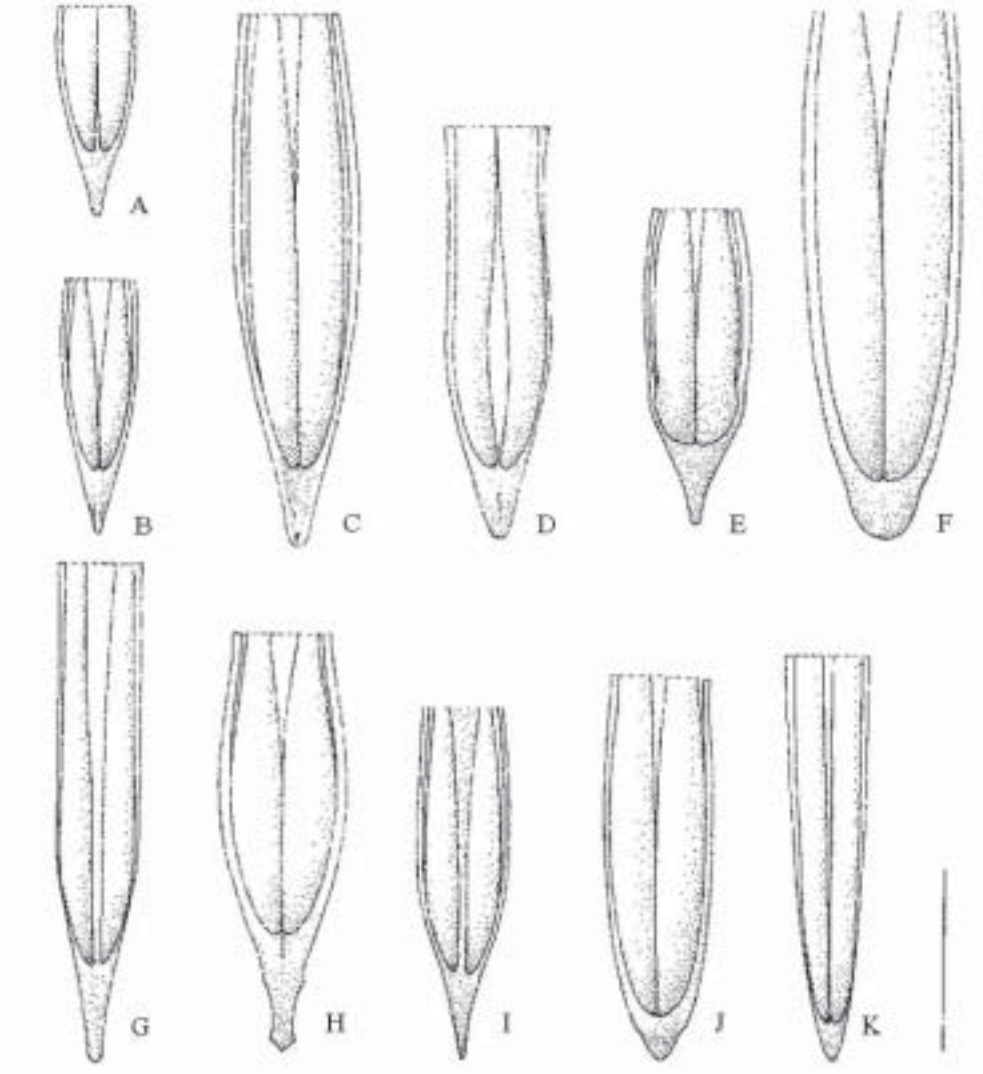

Figure 3. Female terminalia. Aculei in ventral view. A, *T. aczeli*; B, *T. bicolor*; C, *T. brasiliensis*; D, *T. cipoensis*; E, *T. dimorphica*; F, *T. grandis*; G, *T. interrupta*; H, *T. matzenbacheri*; I, *T. rupestris*; J, *T. variabilis*; K, *T. voluta*. (Bar = 0.5 mm).

to couplet 21. *T. aczeli* further differs from the species in the latter couplet in lacking a black spot on the scutellum, and having the apical wing band bordering the costa. In aculeus shape (particularly the acute tip with slightly concave margins), venation (M ratio > 1.15, cell dm ratio >2.6), and abdominal spot pattern, *T. aczeli* resembles *T. bicolor* n. sp., but the latter differs in having a black spot on the meron, a largely black mediotergite, and the spot on the katatergite extending onto the anatergite.

Description. Mesonotum length 1.6-1.8 mm, eye longest diameter 0.7-0.8 mm, frons width at vertex 0.5-0.6 mm. Body ground color dark yellow. Head and thoracic setae and setulae yellow to pale brown. HEAD: Eye 1.5-1.7 times longer than wide. Frons entirely grayish yellow and entirely and evenly microtrichose. Genal height 0.1-0.2 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus moderately broad with pale brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin moderate sized, without other dark markings or vittae; microtrichia bright yellow to silvery gray (depending upon angle of view), evenly distributed, except less dense and duller posteriorly, broad medial area usually slightly grayer; setulae fine, pale yellow, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose, yellow with lateral black spot. Mediotergite shiny, nonmicrotrichose except narrowly on dorsolateral corner, entirely yellow. Katepisternum sometimes with small brown to black spot anteroventral to katepisternal seta. Meron without black spot. Katatergite with large posteroventral black spot, not extending onto anatergite. Anepisternum with second seta 1/2-3/5 as long as largest (dorsalmost) seta. LEGS: Male without unusual modifications. WING (Fig. 1A): Pattern with five complete and well-defined bands. Apical band partially separated from subapical band by small marginal hyaline

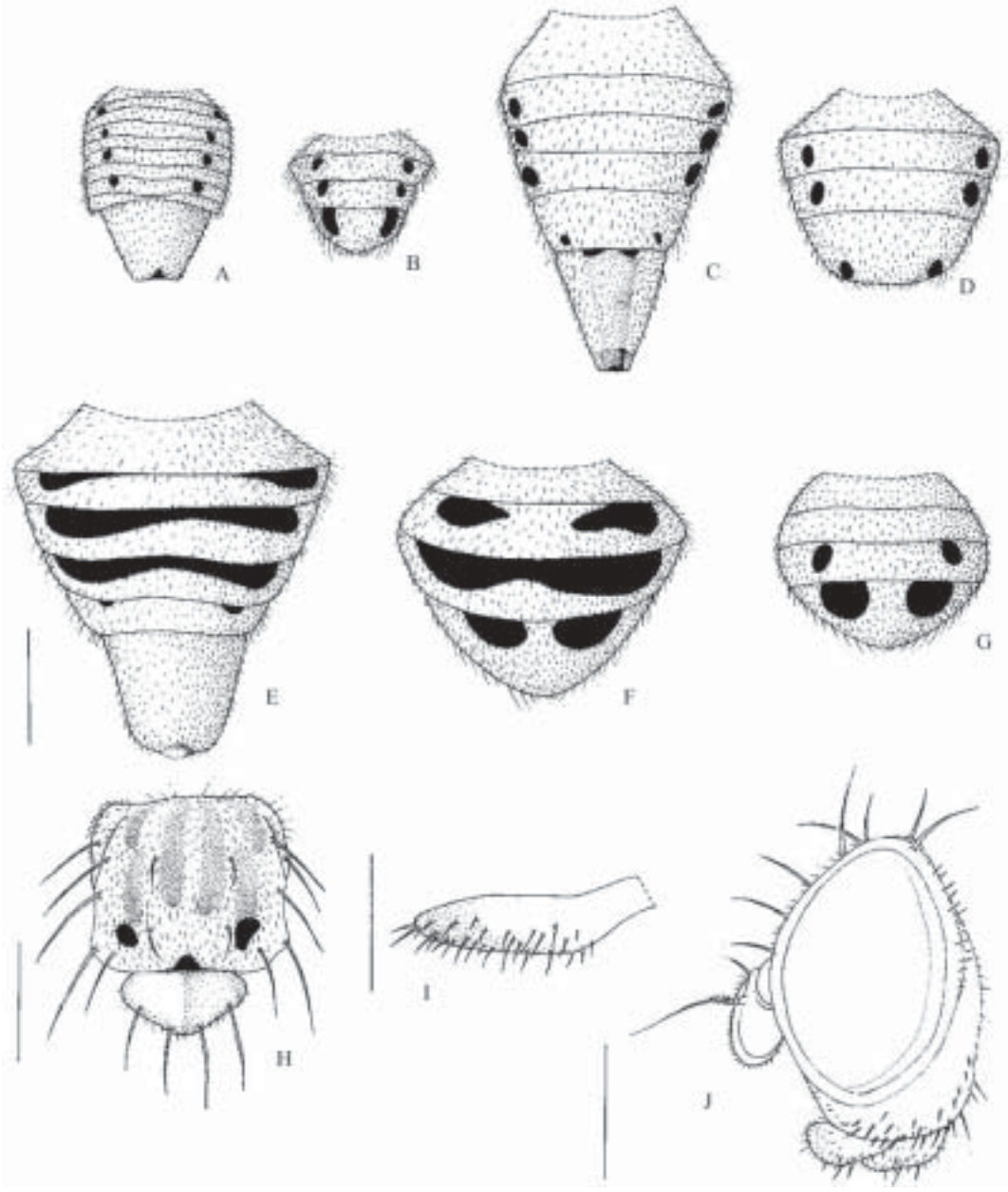

Figure 4. Body. A - F, abdomen, dorsal view. A, *T. aczeli* (female); B, *T. bicolor* (male); C, *T. brasiliensis* (female); D, *T. brasiliensis* (male); E, *T. grandis* (female); F, *T. grandis* (male); G, *T. matzenbacheri* (male) (Bar = 1 mm). H, mesonotum of *T. cipoensis* (Bar = 1 mm). I, palpus of *T. cipoensis* (male) (Bar = 0.25 mm). J, head in lateral view of *T. interrupta*. (Bar = 0.5 mm).

spot in cell r_1 midway between apices of R_1 and R_{2+3}, but otherwise confluent with costa. Median band with yellow part usually extending narrowly into cell r_{4+5} and reaching posterior end of DM-Cu; proximal margin narrowly brown in cell br and usually anteriorly in cell dm; distal brown margin uninterrupted. Prebasal band broadly reaching wing margin at middle of cell cu_1; distal brown margin extended to or almost to vein M. Basal band with brown distal area narrow but elongate, extended more than halfway to apex of A_1+Cu_2. Costal and basal cells mostly yellow orange; cell bm with large anteromedial hyaline spot. Vein M ratio 1.16-1.34; cell dm ratio 2.66-2.91; crossvein DM-Cu nearly straight to convex, forming slightly to strongly obtuse angle with proximal section of *M*. *Microtrichia* white on broad apical spot extending finger-like well into cell r_{4+5}, sometimes almost to vein R_{4+5}, and following less distinct areas: on narrow band from cell br to or almost to posterior margin in cell cu_1 between prebasal and median bands, on narrow band and from cell r_1 to vein R_{4+5} or vein M between median and subapical bands, and sometimes on small ovoid basomarginal spot in cell cu_1. ABDOMEN: Male syntergite 1+2 and tergites 3-5 each with one pair of sublateral black spots forming laterally concave rows, more medial than normal for genus (those on tergites 4 and 5 separated from

lateral margin by ca. two times spot width). Spots of tergite 5 oval and at tergite midlength. Tergite 5 1.2-1.4 times longer than tergite 4. Female with pair of lateral black spots on tergites 2 to 6, also more medial than usual for genus. Epandrium and surstyli with usual shape for genus. Medial surstylus with both prensisetae blunt and spine-like, the medial larger. Female (Fig. 4A) with tergite spot pattern similar to male, tergite 6 also with pair of spots. Oviscape 0.6 mm long, 0.8 times longer than width at base. Aculeus (Fig. 3A) about 0.6 mm long, short-elliptical to triangular; tip short, in ventral view lateral margin slightly concave, extreme apex narrow but blunt.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Diamantina, Estrada Guinda - São João Chapada, 18º9.59'S 43º42.9W, 24 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95415 [ex *Eremanthus bicolor*].

Paratypes. Same data as holotype, 50♂ 54♀ (ZUEC) 1♂ 2♀ (USNM); Diamantina, São João da Chapada, Serra da Guiné 18º06.06'S 43º44.08'W, 07 Sep 1996, T. Lewinsohn, P. Prado, A. Santos, J. Silva, PIC96679, [ex *Lychnophora diamantinana*], 1♀ (ZUEC); Grão Mogol, Trilha da Tropa 16º33'S 42º54'W, 05 Sep 1996, P. Prado, A. Santos, PIC96672, [ex *Eremanthus bicolor*], 1♂ 2♀ (ZUEC).

Distribution. Reared from flower heads collected in campo rupestre vegetation in Grão Mogol and Diamantina, both highlands in the Espinhaço Mountain Range, Minas Gerais, Brazil. Because its host plants were sampled only at these sites, additional collecting in other areas is needed to ascertain the extent of the distribution of *T. aczeli*, but based on the distributions of its known hosts, it probably is restricted to campo rupestre areas.

Hosts. Most of the type specimens were reared from flower heads of *Eremanthus bicolor* (DC.) Baker, which seems to be the main host. Some specimens were reared from *Lychnophora diamantinana* Coile & Jones at Diamantina. Both plants belongs to the Lychnophorinae, a subtribe of the Vernonieae (Asteraceae) virtually restricted to campo rupestre vegetation (MacLeish 1987, Robinson 1992).

Etymology. This species in named in honor of dipterist Martin Aczél, in recognition of his extensive contributions to the taxonomy of *Tomoplagia*.

Tomoplagia bicolor **n. sp.**
(Figs. 1C, 2C, 3B, 4B)
Tomoplagia heringi Aczél: Prado & Lewinsohn (1994): 671 [misidentification]

Diagnosis. *Tomoplagia bicolor* is similar to *T. formosa* Aczél, *T. heringi* Aczél, *T. pleuralis* Hendel, and *T. reimoseri* Hendel, all of which have the usual three black spots on the thoracic pleuron (on the katepisternum, meron, and laterotergite), only the normal pair of black spots posteriorly on the scutum, and the subscutellum black laterally. In the key of Aczél (1955a), it runs to couplets 17-18, which include the above species. *Tomoplagia bicolor* differs from all of them, except perhaps *T. pleuralis* Hendel, for which the aculeus has not been described, in aculeus shape (shorter and more gradually tapered than in *T. formosa* Aczél and *T. heringi* Aczél, the tip more acute than in *T. reimoseri* Hendel and without minute dorsoapical hook (see Prado & Lewinsohn (1994), figs. 1, 3, Aczél (1955a), figs. 98s, 99c, 101j,k), and from all of them except some *T. reimoseri* Hendel in having a more extensively black mediotergite (in *T. pleuralis* Hendel at least the medial third is orange and the black areas are usually separated from the spots on the subscutellum). *Tomoplagia bicolor* further differs from *T. pleuralis* Hendel in having a smaller katepisternal black spot, a larger second seta on the anepisternum, and usually a pair of black sublateral spots on male syntergite 1+2. It further differs from *T. reimoseri* Hendel in usually having sublateral black spots on male and female syntergite 1+2, and from *T. formosa* Aczél in having the male fore tarsus unmodified, the black sublateral spot on male tergite 5 elongate, and the spot on female tergite 6 aligned with the spots on the other tergites, not medially displaced.

Description. Mesonotum length 1.2-1.6 mm, eye longest diameter 0.7-0.8 mm, frons width at vertex 0.4-0.5 mm. Body ground color yellow. Head and thoracic setae and setulae yellow to pale brown. HEAD: Eye 1.3-1.7 times longer than wide. Frons orange and entirely microtrichose, microtrichia of orbital plate and narrow lateral margin sometimes slightly grayer. Genal height 0.04-0.1 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus moderately broad, twice as long as wide, with pale brown to brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin moderate sized, without other black markings except sometimes spot or pair of spots medially on extreme anterior margin and/or with bluish gray areas (due to underlying dark brown marks) broadly medially or submedially to beyond dorsocentral seta and extending presuturally towards presutural supra-alar seta; microtrichia bright yellow to silvery gray (depending upon angle of view), evenly distributed, except less dense and duller posteriorly, without vittae; setulae fine, yellow, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose, yellow medially, broadly black laterally. Mediotergite mostly shining, without microtrichia except narrowly posterodorally, entirely black or at most with medial fourth orange, black areas touching those on subscutellum. Katatergite and anatergite with large posteroventral black spot, extending to mediotergite. Meron with large black spot dorsal to hind coxa. Katepisternum with moderalely large black spot anteroventral to katepisternal seta. Anepisternum with second seta 3/5-4/5 as long as largest (dorsalmost) seta. LEGS: Male without unusual modifications. WING (Fig. 1C): Pattern with five complete and well-defined bands. Apical band partially separated from subapical band by small marginal hyaline spot in cell r_1 midway between apices of R_1 and R_{2+3}, but otherwise confluent with costa. Median band with yellow part sometimes extending narrowly into cell r_{4+5}, always reaching posterior end of DM-Cu; proximal margin narrowly brown in cell br, sometimes extending slightly into cell dm; distal brown margin uninterrupted. Prebasal band

broadly reaching wing margin at middle of cell cu_1; distal brown margin extended to or almost to vein M. Basal band with brown distal area moderately broad, longer than wide, extended more than halfway to apex of A_1+Cu_2. Costal and basal cells mostly yellow orange; cell bm with large anteromedial hyaline spot. Vein M ratio 1.12-1.35; cell dm ratio 2.38-2.86; crossvein DM-Cu nearly straight, forming slightly to strongly obtuse angle with proximal section of M. Microtrichia white on broad apical spot extending finger-like well into cell r_{4+5}, and following less distinct areas: on narrow band from cell br to or almost to posterior margin in cell cu_1 between prebasal and median bands, on narrow band from cell r_1 to vein R_{4+5} or vein M between median and subapical bands, narrow band across cell r_{2+3} between subapical and apical bands, sometimes extending well into cell r_{4+5} or connecting to apical spot, and on elongate ovoid basomarginal spot in cell cu_1. ABDOMEN: Male tergites 3-5 and usually syntergite 1+2 (Fig. 4B) each with one pair of sublateral black spots, forming nearly straight rows; spots on tergite 5 elongated, often reaching posterior margin, those on other tergites rounded. Tergite 5 1.4-1.8 times longer than tergite 4. Epandrium and surstyli with usual shape for genus. Medial surstylus with both prensisetae blunt and spine-like, the medial larger. Female tergites 3-6 and usually syntergite 1+2 each with one pair of rounded sublateral black spots forming almost straight rows; spots on tergite 6 aligned with spots on preceding tergites. Oviscape 0.5-0.7 mm long, 0.8-0.9 times longer than width at base. Aculeus (Fig. 3B) about 0.7 mm long, gradually tapered; tip triangular, in ventral view lateral margin slightly convex to straight, extreme apex acute.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Joaquim Felício, Serra do Cabral, cerrado 17°42.6'S 44°11.7'W, 19 Jul 1995, T. Lewinsohn, P. Prado, B. Buys, V. Motta, PIC95324 [ex *Minasia* sp.].

Paratypes. BRAZIL, Minas Gerais, same data as holotype, 36♂ 35♀ (ZUEC); Diamantina, Estrada para Conselheiro Matta 18°18.07'S 43°49.84'W, 08 Sep 1996, T. Lewinsohn, P. Prado, A. Santos, J. Silva, PIC96725, [ex *Moquinia racemosa*], 1♂ 1♀ (ZUEC); Diamantina, Estrada Conselheiro Matta 18°17.89'S 43°50.16'W, 08 Sep 1996, T. Lewinsohn, P. Prado, A. Santos, J. Silva, PIC96719, [ex *Minasia alpestris*], 2♂ 6♀ (ZUEC); Diamantina, Estrada Guinda – São João da Chapada 18°09.59'S 43°42.9'W, 24 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95415, [ex *Eremanthus bicolor*], 1♂ (ZUEC); Diamantina, Estrada Guinda – São João da Chapada 18°11.91'S 43°42.59'W, 24 Jul 1995, T. Lewinsohn, P. Prado, B. Buys, V. Motta, PIC95421, [ex *Minasia scapigera*], 4♂ 5♀ (ZUEC);Diamantina, Estrada para Mendanha, 18°11.44'S 43°33.98'W, 14 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95798 [ex *Lychnophora tomentosa*], 1♂ 1♀ (USNM) 3♂ 6♀ (ZUEC); Diamantina, São João da Chapada, Serra da Guiné 18°06.6'S 43°44.08'W, 07 Sep 1996, T. Lewinsohn, P. Prado, A. Santos, J. Silva, PIC96675, [ex *Eremanthus polycephalus*], 1♂ (ZUEC); same except PIC96678 [ex *Lychnophora villosissima*], 1♂ 2♀ (ZUEC); Grão Mogol, 16°35.38'S 42°55.5'W, 13 Feb 1995, P. Prado, T. Lewinsohn, B. Buys, PIC95008, [ex *Piptolepis* sp.01], 1♀ (ZUEC); Serra do Cabral, Joaquim Felício, Fazenda da Onça, 17°42.95'S 44°14.51'W, 17 Jul 1995, T. Lewinsohn, P. Prado, B. Buys, V. Motta, PIC95284 [ex *Minasia* sp.], 1♂ (USNM), 12♂ 22♀ (ZUEC); Serra do Cabral, Joaquim Felício, cerrado 17°42.6'S 44°11.7'W, 19 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95325, [ex *Lychnophora marcgravii*], 5♂ 5♀ (ZUEC); Serra do Cabral, Joaquim Felício, vale córrego Jucão, 17°41.83'S 44°16.73'W, 18 Jul 1995, T. Lewinsohn, P. Prado, B. Buys, V. Motta, PIC95299 [ex *Minasia* sp.], 24♂ 19♀ (ZUEC) 1♀ (USNM); Serra do Cipó, Santana do Riacho 19°17.53'S 43°34.12'W, 11 Sep 1996, T. Lewinsohn, P. Prado, A. Santos, J. Silva, PIC96797, [ex *Eremanthus crotonoides*], 1♀ (ZUEC); Serra do Cipó, Santana do Riacho, estrada para o Congonhas 19°17.31'S 43°33.98'W, 16 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95844, [ex *Lychnophora cipoensis*], 2♂ 3♀ (ZUEC).

Distribution. Reared from flower heads collected in campo rupestre vegetation and adjacent cerrado vegetation in Grão Mogol, Serra do Cabral, Diamantina, Serra do Cipó, and Serra do Ouro Branco, all highlands in the Espinhaço Mountain Range, Minas Gerais, Brazil. Probably restricted to campo rupestre and cerrado areas of Brazil.

Hosts. Reared from flower heads of *Eremanthus bicolor* (DC.) Baker, *E. crotonoides* (DC.) Sch. Bip., *E. eleagnus* (Mart. ex DC.) Sch. Bip., *E. polycephalus* MacLeish, *Lychnophoriopsis candelabrum* (Sch. Bip.) H. Rob., *L. cipoensis* Semir & Leitão Filho, *L. markgravii* G.M. Barroso, *L. tomentosa* (Mart. ex DC.) Sch. Bip., *L. villosissima* Mart., *Lychnophora* sp., *Minasia alpestris* (Gardn.) H. Rob., *M. scapigera* H. Rob., *Minasia* spp., *Piptolepis* spp., *Proteopsis argentea* Mart. & Zucc. ex Sch. Bip., *Moquinia racemosa* (Spreng.) DC., and *Chresta sphaerocephala* DC. Except for the last two plants, which are secondary hosts (only 4 of 298 specimens were reared from these plants), all of the host plants belong to the subtribe Lychnophorinae (Asteraceae: Vernonieae), which is mainly restricted to campo rupestre vegetation.

Remarks. *T. bicolor* is the most polyphagous and widespread species of *Tomoplagia* that breeds in flower heads of Lychnophorinae. Additional sampling will show if this species occurs in campo rupestre areas outside Minas Gerais (such as Chapada Diamantina, Bahia, and the highlands of Goiás), as well as in cerrado areas, into which the distributions of some of the host plants extend. *Tomoplagia bicolor* was misidentified as *T. heringi* Aczél by Prado and Lewinsohn (1994), because one of the four specimens reared in that study had a brown mediotergite. The shape of the aculeus and the usually extensively black mediotergite distinguish *T. bicolor* from *T. heringi* Aczél, however. Some morphological variation occurs among specimens reared from different plants and sites. Specimens from the Serra do Cipó tend to have a more slender aculeus (Fig.2C). Specimens reared from *Minasia* spp. are larger than those reared from *Eremanthus* spp.

Etymology. The specific epithet *bicolor* (Latin noun, 'two color') refers to the two-colored, black and yellow mediotergite, an unusual character within the genus.

Tomoplagia brasiliensis **n. sp.**
(Figs. 3C, 4C-D, 5A, 6A-C)

Diagnosis. *Tomoplagia brasiliensis* is the only species of *Tomoplagia* with complete apical and median bands that lacks all of the subapical wing band except its base. The subapical band is highly reduced in *T. aberrans* Aczél, *T. argentinensis* Aczél, *T. grandis* n. sp., *T. incompleta* (Williston), and *T. matzenbacheri* n. sp., but in those species there is at least a spot at the apex of vein M. *Tomoplagia achromoptera* n. sp. also lacks all or most of the subapical band, but its other bands are highly reduced. The rows of spinules on the male fore basitarsus (Fig. 6C) and the row of well developed setae on the facial ridge (Fig. 6B) are also unique characters of *T. brasiliensis*. Other useful diagnostic characters for it include: katepisternum black on ventral two-thirds; mediotergite entirely black; M ratio less than 0.90; male fifth tergite with only one pair of black spots; and epandrium and surstyli of normal shape.

Description. Mesonotum length 1.6-2.4 mm, eye longest diameter 0.9-1.2 mm, frons width at vertex 0.6-0.8 mm. Body ground color yellow. Major head and thoracic setae yellow to pale brown. HEAD (Fig. 6B): Eye 1.5-1.7 times longer than wide. Frons orange and entirely microtrichose, unicolorous or microtrichia orbital plate and narrow lateral margin sometimes slightly grayer. Genal height 0.06-0.15 longest diameter of eye. Facial ridge with row of 5-8 stout, relatively large setae, as long as and stouter than largest genal setae. Maxillary palpus narrow, 2.5 times longer than wide, with brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin moderately large, without other dark markings except sometimes spot or pair of spots medially on extreme anterior margin; microtrichia bright yellow, evenly distributed, except less dense and duller posteriorly, without vittae; setulae fine, pale yellow, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining. Subscutellum black laterally or entirely, entirely microtrichose. Mediotergite shining black, without microtrichia except narrowly laterally. Katepisternum with large black to bluish gray spot covering most of ventral two-thirds. Meron with large black spot dorsal to hind coxa. Anatergite and katatergite with large posteroventral black spot, sometimes reaching mediotergite. Anepisternum with second bristle at least 4/5 as long as larger (dorsalmost) seta. LEGS: Male fore basitarsus with two elongate file-like anterodorsal rows of small

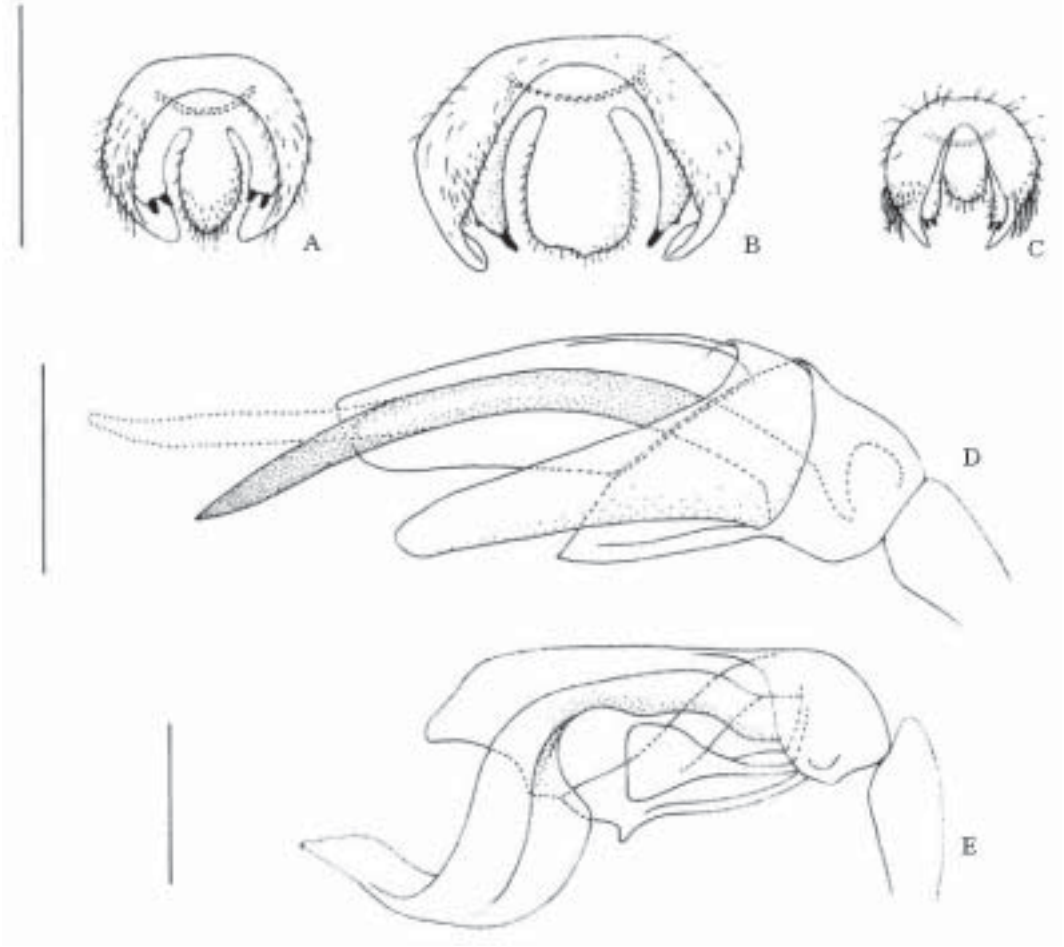

Figure 5. Male terminalia. A, epandrium of *T. brasiliensis*; B, epandrium of *T. grandis*; C, epandrium of *T. voluta* (Bar = 0.5 mm). D, glans of *T. rupestris*, E, glans of *T. voluta* (Bar = 0.1 mm).

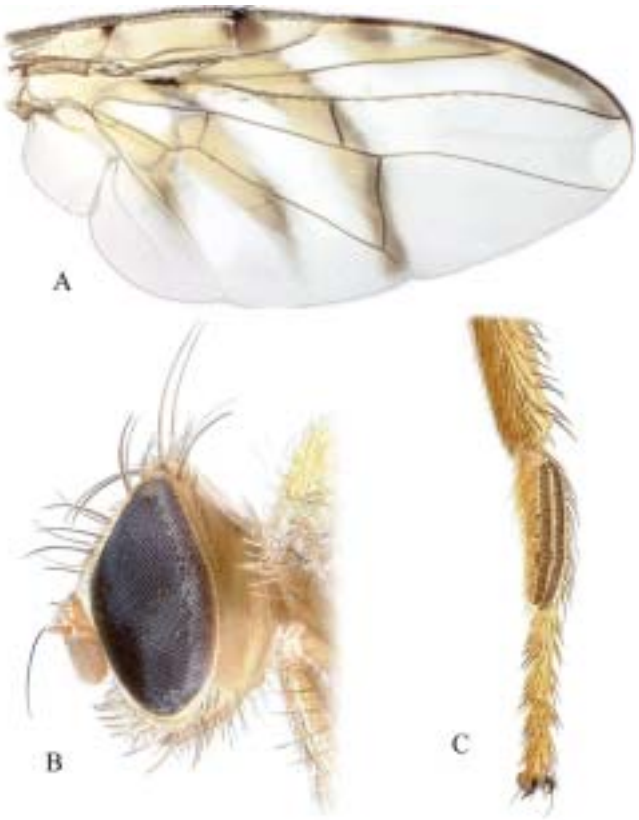

Figure 6. *T. brasiliensis*. A, Wing; B, head, lateral view; C, male fore tarsus, anterior side.

brown spinules (Fig. 6C). WING (Fig. 6A): Subapical band absent except its base in cell r_1, even lacking spot on apex of vein M. Apical band slender, complete, usually partially separated from base of subapical band by small marginal hyaline spot in cell r_1 midway between apices of R_1 and R_{2+3}, but otherwise confluent with costa. Median band slender but complete; yellow part usually extending narrowly into cell r_{4+5}, but not reaching DM-Cu; proximal margin entirely yellow or at most faintly brown only in cell br; distal brown margin uninterrupted. Prebasal band covering basal half of vein Cu_1, strongly tapering distally, often reaching posterior wing margin at middle of cell cu_1, distal brown margin extended variable distance within cell dm. Basal band relatively well defined, but dark brown distal part small, extended less than halfway to apex of A_1+Cu_2. Costal and basal cells mostly yellow, cell bm with small to large anteromedial hyaline spot. Vein M ratio 0.73-0.88; cell dm ratio 1.88-2.26; crossvein DM-Cu slightly to strongly sinuous, forming strongly obtuse angle with proximal section of M. Microtrichia white on semicircular apical spot in cell r_{4+5}, and following less distinct areas: on large ovoid subbasal spot in cell cu_1 parallel to vein A_1+Cu_2 and well separated from posterior margin, on narrow band from cell br to slightly beyond vein Cu_1 between prebasal and median bands, on narrow band from cell r_1 to vein M distal to median band, and sometimes on narrow subapical band in cell r_{2+3}, bordering vein R_{4+5} , and on small subapical spot in cell r_{2+3}. ABDOMEN: Male (Fig. 4D) tergites 3-5 each with pair of sublateral black spots, near midlength on tergites 3 and 4, at apical margin on tergite 5. Tergite 5 1.9-2.4 times longer than tergite 4. Epandrium and surstyli (Fig. 5A) with usual shape for genus. Medial surstylus with two blunt, stout, subequal prensisetae. Female (Fig. 4C) with pair of rounded black sublateral spots on tergites 3 to 5; tergite 6 sometimes with pair of spots that are closer together and on or near posterior margin. Oviscape 0.8-1.0 mm long, about as long as width at base. Aculeus (Fig. 3C) about 1.5 mm long, moderately stout and long-elliptical; tip subtriangular, in ventral view lateral margin slightly concave to straight, extreme apex blunt, in lateral view with small apical hook on dorsal side.

Holotype. ♀ (ZUEC), BRAZIL, Rio Grande do Sul, Capão Novo, campo, 29°40.52'S 49°58.46'W, 10 Feb 1996, Lewinsohn, Prado, Macedo, Batista, PIC96039 [ex *Vernonia constricta*].

Paratypes. BRAZIL, Minas Gerais, Ouro Branco, 20°30.23'S 43°38.78'W, 22 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96549 [ex *Lessingianthus vepretorum*], 1♀ (ZUEC); Serra do Cipó, Santana do riacho, à direita do Chapéu do Sol, campo após a curva, 11 Mar 1996, B. Buys, PIC96269, [ex *Lessingianthus coriaceus*], 1♀ (ZUEC); Serra do Cipó, Santana do Riacho, estrada da Usina 19°17.33'S 43°35.96'W, 16 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95833, [ex *Lessingianthus roseus*], 1♂ (ZUEC); Serra do Cipó, Rodovia MG010, km 109, Estrada da Usina, #108, ex *Lessingianthus pumillus* [as *Vernonia sessiifolia*], 22 Aug 1989, P. Prado, 1♀ (ZUEC); Serra do Cipó, Rodovia MG010, km 107, , #409, ex *Lessingianthus* [as *Vernonia*] *coriaceus*, 24 Mar 1990, P. Prado, 1♀ (ZUEC); Paraná, Vila Velha, 20 Jan 1974, J.G. Rosen, F.C. Thompson, J.S. Moure, 2♂ (AMNH); Rio Grande do Sul, same as holotype, 2♂ 2♀ (ZUEC) 1♂ 1♀ (USNM); Capão da Canoa, próximo à rodovia RS-407, 29°44.67'S 50°01.65'W, 10 Feb 1996, Lewinsohn, Prado, Macedo, Batista, PIC96020 [ex *Vernonia constricta*], 3♂ 1♀ (USNM) 1♂ 1♀ (ZUEC); Santa Catarina, Bom Jardim da Serra, Estrada de Santa Bárbara 28°17.00'S 49°36.76'W, 14 Feb 1996, Lewinsohn, Prado, Macedo, Batista, PIC96138, [ex *Chrysolaena flexuosa*], 1♀ (ZUEC); Lages, Estrada de São José do Cerrito, 27°41.88'S 50°32.56'W, 15 Feb 1996, Lewinsohn, Prado, Macedo, Batista, PIC96163 [ex *Lessingianthus glabratus*] , 1♀ (ZUEC); São Paulo, São Paulo, Aug 1961, Krauss, 1♂ (USNM); Matos Costa, 26°28.22'S 51°10.46'W, 19 Feb 1996, Lewinsohn, Prado, Macedo, Batista, PIC96241, [ex *Lessingianthus glabratus*], 1♀ (ZUEC).

Distribution. This species is known from the states of Minas Gerais, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul (southern and southeastern Brazil).

Hosts. Reared from flower heads of *Chrysolaena flexuosa* (Sims) H. Rob., *Vernonia constricta* N.I. Matzenbacher & S.I. Mafioleti, *Lessingianthus coriaceus* (Less.) H. Rob., *L. glabratus* (Less.) H. Rob., *L. pumilla* (Vell.) H. Rob., *L. roseus* (Mart. ex DC.) H. Rob., and *L. vepretorum* (Mart. ex DC.) H. Rob. (Asteraceae: Vernonieae).

Etymology. The specific epithet *brasiliensis* (adjective) refers to Brazil, where all the examined specimens were collected.

Tomoplagia cipoensis **n. sp.**
(Figs. 1D, 3D, 4H-I)
Tomoplagia tripunctata Hendel: Prado & Lewinsohn (1994): 674 [dark morph]

Diagnosis. *Tomoplagia cipoensis* differs from most species of *Tomoplagia* in having a medial black spot on the posterior margin of the scutum. It differs from the other species having this spot (in some it is variably present or sometimes larger), *T. achromoptera* n. sp., *T. atimeta* Hendel, *T. carrerai* Aczél, *T. pseudopenicillata* Aczél, *T. grandis* n. sp., *T. matzenbacheri* n. sp., *T. tripunctata* Hendel, and *T. trivittata* (Lutz & Lima), by the shape and setation of the male palpus, which is slender and straight, and by the following combination of other characters: scutum with four dark bluish gray vittae, the sublateral one aligned with the posterior sublateral black spot; scutum with only three black spots posteriorly, the medial spot well separated from the sublateral spots; mediotergite mostly to entirely black; katepisternum with large black mark; and aculeus tip moderately tapered and blunt (Fig. 3D).

Description. Mesonotum length 2.1-2.3 mm, eye longest diameter 1.1-1.2 mm, frons width at vertex 0.7-0.8 mm. Body ground color dark yellow. Major head and thoracic setae yellow, or more often pale to moderate brown. HEAD: Eye 1.6-1.7 times longer than wide. Frons orange and entirely microtrichose, microtrichia of orbital plate, broad lateral margin, and narrow medial vitta sometimes slightly grayer. Genal height 0.09-0.15 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus (Fig. 4I) narrow and nearly straight, three times longer than wide, in male slightly acute apically. THORAX: Scutum (Fig. 4H) with triangular or ovoid black spot medially on posterior margin, well separated from usual pair of sublateral oval black spots near posterior margin, which are moderately large; with four, gray to dark bluish gray vittae due to black or dark brown ground color and gray microtrichia (these homologous to normal gray areas of many species); submedial pair of vittae dark brown to black at extreme anterior margin of scutum (sometimes not visible in dorsal view), where shiny and nonmicrotrichose, moderately broad (at level of dorsocentral seta, as broad as or slightly broader than golden brown area between them), extending beyond postsutural supra-alar seta, but not reaching acrostichal seta; sublateral pair of vittae interrupted at transverse suture, broader anterior to suture, reaching or almost reaching presutural supra-alar seta, almost reaching anterior margin of scutum, postsutural part aligned with and connected to sublateral black spot; scutal microtrichia mostly golden yellow, silvery gray on vittae; setulae pale yellow except a few posterolaterally, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum black laterally or entirely, entirely microtrichose. Mediotergite mostly shining, without microtrichia except broadly in dorsolateral corner (more or less square area on dorsal half and lateral fourth to third) and rarely narrowly dorsomedially; mostly or entirely black, at most with slender dorsomedial orange mark. Katepisternum with large black spot covering most of ventral two-thirds; often also with small dark spot dorsal to katepisternal seta. Meron with large black spot dorsal to hind coxa. Anatergite and katatergite with large posteroventral black spot, often reaching mediotergite. LEGS: Male without unusual modifications. WING (Fig. 1D): Pattern with five complete and well-defined bands. Apical band often partially separated from subapical band by small marginal hyaline spot in cell r_1 midway between apices of R_1 and R_{2+3}, but otherwise confluent with costa. Subapical band slightly distally curved along vein M. Median band with yellow part usually extending narrowly into cell r_{4+5}, but not reaching DM-Cu; proximal margin narrowly brown in cell br or entirely; distal brown margin relatively broad and uninterrupted. Prebasal band reaching wing margin at least faintly at middle of cell cu_1; distal brown margin usually uninterrupted and extended to vein M. Basal band with brown distal area small to moderate sized, longer than wide but extended less than halfway to apex of A_1+Cu_2. Costal and basal cells mostly yellow orange; cell bm with small to large anteromedial hyaline spot. Vein M ratio 0.97-1.05; cell dm ratio 2.07-2.37; crossvein DM-Cu nearly straight to slightly sinuous, forming slightly to strongly obtuse angle with proximal section of M. Microtrichia white on semicircular apical spot in cell r_{4+5}, and on three less distinct, narrow bands from cell br to vein Cu_1 between prebasal and median bands, from cell r_1 to vein R_{4+5} or vein M between median and subapical bands, and across cell r_{2+3}, sometimes extending to middle of r_{4+5} between subapical and apical bands. ABDOMEN: Male tergites 4 and 5 each with pair of black sublateral spots, spots of tergite 5 usually elongated but not reaching posterior margin. Tergite 3 sometimes with pair of smaller or paler sublateral spots. Tergite 5 1.4-1.6 times longer than tergite 4. Epandrium and surstyli with usual shape for genus. Medial surstylus with median prensiseta large and stout, lateral prensiseta greatly reduced. Female tergites 4 and 5 and sometimes tergite 3 with pair of sublateral black spots. Oviscape 0.9 mm long, 0.9 times longer than width at base. Aculeus (Fig. 3D) about 1.3 mm long, relatively stout, with margins nearly straight on proximal 2/3; tip broad and triangular, in ventral view lateral margin straight, extreme apex broad and blunt.

Holotype. ♂ (ZUEC), BRAZIL, Minas Gerais, Serra do Cipó, Santana do Riacho, 19°13.91'S 43°30.37'W, 26 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95442 [ex *Lessingianthus linearis*].

Paratypes. BRAZIL, Minas Gerais, Serra do Cipó, Santana do Riacho, estrada da Usina 19°17.33'S 43°35.96'W, 16 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95833, [ex *Lessingianthus roseus*], 1♂ (ZUEC); Serra do Cipó, Santana do Riacho, 19°17.68'S 43°34.00'W, 11 Sep 1996, Lewinsohn, Prado, Santos, Silva, PIC96777, 1♀ (USNM), 2♂ 1♀ (ZUEC); Serra do Cipó, Santana do Riacho, 19°13.91'S 43°30.37'W, 15 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95821, 1♂ (USNM) 1♂ (ZUEC); Serra do Cipó, Santana do Riacho, 19°12.39'S 43°29.36'W, 15 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95804, [ex *Lessingianthus roseus*], 1♀ (USNM); Serra do Cipó, Santana do Riacho, 19°13.81'S 43°30.4'W, 20 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96510, [ex *Lessingianthus vepretorum*], 1♂ (ZUEC);

Serra do Cipó, Rodovia MG010, km 109, #189, ex *Lessingianthus roseus* [as *Vernonia rosea*], 28 Nov 1989, P. Prado, 1♂ (USNM); Serra do Cipó, Rodovia MG010, km 117, #562, ex *Lessingianthus* [as *Vernonia*] *vepretorum*, 28 May 1992, P. Prado, 2♀ (ZUEC); Serra do Cipó, Rodovia MG010, km 126, #466, ex *Lessingianthus roseus* [as *Vernonia rosea*], 21 May 1990, P. Prado, 1♂ (USNM); Serra do Cipó, Rodovia MG010, km 126, #061, ex *Lessingianthus* [as *Vernonia*] *linearis*, 10 Aug 1989, P. Prado, 1♀ (USNM).

Distribution. All specimens examined were reared from flower heads collected in campo rupestre of the Serra do Cipó, Minas Gerais, Brazil. Because samples of likely host plants were made in four other campo rupestre areas (Prado *et al*. 2002) without finding it, this species is probably endemic to the Serra do Cipó region.

Hosts. Reared from flower heads of *Lessingianthus linearis* (Spreng.) H. Rob., *L. psilophyllus* (DC.) H. Rob., *L. roseus* (Mart. ex DC.) H. Rob., *L. tomentellus* (Mart. ex DC.) H. Rob. and *L. vepretorum* (Mart. ex DC.) H. Rob., all belonging to the tribe Vernonieae (Asteraceae) and endemic or typical of campo rupestre vegetation (see also Prado & Lewinsohn 1994).

Remarks. This species was considered a dark morph of *T. tripunctata* Hendel by Prado & Lewinsohn (1994), because both species have three spots posteriorly on the scutum, and similar aculei. They also have a similar microtrichia pattern on the mediotergite and use many of the same host plants (Prado *et al*. 2002), but *T. cipoensis* appears to be a distinct species because of its narrower palpus, different vittae pattern on the scutum (in addition to lacking the black ground color under the gray vittae, *T. tripunctata* Hendel has the sublateral brownish vitta, not the gray one, aligned with the sublateral black spot), black mediotergite, and larger black mark on the katepisternum. Additionally, the aculeus is shorter (1.3 mm) than in *T. tripunctata* Hendel (1.7 mm), and its distal tapered part is shorter and slightly blunter (Fig. 3D; compare with Fig. 2B).

Etymology. The specific epithet *cipoensis* (adjective) refers to the Serra do Cipó area, to which this species seems to be restricted.

Tomoplagia dimorphica **n. sp.**
(Figs. 1E-F, 3E)

Diagnosis. The male of *T. dimorphica* can be easily recognized from all other *Tomoplagia* species by its highly modified wing pattern, in which the apical band and the distal part of the subapical band are fused to form a large subapical, subquadrate mark extending from the costa into cell m, and the base of the subapical band and the median band are fused to form a broad triangular mark covering most of the medial third of the wing. The female, which has the brown markings of the wing pattern reduced and the subapical band often interrupted or pale, might be confused with *T. voluta* n. sp., *T. rupestris* n. sp., or *T. interrupta* n. sp., but differs from them in lacking gray scutal vittae and black markings on the subscutellum, mediotergite, and thoracic pleuron, and having cell dm broader (ratio < 2.35). In the key of Aczél (1955a) the female runs to couplets 38-40, but all of the species contained there differ in having much more extensive brown wing markings.

Description. Mesonotum length 1.7-2.0 mm, eye longest diameter 0.8-1.0 mm, frons width at vertex 0.6 mm. Body ground color pale yellow to yellow. Head and thoracic setae and setulae yellow to pale brown. HEAD: Eye 1.4-1.6 times longer than wide. Frons yellow to orange and entirely and evenly microtrichose. Genal height 0.1 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus relatively narrow, twice longer than wide, with yellow and pale brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin moderate sized; without other black markings; microtrichia silvery gray to yellowish gray, evenly distributed, except less dense and duller posteriorly, in posterodorsal view, sometimes with three faint, very narrow vittae (about as wide as alveoli of thoracic bristles), sublateral vitta aligned with dorsocentral seta; setulae fine, pale yellow, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum broadly medially to entirely microtrichose and entirely yellow. Mediotergite entirely yellow or orange, microtrichose except narrowly ventrally and narrowly to broadly medially. Pleuron (including katepisternum, meron, and laterotergite) without black markings. Anepisternum with second seta at least 3/4 as long as largest (dorsalmost) seta. LEGS: Male without unusual modifications. WING: Female (Fig. 1F) with apical band separated from base of subapical band by large hyaline area in cell r_1 midway between apices of R_1 and R_{2+3}, but otherwise confluent with costa; often connected to distal part of subapical band in cell r_{2+3}. Subapical band often faint or incomplete, if complete without brown margins in cells r_{2+3} and r_{4+5} (although distal 1/5 of band usually pale brown); often interrupted in cell r_{2+3}. Median band complete; mostly yellow, distal brown area not extending beyond vein M, margins entirely yellow anterior to M. Prebasal band covering basal half of vein Cu_1; distal brown part small and faint or absent, not extending into cell dm, sometimes very narrowly reaching posterior wing margin. Basal band entirely yellow, sometimes faint in cell bcu. Costal and basal cells mostly pale yellow, cells c and bm sometimes largely subhyaline. Male (Fig. 1E) with highly modified pattern. Subapical band interrupted basally by hyaline area from costal margin midway between apices of R_1 and R_{2+3} to at least vein R_{4+5}, its distal part broadly fused to apical band to form large subquadrate mark covering apices of radial cells (except white apical spot in cell r_{4+5}) and cell m, mostly yellow to orange, distal margin usually brown. Base of subapical band and median band fused to form broad triangular mark covering most of middle third of wing, mostly yellow to orange except small distal spot in cell r_1 and bordering DM-Cu and posterior wing margin; sometimes connected to apical mark in cell r_{4+5}, and usually connected, sometimes broadly, to prebasal band in cell dm and/or along posterior wing margin. Prebasal band covering at least basal half of vein Cu_1; distal brown part small and often faint, not extending into cell dm, but usually reaching posterior wing margin. Basal band entirely yellow or at most with small, faint distal part; sometimes faint

in cell bcu. Costal and basal cells mostly pale yellow, cells c and bm sometimes largely subhyaline. Vein M ratio 0.97-1.17; cell dm ratio 2.11-2.29; crossvein DM-Cu nearly straight, forming ca. 90° angle with proximal section of M. Microtrichia white on semicircular apical spot in cell r_{4+5}, and following less distinct areas: on marginal spot in cell r_1, small in female, extending to slightly posterior to vein R_{4+5} in male, on spot on vein Cu_1 distal to prebasal band, and on ovoid basal spot in cell cu_1, in female well separated from posterior margin, in male touching or almost touching it. ABDOMEN: Male tergite 5 with pair of ovoid sublateral black spots; tergite 4 sometimes with similar pair of spots. Tergite 5 1.5-1.6 times longer than tergite 4. Epandrium and surstyli with usual shape for genus. Medial surstylus with both prensisetae slender, the medial larger. Female tergite 5 with pair of ovoid sublateral black spots; tergites 4 and/or 6 sometimes also with similar or similar spots. Oviscape 0.5-0.6 mm long, 0.5-0.6 times longer than width at base. Aculeus (Fig. 3E) about 0.9 mm long, short and stout; tip short, in ventral view almost equilateral triangular, lateral margin slightly concave subapically, extreme apex narrow but blunt.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Joaquim Felício, Serra do Cabral, vale córrego. Jucão, 17°41.91'S 44°16.66'W, 2 Sep 1996, Lewinsohn, Prado, Santos, Silva, PIC96584 [ex *Lessingianthus laevigatus*].

Paratypes. BRAZIL, Minas Gerais, same data as holotype 10♂ 6♀ (ZUEC); Serra do Cabral, Joaquim Felício, vale córrego Jucão, 17°41.89'S 44°16.57'W, 18 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95304 [ex *Lessingianthus hoveaefolius*], 1♀ (USNM) 3♂ (ZUEC); Serra do Cabral, Joaquim Felício, 17°43.61'S 44°11.01'W, 13 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96347 [ex *Lessingianthus laevigatus*], 1♂ (USNM); Serra do Cipó, Santana do Riacho, estrada da Usina 19°17.33'S 43°35.96'W, 21 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96531, [ex *Lessingianthus laevigatus*], 1♀ (ZUEC); São Paulo, Martinópolis, Reserva Ambiental do Assentamento Nova Vida, 22°14.01'S 51°06.52'W, 29 May 2000, P. Prado, M. Almeida-Neto, H. Kubota, D. Sudatti, G1504, [ex *Lessingianthus* sp.], 20♂ 12♀ (ZUEC).

Distribution. Reared from flower heads collected in the Serra do Cabral (Joaquim Felício) and Serra do Cipó, in the Espinhaço Mountain Range, Minas Gerais, and Martinópolis, in western São Paulo State, Brazil.

Hosts. Reared from flower heads of *Lessingianthus hovaefolius* (Gardn.) H. Rob. and *L. laevigatus* (Mart. ex DC.) H. Rob. (Asteraceae: Vernonieae), collected in areas of campo rupestre and cerrado vegetation, and an unidentified species of *Lessingianthus* collected in cerrado.

Remarks. *Tomoplagia dimorphica* is unusual in having a consistently and strongly sexually dimorphic wing pattern.

Etymology. The specific epithet *dimorphica* (Greek adjective, 'having two forms') refers to the sexual dimorphism in wing pattern.

Tomoplagia grandis **n. sp.**
(Figs. 1G, 3F, 4E-F, 5B)

Diagnosis. *Tomoplagia grandis* differs from most other species of *Tomoplagia* by its reduced subapical wing band, which is lacking except for its base, a brown spot at the apex of vein M, and at most a small spot in the middle of cell r_{4+5}. It differs from the other species that have a highly reduced subapical band (*T. aberrans* Aczél, *T. achromoptera* n. sp., *T. argentiniensis* Aczél, *T. brasiliensis* n. sp., *T. incompleta* (Williston), and *T. matzenbacheri* n. sp.) in having three distinct brown scutal vittae that lack setulae. In this respect, *T. grandis* resembles *T. trivittata* (Lutz & Lima); in other species with scutal vittae, the vittae are setulose. Other useful diagnostic characters for *T. grandis* include: body size large (mesonotum more than 2 mm long); scutum with three black spots posteriorly (aligned with the 3 vittae); katepisternum with large black mark; cell dm ratio less than 2.1; and aculeus tip very broad and blunt (Fig. 3F).

Description. Mesonotum length 2.3-3.1 mm, eye longest diameter 1.4 mm, frons width at vertex 0.7-0.9 mm. Body ground color dark yellow. Major head and thoracic setae yellow to pale brown. HEAD: Eye 1.3-1.7 times longer than wide. Frons orange medially, yellow laterally, entirely microtrichose, microtrichia of orbital plate, broad lateral margin, and narrow medial vitta sometimes slightly grayer. Genal height 0.07-0.11 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus broad, 1.5 to 2.0 times longer than wide, slightly acute apically, with setulae whitish and some brown to dark brown. THORAX: Scutum with triangular black spot medially on posterior margin, well separated from usual pair of sublateral oval black spots near posterior margin, which are moderately large; with three parallel brown vittae, one aligned with and connected to each posterior black spot; entirely microtrichose, silvery gray between and lateral to vittae, duller and less dense posteriorly, dull brown on vittae; setulae pale yellow except a few posterior to sublateral black spot, absent from vittae and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum black laterally or entirely, entirely microtrichose. Mediotergite shining, without microtrichia except narrowly laterally; entirely orange, or black laterally or entirely. Katepisternum with large black spot covering most of ventral two-thirds, or occasionally with one or two smaller black spots. Meron usually with large black spot dorsal to hind coxa, rarely absent. Anatergite and katatergite with large posteroventral black spot. LEGS: Male without unusual modifications. WING (Fig. 1G): Pattern with four well defined bands, with brown posterodistal parts relatively large. Subapical band absent except for its base, brown spot on apex of vein M, and occasionally one small spot in middle of cell r_{4+5}. Apical band slender, complete, usually completely connected to base of subapical band along costa and without marginal hyaline spot in cell r_1, entirely confluent with costa (marginal hyaline spot present in cell r_1 in one specimen). Median band slender but complete; yellow part not extending into cell r_{4+5} nor reaching DM-Cu, sometimes only barely crossing vein M; proximal margin entirely or nearly entirely narrowly brown; distal brown

margin broad and uninterrupted. Prebasal band covering basal third of vein Cu_1, tapered distally but reaching wing margin, at least faintly, at middle of cell cu_1; distal brown margin broad and extended to vein M. Basal band well defined, but brown distal area small, extended less than halfway to apex of A_1+Cu_2. Costal and basal cells mostly dark yellow to orange including all of cell bm (except crease). Vein M ratio 0.90-0.98; cell dm ratio 1.89-2.04; crossvein DM-Cu slightly sinuous, forming slightly obtuse angle with proximal section of M. Microtrichia usually white only on semicircular to U-shaped apical spot in cell r_{4+5}, sometimes also with two less distinct areas: narrow band from cell br to vein Cu_1, between prebasal and medial bands, and ovoid subbasal spot in cell cu_1 parallel to vein A_1+Cu_2 and well separated from posterior margin. ABDOMEN: Male (Fig. 4F) tergites 4 and 5 each with pair of sublateral black marks on anterior half, of irregular shape, broader than long, often bandlike, sometimes connected or almost connected medially. Tergite 3 sometimes with similar, usually smaller, marks. Tergite 5 1.2-1.3 times longer than tergite 4. Epandrium and surstyli (Fig. 5B) with usual shape for genus, lateral and medial surstyli slightly separated; medial surstylus with medial prensiseta large and stout, lateral prensiseta greatly reduced. Female (Fig. 4E) abdominal markings similar to those of male, with black markings on tergites 4 and 5. Tergites 3 and 6 occasionally also with smaller black spots. Oviscape 1.1-1.3 mm long, 0.8-1.0 times longer than width at base. Aculeus (Fig. 3F) about 1.5 mm long, very stout; tip short and very broad, in ventral view with lateral margin very slightly concave subbasally, extreme apex broad and bluntly rounded.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Serra do Cabral, Joaquim Felício, 17º43.61'S 44º11.01'W, 13 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96344 [ex *Lessingianthus buddleiifolius*].

Paratypes. BRAZIL, Minas Gerais, same data as holotype, 1♂ 1♀ (USNM) 4♂ (ZUEC); Serra do Cabral, Joaquim Felício, cerrado 17º43.8'S 44º11.2'W, 19 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95333 [ex *Lessingianthus buddleiifolius*], 1♀ (USNM) 2♂ (ZUEC).

Distribution. All of the type specimens were reared from two samples of flower heads taken on the Serra do Cabral (Joaquim Felício), Minas Gerais, Brazil, in a transition area between cerrado vegetation and campo rupestre.

Hosts. Reared only from flower heads of *Lessingianthus buddleiifolius* (Mart. ex DC.) H. Rob. (Asteraceae: Vernonieae).

Etymology. The specific epithet *grandis* (Latin adjective, 'large') refers to the size of this species, one of the largest *Tomoplagia*.

Tomoplagia interrupta **n. sp.**
(Figs. 1H, 3G, 4J)

Diagnosis. *Tomoplagia interrupta* differs from most other species of *Tomoplagia* by its incomplete subapical wing band, which is narrowly interrupted along vein M; in other species except *T. voluta* n. sp. and some *T. rupestris* n. sp. this band is complete or much more reduced. *Tomoplagia voluta* n. sp., *T. interrupta* and *T. rupestris* n. sp. are also unique in having the lateral surstylus with a dorsal lobe bearing a cluster of strong, ventrally directed setae. Other useful diagnostic characters for these three species include: gena broad; scutum with three narrow gray vittae; subscutellum mostly to entirely black; mediotergite entirely black; katepisternum usually with narrow wedge-shaped black spot; meron and laterotergite each with large black spot; brown distal areas of wing bands reduced, that of medial band interrupted at least along vein M, that of prebasal band not extended into dm, and that of basal band very small or absent; vein M ratio less than 1.20; cell dm ratio > 2.3; male abdomen orange except for elongate black spot on tergite 5; female abdomen with black spots only on tergite 6 (sometimes absent in *T. interrupta*) and sometimes tergite 5 (some *T. rupestris* n. sp.); and medial prensiseta smaller than lateral. *Tomoplagia interrupta* differs from *T. voluta* n. sp. and *T. rupestris* n. sp. in having its apical band separated from or narrowly connected to the subapical band, its more broadly interrupted subapical band, and its aculeus tip (longer and narrower than in *T. voluta* n. sp. and not as acute as in *T. rupestris* n. sp.). It further differs from *T. rupestris* n. sp. by the spiraled apical sclerite of the glans.

Description. Mesonotum length 1.5-1.7 mm, eye longest diameter 0.7-0.9 mm, frons width at vertex 0.5-0.6 mm. Body ground color golden yellow. Head and thoracic setae yellow to pale brown. HEAD (Fig. 4J): Eye 1.3-1.7 times longer than wide. Frons orange and entirely microtrichose, microtrichia of orbital plate, broad lateral margin, and to lesser extent narrow medial vitta distinctly silvery gray. Genal height 0.17-0.29 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus moderately broad, 1.3 - 1.5 times longer than wide, with yellow and pale brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin relatively small; without other black markings except shiny medial black spot on extreme anterior margin (often not visible in dorsal view); entirely densely microtrichose, except slightly less dense and bright posteriorly, mostly orange to golden, with three narrow gray vittae from anterior margin, medial vitta extending to level of acrostichal seta or posterior margin, sublateral vittae including dorsocentral seta and ending on medial margin of sublateral posterior black spot, in some specimens additional pair of lateral vittae present, from transverse suture to lateral margin of sublateral black spots; setulae fine, yellow to pale brown, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose, entirely black or often with medial orange spot. Mediotergite entirely black, broadly microtrichose dorsolaterally, with broad triangular to semicircular shiny ventromedial area. Katepisternum with usually wedge-shaped black spot anteroventral to katepisternal seta. Meron with large black spot dorsal to hind coxa. Anatergite and katatergite with large posteroventral black spot, usually reaching mediotergite. Anepisternum with

second seta up to 1/2 as long as largest (dorsalmost) seta. LEGS: Male without unusual modifications. WING (Fig. 1H): Pattern with 4-5 distinct bands. Apical band separated from or usually narrowly connected to subapical band, marginal hyaline spot between them in cell r_1 midway between apices of R_1 and R_{2+3} extending at least 2/3 of distance to R_{2+3}; sometimes with very small hyaline spot at apex of cell r_1, but otherwise confluent with costa. Subapical band broadly interrupted along vein M, basal part extended midway to entirely across cell r_{4+5}, but not posterior to vein M nor distally beyond proximal half of apical section of M; distal part reduced to moderate sized brown apical spot separated from basal part of band by hyaline area at least equal to its length. Median band slender but complete; yellow part not extending into cell r_{4+5} and not reaching DM-Cu; proximal margin narrowly brown at most in middle of cell br; distal brown margin interrupted at least along vein M or in cell dm and usually along vein R_{4+5}. Prebasal band covering basal half of vein Cu_1, faint in anterior half of cell dm; distal brown area very small or absent, not extending into cell dm and not reaching wing margin. Basal band reduced to yellowish area in cell bcu, brown distal area absent. Costal cells and base of cell br mostly pale yellow; cell bm mostly hyaline. Vein M ratio 0.92-1.15; cell dm ratio 2.48-2.92; crossvein DM-Cu straight to slightly sinuous, forming slightly obtuse angle with proximal section of M. Microtrichia white on semicircular apical spot in cell r_{4+5}, and following less distinct areas: on narrow spots across cell br and in middle of dm, on ovoid subapical spot in cell cu_1, touching or almost touching vein Cu_1 and posterior margin, on narrow band from cell r_1 to vein M or middle of cell m between median and subapical bands, on spots or band across cell r_{2+3} and anterior half of r_{4+5} between subapical and apical bands, on marginal spot in cell cell r_1, and on elongate basal spot in cell cu_1 bordering middle of vein A_1+Cu_2 and well separated from posterior margin. ABDOMEN: Male tergite 5 with pair of elongate sublateral black spots on basal half to two-thirds; other tergites entirely orange. Tergite 5 1.8-2.4 times longer than tergite 4. Lateral surstylus with bulge-like dorsal lobe with tuft of 5-8 strong, ventrally or posteroventrally projecting setae. Medial surstylus with both prensisetae well developed, the medial one shorter and stouter. Glans with apical sclerite distally flattened and twisted to form spiral. Female tergite 6 usually with pair of small sublateral black spots near midlength, sometimes dotlike or absent; other tergites entirely orange. Oviscape 0.8-0.9 mm long, 1.1-1.2 times longer than width at base. Aculeus (Fig. 3G) about 1.4 mm long, slender, with nearly straight sides; tip elongate, slender, gradually tapered, in ventral view lateral margin very slightly concave to straight, extreme apex blunt.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Diamantina, Estrada para Conselheiro Matta 18°17.89'S 43°50.01'W, 18 Feb 1995, P. Prado, T. Lewinsohn, B. Buys, PIC95074 [*ex Lychnophora pseudovillosissima*].

Paratypes. BRAZIL, Minas Gerais, same data as holotype, 1♂ 1♀ (USNM) 2♂ 8♀ (ZUEC); Diamantina, 18°11.96'S 43°42.56'W, 19 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96474, [ex *Lychnophora villosissima*], 4♂ 5♀ (ZUEC); same data except PIC96478, [ex *Lychnophora* aff. *pohlii*], 2♂ 5♀ (ZUEC); Diamantina, 18°11.92'S 43°42.17'W, 04 Feb 2003, S. Futada & M.R. Braun, PIC03075, [ex *Lychnophora villosissima*], 1♀ (ZUEC); Diamantina, Estrada para Conselheiro Matta 18°17.89'S 43°50.01'W, 18 Feb 1995, P. Prado, T. Lewinsohn, B. Buys, PIC95073, [ex *Lychnophora pohlii*], 4♀ (ZUEC); Diamantina, Estrada Guinda - São João Chapada 18°11.94'S 43°42.45'W, 17 Feb 1995, P. Prado, T. Lewinsohn, B. Buys, PIC95050 [*ex Lychnophora villosissima*], 1♂ 3♀ (ZUEC); Diamantina, São João da Chapada, Serra da Guiné 18°06.54'S 43°44.09'W, 17 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96433, [ex *Lychnophora pseudovillosissima*], 1♀ (ZUEC); same data except PIC96424, [ex *Lychnophora villosissima*], 2♂ 1♀ (ZUEC); Diamantina, Serra da Guiné, São da João Chapada, 18°06.6'S 43°44.08'W, 7 Sep 1996, Lewinsohn, Prado, Santos, Silva, PIC96678 PIC95074 [*ex Lychnophora villosissima*], 2♂ 1♀ (USNM) 4♂ 7♀ (ZUEC).

Distribution. Reared only from flower heads collected in campo rupestre vegetation on the Diamantina plateau, at the center of the Espinhaço mountain range. Not reared from similar species of Lychnophorinae sampled in other campo rupestre areas, thus possibly restricted to the Diamantina region.

Hosts. Reared from flower heads of *Lychnophora pohlii* Sch. Bip., *L. pseudovillosissima* Semir & Leitão Filho, and *L. villosissima* Mart., all from the subtribe Lychnophorinae (Asteraceae: Vernonieae), and restricted to campo rupestre vegetation.

Remarks. This species, *T. rupestris* n. sp., and *T. voluta* n. sp. are probably very closely related (see Remarks for those species).

Etymology. The specific epithet *interrupta* (Latin adjective, 'broken apart') refers to the interrupted subapical wing band and the interrupted distal brown margins of the wing bands.

Tomoplagia matzenbacheri **n. sp.**
(Figs. 1I, 3H, 4G)

Diagnosis. *Tomoplagia matzenbacheri* differs from most other species of *Tomoplagia* by its reduced subapical wing band, which is lacking except for its base, a brown spot at the apex of vein M, and at most a small spot in the middle of cell r_{4+5}. Of the other species that lack or have a highly reduced subapical band [*T. aberrans* Aczél, *T. achromoptera* n. sp., *T. argentiniensis* Aczél, *T. brasiliensis* n. sp., *T. grandis* n. sp., and *T. incompleta* (Williston)] only *T. grandis* n. sp. has a medial black spot on the posterior margin of the scutum like *T. matzenbacheri*. *Tomoplagia grandis* n. sp. differs in having more distinct and nonsetulose scutal vittae, a mostly shiny, nonmicrotrichose mediotergite, a black spot, usually large, on the katepisternum, different abdominal markings, and a much broader and blunter aculeus tip. Other useful diagnostic characters for *T. matzenbacheri* include: scutum with three vittae; meron and katepisternum without black spots; vein

M ratio less than 1.0; female abdominal tergites without black markings; and aculeus tip slender, with slight subbasal and subapical projections. In the shape of the aculeus and to some extent in thoracic markings, *T. matzenbacheri* resembles *T. achromoptera* n. sp., which differs in lacking black spots on the thoracic pleuron, and having a much more reduced wing pattern.

Description. Mesonotum length 2.4-2.5 mm, eye longest diameter 1.2 mm, frons width at vertex 0.7-0.8 mm. Body ground color yellow. Major head and thoracic setae yellow. HEAD: Eye 1.5-1.7 times longer than wide. Frons orange and entirely microtrichose, microtrichia of orbital plate, broad lateral margin, and narrow medial vitta slightly grayer. Genal height 0.08-0.11 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus broad, twice as long as wide, with yellow to brown setae of varying length. THORAX: Scutum with triangular black spot medially on posterior margin, well separated from usual pair of sublateral oval black spots near posterior margin, which are moderate sized; without other black markings; entirely microtrichose, predominantly grayish, with posterior margin and 3-5 vittae yellow to brownish (color depending upon angle of view), medial vitta aligned with medial posterior black spot, sublateral vitta aligned with dorsocentral seta and mesal margin of sublateral black spot, in some specimens, additional pair of lateral vittae present, interrupted at tranverse suture, broader anterior to suture and including pre-sutural supra-alar seta, narrower from tranverse suture to lateral margin of sublateral black spot; setulae pale yellow, evenly distributed (including on vittae) except on posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose, entirely yellow, or sometimes brown laterally. Mediotergite microtrichose except narrowly medially and ventrally, entirely yellow to orange. Katatergite with brown or black posteroventral spot, usually extending to posteroventral part of anatergite. Katepisternum and meron without black markings. Anespiternum with second seta at least 4/5 as long as largest (dorsalmost). LEGS: Male without unusual modifications. WING (Fig. 1I): Subapical band absent except for its base, brown spot on apex of vein M, and sometimes 1 small yellowish spot in middle of cell r_{4+5}. Apical band slender, complete, entirely connected to or (usually) partially separated from subapical band along costa (usually with small marginal hyaline spot in cell r_1 midway between apices of R_1 and R_{2+3}), but otherwise confluent with costa. Median band slender but complete, yellow part usually extending narrowly into cell r_{4+5}, but extending at most slightly posterior to vein M; proximal margin faintly brown in cell br; distal brown margin uninterrupted except sometimes narrowly at vein R_{4+5}. Prebasal band covering basal half of vein Cu_1, faint in cell dm, tapered distally and not reaching posterior wing margin; distal brown margin not extended into cell dm, sometimes faint. Basal band poorly defined basally, distal brown part short and broad, extended less than halfway to apex of A_1+Cu_2. Cells bc and bcu and base of br mostly pale yellow to subhyaline, cells c and bm mostly hyaline. Vein M ratio 0.92-0.96; cell dm ratio 2.16-2.25; crossvein DM-Cu nearly straight to sinuous, forming slightly obtuse angle with proximal section of M. Microtrichia white only on narrow semicircular apical spot in cell r_{4+5}, and sometimes on all or some of the following distinct areas: on elongate spot in cells a_1 and cu_1 bordering brown part of basal band, on small to elongate spot in middle of cell dm, on ovoid apical spot in cell cu_1, almost touching vein Cu_1 and posterior margin, round spot on cells a_1 and a_2 on vein A_1+Cu_2 halfway between apex of cell cup and posterior margin. ABDOMEN: Male (Fig. 4G) tergite 5 with pair of large medial sublateral black spots; tergite 4 usually with pair of small sublateral black lateral spots. Tergite 5 1.6-1.8 times longer than tergite 4. Epandrium and surstyli of usual shape. Medial surstylus with both prensisetae relatively short and stout, the medial larger. Female tergites without black markings. Oviscape 0.6-0.8 mm long, 0.7-1.0 times longer than width at base. Aculeus (Fig. 3H) about 1.0 mm long, stout, especially near midlength; tip elongate, in ventral view lateral margin with slight subbasal and subapical projections; extreme apex triangular.

Holotype. ♀ (ZUEC), BRAZIL, Rio Grande do Sul, Guaíba, Sítio São Maximiano, BR-116 km 31, 30º10.84'S 51º23.52'W, 8 Apr 1995, P. Prado, T. Lewinsohn, A. Macedo, PIC95121 [ex *Lessingianthus poliphyllus*].

Paratypes. Same data as holotype, 1♂ 1♀ (USNM), 1♂ 1♀ (ZUEC).

Distribution. All of the type specimens were reared from a single sample of flower heads taken at Sítio São Maximiano, Guaíba, Rio Grande do Sul, in southern Brazil.

Hosts. Reared from flower heads of *Lessingianthus poliphyllus* (Sch. Bip. ex Baker) H. Rob. (Asteraceae: Vernonieae).

Etymology. This species is named in honor of Dr. Nelson Matzenbacher, specialist on Asteraceae, and friend of PIP and TML. He is also the owner of the type locality, Sítio São Maximiano, where he kindly hosted PIP and TML, and helped in flower head sampling and in plant identification.

Tomoplagia rupestris **n. sp.**
(Figs. 1J, 3I, 5D)

Diagnosis. *Tomoplagia rupestris* might be confused with *T. formosa* Aczél, *T. heringi* Aczél, *T. reimoseri* Hendel, or *T. pleuralis* Hendel, and will run to couplets 17 and 18 in the key of Aczél (1955a) which include those species, but it differs in lacking sublateral black spots on abdominal tergites 3-4 of both sexes, having the brown distal areas of the wing bands reduced (that of medial band interrupted at least along vein M, that of prebasal band not extended into dm, and that of basal band very small or absent), the gena broad, and the lateral surstylus with a dorsal lobe bearing a cluster of strong, ventrally directed setae. *Tomoplagia rupestris* is more similar to *T. voluta* n. sp. and *T. interrupta* n. sp. which share the preceding and following characters: scutum with three narrow gray vittae; subscutellum mostly to entirely black; mediotergite entirely black; katepisternum usually with narrow

wedge-shaped black spot; meron and laterotergite each with large black spot; subapical wing band constricted or narrowly interrupted along vein M; vein M ratio less than 1.20; cell dm ratio > 2.3; male abdomen orange except for elongate black spot on tergite 5; female abdomen with black spots only on tergite 6 (sometimes absent in *T. interrupta* n. sp.) and sometimes tergite 5 (some *T. rupestris*); and medial prensiseta smaller than lateral. *Tomoplagia rupestris* differs from *T. interrupta* n. sp. and *T. voluta* n. sp. by its longer setulose male fore femur, very acute aculeus tip, and non-spiraled apical sclerite of the glans. The subapical band is sometimes constricted rather than interrupted, whereas it is always interrupted in *T. voluta* n. sp. and *T. interrupta* n. sp. (more broadly so in the latter). *Tomoplagia interrupta* n. sp. also differs by its less connected or isolated apical band.

Description. Mesonotum length 1.2-1.5 mm, eye longest diameter 0.6-0.7 mm, frons width at vertex 0.4-0.6 mm. Body ground color golden yellow. Head and thoracic setae yellow to orange brown. HEAD: Eye 1.3-1.6 times longer than wide. Frons orange and entirely microtrichose, microtrichia of orbital plate and narrow lateral margin distinctly silvery gray, sometimes with medial vitta slightly gray. Genal height 0.17-0.22 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus relatively narrow, twice as long as wide, with yellow and pale brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin small to moderate sized; without other black markings except shiny medial black spot on extreme anterior margin (often not visible in dorsal view); entirely densely microtrichose, except slightly less dense and bright posteriorly, mostly orange to golden, with three narrow gray vittae from anterior margin, medial vitta extending to about level of acrostichal seta, sublateral vittae including dorsocentral seta and ending on medial margin of sublateral posterior black spot, in some specimens additional pair of lateral vittae present, from transverse suture to lateral margin of sublateral black spots; setulae fine, yellow to pale brown, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose, entirely black or often with medial orange spot. Mediotergite entirely black, broadly microtrichose dorsolaterally, with broad triangular to semicircular shiny ventromedial area. Katepisternum with usually wedge-shaped black spot anteroventral to katepisternal seta. Meron with large black spot dorsal to hind coxa. Anatergite and katatergite with large posteroventral black spot, usually reaching mediotergite. Anepisternum with second seta up to 1/2 as long as largest (dorsalmost) seta. LEGS: Male fore femur with numerous long thin setae anteriorly and ventrally, normal anterodorsal and ventral rows of setae poorly or not differentiated. WING (Fig. 1J): Pattern with 4-5 distinct bands. Apical band complete, only partially separated from subapical band by marginal hyaline spot in cell r_1 midway between apices of R_1 and R_{2+3} that extends at most 1/2 of distance to R_{2+3}; otherwise confluent with costa. Subapical band constricted or narrowly interrupted along vein M, if interrupted, basal part extended to vein M and distal part (moderate sized, brown, ovoid, apical spot) separated from it by hyaline area smaller than length of distal part. Median band slender but complete; yellow part not extending into cell r_{4+5} and not reaching DM-Cu; proximal margin faint, narrowly brown at most in middle of cell br; distal brown margin usually interrupted along vein R_{4+5} and/or vein M. Prebasal band covering basal 3/5 of vein Cu_1; distal brown area small, usually not extending into cell dm but rarely (in 2 specimens) extending narrowly into cell dm, tapered distally, narrowly reaching or narrowly separated from wing margin. Basal band yellowish in cell bcu, brown distal area very small. Costal cells and base of cell br mostly yellow; cell bm mostly hyaline. Vein M ratio 0.96-1.20; cell dm ratio 2.33-2.86; crossvein DM-Cu straight or nearly so, forming 90° to slightly obtuse angle with proximal section of M. Microtrichia white on broad semicircular to U-shaped apical spot in cell r_{4+5}, and following less distinct areas: on small spot in middle of cell dm, on ovoid subapical spot in cell cu_1, touching or almost touching vein Cu_1 and posterior margin, on narrow series of spots between medial and subapical bands in cells r_1, r_{2+3} and r_{4+5}, on spots between subapical and apical bands in cell r_{2+3} and anterior half of cell r_{4+5}, and on small subbasal spot in cell cu_1 near middle of vein A_1+Cu_2 and well separated from posterior margin. ABDOMEN: Male tergite 5 with pair of elongate sublateral black spots on basal half to two-thirds, sometimes reduced to brown or black oval spots; other tergites entirely orange. Tergite 5 1.4-2.0 times longer than tergite 4. Lateral surstylus with bulge-like dorsal lobe with tuft of more than 10 strong, ventrally or posteroventrally projecting setae. Medial surstylus with both prensisetae well developed, the medial one shorter and stouter. Glans (Fig. 5D) with apical sclerite curved distally but not spiraled. Female tergite 6 with pair of sublateral black spots near midlength; tergite 5 sometimes with similar or smaller and/or paler pair of spots; other tergites entirely orange. Oviscape 0.6-0.7 mm long, 0.9-1.0 times longer than width at base. Aculeus (Fig. 3I) about 0.8 mm long, moderately stout; tip slender, triangular, in ventral view lateral margin slightly concave to straight, extreme apex acute.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Diamantina, Estrada Conselheiro Matta 18°18.04'S 43°49.41'W, 13 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95777 [ex *Lychnophora pohlii*].

Paratypes. BRAZIL, Minas Gerais, same data as holotype, 3♂ 2♀ (ZUEC); Diamantina, 18°11.96'S 43°42.56'W, 19 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96478 [ex *Lychnophora pohlii*], 1♂ 1♀ (USNM) 14♂ 18♀ (ZUEC); Diamantina, Estrada Guinda – São João da Chapada 18°11.94'S 43°42.45'W, 17 Feb 1995, P. Prado, T. Lewinsohn, B. Buys, PIC95052, [ex *Lychnophora pohlii*], 2♀ (ZUEC); Diamantina, Serra da Guiné, São João Chapada, 18°06.6'S 43°44.08'W, 7 Sep 1996, Lewinsohn, Prado, Santos, Silva, PIC96679 [ex *Lychnophora diamantinana*], 7♂ 7♀ (ZUEC); same, except PIC96676 [ex *Lychnophora* sp.], 1♂ (USNM) 21♂ 30♀ (ZUEC); Diamantina, Serra da Guiné, São João da Chapada, 18°06.54'S 43°44.09'W, 17 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96439, [ex *Lychnophora diamantinana*], 2♂ 6♀ (ZUEC); Grão Mogol, Trilha da Tropa 16°33.00'S 42°54.00'W, 05 Sep 1996, P. Prado, A. Santos, PIC96649, [ex *Eremanthus incanus*], ♂ 1 (ZUEC); Serra do Cabral, Joaquim

Felício, 17°41.93'S 44°14.73'W, 15 Feb 1995, P. Prado, T. Lewinsohn, B. Buys, PIC95025, [ex *Lychnophora* sp.], 2♂ 4♀ (ZUEC); Serra do Cabral, Joaquim Felício, cerrado 17°43.61'S 44°11.01'W, 13 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96342, [ex *Lychnophora salicifolia*], 1♂ (ZUEC); Serra do Cabral, Joaquim Felício, vale córrego Jucão 17°41.94'S 44°16.79'W, 06 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95637, [ex *Lychnophora salicifolia*], 1♂ 8♀ (ZUEC); Serra do Cipó, Santana do Riacho, à direita do Chapéu do Sol, campo após a curva, 11 Mar 1996, Bruno D. Buys, PIC96268, [ex *Lychnophora* sp.], 1♂ 3♀ (ZUEC); Serra do Cipó, Santana do Riacho, estrada da Usina 19°17.19'S 43°36.09'W, 11 Sep 1996, T. Lewinsohn, P. Prado, A. Santos, J. Silva, PIC96767, [ex *Eremanthus elaeagnus*], 1♀ (ZUEC); Serra do Cipó, Santana do Riacho, estrada da Usina 19°17.33'S 43°35.96'W, 21 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96532, [ex *Lychnophora rosmarinifolia*], 1♂ (ZUEC).

Distribution. Reared from flower heads collected in campo rupestre vegetation in Grão Mogol, Serra do Cabral, Diamantina, and Serra do Cipó, all highlands in the Espinhaço Mountain Range, Minas Gerais, Brazil. Probably restricted to areas of campo rupestre and campo cerrado of Brazil.

Hosts. Reared from flower heads of *E. elaeagnus* (Mart. ex DC.) Sch. Bip., *E. incanus* (Less.) Less., *Lychnophora diamantinana* Semir & Leitão Filho, *L. pohlii* Sch. Bip., *L. rosmarinifolia* Mart., *L. salicifolia* Mart., and *Minasia* spp., all belonging to the subtribe Lychnophorinae (Asteraceae: Vernonieae) and occurring in campo rupestre areas of Brazil.

Remarks. *Tomoplagia rupestris*, *T. voluta* n. sp. and *T. interrupta* n. sp. have similar wing patterns, scutal vittae, thoracic and abdominal black markings, and male genitalia, and possibly form a clade that radiated on the endemic Lychnophorinae of the campo rupestre.

Etymology. The specific epithet *rupestris* (Latin adjective, rocky) refers to the campo rupestre vegetation, to which this species seems to be restricted.

Tomoplagia variabilis **n. sp.**
(Fig. 1L, 3J)

Diagnosis. This species is difficult to identify due to its variable thoracic pleural markings. In the key of Aczél (1955a) it runs to couplets 15-25. It differs from most of the species in those couplets in lacking black spots on the female abdomen and having only one pair in the male, on tergite 5. *Tomoplagia arsinöe* Hering and *T. conjuncta* Hendel, which were both described from the male only, also at least sometimes have only one pair of spots on tergite 5, but differ in having a much larger basal band; *T. arsinöe* Hering also has an apical black spot on the scutellum. *Tomoplagia deflorata* Hering, *T. dejeanii* (Robineau-Desvoidy), *T. achromoptera* n. sp., *T. matzenbacheri* n. sp., *T. interrupta* n. sp., and males of *T. rupestris* n. sp. and *T. voluta* n. sp. might be confused with *T. variabilis* based on their abdominal markings, but *T. deflorata* Hering, *T. dejeanii* (Robineau-Desvoidy), and *T. achromoptera* n. sp. lack lateral black spots on the subscutellum, *T. achromoptera* n. sp. and the other species differ in wing pattern, with at least the subapical band reduced or interrupted (except in some *T. rupestris* n. sp.), and *T. interrupta* n. sp., *T. rupestris* n. sp. and *T. voluta* n. sp. have more extensive black markings on the subscutellum and mediotergite. Also, the stout aculeus with a short triangular tip, delimited by a slight subapical concavity in ventral view, is distinctive from all other species from which the aculei are known.

Description. Mesonotum length 1.7-2.0 mm, eye longest diameter 0.8-0.9 mm, frons width at vertex 0.6 mm. Body ground color yellow. Head and thoracic setae yellow to pale brown. HEAD: Eye 1.4-1.5 times longer than wide. Frons orange and entirely and evenly microtrichose, sometimes slightly more grayish yellow laterally. Genal height 0.08-0.12 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus moderately broad, twice as long as wide, with yellow and pale brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin small to moderate sized; without other black markings; entirely densely microtrichose, except slightly less dense and bright posteriorly, mostly golden yellow, sometimes slightly grayish anteriorly, in posterodorsal view, sometimes with three faint, very narrow vittae (about as wide as alveoli of thoracic setae), sublateral vitta aligned with dorsocentral seta; setulae fine, yellow, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose, yellow, with lateral black spot. Mediotergite entirely yellow to orange, microtrichose except narrowly medially and ventrally. Pleuron with 0-3 black spots in varying combinations. Katepisternum with or without small black spot anteroventral to katepisternal seta. Meron with or without black spot. Katatergite with or without posteroventral black spot, sometimes extending onto anatergite. Anepisternum with second seta at least 2/3 as long as largest (dorsalmost) seta. LEGS: Male without unusual modifications. WING (Fig. 1L): Pattern with five complete and well-defined bands. Apical band completely connected to subapical band along costa (without marginal hyaline spot in cell r_1), entirely confluent with costa. Subapical band with distal brown margin extending anteriorly at least to vein R_{4+5}. Median band with yellow part sometimes extending narrowly into cell r_{4+5}, always extending into cell dm, but well separated from DM-Cu; proximal margin narrowly brown in cell br; distal brown margin uninterrupted. Prebasal band at least narrowly reaching wing margin at middle of cell cu_1; distal brown margin extended into cell dm. Basal band with brown distal area moderately broad, ca. as long as wide, extended less than halfway to apex of A_1+Cu_2. Costal and basal cells mostly yellow; cell bm with large anteromedial hyaline spot. Vein M ratio 0.96-1.20; cell dm ratio 1.85-2.90; crossvein DM-Cu nearly straight to slightly sinuous, forming slightly obtuse angle with proximal section of M. Microtrichia white on broad apical spot extending finger-like into cell r_{2+3}, and following less distinct areas: on spot on vein Cu_1 distal to prebasal band, sometimes extended to posterior margin in cell cu_1 or with

separate spot there, on narrow band from cell r_1 to vein R_{4+5} or vein M between median and subapical bands, and on ovoid basomarginal spot in cell cu_1 extending slightly into anal lobe. ABDOMEN: Male tergite 5 with pair of small to very small ovoid to elongated sublateral black spots on posterior half, sometimes nearly reaching posterior margin. Tergite 5 1.5-1.6 times longer than tergite 4. Epandrium and surstyli with usual shape for genus. Medial surstylus with both prensisetae blunt, the medial larger. Female tergites entirely yellow, without black spots. Oviscape 0.7-0.9 mm long, 0.8-1.0 times longer than width at base. Aculeus (Fig. 3J) about 0.9 mm long, relatively stout; tip short, in ventral view lateral margin slightly concave subapically, extreme apex blunt.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Serra do Cabral, Joaquim Felício, vale córrego Jucão 17º41.91'S 44º16.66'W, 2 Sep 1996, Lewinsohn, Prado, Santos, Silva, PIC96584 [ex *Lessingianthus laevigatus*].

Paratypes. BRAZIL, Minas Gerais, same data as holotype, 27♂ 19♀ (ZUEC); Serra do Cabral, Joaquim Felício, vale córrego Jucão, 17°41.89'S 44°16.57'W, 18 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95304 [ex *Lessingianthus hovaefolius*], 1♂ (USNM) 27♂ 20♀ (ZUEC); Santana do Riacho, Serra do Cipó, Estrada da Usina, 19°17.25'S 43°35.92'W, 27 Jul 1995, P. Prado, T. Lewinsohn, B. Buys, V. Motta, PIC95466 [ex *Lessingianthus hovaefolius*], 1♀ (USNM) 7♂ 7♀ (ZUEC); São Paulo, Martinópolis, Reserva Ambiental do Assentamento Nova Vida, 22º14.01'S 51º06.52'W, 29 May 2000, P. Prado, M. Almeida-Neto, H. Kubota, D. Sudatti, G1504, [ex *Lessingianthus* sp.], 8♂ 8♀ (ZUEC).

Distribution. Reared from flower heads collected in campo rupestre vegetation and adjacent cerrado vegetation, in the Serra do Cabral (Joaquim Felício) and Serra do Cipó, both in the Espinhaço Mountain Range, Minas Gerais, and also in cerrado vegetation in Martinópolis, western São Paulo State, Brazil.

Hosts. Reared from flower heads of *Lessingianthus hovaefolius* (Gardn.) H. Rob., *L. laevigatus* (Mart. ex DC.) H. Rob. and another unidentified species of *Lessingianthus* (Asteraceae: Vernonieae).

Remarks. This species varies greatly in pleural markings, usually a stable character in other species of *Tomoplagia*. Series of specimens reared from the same plant population include some entirely without black spots on the pleuron, others having black spots on the katepisternum, meron, and katatergite, and others with all intermediate combinations.

Etymology. The specific epithet *variabilis* (Latin adjective, changeable) refers to the variability in pleural markings.

Tomoplagia voluta **n. sp.**
(Figs. 1M, 3K, 5C, 5E)

Diagnosis. *Tomoplagia voluta* differs from most other species of *Tomoplagia* by its incomplete subapical wing band, which is narrowly interrupted along vein M; in other species except *T. interrupta* n. sp. and some *T. rupestris* n. sp. this band is complete or much more reduced. *Tomoplagia voluta*, *T. interrupta* n. sp. and *T. rupestris* n. sp. are also unique in having the lateral surstylus with a dorsal lobe bearing a cluster of strong, ventrally directed setae. Other useful diagnostic characters for these three species include: gena broad; scutum with three narrow gray vittae; subscutellum mostly to entirely black; mediotergite entirely black; katepisternum usually with narrow wedge-shaped black spot; meron and laterotergite each with large black spot; brown distal areas of wing bands reduced, that of medial band interrupted at least along vein M, that of prebasal band not extended into dm, and that of basal band very small or absent; vein M ratio less than 1.20; cell dm ratio > 2.3; male abdomen orange except for elongate black spot on tergite 5; female abdomen with black spots only on tergite 6 (sometimes absent in *T. interrupta* n. sp.) and sometimes tergite 5 (some *T. rupestris* n. sp.); and medial prensiseta smaller than lateral. *Tomoplagia voluta* differs from *T. interrupta* n. sp. and *T. rupestris* n. sp. by its short and blunt aculeus tip. It further differs from *T. interrupta* n. sp. by its more connected apical and subapical bands and its more narrowly interrupted subapical band, and from *T. rupestris* n. sp. by the spiraled apical sclerite of the glans.

Description. Mesonotum length 1.2-1.6 mm, eye longest diameter 0.6-0.8 mm, frons width at vertex 0.5-0.6 mm. Body ground color golden yellow. Head and thoracic setae yellow to pale brown. HEAD: Eye 1.3-1.5 times longer than wide. Frons orange and entirely microtrichose, microtrichia of orbital plate and narrow lateral margin distinctly silvery gray, sometimes with medial vitta slightly gray. Genal height 0.18-0.27 longest diameter of eye. Facial ridge setulae much smaller and weaker than genal setae. Maxillary palpus relatively narrow , twice as long as wide, with yellow and pale brown setulae of varying length. THORAX: Scutum with usual pair of sublateral oval black spots near posterior margin small to moderate sized; rarely (1 male) with paler brown pair of spots medially on posterior margin; without other black markings except shiny medial black spot on extreme anterior margin (often not visible in dorsal view); entirely densely microtrichose, except slightly less dense and bright posteriorly, mostly orange to golden, with three narrow gray vittae from anterior margin, medial vitta extending to level of acrostichal seta, sublateral vittae including dorsocentral seta and extending to level of acrostichal seta or at most to medial margin of sublateral posterior black spot, in some specimens sublateral vittae extending only to acrostichal setae, not reaching sublaterla balck spots; setulae fine, yellow to pale brown, evenly distributed except on black spots and posterior margin. Scutellum entirely yellow, subshining, with microtrichia less dense than on scutum. Subscutellum entirely microtrichose, entirely black or often with medial orange spot. Mediotergite entirely black, broadly microtrichose dorsolaterally, with broad triangular to semicircular shiny ventromedial area. Katepisternum with or without small ovoid to larger wedge-shaped black spot anteroventral to katepisternal seta. Meron with large black spot dorsal to hind coxa. Anatergite and katatergite with large posteroventral

black spot, usually reaching mediotergite. Anepisternum with second seta up to 1/2 as long as largest (dorsalmost) seta. LEGS: Male without unusual modifications. WING (Fig. 1M): Pattern with 4-5 distinct bands. Apical band complete, partially separated from subapical band by marginal hyaline spot in cell r_1 midway between apices of R_1 and R_{2+3} that extends at most 1/2 of distance to R_{2+3}; otherwise confluent with costa. Subapical band constricted to narrowly interrupted along vein M, basal part extended to vein M; if interrupted distal part a moderate sized, brown, ovoid, apical spot separated from basal part of band by hyaline area much smaller than its length. Median band slender but complete; yellow part not extending into cell r_{4+5} and not reaching DM-Cu; proximal margin narrowly brown at most in middle of cell br; distal brown margin interrupted at least along vein M or in cell dm and usually along vein R_{4+5}. Prebasal band covering basal 3/5 of vein Cu_1; distal brown area small, not extending into cell dm and not reaching wing margin. Basal band reduced to yellowish area in and posterior to cell bcu, brown distal area absent. Costal cells and base of cell br mostly pale yellow; cell bm mostly hyaline. Vein M ratio 0.98-1.18; cell dm ratio 2.55-3.17; crossvein DM-Cu straight or nearly so, forming slightly obtuse angle with proximal section of M. Microtrichia white on broad semicircular to U-shaped apical spot in cell r_{4+5}, and following less distinct areas: narrow band across cell br and anterior half of cell dm, on ovoid subapical spot in cell cu_1, touching or almost touching vein Cu_1 and posterior margin, on narrow series of spots in cells r_1, r_{2+3} and r_{4+5} between medial and subapical bands, on spots in cell r_{2+3} and anterior half of r_{4+5} between subapical and apical bands, and on small subbasal spot in cell cu_1 near middle of vein A_1+Cu_2 and well separated from posterior margin. ABDOMEN: Male tergite 5 with pair of elongate sublateral black spots on basal half to two-thirds; other tergites entirely orange. Tergite 5 1.6-1.9 times longer than tergite 4. Lateral surstylus (Fig. 5C) with bulge-like dorsal lobe with dense tuft of more than 10 strong, ventrally or posteroventrally projecting setae. Medial surstylus with both prensisetae well developed, the medial one shorter and stouter. Glans (Fig. 5E) with apical sclerite distally flattened and twisted to form spiral. Female tergite 6 with pair of sublateral black spots near midlength; other tergites entirely orange. Oviscape 0.7-0.9 mm long, 1.1-1.4 times longer than width at base. Aculeus (Fig. 3K) about 1.1 mm long, slender, gradually tapering; tip short, in ventral view lateral margin convex, extreme apex blunt.

Holotype. ♀ (ZUEC), BRAZIL, Minas Gerais, Santana do Riacho, S.Cipó, à direita do Chapéu do Sol, campo após a curva, 11 Mar 1996, Bruno D. Buys, PIC96268, [ex *Lychnophora* sp.].

Paratypes. BRAZIL, Minas Gerais, same data as holotype 1♀ (ZUEC); Diamantina, 18°11.96'S 43°42.56'W, 19 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96478, [ex *Lychnophora* aff. *pohlii*], 1♀ (ZUEC); Serra do Cabral, Joaquim Felício, 17°41.93'S 44°14.73'W, 15 Feb 1995, P. Prado, T. Lewinsohn, B. Buys, PIC95025, [ex *Lychnophora* sp.], 3♀ (ZUEC); Serra do Cabral, Joaquim Felício, vale córrego Jucão 17°41.94'S 44°16.79'W, 6 Dec 1995, P. Prado, T. Lewinsohn, M. Lopes, J. Silva, PIC95637 [ex *Lychnophora salicifolia*], 1♂ (USNM) 1♂ 3♀ (ZUEC); Serra do Cabral, Joaquim Felício, 17°43.61'S 44°11.01'W, 13 Apr 1996, T. Lewinsohn, M. Lopes, B. Buys, J. Silva, PIC96342 [ex *Lychnophora salicifolia*], 3♀ (ZUEC); .

Distribution. Reared from flower heads collected in campo rupestre vegetation in the Serra do Cabral (Joaquim Felício) and Serra do Cipó (Santana do Riacho), highlands in the Espinhaço mountain range, Minas Gerais, Brazil. Probably restricted to areas of campo rupestre of Brazil.

Hosts. Reared from flower heads of *Lychnophora salicifolia* Mart. and two other unidentified *Lychnophora* species (Asteraceae: Vernonieae: Lychnophorinae).

Remarks. This species and *T. interrupta* n. sp. are probably very closely related. They have similar host plants and morphology, most notably the twisted apical sclerite of the glans, a distinctive character within *Tomoplagia*, and probably a synapomorphy. Also see Remarks for *T. rupestris* n. sp.

Etymology. The specific epithet *voluta* (Latin noun, spiral) refers to the twisted apical sclerite of the glans.

Addendum to Aczél (1955a) Key to Species of *Tomoplagia*

The following key is intended to supplement the key of Aczél (1955a). Users should begin with couplet A, which will lead either to Aczél's key (couplet 1) or to the additional couplets starting with number 41. The additional couplets include all of the species with the subapical band incomplete, highly modified, or absent, seven of which are described here. Some females of *T. dimorphica* n. sp., some specimens of *T. rupestris* n. sp., and the other five new species described here will run to the original part of Aczél's key. Characters to differentiate them are listed in the diagnosis section for each of those species.

A. Wing with uninterrupted, slender, subapical band from apex of vein R_1 to apex of vein M, often connected to apical band anteriorly, or rarely posteriorly [*T. discolor* (Loew), *T. pura* (Curran), but not medially (Aczél 1955a, figs. 1-11, 14-27)] 1

- Wing with subapical band interrupted, broadly connected to apical band (unrecognizable), or highly reduced or absent (Figs. 1B, E-J, M, 6A).....41

41. Wing largely hyaline, without any complete bands (Fig. 1B), or with two broad transverse marks (Fig. 1E), 1 formed by fusion of base of subapical band with median band, the other by distal part of subapical band fused to apical band. Subscutellum, mediotergite, and thoracic pleuron without black markings.....42

- Wing with complete or nearly complete median and apical bands, subapical and apical bands connected at most proximally and distally (Figs. 1F-J, M, 6A). Subscutellum, mediotergite, and/or thoracic pleuron often with black markings.....43

42. Wing largely hyaline, without any complete bands (Fig. 1B). Scutum usually with brown to black spot medially on posterior margin.....*achromoptera* n. sp.

- Wing with two broad transverse marks (Fig. 1E), one formed by fusion of base of subapical band with median band, the other by distal part of subapical band fused to apical band. Scutum without brown to black medial spot on posterior margin.....*dimorphica* n. sp. (male)

43. Subapical band highly reduced, at most with basal part in cell r_1, apical spot on apex of vein M (sometimes connected to apical band), and small spot in middle of cell r_{4+5} present (Figs. 1G, I, 6A, Aczél 1954, fig. IID, 1955a, figs. 12-13). Brown margins of wing bands usually well developed, that of medial band uninterrupted, that of prebasal band usually extended into cell dm [except some *T. incompleta* (Williston)].....44

- Subapical band more complete, interrupted in cell r_{2+3} or along vein M (Figs.1F, H, J, M). Brown margins of wing bands reduced, that of medial band interrupted at least along vein M, and that of prebasal band not extended into dm.....49

44. Wing without brown spot at apex of vein M (Fig. 6A). Facial ridge with row of 5-8 stout, relatively large setae, as long as and stouter than largest genal setae (Fig. 6B). Male fore basitarsus with two elongate file-like anterodorsal rows of small brown spinules (Fig. 6C).....*brasiliensis* n. sp.

- Wing with brown spot at apex of vein M, sometimes connected to apical band. Facial ridge setulae much smaller than largest genal setae. Male fore basitarsus without anterodorsal rows of small brown spinules.....45

45. Scutum with medial black spot on posterior margin. Large species, mesonotum length greater than 2 mm.....46

- Scutum without medial black spot posteriorly. Smaller species, mesonotum length less than 2 mm.....47

46. Scutum with 3 distinct brown vittae that lack setulae. Katepisternum with large black mark. Meron usually with black spot. Aculeus tip very broad and blunt (Fig. 3F).....*grandis* n. sp.

- Scutum with 3-5 yellow to brownish vittae, but more or less evenly setulose, including on vittae. Katepisternum and meron without black spots. Aculeus tip narrower, with slight subbasal and subapical projections, extreme apex triangular (Fig. 3H).....*matzenbacheri* n. sp.

47. Wing pattern mostly dark brown (Aczél 1954, fig. IID). Median band extending only slightly beyond vein M. Prebasal band straight, extended to apex of vein Cu_1. Brown spot at apex of vein M large, extending along wing margin and broadly separating white apical spot from apex of vein M. *aberrans* Aczé.....l

- Wing pattern mostly yellow to orange (Aczél 1955a, figs. 12-13). Median band complete, reaching posterior wing margin. Prebasal band curved across middle of cell cu_1 or incomplete. Brown spot at apex of vein M small or if larger not extending along wing margin; white apical spot touching or almost touching apex of vein M.....48

48. Scutum with two dark brown marks on anterior half: one lateral to presutural supra-alar seta; the other anterolateral to dorsocentral seta, sometimes extending to anterior margin as inverted J-shaped mark (Aczél 1955a, fig. 98a). Aculeus tip triangular and relatively slender (Prado & Lewinsohn 1994, fig. 7). Male surstyli and prensisetae short (Aczél 1955a, fig. 98b).....*argentinensis* Aczél

- Scutum without dark brown marks on anterior half. Aculeus tip short and blunt (Aczél 1955a, fig. 99h). Male medial and lateral surstyli elongate and presisetae very long and slender (Aczél 1955a, figs. 99l, m).....*incompleta* (Williston)

49. Subscutellum, mediotergite, and thoracic pleuron without black markings. Scutum without distinct vittae .....*dimorphica* n. sp. (female, in part)

- Subscutellum and mediotergite mostly to entirely black. Katepisternum usually with narrow wedge-shaped black spot. Meron and laterotergite each with large black spot. Scutum with three narrow gray vittae.....50

50. Apical band separated from or narrowly connected to subapical band, marginal hyaline spot between them in cell r_1 extending at least 2/3 distance to R_{2+3}. Subapical band broadly interrupted along vein M, distal part (spot on apex of M) separated from basal part by hyaline area at least equal to its length. Glans with apical sclerite spiraled.....*interrupta* n. sp.

- Apical band more broadly connected to subapical band, marginal hyaline spot between them in cell r_1 extending at most 1/2 distance to R_{2+3}. Subapical band narrowly interrupted along vein M, distal part separated from basal part by hyaline area smaller than its length. Glans with apical sclerite spiraled or curved.....51

51. Aculeus tip short and relatively narrow, but with extreme apex blunt (Fig. 3K). Glans with apical sclerite spiraled (Fig. 5E).....*voluta* n. sp.

- Aculeus tip moderately long and slender, extreme apex very acute (Fig. 3I). Glans with apical sclerite curved but not spiraled (Fig. 5D).....*rupestris* n. sp. (in part)

Concluding Remarks

The species described in this paper significantly increase the amount of wing pattern variation known within *Tomoplagia*. Of the 12 new species, five have highly modified patterns. The patterns of *T. brasiliensis* n. sp., *T. grandis* n. sp., and *T. matzenbacheri* n. sp. somewhat resemble those of *T. aberrans* Aczél, *T. argentiniensis* Aczél, and *T. incompleta* (Williston), the only previously known species with the subapical band reduced to an apical spot (or completely lost in *T. brasiliensis* n. sp.), but the other bands well developed. *Tomoplagia achromoptera* n. sp. has the entire wing pattern reduced, with only some of the normal brown marks distinct; the normal yellow areas are evanescent or absent. *Tomoplagia dimorphica* n. sp. has strongly sexually dimorphic wing patterns: that of the female is slightly modified, but the male has broad marks, one formed by fusion of the base of the apical band with the median band, and another from the distal

parts of the apical and subapical band. In addition to this wing pattern diversity, we have also discovered a pair of very closely related species with reticulate wing patterns that is now under genetic and morphometric study and will be described elsewhere (Abreu *et al.* in prep.).

Despite their unusual wing patterns, all of the above species clearly seem to belong in *Tomoplagia* as evidenced by their thoracic markings and the presence of the white apical spot on the wing. The common wing pattern, with five yellow oblique bands, may be a synapomorphy for the genus with subsequent modification in some species, but it can no longer be considered a completely reliable diagnostic character for the entire genus.

It is also interesting to note that two of the new species (*T. brasiliensis* n. sp. and *T. rupestris* n. sp.) have sexually dimorphic legs, although they have different modifications in the male than previously described species (*T. penicillata* Hendel, *T. formosa* Aczél, *T. pseudopenicillata* Aczél).

Our surveys of flower head endophages in only two regions of Brazil increased the number of known species of *Tomoplagia* by nearly 30 percent. In other tephritid genera, similar ratios of undescribed species were found (Prado *et al*. 2002), showing that, as indicated by Foote *et al*. (1993), the neotropical Tephritidae, and especially the subfamily Tephritinae, are still largely unknown. Phytophagous insects, particularly endophages, often are rarely encountered away from their host plants, and they are prone to be undersampled through traditional collecting methods (Lewinsohn *et al.* 2001). Rearing adults from the plant parts where their larvae live is an alternative way to collect these overlooked species. Flower heads can be easily sampled, transported to, and maintained in the laboratory, and rearing tephritids from them already has been a routine of some ecologists and taxonomists (e.g., Zwölfer 1988, Straw 1989, Goeden 1997, and references therein). Expanding this practice would greatly increase and improve our knowledge about neotropical tephritids.

The host plants of all of the species of *Tomoplagia* described in this paper belong to the tribe Vernonieae, and most of them to a single subtribe, the Lychnophorinae. Tephritids that breed in capitula of Asteraceae tend to attack related plants, usually from one subtribe (Zwölfer 1983, Sobhian & Zwölfer 1985, Straw 1989, White & Elson-Harris 1992, Foote *et al.* 1993, Prado *et al.* 2002). Along with their narrow host ranges, most of these new species appear to have small geographic distributions. In some cases, additional samples of host plants in other places are necessary to determine the full distribution, but some species associated with endemic plants probably are confined to small areas. The subtribe Lychnophorinae occurs only in southeastern and central Brazil, and most of the species are endemic to the campo rupestre, a vegetation restricted to the tops of the mountain chains in the states of Minas Gerais, Rio de Janeiro, Goiás and Bahia (MacLeish 1987, Robinson 1992). Despite its narrow distribution, the Lychnophorinae harbors a diverse and specialized group of Tephritinae (Prado *et al.* 2002), which includes five species of *Tomoplagia* described in this work, and at least two others to be described. These species of *Tomoplagia* were not recorded in other sites we sampled, and also were not found in important entomological collections of neotropical tephritids (MZSP, USNM, IML, IZAM, BMNH). Hence, they may not be able to switch to other hosts and expand outside the range of the Lychnophorinae.

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