

Papéis Avulsos de Zoologia

Museu de Zoologia da Universidade de São Paulo

Volume 57(6):57-91, 2017

www.mz.usp.br/publicacoes
www.revistas.usp.br/paz

ISSN impresso: 0031-1049
ISSN on-line: 1807-0205

GENERA OF BELYTINAE (HYMENOPTERA: DIAPRIIDAE) RECORDED IN THE ATLANTIC DENSE OMBROPHILOUS FOREST FROM PARAÍBA TO SANTA CATARINA, BRAZIL

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ABSTRACT

The parasitoid wasps Belytinae (Hymenoptera: Diaprioidea: Diapriidae) recorded thus far in the Atlantic Dense Ombrophilous Forest are reviewed at the supra specific level. The knowledge about the diversity of Belytinae in the Atlantic Forest is relatively poor, although these parasitoids may play a key role in the natural regulation of populations of the Mycetophilidae and Sciaridae (Diptera). The material used in this study comes mostly from standardized collections in 18 regularly spaced sites, from Paraíba to Santa Catarina Brazilian states, between 2000 and 2002, by the project "Richness and diversity of Hymenoptera and Isoptera along a latitudinal gradient in the Atlantic Forest – the eastern Brazilian rain forest" (Biota/SP – FAPESP). At each location ten Malaise traps and a hundred Moericke traps were installed, both along two parallel transects spaced 100 m from each other. Further, a similar effort for the sweeping of vegetation was applied at each locality, being each sweeping sample the result of 5 minutes of sweeping. Traps, and sweeping of vegetation in the summed localities yielded a total of 1,241 Belytinae specimens, of which we recognize 115 morphospecies in eight genera (Aclista, Belyta, Cinetus, Odontopsilus, Scorpioteleia, Lyteba, Tropicopsilus and Camptopsilus). A further belytine genus (Miota), recorded in similar environment, was found at the collection of the Federal University of Espírito Santo and added to the list, totalling nine here keyed genera; for each genus we include a diagnosis, comments and a discussion on its records, distribution and biology; we also provide twenty-two plates with 102 figures (93 photographs and 9 maps).

KEY-WORDS: Belytinae; Diaprioidea; Proctotrupeoidea; Key for genera; Atlantic Forest.

INTRODUCTION

Diapriidae encompasses relatively small, very diverse and rich in species parasitoid wasps, belonging to the order Hymenoptera. Until recently, Diapriidae was included by most authors in Proctotru-

peoidea, with four recognized subfamilies: Belytinae, Ismarinae, Ambositrinae and Diapriinae. Sharkey *et al.* (2012), based on morphological and molecular analyses, suggested that Ismarinae should be elevated to family rank and proposed the superfamily Diaprioidea (split from Proctotrupeoidea) composed by Is-

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maridae, Diapriidae, Monomachidae and Maamingidae.

Until today, some 2,300 Diapriidae species have been described in 197 genera worldwide, of which 79 recorded in the Neotropical Region (Arias-Penna, 2003; Gillott, 2005). The Neotropics must, however, house thousands of diapriid species, since Hanson & Gauld (2006) estimated that some 1,000 species shall occur in Costa Rica only. Moreover, the Diapriidae species have not been adequately studied in most tropical areas of the world (Masner, 1995). Literature enabling the identification of diapriids species is strongly biased towards European faunas; it is rather common also that elsewhere diapriids taxonomy is considered mostly at the supra specific level (Yoder, 2007). Naumann (1982) presented the diagnostic characteristics of the Neotropical Ambositrinae and Masner & García (2002) a key for the identification of Diapriinae genera of the New World, but there is no identification key for the Neotropical Belytinae genera (see Hanson & Gauld, 2006).

Belytinae is perhaps the Diapriidae subfamily that comparatively displays most characters in plesiomorphic state, based on both morphology and selection of favourite hosts; the forewing confirms this pattern, venation usually with three closed cells (costal, medial, and radial) considered as plesiomorphic for the family. The metasoma bears a relatively large tergite and a synapomorphy that defines the subfamily: two longitudinal grooves on the sternite 2, in which the lateral margins of tergite 2 fit; this groove may continue on the following sternite, sometimes supplemented by a ridge. The gaster is completely surrounded anteriorly by the petiole, which junction is clearly visible from above with no part of the junction covered by the tergite 2. The antenna usually has 13 flagellomeres in females (rarely 12 or only 10), 12 in males, with flagellomere 1 sexually modified (Naumann, 1991; Goulet & Huber, 1993).

We know relatively little about the hosts of Belytinae because they are relatively seldom collected. It's believed, however, that the Belytinae are parasitoids of larvae and pupae of Mycetophilidae and Sciaridae (Diptera), hosts that live in macrofungi, rotten wood, humus, plant root, leaf litter and similar environments (Chambers, 1971; Huggert, 1979; Dreistadt, 2001). There is no information in the literature about Belytinae's main strategies of parasitoidism (koinobiontism or idiobiontism), but considering that Diapriinae are koinobionts (Hanson & Gauld, 2006), it is plausible that Belytinae displays similar syndrome.

The subfamily is cosmopolite and generally found in wet and shady habitats such as forests,

marshlands, peatbogs and wet meadows. A few Belytinae, for example, *Belyta depressa* Thomson, 1858, are able to live in open and dry habitats such as grasslands (Macek, 1996). There are 24 genera of Belytinae recorded in the Neotropical Region (Arias-Penna, 2003; Hanson & Gauld, 2006); in South America several undescribed genera have been recognized and three genera may have many novelties at the specific level, *Gladicauda* Early, 1980, *Masnerolyta* Buhl, 1997 and *Masneretus* Buhl, 1997 (Loiácono, 1988; Buhl, 1997). In Brazil 10 genera (*Acidopsilus* Kieffer, 1909, *Aclista* Förster, 1856, *Belyta* Jurine, 1807, *Camptopsilus* Kieffer, 1908, *Lyteba* Thompson, 1858, *Miota* Förster, 1856, *Odontopsilus* Kieffer, 1909, *Scorpioteleia* Ashmead, 1897, *Therinopsilus* Kieffer, 1909 and *Tropidopsilus* Kieffer, 1908) and only two species (*Tropidopsilus laticeps* Kieffer, 1909 and *Therinopsilus pubescens* Kieffer, 1909) have been officially recorded (Kieffer, 1909; Azevedo *et al.*, 2015; Margaría, 2016).

The Brazilian Atlantic Forest is one of the most biodiverse biomes in the world but, at the same time, one of the most endangered by anthropic action (Myers *et al.*, 2000). Covering approximately 30 degrees of latitude, between about 10 degrees South of the Equator and the tropic of Capricorn, the Atlantic Forest occurs under the conjugation of two climatic factors (average temperature about 25°C and relatively high air humidity) largely associated with its wealth of fauna and flora (Monteiro, 2003). Although most of the Atlantic Forest is in danger, the biome still shelters comparatively many endemic species of vascular plants, amphibians, reptiles, birds and mammals (Myers *et al.*, 2000).

The Atlantic Dense Ombrophilous Forest is characterized by the dominant presence of phanerophytes, which occur in moist environments under relatively hot climate with little annual variation and not subject to dry periods throughout the year. The presence of large amounts of woody lianas and epiphytes is a characteristic that distinguishes it from other classes of plant formations (Veloso *et al.*, 1991).

There is little knowledge about the Belytinae or even on the parasitoid Hymenoptera in general from the Atlantic Forest. The scope of this paper is to present an identification key, diagnoses, comments, photographs and maps of the Belytinae genera thus far recorded in the Atlantic Dense Ombrophilous Forest.

MATERIAL AND METHODS

We obtained almost all here studied specimens of Belytinae (except for representatives of *Miota* de-

TABLE 1: Geographical coordinates of localities selected for wasps (*sensu lato*) collecting by the project “Richness and Diversity of Hymenoptera and Isoptera along a latitudinal gradient in the Atlantic forest – the Eastern Brazilian Rain Forest” (Biota/SP – FAPESP), from south to north, in decimal degrees, altitude above sea level (a.s.l.) in metres and sampling month and year.

Localities	Latitude	Longitude	Altitude (M)	Sampling Month/Year
CEPA Rugendas (São Bento do Sul, SC)	26,323	49,307	585	10, 2001
CEPA Vila da Glória (São Francisco do Sul, SC)	26,227	48,666	9	10, 2001
Parque Estadual do Pau Oco (Morretes, PR)	25,576	48,898	406	4, 2002
Estação Ecológica Jurúia-Itatins (Peruibe, SP)	24,518	47,201	20	4-5, 2002
Parque Estadual de Intervalos (Ribeirão Grande, SP)	24,304	48,364	848	12, 2000
Estação Biológica de Boracéia (Salesópolis, SP)	23,652	45,896	876	3-4, 2001
Parque Estadual Serra do Mar (Ubatuba, SP)	23,361	44,822	14	1, 2002
Reserva Biológica do Tinguá (Nova Iguaçu, RJ)	22,576	43,436	156	3, 2002
Parque Estadual do Desengano (Santa Maria Madalena, RJ)	21,984	41,952	521	4, 2001
Estação Biológica de Santa Lúcia (Santa Teresa, ES)	19,971	40,535	762	4, 2002
Reserva Biológica de Sooretama (Linhares, ES)	18,967	40,134	76	3, 2002
Estação Ecológica Pau Brasil (Porto Seguro, BA)	16,388	39,182	96	5, 2002
Mata da Esperança (Ilhéus, BA)	14,766	39,066	10	5, 2002
Reserva de Sapiroanga (Mata de São João, BA)	12,561	38,045	34	7, 2001
Reserva Ecológica do Castro (Craсто, SE)	11,378	37,417	22	7-8, 2001
Reserva Biológica Pedra Talhada (Quebrangulo, AL)	9,316	36,466	408	9, 2002
Horto Dois Irmãos (Recife, PE)	8,009	34,942	18	7-8, 2002
Mata do Buraquinho (João Pessoa, PB)	7,14	34,86	9	7-8, 2002

posited at the Federal University of Espírito Santo) during the project “Richness and Diversity of Hymenoptera and Isoptera along a latitudinal gradient in the Atlantic forest – the Eastern Brazilian Rain Forest” (Biota/SP – FAPESP), between the years of 2000 and 2002. This project collected wasps (*sensu lato*) in 18 locations listed in Table 1 and mapped in Fig. 1.

When the objective is to census species in a given geographical area in order to estimate the maximum number of groups with different ecological and behavioural characteristics, authors recommend the simultaneous use of various collecting techniques (for instance, Noyes, 1989). In the case, we applied three collecting techniques: Malaise (Townes, 1962) (flight interception) and Moericke traps (attractive yellow trays) and sweeping of vegetation.

The standardized guidelines for collecting wasps suggest the application of a fixed number of Malaise and Moericke traps at each location, as well as the application of a constant effort for the sweeping of vegetation in these locations (Gonçalves & Brandão, 2008). Although we did not analyze the data quantitatively, we employed the same effort in each locality to afford comparisons. At each location ten Malaise traps were installed and remained in the field for two consecutive periods of three days; the material collected at each period resulting in a sample. Of these traps, five were set inside the forest and five in trails or near streams, in two parallel transects spaced 100 m from each other; the traps were spaced 100 m between each

as well, covering a total area of 50,000 m². Similarly, at each location a hundred Moericke traps were set for six consecutive days. In two parallel transects spaced 100 m from each other, 10 marked points were spaced 50 cm² between each other. At each point a group of five traps spaced 2 m between each was set perpendicularly to the transect axis. For the sweeping of vegetation sweeping nets were used near the locations where the traps were installed; each sweeping sample was the result of five minutes of sweeping.

The collecting periods occurred preferably in the rainy months, which generally show greater wealth of fauna; therefore, even if we sampled different regions of the gradient at different periods of the year, collections were under similar climatic conditions. The sampling points were georeferenced with the aid of a Garmim eTrex GPS receiver. The collected Belytinae were mounted, labelled and deposited in the collection of the Zoology Museum of USP (University of São Paulo).

We identified Belytinae specimens under a stereomicroscope and with the aid of dichotomous keys to subfamilies (Hanson & Gauld, 2006) or using information from Yoder *et al.* (2006) web site.

The terms applied to morphological structures used in diagnoses and key were taken from Nixon (1957), Macek (1995, 1996, 2005, 2006, 2007), Masner & García (2002), Mikó *et al.* (2007), Melo *et al.* (2012) and Hymenoptera Anatomy Ontology project (HAO), using the proofing tool available through the

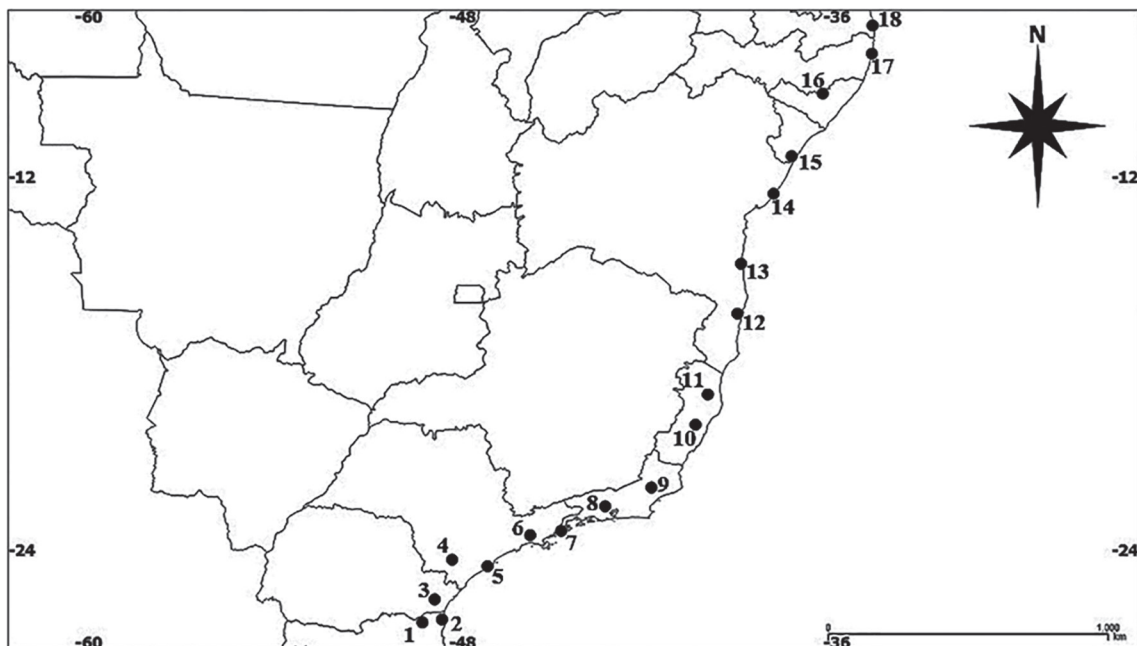


FIGURE 1: Detail of Brazil map (scale of 1:1000) highlighting the localities (1-18) selected for wasps (*sensu lato*) collecting by the project “Richness and Diversity of Hymenoptera and Isoptera along a latitudinal gradient in the Atlantic forest – the Eastern Brazilian Rain Forest” (Biota/SP – FAPESP). (1) CEPA Rugendas, SC; (2) CEPA Vila da Glória, SC; (3) Parque Estadual do Pau Oco, PR; (4) Parque Estadual de Intervalos, SP; (5) Estação Ecológica Juréia-Itatins, SP; (6) Estação Biológica de Boracéia, SP; (7) Parque Estadual Serra do Mar, SP; (8) Reserva Biológica do Tinguá, RJ; (9) Parque Estadual do Desengano, RJ; (10) Estação Biológica de Santa Lúcia, ES; (11) Reserva Biológica de Sooretama, ES; (12) Estação Ecológica Pau Brasil, BA; (13) Mata da Esperança, BA; (14) Reserva de Sapiroanga, BA; (15) Reserva Ecológica do Castro, SE; (16) Reserva Biológica Pedra Talhada, AL; (17) Horto Dois Irmãos, PE; (18) Mata do Buraquinho, PB.

Hymenoptera Glossary (2016) (Yoder *et al.*, 2010). We used information recorded during Belytinae specimens’ separation into morphospecies to build the diagnoses and the identification key for the nine identified genera, providing information from bibliographical references, and pointing out possibly unique characteristics (autapomorphies). In the diagnoses, we present morphological characters states from head to metasoma, followed by wings and legs. In the key, the term “mandibles relatively short” means that they are as long as or shorter than the distance between the ventrolateral margins of the head, taken near the bases of the mandibles, “mandibles short to long” that they are shorter, as long as, or longer than this distance and “mandibles short” that they are shorter than this distance. Due the lack of a complete well supported venational scheme for the Belytinae forewing we present the adopted forewing veins terminology in the Fig. 2 to facilitate the use of the key.

To capture high-resolution photographs of the morphospecies by a process of self-assembly of images we employed a Leica M205C[®] stereomicroscope coupled to a Leica DFC 295[®] camera. To acquire and self-assembly images we used Leica Application Suite V3.Ink program. We then choose those pictures that best illustrate the highlighted characters. To clean and

edit the photographs we used Photoshop image-editing application, from the Adobe Suite CS4 package. The plates of photographs (Appendix 1, Figs. 3-21) show almost all key’s morphological characters states and at least part of the interspecific variation (*e.g.*, variation in first male flagellomere’s modification and in metasoma morphology in dorsal view) of some genera such as *Aclista* and *Cinetus*.

For the construction of the genera occurrence maps (Appendix 2, Figs. 22-24) we used Google Earth, the Quantum GIS 2.8 (Quantum GIS Development Team, 2014) and the Photoshop image-editing program, from the Adobe Suite CS4 package.

RESULTS

Within the Hymenoptera collected by the described techniques along the 18 Atlantic Forest localities during the above-mentioned project we found 1,241 Belytinae specimens of 115 morphospecies, distributed in eight genera (*Aclista* Förster, 1856, *Belyta* Jurine, 1807, *Camptopsilus* Kieffer, 1908, *Cinetus* Jurine, 1807, *Lyteba* Thompson, 1858, *Odontopsilus* Kieffer, 1909, *Scorpioteleia* Ashmead, 1897 and *Tropidopsilus* Kieffer, 1908). Dr. Lubomir Masner (Canada

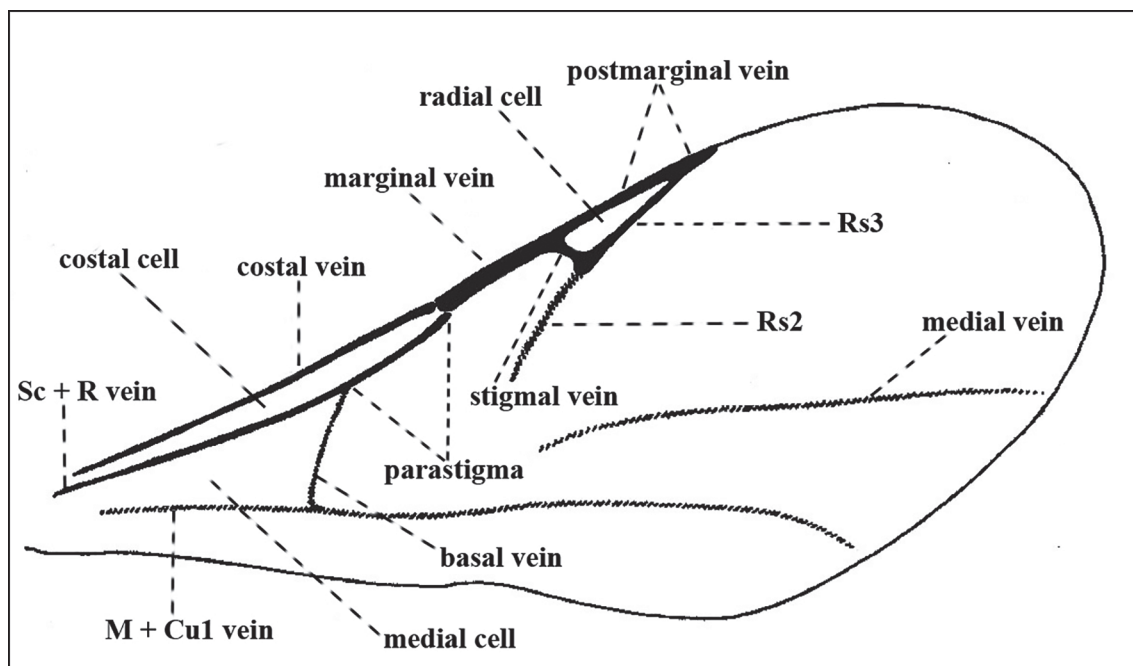


FIGURE 2: Venational scheme for the Belytinae forewing, modified from Nixon (1957).

Department of Agriculture, Ottawa) further identified two male specimens of a *Miota* Förster, 1856 single morphospecies also collected in the Atlantic Forest, in the Hymenoptera collection of the Federal University of Espírito Santo, summing then nine identified Belytinae genera recorded thus far in the Atlantic Forest.

Before treating each genus, we present the total number of specimens assigned to the genus and how many morphospecies we recognize, although this is only indicative, as we did not revise extensively the subfamily.

Diagnoses of the Belytinae genera found in the Atlantic Dense Ombrophilous Forest

Aclista Förster, 1856

(Figs. 5A, 12A, 15C, 15F, 18, 19, 20A, 20C-H, 21, 24A)

Total of specimens found: 350 (177 females and 173 males) in 28 morphospecies.

Diagnosis: Most species with 2 and 5 mm in size; sickle-shaped mandibles (Figs. 12A, 18A); malar keel present or absent; antenna 14 (Fig. 21B) or 15-segmented in females (Figs. 21A, 21C-F), 14-segmented in males; scape considerably shorter than head width seen from above; first segment of male flagellum with

(Figs. 20C-H) or without (Fig. 20A) modification. Pronotal shoulder angular (dentiform) (Fig. 18C), epomia sharply defined and extending from the pronotal shoulder almost as far as the front coxa; presence (Figs. 18E, 19A) or absence (Figs. 19B-C) of projection in the metascutellum. Forewing with closed radial cell (Figs. 5A, 18D); marginal vein at least two-thirds as long as the parastigma (Figs. 5A, 18D).

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 13-16.x.2001(5), 16-19.x.2001(3), A.M. Pentead-Dias e eq. col., 7 ♀♀/1 ♂; São Francisco do Sul, CEPA Vila da Glória, 26°13'40.0"S, 48°40'49.1"W, 14-17.x.2001(8), 17-20.x.2001, A.M. Pentead-Dias e eq. col., 7 ♀♀/2 ♂♂; **Paraná:** Morretes, Parque Estadual do Pau Oco, 25°34'27.9"S, 48°58'46.7"W, 08-11.iv.2002, M.T. Tavares e eq. col., 1 ♀; **São Paulo:** Base Barra Grande, Parque Estadual de Intervalos, 24°18'14.4"S, 48°21'50.4"W, 13-16.xii.2000(13), 10-13.xii.2000(17), 11-14.xii.2000(4), 14-17.xii.2000(1), 12.xii.2000(4), 13.xii.2000(3), M.T. Tavares e eq. col., 26 ♀♀/16 ♂♂; Salesópolis, Estação Biológica de Boracéia, 23°39'06.3"S, 45°53'48.9"W, 30.iii-02.iv.2001, S.T.P. Amarante e eq. col., 1 ♂; Ubatuba, Parque Estadual Serra do Mar, 23°21'43"S, 44°49'22"W, 21.i.2002(33), 22.i.2002(5), 23.i.2002(1), 24.i.2002(24), N.W. Perieto e eq. col., 33 ♀♀/30 ♂♂; Peruíbe, Estação Ecológica Juréia-Itatins, 24°31'06"S, 47°12'06"W,

06.v.2002, M.T. Tavares e eq. col., 1 ♀; **Rio de Janeiro:** Nova Iguaçu, Reserva Biológica do Tinguá, 22°34'32"S, 43°26'09"W, 06-09.iii.2002(1), 05-08.iii.2002(3), 08-11.iii.2002(2), 09-12.iii.2002(2), 08.iii.2002(1), S.T.P. Amarante e eq. col., 4 ♀♀/5 ♂♂; Santa Maria Madalena, Parque Estadual do Desengano, 21°59'03.9"S, 41°57'08.4"W, 16-19.iv.2002(7), 19-22.iv.2002(7), A.M. Pentead-Dias e eq. col., 7 ♀♀/7 ♂♂; **Espírito Santo:** Linhares, Reserva Biológica Sooretama, 19°02'81.3"S, 40°08'58.0"W, 21-24.iii.2002, 06.iv.2002, C.O. Azevedo e eq. col., 2 ♀♀; Santa Teresa, Estação Biológica de Santa Lúcia, 19°58'14.9"S, 40°32'05.8"W, 06-09.iv.2001, C.O. Azevedo e eq. col., 1 ♀; **Bahia:** Ilhéus, Mata Esperança, 14°46'S/39°04'W, 15-18.v.2002(4), 18-21.v.2002(1), 17.v.2002(1), 19.v.2002(1), A.M. Pentead-Dias e eq. col., 5 ♀♀/2 ♂♂; Mata de São João, Reserva de Sapiranga, 12°33'42.1"S, 38°02'43.8"W, 23-26.vii.2001(1), 21.vii.2001(2), 22.vii.2001(2), 24.vii.2001(2), M.T. Tavares e eq. col., 5 ♀♀/2 ♂♂; Porto Seguro, Estação Ecológica Pau Brasil, 16°22'17.7"S, 39°10'55.8"W, 16.v.2002(1), 17.v.2002(3), C.O. Azevedo e eq. col., 1 ♀/3 ♂♂; **Sergipe:** Santa Luzia do Itanhy, Reserva Ecológica do Castro, 11°22'37.9"S, 37°25'01.8"W, 01-04.viii.2001(9), 29.vii-01.viii.2001(10), 02-05.viii.2001(1), 31.vii.2001(14), 01.viii.2001(8), M.T. Tavares e eq. col., 21 ♀♀/21 ♂♂; **Alagoas:** Quebranango, Reserva Biológica Pedra Talhada, 09°18'57.6"S, 36°27'57.6"W, 08-11.ix.2002(61), 11-14.ix.2002(42), 08-14.ix.2002(1), 11.ix.2002(4) A.M. Pentead-Dias e eq. col., 32 ♀♀/76 ♂♂; **Pernambuco:** Recife, Parque dos Dois Irmãos, 08°03'14"S, 34°52'52"W, 17-20.vii.2002(7), 20-23.vii.2002(2), vii.2002(2), S.T.P. Amarante e eq. col., 6 ♀♀/5 ♂♂; **Paraíba:** João Pessoa, Mata do Buraquinho, 07°08'25"S, 35°51'38"W, 28-31.vii.2002(8), 25-28.vii.2002(10), 27.vii.2002(1), vii.2002(1), S.T.P. Amarante e eq. col., 18 ♀♀/2 ♂♂. A.L. Quadros det.

Remarks: *Aclista* Förster, 1856 is a highly variable cosmopolitan genus and one of the most speciose within Diapriidae (Macek, 2007). There are 159 described species of *Aclista* in the world (Johnson, 1992), being *Aclista bakeri* Kieffer, 1909 (Chinandega, Nicaragua), *Aclista polyrhysis* Kieffer, 1909 (Granada, Nicaragua) and *Aclista xanthosema* Kieffer, 1916 (Mexico) recorded in the Neotropics (Kieffer, 1909, 1916). There are estimated one hundred species only in the region (Hanson & Gauld, 2006). Most *Aclista* species were described by Kieffer (1916), but recognition is difficult using only these descriptions. Existing identification keys (Nixon, 1957; Wall, 1967; Kozlov,

1978 and Macek, 2007) are not efficient for the identification of most recognized *Aclista* species (Macek, 2005).

Distribution: Cosmopolite. *Aclista* species were recorded throughout the Atlantic Forest (Fig. 24A).

Biology: Poorly known; one female was bred from a mycetophilid fly pupa (Nixon, 1957).

Belyta Jurine, 1807

(Figs. 4E-F, 6, 7, 12B, 15D-E, 23C)

Total of specimens found: 285 (158 females and 127 males) in 18 morphospecies.

Diagnosis: Small (1.8 mm) to large (7 mm) specimens; antenna 15-segmented in females, 14-segmented in males; the form of female antenna varies, with flagellar segments gradually enlarged towards the apex, filiform or wider at the middle; mandibles short (mandible length shorter than the distance between the ventrolateral margins of the head, near the bases of the mandibles), asymmetrical, with wide base and wide inner tooth inverted backwards (Figs. 6A, 12B); subantennal furrows percurrent, confluent with subantennal rugosity; antennal sockets more or less projected anterodorsally. Body slender, a bit depressed or totally flattened in lateral view, female's mesosoma more flattened than of male's (Figs. 6C, 6E); pronotum more or less cervicoid subdivided into pronotal neck and pronotal collar (Fig. 7); pronotal shoulder rounded (Fig. 7A) or angular (Fig. 7B). Forewing with closed (Fig. 4E) or open (Fig. 4F) radial cell; marginal vein shorter than parastigma (Figs. 4E-F).

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 13-16.x.2001, A.M. Pentead-Dias e eq. col., 2 ♀♀; São Francisco do Sul, CEPA Vila da Glória, 26°13'40.0"S, 48°40'49.1"W, 14-17.x.2001(11), 17-20.x.2001(3), 17.x.2001(2), A.M. Pentead-Dias e eq. col., 11 ♀♀/5 ♂♂; **São Paulo:** Base Barra Grande, Parque Estadual de Intervales, 24°18'14.4"S, 48°21'50.4"W, 13-16.xii.2000(4), 10-13.xii.2000(1), 11-14.xii.2000(2), 14-17.xii.2000(3), 12.xii.2000(1), 13.xii.2000(3), 15.xii.2000(1), M.T. Tavares e eq. col., 9 ♀♀/6 ♂♂; Ubatuba, Parque Estadual Serra do Mar, 23°21'43"S, 44°49'22"W, 21.i.2002(30), 22.i.2002(16), 23.i.2002(2), 24.i.2002(5), N.W. Periotto e eq. col., 34 ♀♀/19 ♂♂; Peruíbe, Estação Ecológica Juréia-Itatins,

24°31'06"S, 47°12'06"W, 05.v.2002, M.T. Tavares e eq. col., 1 ♀; **Rio de Janeiro:** Nova Iguaçu, Reserva Biológica do Tinguá, 22°34'32"S, 43°26'09"W, 06-09.iii.2002(1), 05-08.iii.2002(5), 08-11.iii.2002(14), 09-12.iii.2002(30), 07.iii.2002(5), 08.iii.2002(3), S.T.P. Amarante e eq. col., 30 ♀♀/28 ♂♂; Santa Maria Madalena, Parque Estadual do Desengano, 21°59'03.9"S, 41°57'08.4"W, 16-19.iv.2002(14), 19-22.iv.2002(14), 21.iv.2002(2), A.M. Pentead-Dias e eq. col., 13 ♀♀/17 ♂♂; **Bahia:** Ilhéus, Mata Esperança, 14°46'S/39°04'W, 15-18.v.2002(1), 18-21.v.2002(6), 17.v.2002(3), A.M. Pentead-Dias e eq. col., 8 ♀♀/2 ♂♂; Mata de São João, Reserva de Sapiranga, 12°33'42.1"S, 38°02'43.8"W, 19-22.vii.2001(3), 22-25.vii.2001(3), 20-23.vii.2001(3), 21.vii.2001(2), 24.vii.2001(4), M.T. Tavares e eq. col., 9 ♀♀/6 ♂♂; Porto Seguro, Estação Ecológica Pau Brasil, 16°22'17.7"S, 39°10'55.8"W, 16.v.2002(1), 17.v.2002(1), 18.v.2002(3), 20.v.2002(1), 21.v.2002(15), C.O. Azevedo e eq. col., 7 ♀♀/14 ♂♂; **Sergipe:** Santa Luzia do Itanh, Reserva Ecológica do Castro, 11°22'37.9"S, 37°25'01.8"W, 01-04.viii.2001(20), 30.vii-02.viii.2001(5), 02-05.viii.2001(20), 01.viii.2001(9), M.T. Tavares e eq. col., 25 ♀♀/29 ♂♂; **Alagoas:** Quebrangulo, Reserva Biológica Pedra Talhada, 09°18'57.6"S, 36°27'57.6"W, 08-11.ix.2002(7), 11-14.ix.2002(1), 11.ix.2002(1), A.M. Pentead-Dias e eq. col., 8 ♀♀/1 ♂; **Pernambuco:** Recife, Parque dos Dois Irmãos, 08°03'14"S, 34°52'52"W, 18-21.vii.2002, S.T.P. Amarante e eq. col., 1 ♀. A.L. Quadros det.

Remarks: The genus was established for *Belyta bicolor* Jurine, 1807, by monotypy. Kieffer's (1916) concept of *Belyta* is based on the flattened mesosoma. All species classified by Kieffer under *Belyta* (except for one) display the diagnostic characters accepted for the genus, still a reliable diagnostic character for *Belyta*, but only for females; in males the mesosoma is generally convex in side view. The flattened female body might represent an adaptation for facultative terrestrial habits (search for hosts), contrary to the predominantly free-living activities of males. Sexual dimorphism of *Belyta* species had not been fully appreciated, and conspecific males and females were described as different species, sometimes being even assigned to different genera (*Pantoclis*, *Xenotoma*, *Aclista*) (Macek, 1996). There are 91 described species of *Belyta* in the world (Johnson, 1992), being *Belyta rufipes* Kieffer, 1906 the only species recorded in the Neotropics (San Marcos, Nicaragua) (Kieffer, 1906) thus far; Hanson & Gauld (2006) estimated some twenty species in this region. Nixon's (1957) identification key is

reliable to separate European species, although with greater focus on the British fauna, and suggests how a thorough re-evaluation of previously described species is needed. Subsequently, keys were published for the Finland (Hellen, 1964), Switzerland (Wall, 1967), European part of USSR (Kozlov, 1978) and SW-Germany (Wall, 1993) species. Macek (1996) revised and keyed out the 16 European *Belyta* species he recognized as valid.

Distribution: *Belyta* is cosmopolite (Hanson & Gauld, 2006). In the Atlantic Forest *Belyta* species have been recorded from Santa Catarina to Pernambuco (Fig. 23C).

Biology: Most species are polyvoltine parasitoids of Mycetophilidae (Hanson & Gauld, 2006). Some species may show affinity to a specific plant formation (Macek, 1996).

***Camptopsilus* Kieffer, 1908 (Figs. 5B, 15A-B, 16, 23A)**

Total of specimens found: 173 (127 females and 46 males) in 48 morphospecies.

Diagnosis: Overall size between 2.15 and 3.9 mm; sickle-shaped mandibles short to long (mandibular length as long as, shorter or longer than the distance between the ventrolateral margins of the head, near the bases of the mandibles) (Fig. 16A); distance between toruli relatively long, 1.5 to 2.5 times the diameter of each torulus (Fig. 16A); antenna 15-segmented and filiform in females, 14-segmented in males. Posterior extremities of the notauli directed to points outside to scutellar fovea, very close or a little distant from the fovea lateral margins (Figs. 15A-B, 16D); scutellar fovea trapezoidal, sometimes almost circular [divergent side margins (straight or curved) and the margin near the notauli straight and shorter than the distal margin, which is straight or slightly curved] (Figs. 15A-B, 16D); teeth present or absent, when present one on each scutellar bridge, near the posterolateral margin of the scutellar fovea; semicircular projection, tubercle (Fig. 16C) or spine on the metascutellum; carina between the medial keel and the internal plica present (Figs. 15A, 16D) or absent (Fig. 15B). Forewing with radial cell closed and at least 2.3 times longer than marginal vein (Figs. 5B, 16G). Petiole relatively long, 6-11 times longer than its smallest width, with little wisps of short hair on the ventral side (Figs. 16B, 16F).

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 13-16.x.2001(8), 16-19.x.2001(4), 15.x.2001(5), A.M. Penteado-Dias e eq. col., 10 ♀♀/7 ♂♂; São Francisco do Sul, CEPA Vila da Glória, 26°13'40.0"S, 48°40'49.1"W, 17-20.x.2001, A.M. Penteado-Dias e eq. col., 2 ♀♀; **São Paulo:** Base Barra Grande, Parque Estadual de Intervalos, 24°18'14.4"S, 48°21'50.4"W, 13-16.xii.2000(11), 10-13.xii.2000(2), 11-14.xii.2000(3), 14-17.xii.2000(7), 12.xii.2000(8), 13.xii.2000(13), 15.xii.2000(8), M.T. Tavares e eq. col., 40 ♀♀/12 ♂♂; Salesópolis, Estação Biológica de Boracéia, 23°39'06"S, 45°53'48"W, 30.iii-02.iv.2001, S.T.P. Amarante e eq. col., 1 ♀; Ubatuba, Parque Estadual Serra do Mar, 23°21'43"S, 44°49'22"W, 21.i.2002(2), 22.i.2002, 23.i.2002, 24.i.2002, N.W. Perioto e eq. col., 3 ♀♀/2 ♂♂; **Rio de Janeiro:** Nova Iguaçu, Reserva Biológica do Tinguá, 22°34'32"S, 43°26'09"W, 06-09.iii.2002(2), 07.iii.2002(2), S.T.P. Amarante e eq. col., 4 ♀♀; **Espirito Santo:** Linhares, Reserva Biológica Sooretama, 18°58'02.8"S, 40°07'53.6"W, 21-24.iii.2002, 22.iii.2002, C.O. Azevedo e eq. col., 1 ♀/1 ♂; Santa Teresa, Estação Biológica de Santa Lúcia, 19°58'16.7"S, 40°32'06.9"W, 09-12.iv.2001, C.O. Azevedo e eq. col., 2 ♀♀; **Bahia:** Ilhéus, Mata Esperança, 14°46'S/39°04'W, 15-18.v.2002, 18-21.v.2002, 17.v.2002, A.M. Penteado-Dias e eq. col., 3 ♀♀; Mata de São João, Reserva de Sapiranga, 12°33'42.1"S, 38°02'43.8"W, 22.vii.2001, 24.vii.2001, M.T. Tavares e eq. col., 1 ♀/1 ♂; Porto Seguro, Estação Ecológica Pau Brasil, 16°22'17.7"S, 39°10'55.8"W, 16.v.2002(9), 17.v.2002(2), 18.v.2002(1), 20.v.2002(2), C.O. Azevedo e eq. col., 8 ♀♀/6 ♂♂; **Sergipe:** Santa Luzia do Itanhy, Reserva Ecológica do Castro, 11°22'43.9"S, 37°25'03.0"W, 02-05.viii.2001, 01.viii.2001(2), M.T. Tavares e eq. col., 2 ♀♀/1 ♂; **Alagoas:** Quebrangulo, Reserva Biológica Pedra Talhada, 09°18'57.6"S, 36°27'57.6"W, 08-11.ix.2002(14), 11-14.ix.2002(42), 08-14.ix.2002(1), 11.ix.2002(5), A.M. Penteado-Dias e eq. col., 47 ♀♀/15 ♂♂; **Pernambuco:** Recife, Parque dos Dois Irmãos, 08°03'14"S, 34°52'52"W, 17-20.vii.2002(2), vii.2002, S.T.P. Amarante e eq. col., 2 ♀♀/1 ♂; **Paraíba:** João Pessoa, Mata do Buraquinho, 07°08'25"S, 35°51'38"W, vii.2002, S.T.P. Amarante e eq. col., 1 ♀. A.L. Quadros det.

Remarks: There is only one described *Camptopsilus* species in the world (Johnson, 1992), *C. nigriceps* Kieffer, 1909, which has been recorded in the Neotropics (Cayamas, Cuba) (Kieffer, 1909). Nevertheless, the number of *Camptopsilus* species estimated

for this region is 60 (Hanson & Gauld, 2006). Like *Aclista*, this is a highly variable genus.

Distribution: Neotropics and Australia (Hanson & Gauld, 2006). In our survey, the genus was recorded throughout the Atlantic Forest, from Santa Catarina to Paraíba states (Fig. 23A).

Biology: Unknown.

Cinetus Jurine, 1807

(Figs. 4B, 4D, 8, 9, 12C, 14B, 22C)

Total of specimens found: 6 (females) in four morphospecies.

Diagnosis: Overall size between 2 and 5 mm; mandibles short (mandible length as long as or shorter than the distance between the ventrolateral margins of the head, near the bases of the mandibles) (Figs. 9A, 12C); antenna 15-segmented in females, 14-segmented in males. Epomia always well developed; notauli complete, slightly diverging posteriorly (Fig. 9E); scutellar fovea subquadrate, relatively large (Fig. 9E); posterior extremity of the notaulus directed to a point inside this fovea (Fig. 9E); carina between the medial keel and the internal plica present (Fig. 9C) or absent. Marginal vein as long as or shorter than radial cell, and as long as or slightly shorter than parastigma (Figs. 4B, 4D); third gaster segment almost always very long, dorsoventrally flattened or in the form of a truncated cone, the open end of which is more or less tubular; the gaster apical segments can be otherwise modified, rarely 2-3 clearly defined simple ring segments beyond the large tergite (Figs. 8, 9B); male genitalia with fused volsellae and dentes.

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 13-16.x.2001, A.M. Penteado-Dias e eq. col., 2 ♀♀; **São Paulo:** Base Barra Grande, Parque Estadual de Intervalos, 24°18'14.4"S, 48°21'50.4"W, 12.xii.2000, 13.xii.2000, M.T. Tavares e eq. col., 2 ♀♀; **Rio de Janeiro:** Santa Maria Madalena, Parque Estadual do Desengano, 21°59'03.9"S, 41°57'08.4"W, 19-22.iv.2002, A.M. Penteado-Dias e eq. col., 1 ♀; **Alagoas:** Quebrangulo, Reserva Biológica Pedra Talhada, 09°18'57.6"S, 36°27'57.6"W, 11-14.ix.2002, A.M. Penteado-Dias e eq. col., 1 ♀. A.L. Quadros det.

Remarks: *Cinetus* species share some character states with *Scorpioteleia*. The two genera can be easily dis-

tinguished one from each other by the venation; in *Scorpioteleia* the marginal vein is always clearly shorter than the radial cell and parastigma (Figs. 4A, 4C) (Macek, 2006). There are fifty nine described species of *Cinetus* in the world (Johnson, 1992; Buhl, 1998; Rajmohana, 2006), being *Cinetus tabidus* Spinola, 1851 the only species recorded in the Neotropics (Santa Rosa de los Andes, Chile) (Spinola, 1851) thus far, but there may be up to twenty species in the Region (Hanson & Gauld, 2006). Nixon (1957)'s identification key is reliable for the European species, with emphasis on the British fauna.

Distribution: Cosmopolite (Hanson & Gauld, 2006). In the Atlantic Forest, the six specimens were recorded in Alagoas state and in the southern portion of the biome, from Santa Catarina to Rio de Janeiro (Fig. 22C).

Biology: Parasitoids of Mycetophilidae (Hanson & Gauld, 2006).

***Lyteba* Thomson, 1859**
(= ***Oxylabis* auct., nec Förster 1856**)
(Figs. 3, 5C-D, 14A, 23B)

Total of specimens found: 38 (16 females and 22 males) in five morphospecies.

Diagnosis: Mostly relatively medium-sized (2-4 mm); occipital carina complete; hypostomal bridge narrow; posterior keel of toruli medially produced; antenna 15-segmented in females (Fig. 3E), 14-segmented in males. Mesosoma wider than high; presence of teeth, one on each scutellar bridge, near the posterolateral margin of the scutellar fovea (Fig. 3C); lateral fovea smooth with dense pubescence (Fig. 3D); metascutellum as a tubercle or spine in lateral view (Fig. 14A). Forewing densely pubescent; Radial cell of forewings open (Fig. 5C) and in some species the Rs3 continues as a weak trail that reaches the anterior margin of the wing (Fig. 5D); stigmal vein almost perpendicular to the marginal vein (Figs. 5C-D); marginal vein longer than parastigma (Figs. 5C-D). Petiole relatively short (Fig. 3B) and at least as long as wide; basal sculpture of macrotergite with long medial furrow and short lateral striation; ovipositor short.

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 13-16.x.2001(4), 16-19.x.2001(2), 15.x.2001, A.M. Pentead-Dias e eq. col.,

2 ♀♀/5 ♂♂; São Francisco do Sul, CEPA Vila da Glória, 26°13'40.0"S, 48°40'49.1"W, 14-17.x.2001, 17-20.x.2001, A.M. Pentead-Dias e eq. col., 2 ♀♀; **São Paulo:** Base Barra Grande, Parque Estadual de Intervales, 24°18'14.4"S, 48°21'50.4"W, 10-13.xii.2000(6), 11-14.xii.2000(3), 14-17.xii.2000(2), 12.xii.2000(2), 13.xii.2000(5), M.T. Tavares e eq. col., 8 ♀♀/10 ♂♂; Salesópolis, Estação Biológica de Boracéia, 23°39'01.8"S, 45°52'55.5"W, 04.iv.2001, S.T.P. Amarante e eq. col., 1 ♂; **Rio de Janeiro:** Nova Iguaçu, Reserva Biológica do Tinguá, 22°34'32"S, 43°26'09"W, 09-12.iii.2002, S.T.P. Amarante e eq. col., 1 ♂; Santa Maria Madalena, Parque Estadual do Desengano, 21°59'03.9"S, 41°57'08.4"W, 16-19.iv.2002(4), 19-22.iv.2002(2), 18.iv.2002, A.M. Pentead-Dias e eq. col., 2 ♀♀/5 ♂♂; **Espírito Santo:** Santa Teresa, Estação Biológica de Santa Lúcia, 19°58'16.7"S, 40°32'06.9"W, 06-09.iv.2001, C.O. Azevedo e eq. col., 1 ♀; **Alagoas:** Quebrangulo, Reserva Biológica Pedra Talhada, 09°18'57.6"S, 36°27'57.6"W, 11-14.ix.2002, A.M. Pentead-Dias e eq. col., 1 ♀. A.L. Quadros det.

Remarks: The name *Lyteba* was proposed by Thomson (1859) for *Belyta bisulca* Nees, 1834. Marshall (1873) synonymized *Lyteba* under *Oxylabis* Förster, 1856. Apparently, Förster (1856) published the original diagnosis of *Oxylabis* without having seen any of the Nees species, *Oxylabis picipes* (Nees ab Esenbeck, 1834) and *Oxylabis jurini* (Nees ab Esenbeck, 1834), which he originally included in his genus *Oxylabis*. The disputable presence of the metascutellum spine as stated in the Nees' brief diagnosis of *O. picipes* was the main character upon which Förster (1856) based his *Oxylabis*, and it became the main diagnosis character of *Oxylabis* henceforth accepted by later authors. Consequently, some of the authors assigned to *Oxylabis* other species possessing this character state, including some species of *Pantoclis* Förster, 1856 with closed radial cell. However, comparative analysis on the frequency of this character within other Belytinae evinced the presence of the metascutellum spine in other unrelated species, thus proving its homoplastic status in Belytinae (Macek, 1995). Furthermore, there is a high rate of variation in the development of the metascutellum spine in *Lyteba bisulca* (Nees ab Esenbeck, 1834), in which this structure is either reduced to a mere tubercle or missing at all (Macek, 1995). Kieffer (1916) recognized 25 species of *Oxylabis* (18 Palearctic; 6 Nearctic; 1 Neotropical). Nixon (1957) keyed out four European species. Johnson (1992) listed 37 *Lyteba* species names in total, including *Oxylabis neotropica* Kieffer, 1909, the only

species officially recorded in the Neotropics (Mapi, Bolivia). Macek (1995) revised and keyed out the West Palearctic species and recognized only four *Lyteba* species: *L. bisulca* (Nees ab Esenbeck, 1834), *L. canaliculata* (Kieffer, 1907), *L. carinifrons* (Kieffer, 1909) and *L. pectinifer* Macek, 1995; many nominal species in Johnson's catalogue were synonymized by Macek (1995) with *L. bisulca* and one of them with *L. canaliculata*.

Distribution: Holarctic, Oriental and the Neotropics (Macek, 1995). In our study, the genus was recorded in Alagoas state and from Santa Catarina to Espírito Santo (Fig. 23B).

Biology: Nothing is known about *Lyteba* hosts. Adults may be encountered from spring to autumn with at least one species (*L. bisulca* Nees ab Esenbeck, 1834) probably overwintering in the adult stage (Macek, 1995).

***Miota* Förster, 1856**
(Figs. 11, 24C)

Total of specimens found: 2 (males) in one morphospecies.

Diagnosis: Medium sized (3–4 mm); mandibles short (mandible length shorter than the distance between the ventrolateral margins of the head, near the bases of the mandibles) (Fig. 11A); antenna 15-segmented and filiform in females, 14-segmented in males. Epomia present or absent; notauli parallel (Fig. 11C); scutellar fovea relatively large, subquadrate (Fig. 11C), posterior extremity of the notaulus directed to a point inside this fovea (Fig. 11C). Stigmal vein straight, perpendicular to the postmarginal vein; marginal vein longer than or as long as parastigma (Fig. 11D); well developed postmarginal vein (Fig. 11D). Basal sculpture of macrotergite with long medial furrow and short lateral striation; the apical segments of the female's gaster can be extruded and then resemble a scorpion's tail; male genitalia with free dentes, not fused to volsellae.

Material examined: BRAZIL: Espírito Santo: Domingos Martins, Parque Estadual da Pedra Azul, 20°25'55"S, 41°00'53"W, 26.viii.02.ix.2003, C. Azevedo e eq. col., 2 ♂♂. L. Masner det.

Remarks: There are 56 described species of *Miota* in the world (Johnson, 1992; Buhl, 1998), being

M. brevinervis, Kieffer, 1906 the only species recorded in the Neotropical region (São Marcos, Nicaragua) thus far (Kieffer, 1906). *Scorpioteleia* and *Cinetus* have been confused with *Miota*, which is clearly different due the presence of parallel notauli (Fig. 11C), straight stigmal vein (Fig. 11D) and male genitalia with free dentes, not fused to the volsellae (Macek, 2006).

Distribution: Holarctic, Oriental and Neotropical (Johnson, 1992). The specimens listed above were collected by Celso Azevedo in Espírito Santo state (Fig. 24C) and not by our survey; they are deposited at the Federal University of Espírito Santo collection. Dr. Masner kindly called our attention to the specimens, which complement the list of recorded Belytinae occurring in the Atlantic Forest.

Biology: Unknown.

***Odontopsilus* Kieffer, 1909**
(Figs. 17, 20B, 24B)

Total of specimens found: 182 (73 females and 109 males) in one morphospecies.

Diagnosis: Overall size between 2.4 and 3.75 mm; mandibles long (mandible length longer than the distance between the ventrolateral margins of the head, near the bases of the mandibles), sickle-shaped (Fig. 17A); antenna 15-segmented and filiform in females (Fig. 17D), 14-segmented in males; first male flagellomere not modified (Fig. 20B). Mesosoma higher than wide; pronotal shoulders angular (Fig. 17C); epomia well developed; presence of teeth, one on each scutellar bridge, near the posterolateral margin of the scutellar fovea, plus a small tooth in the middle posterior part of the scutellar disc (Fig. 17E). Forewing with closed radial cell (Fig. 17F).

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 14-17.x.2001, A.M. Pentead-Dias e eq. col., 1 ♀; São Francisco do Sul, CEPA Vila da Glória, 26°13'40.0"S, 48°40'49.1"W, 14-17.x.2001(3), 17-20.x.2001, A.M. Pentead-Dias e eq. col., 1 ♀/3 ♂♂; São Paulo: Base Barra Grande, Parque Estadual de Intervalos, 24°18'14.4"S, 48°21'50.4"W, 10-13.xii.2000, M.T. Tavares e eq. col., 1 ♀; Ubatuba, Parque Estadual Serra do Mar, 23°21'43"S, 44°49'22"W, 21.i.2002(10), 22.i.2002(3), 24.i.2002(9), N.W. Periotto e eq. col., 13 ♀♀/9 ♂♂;

Rio de Janeiro: Nova Iguaçu, Reserva Biológica do Tinguá, 22°34'32"S, 43°26'09"W, 06-09.iii.2002(5), 05-08.iii.2002(4), 08-11.iii.2002(3), 09-12.iii.2002(2), 08.iii.2002(1), S.T.P. Amarante e eq. col., 6 ♀♀/9 ♂♂; Santa Maria Madalena, Parque Estadual do Desengano, 21°59'03.9"S, 41°57'08.4"W, 16-19.iv.2002(14), 19-22.iv.2002(20), A.M. Pentead-Dias e eq. col., 17 ♀♀/17 ♂♂; **Espírito Santo:** Santa Teresa, Estação Biológica de Santa Lúcia, 19°58'16.7"S, 40°32'06.9"W, 09-12.iv.2001, C.O. Azevedo e eq. col., 1 ♂; **Bahia:** Ilhéus, Mata Esperança, 14°46'S/39°04'W, 15-18.v.2002(3), 18-21.v.2002, 19.v.2002, A.M. Pentead-Dias e eq. col., 2 ♀♀/3 ♂♂; **Sergipe:** Santa Luzia do Itanh, Reserva Ecológica do Castro, 11°22'37.9"S, 37°25'01.8"W, 01-04.viii.2001, M.T. Tavares e eq. col., 1 ♀/1 ♂; **Alagoas:** Quebrangulo, Reserva Biológica Pedra Talhada, 09°18'57.6"S, 36°27'57.6"W, 08-11.ix.2002(56), 11-14.ix.2002(33), 08-14.ix.2002(1), A.M. Pentead-Dias e eq. col., 25 ♀♀/65 ♂♂; **Pernambuco:** Recife, Parque dos Dois Irmãos, 08°03'14"S, 34°52'52"W, 17-20.vii.2002(6), 20-23.vii.2002, S.T.P. Amarante e eq. col., 6 ♀♀/1 ♂. A.L. Quadros det.

Remarks: There is only one described species of *Odontopsilus* in the world (Johnson, 1992), *O. tenuicornis* Kieffer, 1909, which was recorded also in the Neotropics (Pachitea, Peru) (Kieffer, 1909). It shares character states with *Aclista* such as the sickle-shaped mandibles (Figs. 12A, 17A, 18A), the angular pronotal shoulders (Figs. 17C, 18C), well developed epomia and forewing with closed radial cell (Figs. 5A, 17F, 18D), with some *Aclista* species with teeth, one on each scutellar bridge, near the posterolateral margin of the scutellar fovea (Figs. 17E, 19B-C). The *Odontopsilus* species might represent an *Aclista* with significant modifications in the scutellum.

Distribution: In our study, it was recorded from Santa Catarina to Pernambuco states (Fig. 24B).

Biology: Unknown.

***Scorpioteleia* Ashmead, 1897**
(Figs. 4A, 4C, 10, 22B)

Total of specimens found: 7 (3 females and 4 males) in four morphospecies.

Diagnosis: Mostly relatively medium sized (3-4 mm); brownish to black species with light coloured appendages; antenna 15-segmented in females, 14-seg-

mented in males; head subtriangular in frontal view (Fig. 10A); mandibles slightly asymmetrical, left bidentate, right tridentate, crossing at tips; occipital carina incomplete, developed in its upper part; hypostomal bridge and hypostomal carina developed; clypeus slightly convex, lustrous, with truncate lower margin; labrum transverse, slightly emarginated in middle; fore tentorial pits deep; palpal formula 5-3; apical segment of maxillary palps slender, twice as long as penultimate segment; antennal shelf moderately prominent with shallow furrow between toruli. Mesosoma slender, higher than wide, narrower than head; pronotal shoulders angular (Fig. 10C); epomia well developed; mesoscutum convex; notauli complete, slightly diverging posteriorly (Fig. 10C); parapsidal impressions (situated laterally to the notaulus) usually in form of shallow declivities; scutellum convex, with large subquadrate fovea (Fig. 10C); posterior extremity of the notaulus directed to a point inside this fovea (Fig. 10C); propodeum subquadrate, convex, with plicae not protruded posteriorly (Fig. 10C); medial keel of propodeum simple (Fig. 10C); fore tibiae in male slightly widened in middle, with some modified setae (Fig. 10E). Radial cell of forewings completely closed, longer than marginal vein (Figs. 4A, 4C); parastigma longer than marginal vein (Figs. 4A, 4C). Petiole short to long, cylindrical, rugose or ribbed; gaster fusiform (Figs. 10B, 10D), the apical segments of female gaster extruded and resembling a scorpion's tail (Figs. 10B, 10F); ovipositor thin and relatively small, with large gonoplares (= third valvulae); male genitalia with fused volsellae and dentes.

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 13-16.x.2001, 15.x.2001, A.M. Pentead-Dias e eq. col., 2 ♂♂; São Francisco do Sul, CEPA Vila da Glória, 26°13'40.0"S, 48°40'49.1"W, 14-17.x.2001(3), A.M. Pentead-Dias e eq. col., 1 ♀; **São Paulo:** Base Barra Grande, Parque Estadual de Intervales, 24°18'14.4"S, 48°21'50.4"W, 12.xii.2000, 13.xii.2000, M.T. Tavares e eq. col., 1 ♀/1 ♂; Ubatuba, Parque Estadual Serra do Mar, 23°21'43"S, 44°49'22"W, 21.i.2002, N.W. Periotto e eq. col., 1 ♀; **Rio de Janeiro:** Santa Maria Madalena, Parque Estadual do Desengano, 21°59'03.9"S, 41°57'08.4"W, 16-19.iv.2002, S.T.P. Amarante e eq. col., 1 ♂. A.L. Quadros det.

Remarks: *Scorpioteleia* Ashmead, 1897 was established for *S. mirabilis* Ashmead, 1897, by monotypy. *Scorpioteleia* shares some character states with *Cinetus* such as the slightly posteriorly diverging notauli

(Figs. 9E, 10C), large subquadrate scutellar fovea (Figs. 9E, 10C); oblique stigmal vein in relation to the postmarginal vein (Figs. 4A-D) and male genitalia with fused volsellae and dentes. The two genera can be easily distinguished, however, by the alar venation, because in *Scorpioteleia* the marginal vein is always clearly shorter than the radial cell and parastigma (Figs. 4A, 4C) (Macek, 2006). In the past, both genera were confused with *Miota*, which occurs also in Atlantic Forest. *Miota* is clearly different due the presence of parallel notauli (Fig. 11C), straight stigmal vein (Fig. 11D) and male genitalia with free dentes (not fused to the volsellae). Hellén (1964) suggested the name *Eumiota* for the species remaining in *Miota sensu* Förster. Masner & Muesebeck (1968) synonymized *Eumiota* with *Scorpioteleia*. Nevertheless, Johnson (1992) did not follow Masner & Muesebeck (1968) and listed, without any comment, four species of *Scorpioteleia* (three European and one Nearctic) and three European species of *Eumiota* (Macek, 2006). Macek (2006) recognized six species of *Scorpioteleia* and reviewed the five European species, providing an identification key.

Distribution: Six species are recognized in the Holarctic region (one Nearctic and five European) (Macek, 2006). Approximately 50 *Scorpioteleia* species are estimated to occur in the Neotropical region (L. Masner, *pers. comm.*, May 6, 2015). In the Atlantic Forest the seven specimens were recorded in the southern portion of the biome, from Santa Catarina to Rio de Janeiro (Fig. 22B).

Biology: Hosts of most species are unknown, but field and rearing observations suggest that *Scorpioteleia* species are associated with fungivorous Mycetophiloidea Nematoceran Diptera, which develop in soft sporocarps of Basidiomycetes (Macek, 2006).

***Tropidopsilus* Kieffer, 1908**
(Figs. 13, 14C-D, 22A)

Total of specimens found: 199 (89 females and 110 males) in seven morphospecies.

Diagnosis: Overall size relatively small to medium (1.8–4.2 mm); antenna 15-segmented in females, 14-segmented in males; first segment of male flagellum with straight emargination starting at the base of the segment and with a small projection at its apex; eyes relatively big, usually occupying little less than the total length of the head, with inner eye orbits con-

verging below on the face in frontal view (Fig. 13B); female's eyes (Fig. 13B) tend to be relatively bigger and with inner eye orbits more convergent than that of males. Scutellar disc in lateral view rounded, (Fig. 14D), or as a triangular pyramid, apically pointed (Fig. 14C); posterior margin of scutellar disc crenulate (Fig. 14D) or not (Fig. 14C); metascutellum with spiniform projection (Figs. 13C, 14C-D). Radial cell of forewings triangular and completely closed (Fig. 13D); Rs2 nebulous and only slightly curved (Fig. 13D). Petiole with various sculptures but with no longitudinal carinae, or with several strong longitudinal carinae, without microsculpture in between; presence of continuous row of hairs or small tufts of hairs at the petiole's ventral side; female gaster somewhat compressed at tip, near the partially extruded ovipositor (Fig. 13A).

Material examined: BRAZIL: Santa Catarina: São Bento do Sul, CEPA Rugendas, 26°19'25.6"S, 49°18'26.5"W, 13-16.x.2001(3), 16-19.x.2001(1), 14-17.x.2001(1), A.M. Pentead-Dias e eq. col., 4 ♀♀/1 ♂; São Francisco do Sul, CEPA Vila da Glória, 26°13'40.0"S, 48°40'49.1"W, 14-17.x.2001(4), 17-20.x.2001(18), A.M. Pentead-Dias e eq. col., 15 ♀♀/7 ♂♂; **São Paulo:** Base Barra Grande, Parque Estadual de Intervalos, 24°18'14.4"S, 48°21'50.4"W, 13-16.xii.2000(2), 10-13.xii.2000(2), 11-14.xii.2000(4), 14-17.xii.2000(9), 12.xii.2000(1), M.T. Tavares e eq. col., 18 ♀♀; Salesópolis, Estação Biológica de Boracéia, 23°39'01.8"S, 45°52'55.5"W, 04.iv.2001, S.T.P. Amarante e eq. col., 2 ♂♂; Ubatuba, Parque Estadual Serra do Mar, 23°21'43"S, 44°49'22"W, 21.i.2002(7), 22.i.2002(6), 23.i.2002(1), 24.i.2002(4), 26.i.2002(4), N.W. Perito e eq. col., 16 ♀♀/6 ♂♂; Peruíbe, Estação Ecológica Juréia-Itatins, 24°31'06"S, 47°12'06"W, 05.v.2002, M.T. Tavares e eq. col., 1 ♂; **Rio de Janeiro:** Nova Iguaçu, Reserva Biológica do Tinguá, 22°34'32"S, 43°26'09"W, 06-09.iii.2002(3), 05-08.iii.2002(2), 08-11.iii.2002(1), 09-12.iii.2002(3), 07.iii.2002(2), 08.iii.2002(1), S.T.P. Amarante e eq. col., 5 ♀♀/7 ♂♂; Santa Maria Madalena, Parque Estadual do Desengano, 21°59'03.9"S, 41°57'08.4"W, 16-19.iv.2002(45), 19-22.iv.2002(37), 18.iv.2002(3), 20.iv.2002(1), A.M. Pentead-Dias e eq. col., 13 ♀♀/73 ♂♂; **Bahia:** Ilhéus, Mata Esperança, 14°46'S/39°04'W, 18-21.v.2002(2), 19.v.2002(1), A.M. Pentead-Dias e eq. col., 1 ♀♀/2 ♂♂; Mata de São João, Reserva de Sapiranga, 12°33'42.1"S, 38°02'43.8"W, 21.vii.2001, 25.vii.2001, M.T. Tavares e eq. col., 2 ♂♂; **Alagoas:** Quebrangulo, Reserva Biológica Pedra Talhada, 09°18'57.6"S, 36°27'57.6"W, 08-11.ix.2002(8),

11-14.ix.2002(5), A.M. Pentead-Dias e eq. col., 8 ♀♀/5 ♂♂; **Pernambuco:** Recife, Parque dos Dois Irmãos, 08°03'14"S, 34°52'52"W, 18-21.vii.2002(2), 17-20.vii.2002(6), 21.vii.2002(1), vii.2002(1), 21-24.vii.2002(1), 22.vii.2002(1), S.T.P. Amarante e eq. col., 8 ♀♀/4 ♂♂; **Paraíba:** João Pessoa, Mata do Buraquinho, 07°08'25"S, 35°51'38"W, 29.vii-01.viii.2002, S.T.P. Amarante e eq. col., 1 ♀. A.L. Quadros det.

Kieffer, 1909, recorded also in the Neotropical region (Pará, Brazil) (Kieffer, 1909). A genus very close to *Tropidopsilus*, composed by undescribed species that have been misidentified in collections, is under description (L. Masner, *pers. comm.*, March 12, 2015).

Remarks: There is only one described species of *Tropidopsilus* in the world (Johnson, 1992), *T. laticeps*

Distribution: In the present study, undescribed *Tropidopsilus* species have been recorded throughout the Atlantic Forest, from Santa Catarina to Pernambuco (Fig. 22A).

Biology: Unknown.

Key to Belytinae genera in the Atlantic Forest

(**Note:** The following key separates the Atlantic Forest Belytinae genera in the sense they are considered by authors, not taking in consideration unpublished opinions)

1. Radial cell open (Figs. 4F, 5C) or closed; when closed, part of Rs3 is nebulous (Fig. 5D).....2
 - Radial cell closed by tubular Rs3 (Figs. 4A-E, 5A-B, 11D, 13D, 16G, 17F, 18D).....3
- 2(1). Marginal vein longer than parastigma (Figs. 5C-D); presence of teeth, one on each scutellar bridge, near the posterolateral margin of the scutellar fovea (Fig. 3C); metascutellum with a tubercle or spine or at least with a tendency to show it (Fig. 14A) **Lyteba Thomson, 1859**
 - Marginal vein shorter than parastigma (Fig. 4F); teeth on the scutellar bridge absent; metascutellum without spiniform projection (Figs. 6C, 6E) **Belyta Jurine, 1807**
- 3(1). Inner eye orbits converging below (frontal view) (Fig. 13B); eyes relatively big, usually occupying little less than the head length (Fig. 13B); metascutellum with spiniform projection (Figs. 13C, 14C-D); ovipositor permanently partly extruded (Fig. 13A) **Tropidopsilus Kieffer, 1908**
 - Inner eye orbits not converging below (frontal view) (Figs. 6A, 9A, 10A, 11A, 12, 16A, 17A, 18A); metascutellum with or without tubercle or spine (Figs. 6C, 6E, 14B, 16C, 17E, 18E, 19); ovipositor permanently partly extruded or not (Figs. 8, 9B, 10B, 10F, 16B, 17B, 18B).....4
- 4(3). Mandibles relatively short; mouthparts often partially covered by dense pubescence (Figs. 9A, 10A, 11A, 12C); scutellar fovea large, subquadrate, and posterior extremity of the notaulus directed to a point inside this fovea (Figs. 9E, 10C, 11C); tubercle or spine in the metascutellum absent (Fig. 14B) **8**
 - Mandibles short to long, sickle-shaped (Figs. 12A, 16A, 17A, 18A), or mandibles short, asymmetrical with wide base and wide inverted backwards inner tooth (Figs. 6A, 12B); posterior extremity of the notaulus directed to a point inside (Figs. 6D, 15D) or outside (Figs. 15A-C, 15E-F, 16D, 17C, 18C) the scutellar fovea, which can be subquadrate, circular, oval or trapezoidal (side margins divergent and the margin near the notauli straight and shorter than the distal margin) (Figs. 6D, 15, 16D, 17C, 18C); when subquadrate, the posterior extremity of the notaulus is directed to a point outside this fovea (very close or a little bit distant from the fovea lateral margin) (Figs. 15C, 18C); tubercle or spine in the metascutellum present or absent (Figs. 6C, 6E, 16C, 17E, 18E, 19).....5
- 5(4). Mandibles short, asymmetrical with wide base and wide inner tooth backwards inverted (Figs. 6A, 12B); pronotum more or less cervicoid, subdivided into pronotal neck and pronotal collar (Fig. 7); metascutellum without spiniform projection (Figs. 6C, 6E); angle formed by stigmal and postmarginal veins almost always smaller than 30° (Fig. 4E) **Belyta Jurine, 1807**
 - Mandibles short to long, sickle-shaped (Figs. 12A, 16A, 17A, 18A); tubercle or spine in the metascutellum present or absent (Figs. 16C, 17E, 18E, 19); stigmal vein forming an angle between 30° and 90° with the postmarginal vein (Figs. 5A-B, 16G, 17F, 18D).....6
- 6(5). Petiole relatively long, 6-11 times longer than its smallest width, with little wisps of short hairs on the ventral side (Figs. 16B, 16F); distance between toruli relatively long, 1.5-2.5 times the diameter of each torulus (Fig. 16A) **Camptopsilus Kieffer, 1908**

- Petiole length in lateral only 2-5 times longer than its smallest width (Figs. 17B, 18B); distance between toruli 0.4-1.3 times the diameter of each torulus (Figs. 12A, 17A, 18A)7
- 7(6). Teeth present (Figs. 19B-C) or absent (Fig. 19A) on each scutellar bridge, near the posterolateral margin of the scutellar fovea; small tooth on the median posterior part of the scutellar disc absent (Fig. 19); first male flagellomere modified (Figs. 20C-H) or not (Fig. 20A); antenna 14 (Fig. 21B) or 15-segmented in females (Figs. 21A, 21C-F) ***Aclista* Förster, 1856**
- Teeth present on each scutellar bridge, near the posterolateral margin of the scutellar fovea, plus a small tooth on the middle posterior part of the scutellar disc (Fig. 17E); first male flagellomere not modified (Fig. 20B); antenna 15-segmented in females (Fig. 17D) ***Odontopsilus* Kieffer, 1909**
- 8(4). Parallel notauli (Fig. 11C); stigmal vein straight, perpendicular to the postmarginal vein (Fig. 11D); apical segments of the female's gaster can be extruded and then resembling a scorpion's tail; male genitalia with free dentes (not fused to volsellae)..... ***Miota* Förster, 1856**
- Notauli slightly diverging posteriorly (Figs. 9E, 10C); angle formed by stigmal and postmarginal veins varies generally between 40° and 80° (Figs. 4A-D); fused volsellae and dentes in male genitalia **9**
- 9(8). Marginal vein always distinctly shorter than radial cell and parastigma (Figs. 4A, 4C); apical segments of the female gaster extruded and thus resembling a scorpion's tail (Figs. 10B, 10F); male gaster fusiform, very different from female gaster (Fig. 10D) ***Scorpioteleia* Ashmead, 1897**
- Marginal vein as long as or shorter than radial cell, and as long as or slightly shorter than parastigma (Figs. 4B, 4D); third gaster segment almost always very long, dorsoventrally flattened or in the form of a truncated cone, the open end of which is more or less tubular, or the apical segments can be otherwise modified, rarely with 2-3 clearly defined simple ring segments beyond the large tergite (Figs. 8, 9B) ***Cinetus* Jurine, 1807**

DISCUSSION

Like most parasitoid Hymenoptera, Belytinae is very poorly known in the Neotropics. Only two species have been recorded officially in the region thus far, but the present effort revealed the presence of more than a hundred morphologically recognizable species. From the very rare recorded biological information, as most known specimens were captured in general traps, it seems that the Belytinae are specialized koinobiont parasitoids of Dipteran hosts (Hanson & Gauld, 2006), mostly fungus and soil-inhabiting Mycetophilidae and Sciaridae, showing thus an important ecological role that deserves further investigation.

Fifteen genera of Belytinae recorded in the Neotropics (e.g., *Acidopsilus* Kieffer, 1909; *Ctenopria* Ogloblin, 1966; *Mioella* Kieffer, 1909; *Pantoclis* Förster, 1856 and *Prozelotypa* Kieffer, 1909) were not found in the Atlantic Dense Ombrophilous Forest in the survey, but many of them, such as *Acidopsilus* Kieffer, 1909 and *Therinopsilus* Kieffer, 1909, which are recorded in Brazil, need to have their validity checked (Arias-Penna, 2003; Hanson & Gauld, 2006; Azevedo *et al.*, 2015). The specimen of *Acidopsilus* Kieffer, 1909 recorded in Espírito Santo: Brazil (Azevedo *et al.*, 2015) was identified by us as a specimen of *Tropidopsilus* Kieffer, 1908 and L. Masner examined the holotype of one *Therinopsilus* Kieffer,

1909 species and identified it as a specimen of *Belyta* Jurine, 1807 (L. Masner, *pers. comm.*, Oct 16, 2015).

Like *Tropidopsilus* Kieffer, 1908, which was recorded in a different Brazilian biome (Amazon rainforest) (Kieffer, 1909), as well as *Belyta* Jurine, 1807 and *Camptopsilus* Kieffer, 1908, which specimens have been collected in the Cerrado (Uruaçu, Goiás; material deposited in the collection of the Zoology Museum of USP), the other genera keyed in this paper may also occur in other Brazilian biomes (Cerrado, Pantanal, Pampas, Amazon rainforest and Caatinga). The only species of *Odontopsilus* Kieffer, 1909 here recorded occurs also in the Peruvian Amazon.

Before our study, few papers (e.g., Kieffer, 1916; Loiacono, 1988 and Buhl, 1997) have studied taxonomic aspects of Neotropical Belytinae genera. It is hoped that the present paper contributes to stimulate future studies on the Neotropical Belytinae.

RESUMO

As vespas parasitoides Belytinae (Hymenoptera: Diapriodea: Diapriidae) registradas ao longo da Floresta Ombrófila Densa Atlântica são revisadas em nível supra-específico. O conhecimento sobre a diversidade de Belytinae na Mata Atlântica é relativamente pequeno, embora estes parasitoides pareçam exercer papel chave na regulação natural de populações de muitas espécies de Myceto-

philidae e Sciaridae (Diptera). A maioria do material utilizado neste estudo provém de coletas realizadas em 18 localidades regularmente espaçadas, da Paraíba à Santa Catarina, Brasil, entre os anos de 2000 e 2002, no âmbito do projeto "Riqueza e diversidade de Hymenoptera e Isoptera ao longo de um gradiente latitudinal na Mata Atlântica – a floresta pluvial do leste do Brasil" (Biota/SP – FAPESP). Em cada localidade foram instaladas dez armadilhas Malaise e cem armadilhas Moericke, ambas ao longo de dois transectos paralelos espaçados 100 m entre si. Foi aplicado ainda em cada localidade esforço similar na varredura de vegetação, sendo cada amostra o resultado de cinco minutos de varredura. Armadilhas e varredura de vegetação obtiveram somadas um total de 1.241 exemplares de Belytinae, no qual foram reconhecidos 115 morfoespécies e oito gêneros (Aclista, Belyta, Cinetus, Odontopsilus, Scorpioteleia, Lyteba, Tropidopsilus e Camptopsilus). Outro gênero de Belytinae (Miota), registrado em ambiente similar, foi encontrado na coleção da Universidade Federal do Espírito Santo e adicionado à lista, totalizando nove gêneros para os quais foi feita uma chave de identificação; incluímos para cada gênero uma diagnose, comentários e uma discussão sobre seus registros, distribuição e biologia; fornecemos também 22 pranchas com 102 figuras (93 fotos e 9 mapas).

PALAVRAS-CHAVE: Belytinae; Diapriodea; Proctotrupeida; Chave para gêneros; Mata Atlântica.

ACKNOWLEDGEMENTS

Thanks are due to Dr. Lubomir Masner (Canada Department of Agriculture, Ottawa), Dr. Jan Macek (National Museum, Praha), Dr. Helena Onody and Dr. Sônia Casari (Museum of Zoology of the University of São Paulo), and Dr. Marcelo Tavares and Fernanda Gomes (Federal University of Espírito Santo). A.Q. thanks FAPESP for the grant and C.R.F.B. thanks CNPq and FAPESP for continuous support.

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Aceito em: 02/02/2017

Publicado em: 16/03/2017

Editor Responsável: Helena Carolina Onody



APPENDIX 1

Plates of photographs

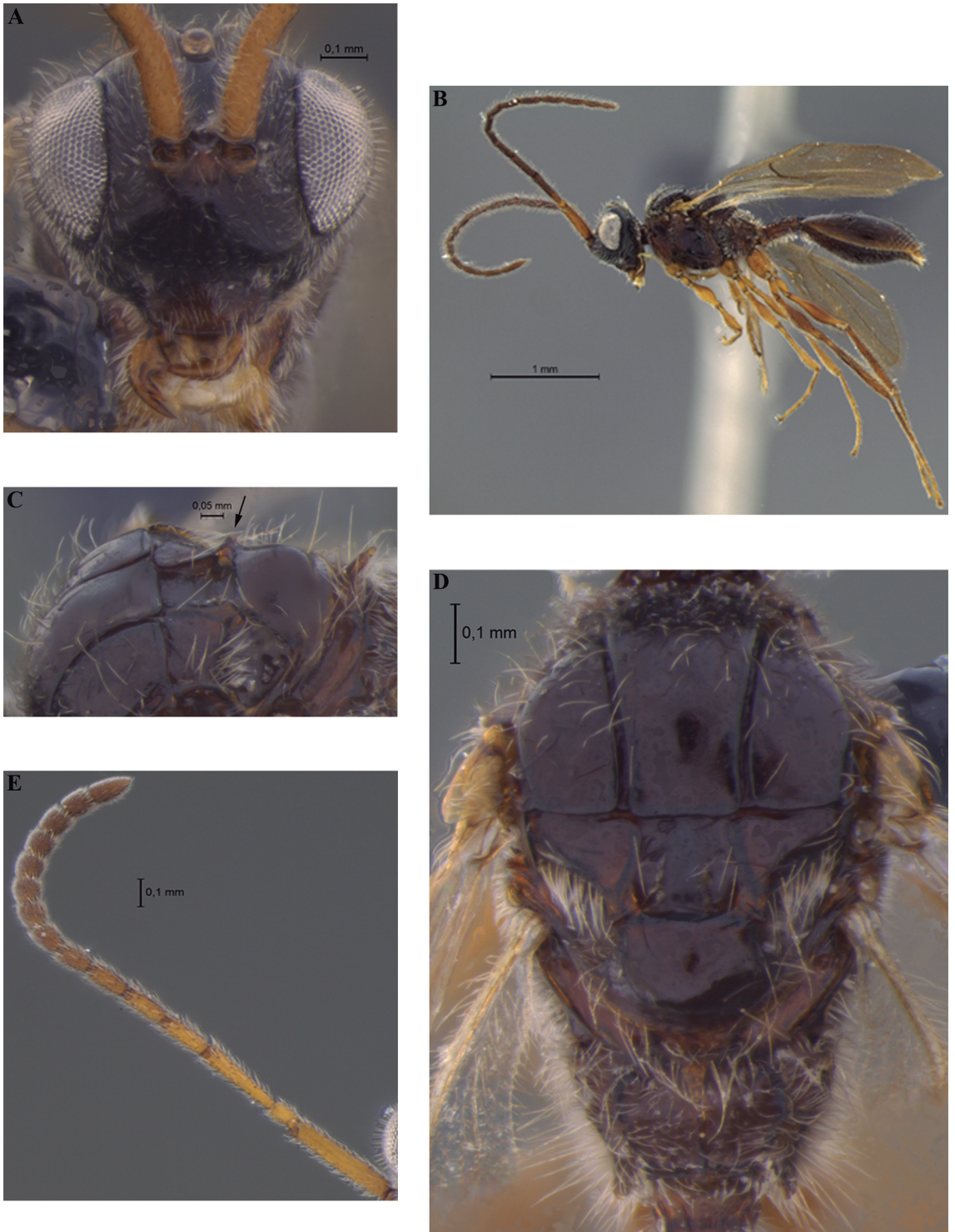


FIGURE 3: *Lyteba* sp. (Hymenoptera, Diapriidae, Belytinae) from Parque Estadual de Intervales, SP (Biota project 2000-2002): (A) head of male, frontal view; (B) *habitus* of male, lateral view; (C) part of mesosoma, dorsolateral view (arrow indicates the tooth in the scutellar bridge); (D) mesosoma of male, dorsal view; (E) female antenna.

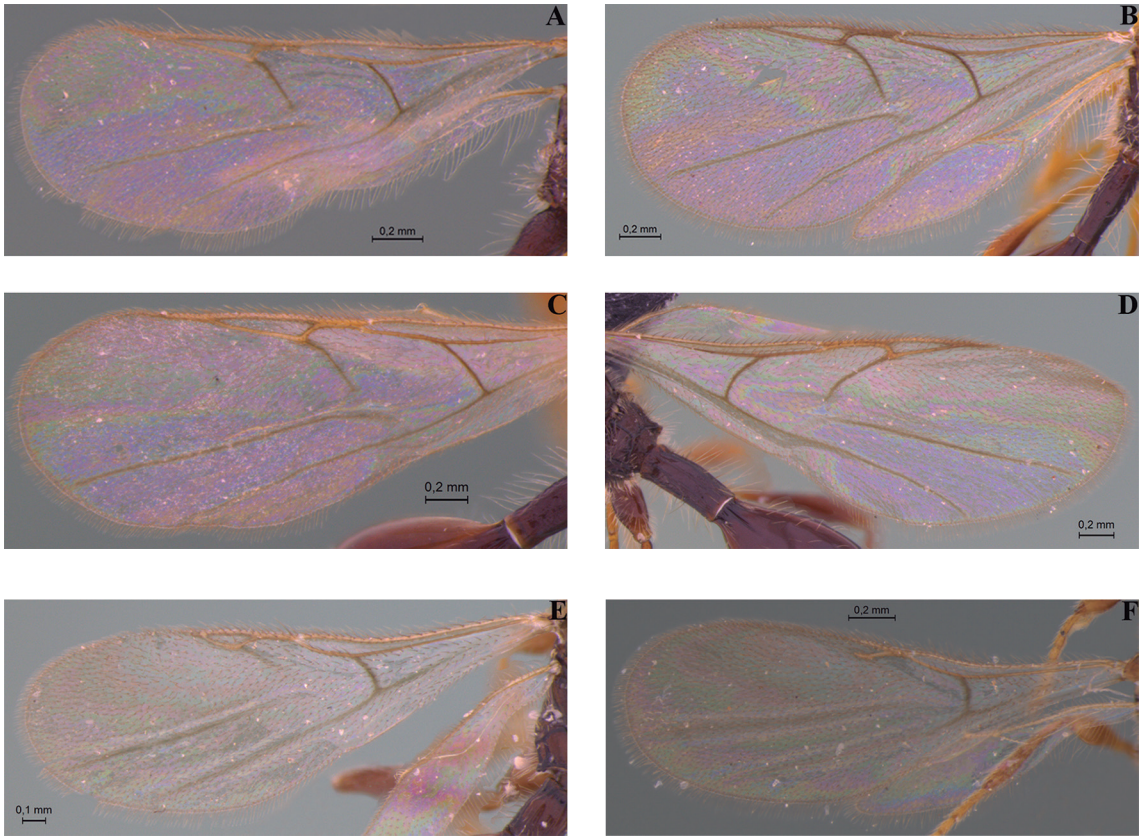


FIGURE 4: Forewing of six Belytinae spp. (Hymenoptera, Diapriidae) from the Biota project (2000-2002): (A) female forewing of *Scorpioteleia* collected in Parque Estadual Serra do Mar, SP; (B) female forewing of *Cinetus* collected in CEPA Rugendas, SC; (C) female forewing of *Scorpioteleia* collected in Parque Estadual de Intervales, SP; (D) female forewing of *Cinetus* collected in Parque Estadual de Intervales, SP; (E) female of *Belyta* collected in Estação Ecológica Pau Brasil, BA; (F) male forewing of *Belyta* collected in Reserva Biológica do Tinguá, RJ.

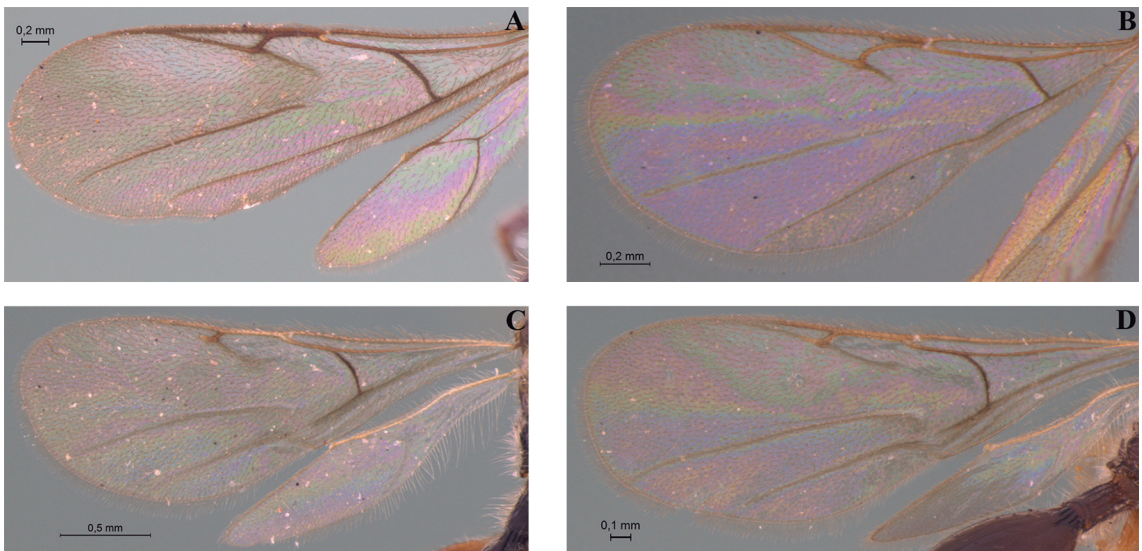


FIGURE 5: Forewing of four different Belytinae spp. (Hymenoptera, Diapriidae) from Biota project (2000-2002): (A) male forewing of *Aclista* collected in CEPA Rugendas, SC; (B) male forewing of *Camptopsilus* collected in CEPA Rugendas, SC; (C) male forewing of *Lyteba* collected in Parque Estadual de Intervales, SP; (D) male forewing of *Lyteba* collected in Parque Estadual de Intervales, SP.

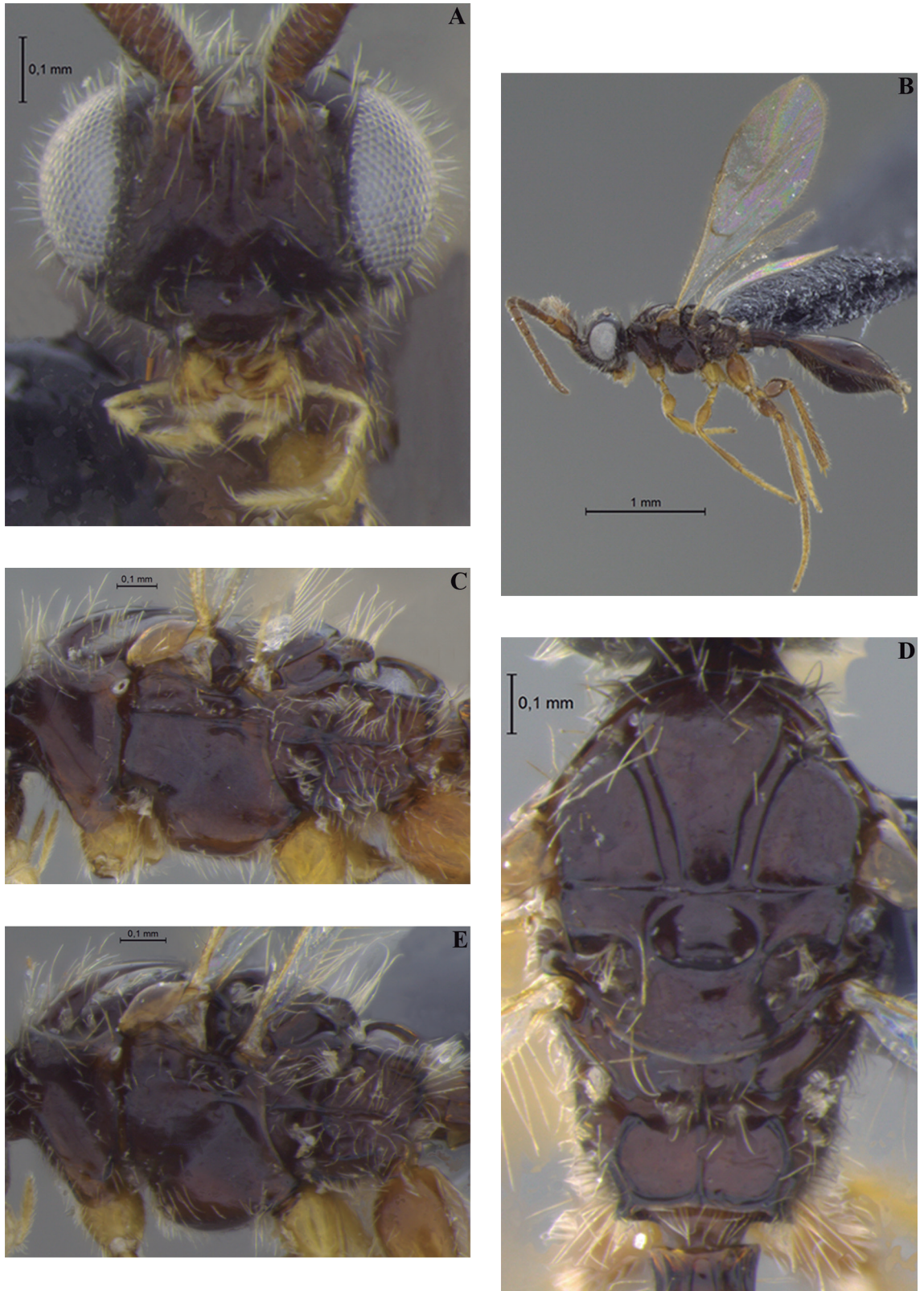


FIGURE 6: *Belyta* sp. (Hymenoptera, Diapriidae, Belytinae) from Reserva Biológica do Tinguá, RJ (Biota project 2000-2002): (A) head of male, frontal view; (B) habitus of male, lateral view; (C) mesosoma of female, lateral view; (D) mesosoma of male, dorsal view; (E) mesosoma of male, lateral view.

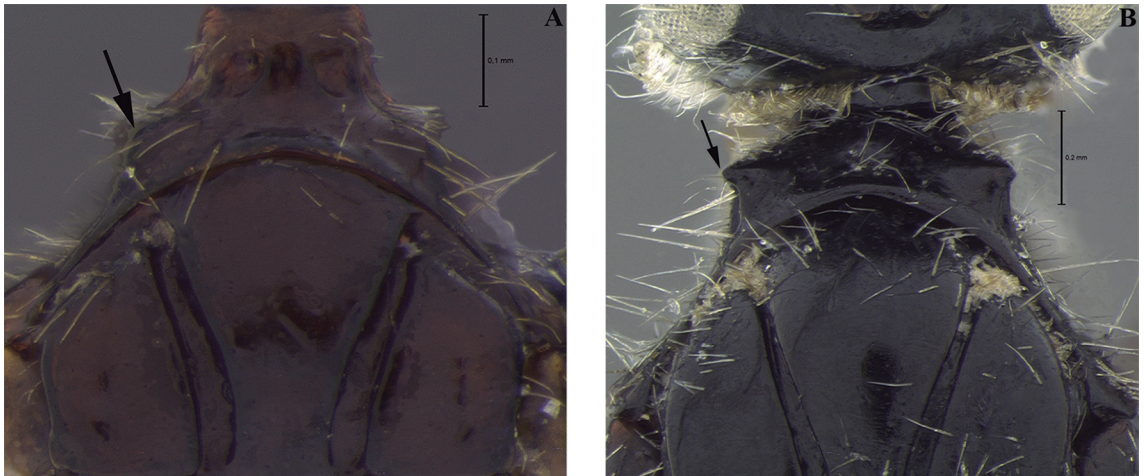


FIGURE 7: Mesoscutum and pronotum of two *Belyta* spp. (Hymenoptera, Diapriidae, Belytinae) from the Biota project (2000-2002): (A) male from Mata da Esperança, BA (arrow indicates the rounded pronotal shoulder); (B) male from Parque Estadual do Desengano, RJ (arrow indicates the angular pronotal shoulder).

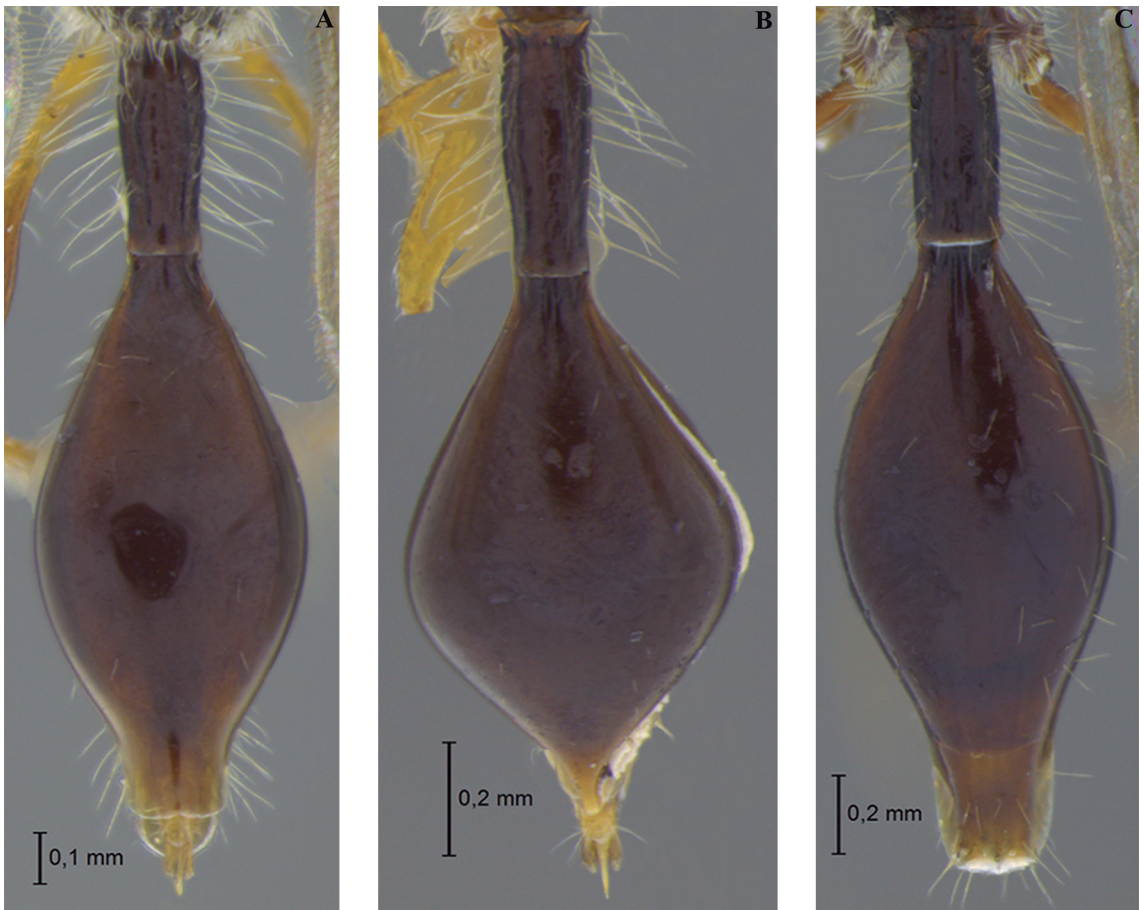


FIGURE 8: Metasoma in dorsal view of three *Cinetus* spp. (Hymenoptera, Diapriidae, Belytinae), females collected by the Biota project (2000-2002): (A) from Parque Estadual do Desengano, RJ; (B) from CEPA Rugendas, SC; (C) from Parque Estadual de Intervales, SP.



FIGURE 9: *Cinetus* sp. (Hymenoptera, Diapriidae, Belytinae), female collected in the Parque Estadual de Intervalos, SP (Biota project 2000-2002): (A) head, frontal view; (B) *habitus*, lateral view; (C) propodeum, dorsal view; (D) mesosoma, lateral view; (E) mesosoma, dorsal view.

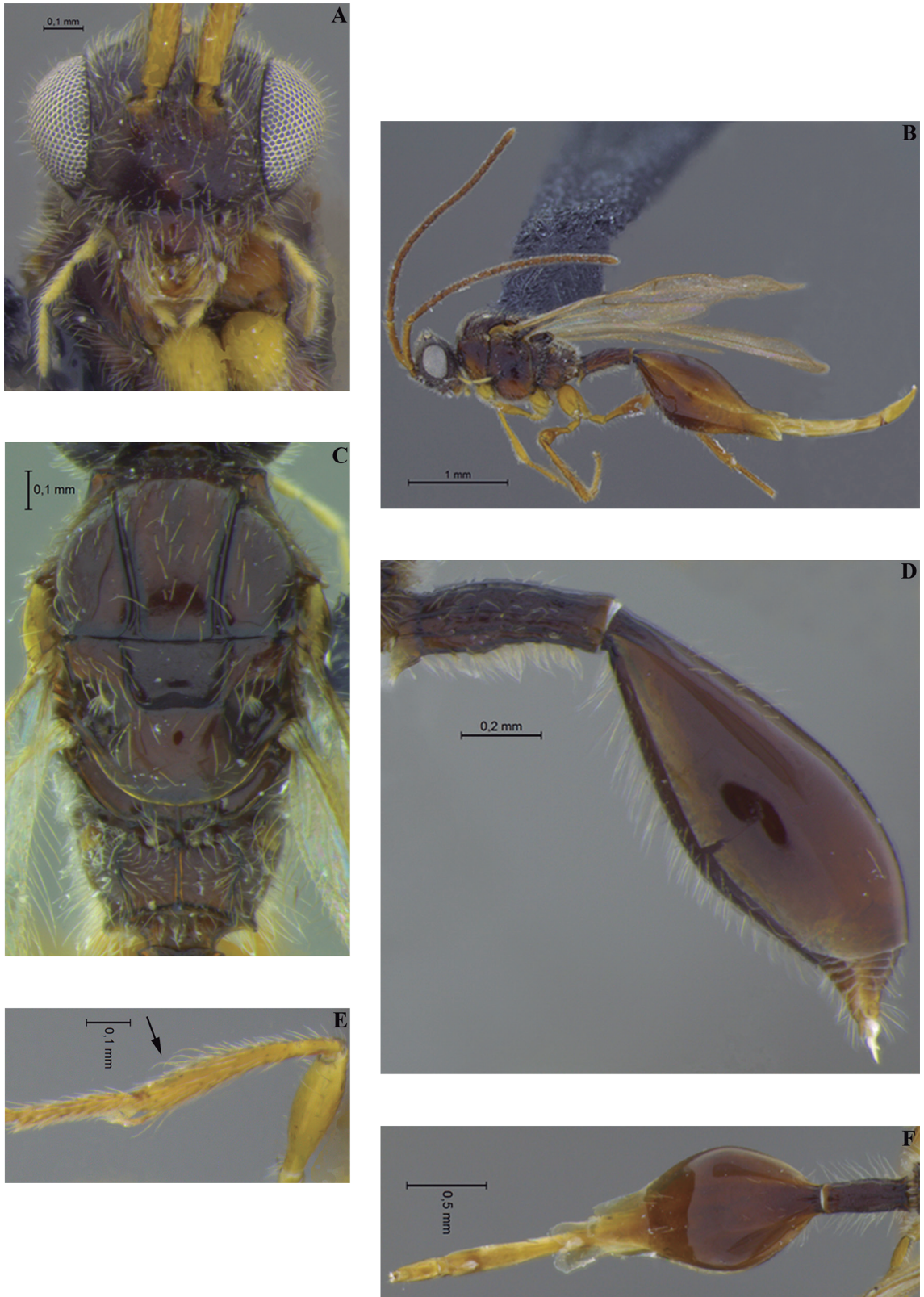


FIGURE 10: *Scorpioteleia* sp. (Hymenoptera, Diapriidae, Belytinae) from Parque Estadual de Intervales, SP (Biota project 2000-2002); (A) head of female, frontal view; (B) *habitus* of female, lateral view; (C) mesosoma of female, dorsal view; (D) metasoma of male, lateral view; (E) fore tibia of male (arrow indicates the modified setae); (F) metasoma of female, dorsal view.



FIGURE 11: *Miota* sp. (Hymenoptera, Diapriidae, Belytinae), male collected in the Parque Estadual da Pedra Azul, ES (collection of the Federal University of Espírito Santo); (A) head, frontal view; (B) *habitus*, lateral view; (C) mesosoma, dorsal view; (D) forewing.

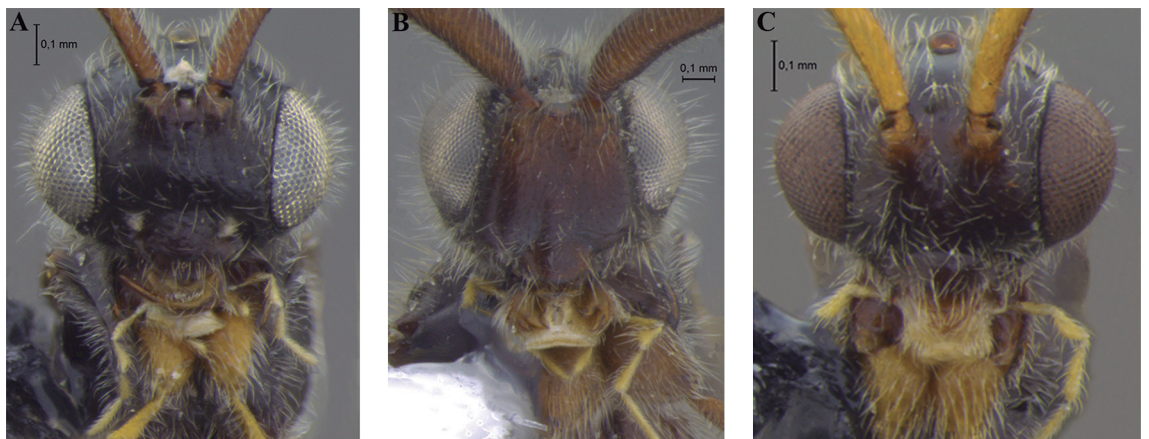


FIGURE 12: Head in frontal view of three different Belytinae spp. (Hymenoptera, Diapriidae) from Biota project (2000-2002): (A) female of *Aclista* collected in Parque Estadual de Intervalos, SP; (B) female of *Belyta* collected in Reserva Biológica do Tinguá, RJ; (C) female of *Cinetus* collected in CEPA Rugendas, SC.

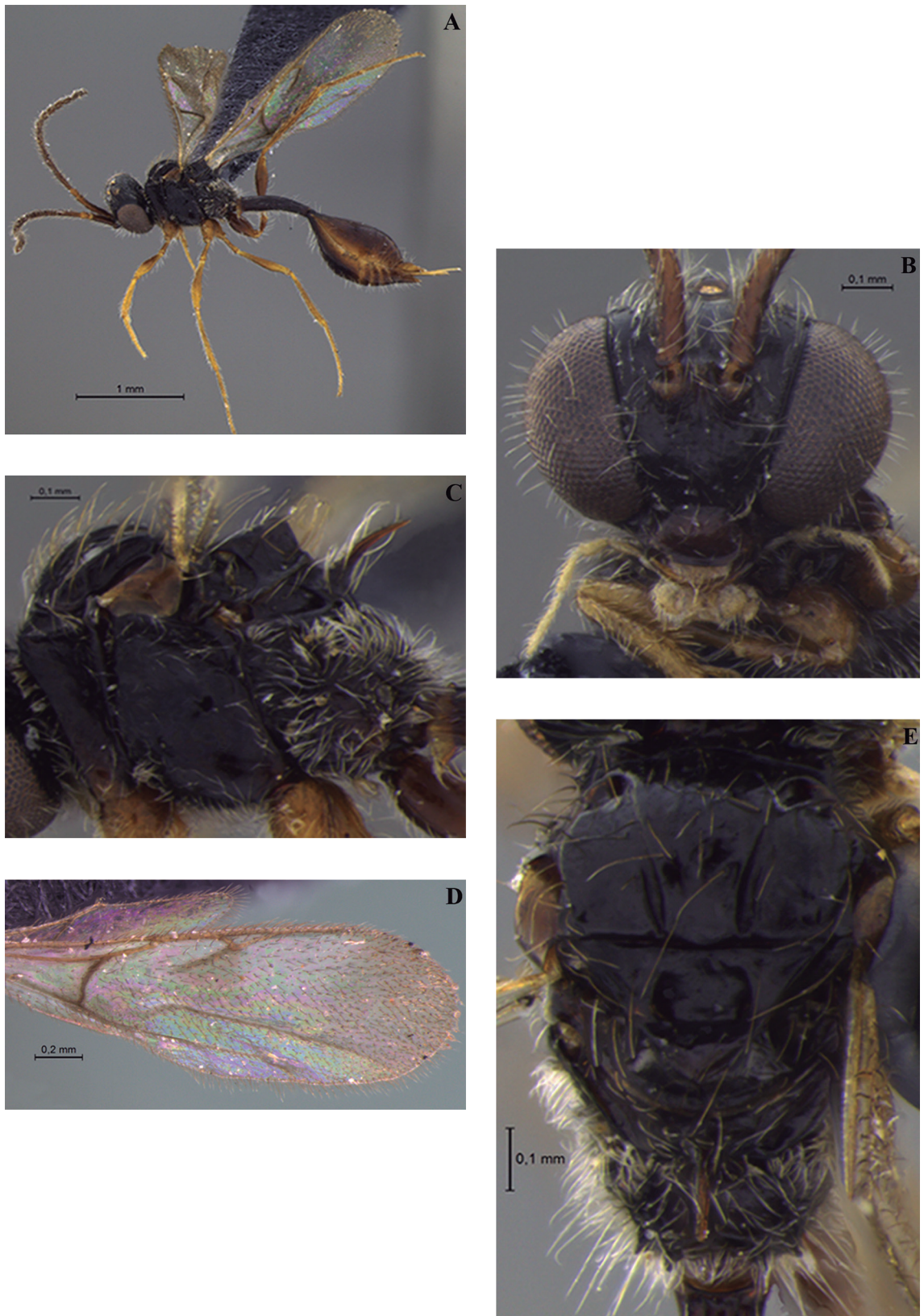


FIGURE 13: *Tropidopsilus* sp. (Hymenoptera, Diapriidae, Belytiinae), female collected in the Parque Estadual do Desengano, RJ (Biota project 2000-2002): (A) *habitus*, lateral view; (B) head, frontal view; (C) mesosoma, lateral view; (D) forewing; (E) mesosoma, dorsal view.



FIGURE 14: Scutellar disc, metascutellum and propodeum in lateral view of four Belytinae spp. (Hymenoptera, Diapriidae) from Biota project (2000-2002): **(A)** male of *Lyteba* collected in Parque Estadual de Intervalos, SP; **(B)** female of *Cinetus* collected in Parque Estadual do Desengano, RJ; **(C)** female of *Tropidopsilus* collected in Parque Estadual do Desengano, RJ; **(D)** female of *Tropidopsilus* collected in CEPA Vila da Glória (arrow indicates the crenulation in the posterior margin of scutellar disc).

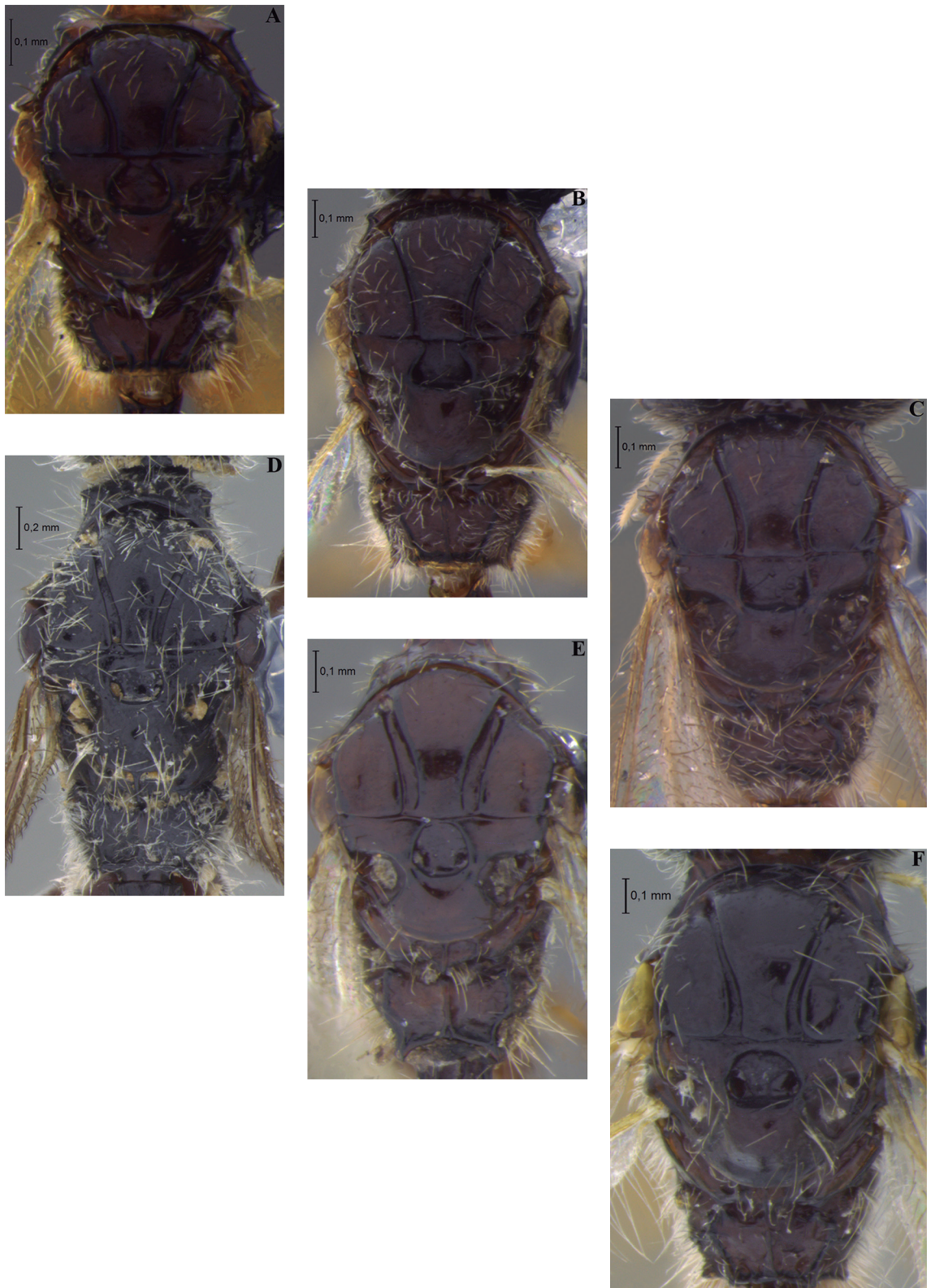


FIGURE 15: Mesosoma in dorsal view of six Belytinae spp. (Hymenoptera, Diapriidae) from Biota project (2000-2002): (A) female of *Camptopsilus* collected in Parque Estadual Serra do Mar, SP; (B) female of *Camptopsilus* collected in CEPA Rugendas, SC; (C) female of *Aclista* collected in Reserva Biológica Pedra Talhada, AL; (D) male of *Belyta* collected in Parque Estadual do Desengano, RJ; (E) male of *Belyta* collected in Mata da Esperança, BA; (F) male of *Aclista* collected in Parque Estadual Serra do Mar, SP.



FIGURE 16: *Camptopsilus* sp. (Hymenoptera, Diapriidae, Belytinae) from Reserva Biológica Pedra Talhada, AL (Biota project 2000-2002): (A) head of female, frontal view; (B) *habitus* of female, lateral view; (C) mesosoma of female, lateral view; (D) mesosoma of female, dorsal view; (E) male antenna, proximal part; (F) metasoma of male, lateral view; (G) forewing of female.



FIGURE 17: *Odontopsilus* sp. (Hymenoptera, Diapriidae, Belytinae), female collected in the Reserva Biológica do Tinguá, RJ (Biota project 2000-2002): (A) head, frontal view; (B) *habitus*, lateral view; (C) mesosoma, dorsal view; (D) antenna; (E) scutellar disc, metascutellum e propodeum, lateral view (arrow indicates the tooth in the middle posterior part of the scutellar disc); (F) forewing.



FIGURE 18: *Aclista* sp. (Hymenoptera, Diapriidae, Belytinae), female collected in the Reserva Biológica Pedra Talhada, AL (Biota project 2000-2002): (A) head, frontal view; (B) *habitus*, lateral view; (C) mesosoma, dorsal view; (D) forewing; (E) mesosoma, lateral view.

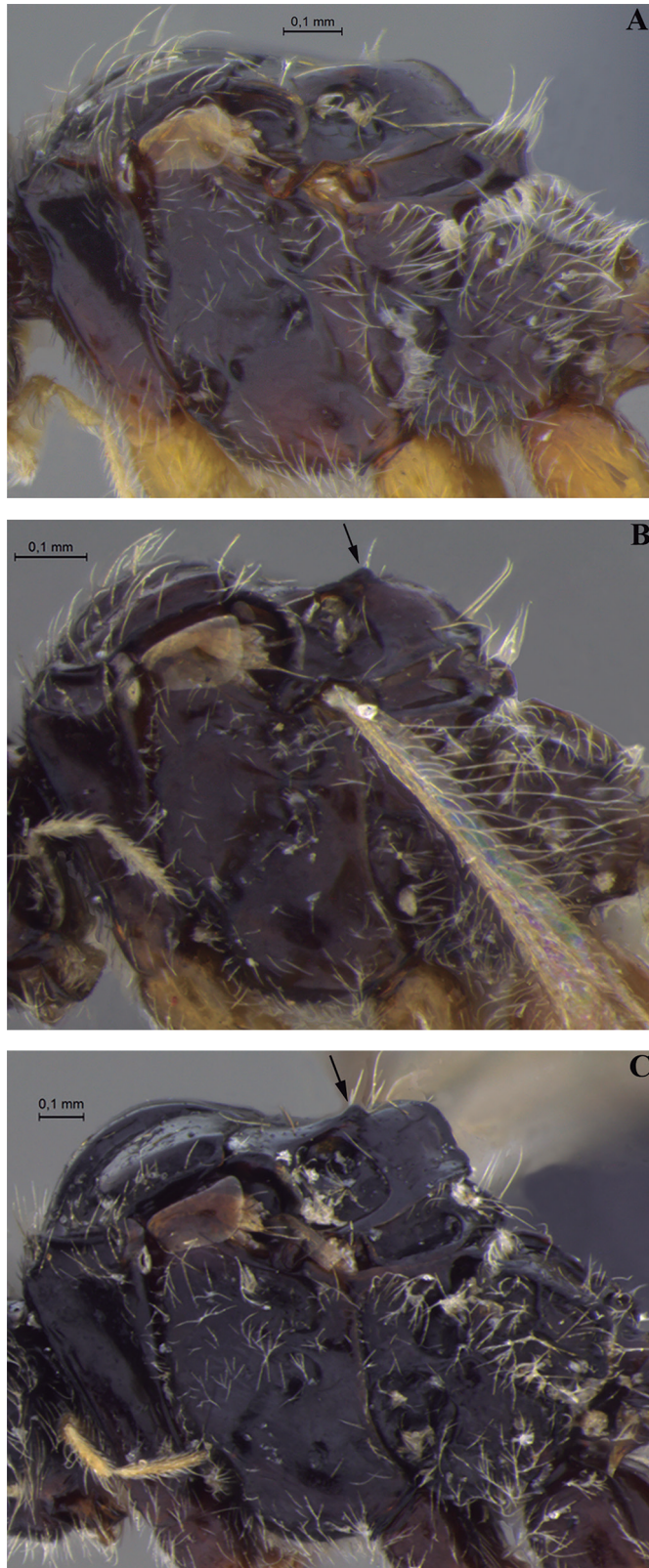


FIGURE 19: Mesosoma in lateral view of three *Aclista* spp. (Hymenoptera, Diapriidae, Belytinae), females collected by the Biota project (2000-2002): (A) from Reserva Biológica Pedra Talhada, AL; (B) from Parque Estadual Serra do Mar, SP (arrow indicates the tooth in the scutellar bridge); (C) from CEPA Vila da Glória (arrow indicates the tooth in the scutellar bridge).

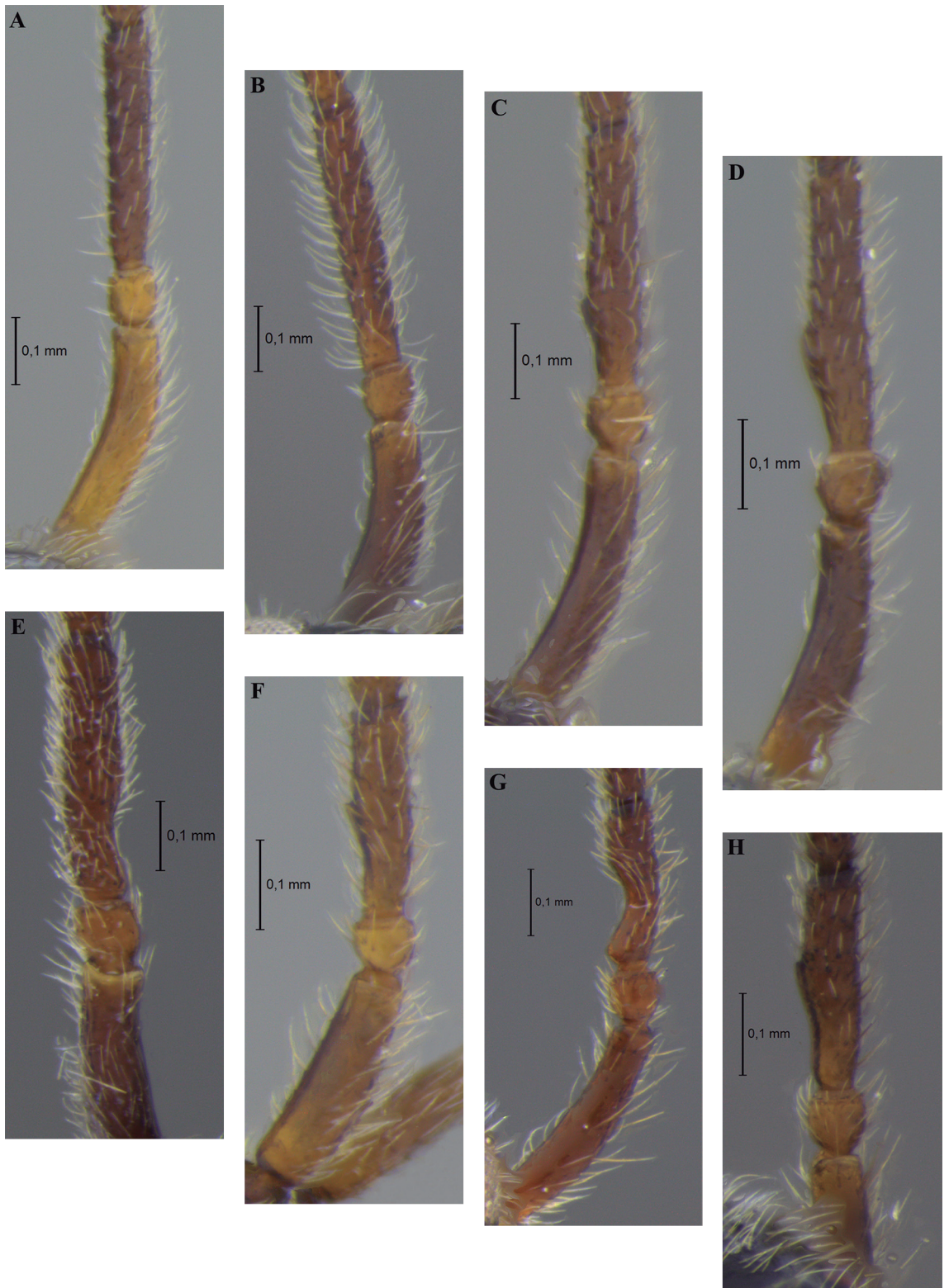


FIGURE 20: Proximal part of Belytinae (eight different morphospecies) male antenna (Hymenoptera, Diapriidae) from the Biota project (2000-2002): **(A)** *Aclista* from Parque Estadual de Intervalos, SP; **(B)** *Odontopsilus* from Reserva Biológica do Tinguá, RJ; **(C)** *Aclista* from Reserva Biológica Pedra Talhada, AL; **(D)** *Aclista* from Parque Estadual do Desengano, RJ; **(E)** *Aclista* from Parque Estadual Serra do Mar, SP; **(F)** *Aclista* from Parque Estadual do Desengano, RJ; **(G)** *Aclista* from Reserva Biológica Pedra Talhada, AL; **(H)** *Aclista* from Reserva Biológica Pedra Talhada, AL.



FIGURE 21: Female antenna of six *Aclista* spp. (Hymenoptera, Diapriidae, Belytinae) from Biota project (2000-2002): (A) from Parque Estadual de Intervalos, SP; (B) from CEPA Rugendas, SC; (C) from Reserva Biológica Pedra Talhada, AL; (D) from Reserva Biológica Pedra Talhada, AL; (E) from Reserva Biológica Pedra Talhada, AL; (F) from Parque Estadual de Intervalos, SP.

APPENDIX 2

Plates of maps

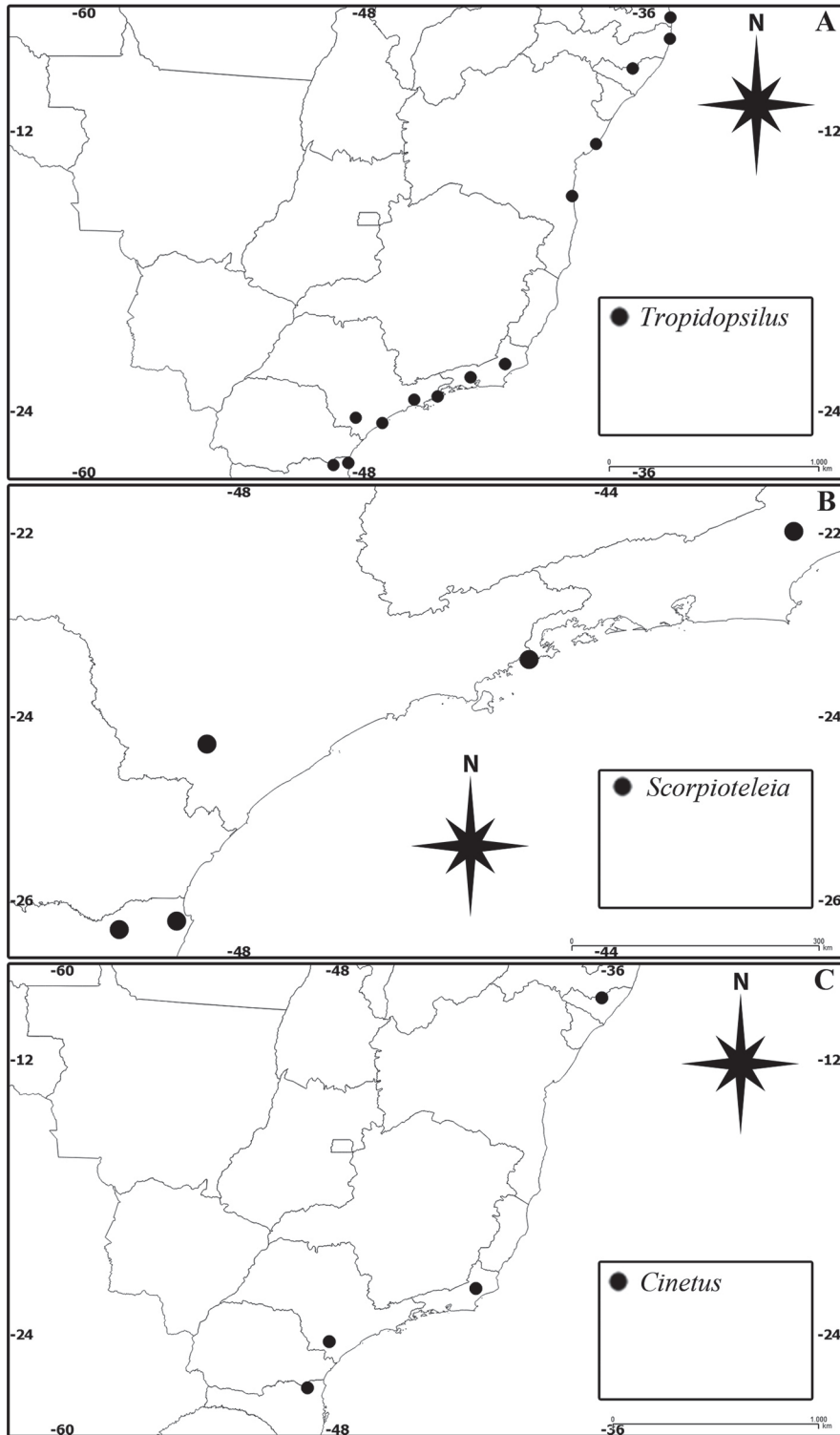


FIGURE 22: Distribution of Belytinae genera (Hymenoptera, Diapriidae) in the Atlantic Forest collected by the Biota project (2000-2002): (A) *Tropidopsilus*, at a scale of 1:1000; (B) *Scorpioteleia*, at a scale of 1:300; (C) *Cinetus*, at a scale of 1:1000.

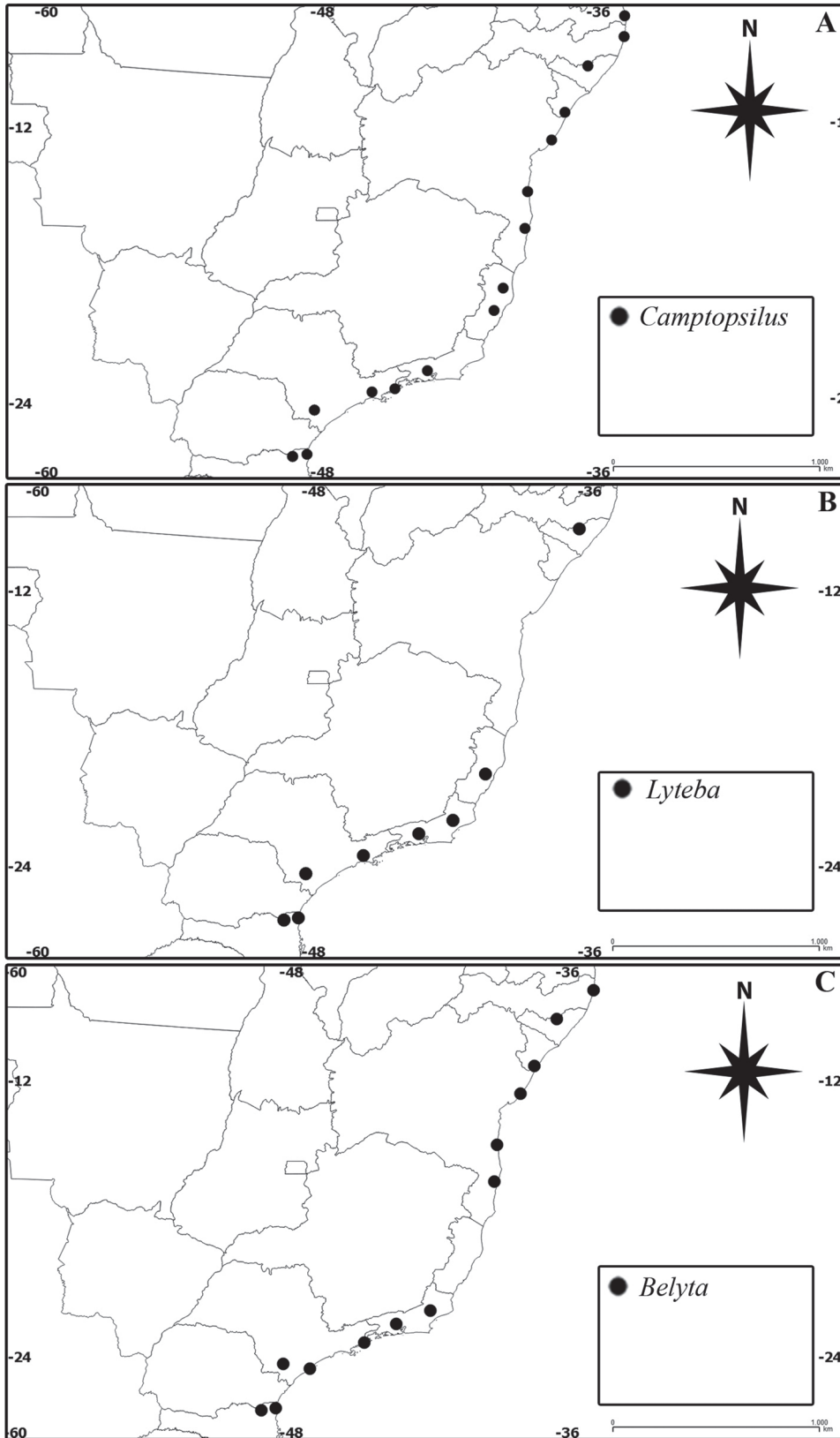


FIGURE 23: Distribution of Belytinae genera (Hymenoptera, Diapriidae) in the Atlantic Forest collected by the Biota project (2000-2002), at a scale of 1:1000: (A) *Camptopsilus*; (B) *Lyteba*; (C) *Belyta*.

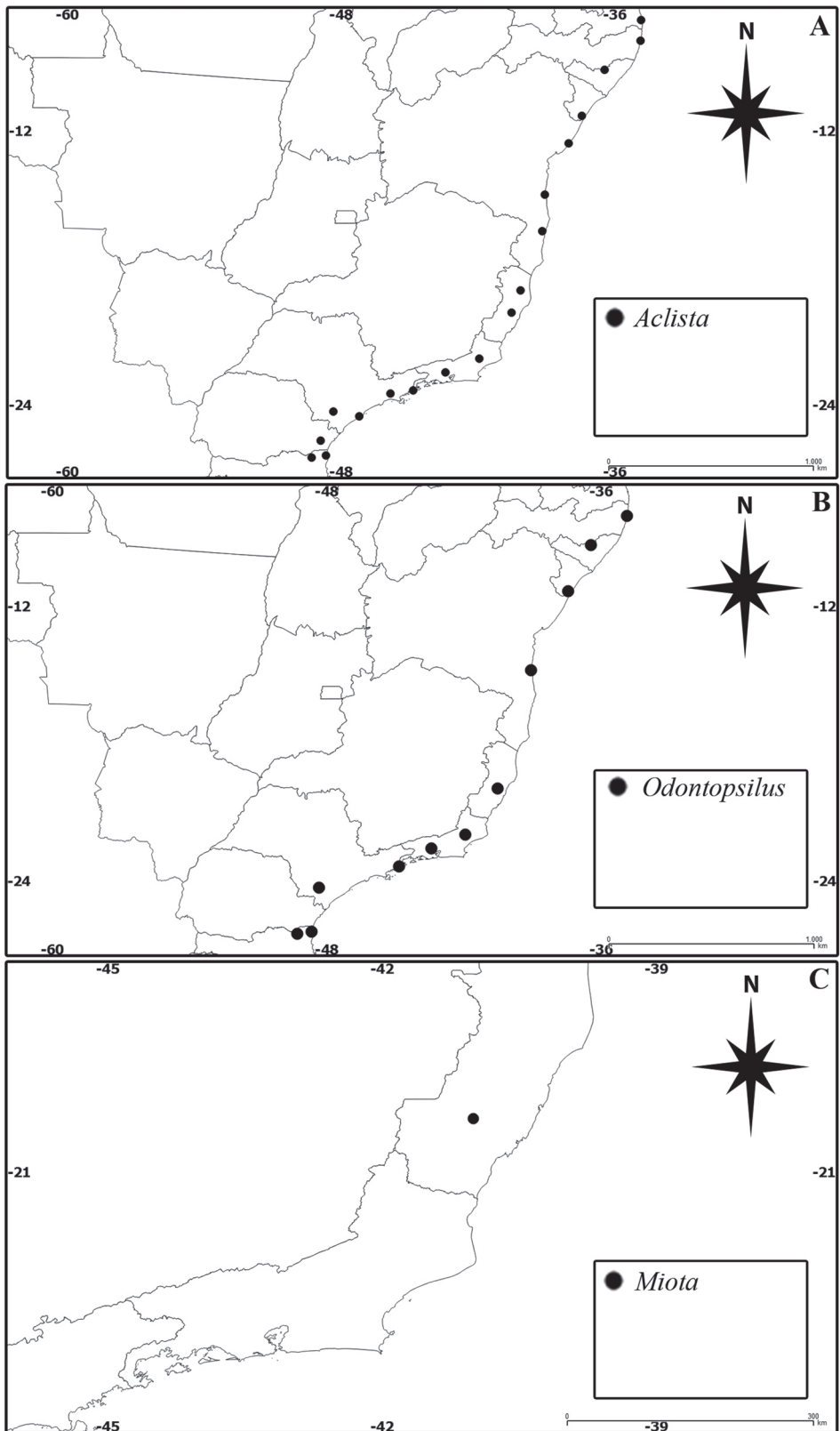


FIGURE 24: Distribution of Belytinae genera (Hymenoptera, Diapriidae) in the Atlantic Forest: (A) *Aclista* from Biota project (2000-2002), at a scale of 1:1000; (B) *Odontopsilus* from Biota Project (2000-2002), at a scale of 1:1000; (C) *Miota* from collection of the Federal University of Espírito Santo, at a scale of 1:300.