

First characterization of a taxonomically well-resolved trophic network composed by host plants and gall midges (Diptera: Cecidomyiidae) in the Neotropical region

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Abstract. In the present study we described the structure of a trophic network composed by gall-midge species (Diptera: Cecidomyiidae) and their host plants in the Restinga of Barra de Maricá (Maricá, Rio de Janeiro, Brazil). Species data were retrieved from literature and different topological descriptors (links per species, connectance, and modularity of interactions) were used. All gall-midge species were monophages, with connectance of 2.8% of the 2,016 possible interactions. The network of host plants and gall midges had low number of links per species and high modularity, which indicates high specificity and specialization of plant-galling interactions in the area. This is the first characterization of a trophic network with good taxonomic resolution for the Neotropical gall midges.

Keywords. Atlantic Forest; Cecidomyiidae; Diptera; Plant-galling interactions; Specificity.

INTRODUCTION

Cecidomyiidae (Diptera) is the most diverse group of gall-inducing insects in the world, with more than 6,500 described species (Gagné & Jaschhof, 2017). Nevertheless, the Neotropical fauna comprises only about 8% of the known species, a very low percentage, considering that in this region there are some megadiverse countries (Fernandes & Santos, 2014). The Brazilian fauna includes about 50% of the described Neotropical species (Gagné, 1994; Gagné & Jaschhof, 2017), most of them from the Atlantic Forest. This situation reflects the scarcity of taxonomical studies about gall midges (Araújo *et al.*, 2019a), which makes it difficult to understand biological and ecological processes involving these insects and their host plants.

In the present study, we describe for the first time a taxonomically well-resolved network composed by host plants and gall midges at the Restinga of Barra de Maricá, municipality of Maricá, State of Rio de Janeiro, Southeastern Brazil. Restinga or coastal shrub zone is one of the most endangered vegetal physiognomy of the Brazilian Atlantic Forest due to anthropic action (Santos *et al.*, 2017). For explore the network structure we

used different topological descriptors (links per species, connectance, modularity, and robustness of interactions) commonly indicated to describe the architecture of binary bipartite networks (review in Dormann *et al.*, 2009).

MATERIAL AND METHODS

Data compilation

Maia studied the Restinga of Barra de Maricá for several years, from 1992 to 2011, during which this author and collaborators recorded a great amount of insect galls and their host plants, and described many gall midge species. In the present study, we compiled these data and arranged them in a database containing the gall-midge species and their host plants in order to building a list of plant-galling interactions (Table 1). All data used were previously published (Appendix 1). Only plants and gall midges identified at specific level were used in the compilation. All botanical names were updated using the database Flora do Brasil (2020) and nomenclature of gall midges was verified using Gagné & Jaschhof (2017).

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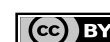


Table 1. Checklist of host plants and gall midges recorded in the Restinga of Barra de Maricá (Maricá, RJ, Brazil).

Host species	Gall midge species
<i>Borreria verticillata</i> (L.) G. Mey.	<i>Asphondylia borreriae</i> Rübsaamen, 1905
<i>Byrsonima sericea</i> DC.	<i>Bruggmanniella byrsonimae</i> (Maia & Couri, 1992)
<i>Byrsonima sericea</i> DC.	<i>Dasineura byrsonimae</i> Maia, 2010
<i>Clusia fluminensis</i> Planch. & Triana	<i>Parazalepidota clusiae</i> Maia, 2001
<i>Clusia lanceolata</i> Cambess.	<i>Clusiamyia nitida</i> Maia, 1996
<i>Couepia ovalifolia</i> (Schott) Benth. ex Hook.f.	<i>Dasineura couepiae</i> Maia, 2001
<i>Couepia ovalifolia</i> (Schott) Benth. ex Hook.f.	<i>Lopesia marginalis</i> Maia, 2001
<i>Dalbergia ecastaphyllum</i> (L.) Taub.	<i>Lopesia grandis</i> Maia, 2001
<i>Erythroxylum ovalifolium</i> Peyr.	<i>Dasineura ovalifoliae</i> Maia & Fernandes, 2011
<i>Erythroxylum ovalifolium</i> Peyr.	<i>Lopesia erythroxylifera</i> Rodrigues & Maia, 2010
<i>Eugenia astringens</i> Cambess.	<i>Dasineura globosa</i> Maia, 1995
<i>Eugenia astringens</i> Cambess.	<i>Dasineura marginalis</i> Maia, 2005
<i>Eugenia astringens</i> Cambess.	<i>Stephomyia rotundifoliorum</i> Maia, 1993
<i>Eugenia copacabanensis</i> Kiaersk.	<i>Stephomyia spiralis</i> Maia, 1993
<i>Eugenia copacabanensis</i> Kiaersk.	<i>Stephomyia tetralobae</i> Maia, 1993
<i>Eugenia uniflora</i> L.	<i>Clinodiplosis profusa</i> Maia, 2001
<i>Eugenia uniflora</i> L.	<i>Eugeniomyia triangularis</i> Maia, 2011
<i>Eugenia uniflora</i> L.	<i>Neolasioptera eugeniae</i> Maia, 1993
<i>Fridericia conjugata</i> (Vell.) L.G. Lohmann	<i>Arrabiadaemyia serrata</i> Maia, 2001
<i>Guapira opposita</i> (Vell.) Reitz	<i>Bruggmannia acaudata</i> Maia, 2004
<i>Guapira opposita</i> (Vell.) Reitz	<i>Bruggmannia elongata</i> Maia & Couri, 1993
<i>Guapira opposita</i> (Vell.) Reitz	<i>Bruggmannia monteiroi</i> Maia & Couri, 1993
<i>Guapira opposita</i> (Vell.) Reitz	<i>Bruggmannia robusta</i> Maia & Couri, 1993
<i>Guapira opposita</i> (Vell.) Reitz	<i>Pisphondylia brasiliensis</i> Couri & Maia, 1992
<i>Guapira opposita</i> (Vell.) Reitz	<i>Proasphondylia formosa</i> Maia, 1993
<i>Guapira opposita</i> (Vell.) Reitz	<i>Proasphondylia guapirae</i> Maia, 1993
<i>Heteropterys nitida</i> (Lam.) DC.	<i>Clinodiplosis floricola</i> Novo-Guedes & Maia, 2008
<i>Hylocereus setaceus</i> (Salm-Dyck) R.Bauer	<i>Neolasioptera cerei</i> (Rübsaamen, 1905)
<i>Jacquemontia holosericea</i> (Weinm.) O'Donnell	<i>Schizomyia santosi</i> Maia & Araújo, 2009
<i>Lantana camara</i> L.	<i>Schismatodiplosis lantanae</i> (Rübsaamen, 1916)
<i>Manilkara subsericea</i> (Mart.) Dubard	<i>Manilkaramyia notabilis</i> Maia, 2001
<i>Melissa officinalis</i> L.	<i>Clinodiplosis melissae</i> Maia, 1994
<i>Microgramma vacciniifolia</i> (Langsd. & Fisch.) Copel.	<i>Primadiplosis microgramma</i> Maia, 2011
<i>Microstachys corniculata</i> (Vahl) Griseb.	<i>Clinodiplosis conica</i> Oliveira & Maia, 2008
<i>Microstachys corniculata</i> (Vahl) Griseb.	<i>Schizomyia spherica</i> Maia & Oliveira, 2007
<i>Monteverdia obtusifolia</i> (Mart.) Biral	<i>Bruggmanniella maytenuse</i> (Maia & Couri, 1992)
<i>Monteverdia obtusifolia</i> (Mart.) Biral	<i>Mayteniella distincta</i> Maia, 2001
<i>Myrcia ovata</i> Cambess.	<i>Myrciamyia maricaensis</i> Maia, 1996
<i>Myrciaria floribunda</i> (H.West ex Willd.) O. Berg	<i>Dasineura myrciariae</i> Maia, 1995
<i>Myrciaria floribunda</i> (H.West ex Willd.) O. Berg	<i>Myrciariomyia bivalva</i> Maia, 1994
<i>Neomitranthes obscura</i> (DC.) N.Silveira	<i>Neomitranthella robusta</i> Maia, 1995
<i>Neomitranthes obscura</i> (DC.) N.Silveira	<i>Stephomyia mina</i> Maia, 1993
<i>Paullinia weinmannifolia</i> Mart.	<i>Clinodiplosis costai</i> Maia, 2005
<i>Paullinia weinmannifolia</i> Mart.	<i>Paulliniomyia ampla</i> Maia, 2001
<i>Peplonia asteria</i> (Vell.) Fontella & E.A. Schwarz	<i>Asphondylia peploniae</i> Maia, 2001
<i>Pouteria caimito</i> (Ruiz & Pav.) Radlk.	<i>Youngomyia pouteriae</i> Maia, 2001
<i>Pouteria venosa</i> (Mart.) Baehni	<i>Lopesia singularis</i> Maia, 2001
<i>Protium brasilense</i> (Spreng.) Engl.	<i>Lopesia maricaensis</i> Rodrigues & Maia, 2010
<i>Psittacanthus dichroos</i> (Mart.) Mart.	<i>Costadiplosis maricaensis</i> Viceconte & Maia, 2009
<i>Senna bicapsularis</i> (L.) Roxb.	<i>Asphondylia sennae</i> Maia & Couri, 1992
<i>Smilax rufescens</i> Griseb.	<i>Smilasioptera candelariae</i> Möhn, 1975
<i>Struthanthus taubataensis</i> Eichler	<i>Asphondylia maricaensis</i> Maia & Couri, 1992
<i>Tetrapterys phlomoides</i> (Spreng.) Nield.	<i>Schizomyia maricaensis</i> Sousa & Maia, 2007
<i>Varronia curassavica</i> Jacq.	<i>Asphondylia cordiae</i> Möhn, 1959
<i>Varronia curassavica</i> Jacq.	<i>Cordiomyia globosa</i> Maia, 1996
<i>Ximena americana</i> L.	<i>Asphondylia communis</i> Maia & Couri, 1992

The Restinga of Barra de Maricá is located in the municipality of Maricá, Rio de Janeiro, Brazil (22°52'-22°54'S and 42°48'-42°54'W). This restinga has 8 km of extension and 844.16 ha of total area (Santos *et al.*, 2017). The climate of the Maricá region is classified as hot tropical, super humid, with a dry season (Alvares *et al.*, 2013). The region has an average annual temperature of 23.2°C and the average annual precipitation is 1,230.8 mm (Santos *et al.*, 2017). It comprises several microenvironment and vegetal formations, which characterize this complex ecosystem with a very diverse flora (Oliveira & Silva, 1989).

Data analyses

The structure of interactions between host plants and gall midges was evaluated using three topological descriptors: connectance, number of links per species, modularity, and robustness. Connectance (C) is the proportion of observed interactions compared to the possible interactions in the network ranging of 0 (totally specialized) to 1 (totally connected) (Dormann *et al.*, 2009). Number of links per species (L) is the sum of links divided by number of species. Modularity (M) is a measure of the occurrence of densely connected modules within the network (Dormann *et al.*, 2009), ranging between 0 (when the network is not modular) and 1 (when a network is very modular). Robustness (R) is a measure of the resistance level of the network to coextinctions (Dormann *et al.*, 2009), measured as the exponent of the curve generated by the proportion of remaining species of gall midges in function of the proportion of primary random extinctions of host plant species. The significance of observed values of each network descriptor was calculated using null models (Dormann *et al.*, 2009). All network analyses were performed using *bipartite* package (Dormann *et al.*, 2008) in the R software version 3.6.1 (R Core Team, 2020).

RESULTS

In total, we recorded 56 species of 27 genera of gall midges and 36 species of 32 genera and 24 families of host plants (Table 1). The richest gall-midge genera were *Asphondylia* Loew, 1850 and *Dasineura* Rondani, 1840, each with six species. All species of gall midges recorded are gall-inducers, except *Clinodiplosis floricola* Novo-Guedes & Maia, 2008 that is a free-living herbivore. All gall-midge species were monophagous, inducing galls on only one plant species (Table 1).

The host plants *Guapira opposita* (Vell.) Reitz (Nyctaginaceae), *Eugenia astringens* Cambess. and *Eugenia uniflora* L. sheltered more gall midges, with seven, three and three species, respectively (Table 1). The most important host family was Myrtaceae with six plant species and 13 gall-midge species. The genus *Eugenia* L. (Myrtaceae) stands out for having three species of host plants and eight species of gall midges.

The plant-galling network comprised 56 interactions (Fig. 1), corresponding to only 2.8% of the 2,016 possi-

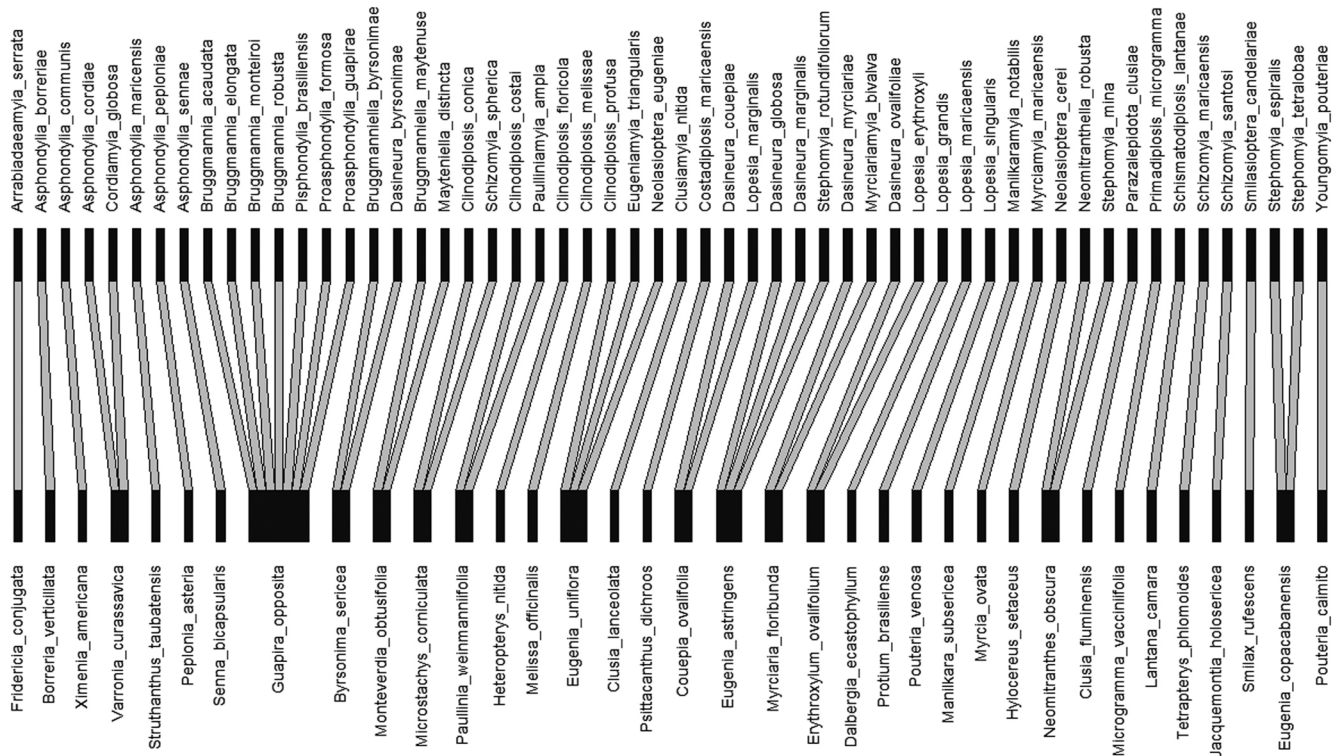


Figure 1. Bipartite network of host plants and gall midge species at the Restinga of Barra de Maricá (Maricá, RJ, Brazil). Lower bars represent host plant species and upper bars represent gall-midge species; grey bars represent interactions. Bar thickness is proportional to the number of interactions of each species.

ble interactions. The observed connectance ($C = 0.028$) was lower than expected from null model values (Null $C = 0.032 \pm 0.001$, $p < 0.001$). Similarly, the observed number of links per species ($L = 0.608$) also was lower than expected by chance (Null $L = 0.710 \pm 0.020$, $p < 0.001$). The observed modularity for plant-galling network was very high ($M = 0.958$), but did not differ from null model values (Null $M = 0.959 \pm 0.001$, $p > 0.05$). Robustness observed was relatively low ($R = 1.343$), but was higher than expected by chance (Null $R = 1.334 \pm 0.232$, $p < 0.001$).

DISCUSSION

We found a high specialization of interactions between host plants and gall midges in the present study, confirming previous studies (Carneiro *et al.*, 2009; Araújo *et al.*, 2019b). All species of gall midges were recorded on a single host plant species (*i.e.*, monophagous species). The percentage of specialist species recorded in our study is higher than found by Carneiro *et al.* (2009) which recorded 92% of monophagous gall midges for Brazil. In other study, Araújo *et al.* (2019b) recorded that 79% of gall-midge species were monophages in the Slovakia. These results suggest a lower specialization of gall midges in temperate environments when compared to the Neotropical region, which have more specific gallers in their host plants, as observed for the Restinga of Barra de Maricá. It is important to note that there are differences in the duration and frequency of sampling between the present study and the others mentioned. Our network was sampled for a much longer period of time than any previously published study (almost two

decades), which enhances the sampling of rarer interactions, and consequently increases the specialization of the network. However, this fact reinforces the relevance of the observed patterns, because even with such a long sampling, only species-specific plant-galling interactions were registered.

The structure of the network formed by the gall midges and their host plants proved to be highly specialized. The connectance observed in the present study (2.8%) was low as compared to other plant-phytophagous networks (review in Araújo *et al.*, 2015). However, comparing with other networks of galling arthropods, the value observed here was higher than observed by Araújo *et al.* (2017) (2.3%) but lower to that observed by Araújo & Kollar (2019) (5.4%), which sampled networks in temperate forests. Our plant-galling network also showed a low number of links per species (0.608) and a high modularity (0.958), corroborating the pattern observed in other galling networks (Araújo *et al.*, 2017; Araújo & Kollar, 2019). Our results provide evidence that supports the high specificity and specialization of plant-galling interactions (Araújo *et al.*, 2019b). Furthermore, our results show that the network of host plants and gall midges is few robust to coextinctions. This result is due to the high specificity of the plant-galling interactions, since each species of plant lost, represents the loss of at least one species of gall midge (Araújo *et al.*, 2017).

Main genera of gall midges recorded in our study were *Dasineura* and *Asphondylia*. The genus *Dasineura* is the richest in Cecidomyiidae family with 476 described species (Gagné & Jaschhof, 2017). For the Neotropical region, only 39 species in this genus are described, 10 species from Brazil (Maia & Silva, 2013). In the present study,

Dasineura induced galls mainly on Myrtaceae (but also on Chrysobalanaceae, Erythroxylaceae, and Malpighiaceae). The genus *Asphondylia* is cosmopolitan and includes 272 gall-inducing species in the world and 100 in the Neotropical region (Gagné & Jaschhof, 2017). In Brazil, Flor & Maia (2017) listed 58 species of *Asphondylia*, being 20 are already known and 38 are still undetermined. In the Restinga of Maricá, *Asphondylia* induced galls on host plants of six families (Asclepiadaceae, Boraginaceae, Fabaceae, Loranthaceae, Olacaceae, and Rubiaceae). These two genera are characterized by highly specialized galling species, most of which are monophages (Carneiro *et al.*, 2009), which contributed to the low connectivity of the plant-galling network.

Myrtaceae was the plant family that sheltered more gall-midge species (13 species) and presented important host plants (in terms of the number of interactions), such as *Eugenia astringens*, and *Eugenia uniflora* (three gall midge species each). Myrtaceae are one of the most diverse families of Angiospermae, with thousands of species, being important in several Neotropical ecosystems (Wilson *et al.*, 2001). *Eugenia*, with about 1,000 species, is one of the most diverse genera of Myrtaceae, distributed mainly in the Central and South Americas (Merwe *et al.*, 2004), being the genus with the greatest number of species at restingas in the State of Rio de Janeiro (Araújo & Henriques, 1984). The great number of gall midges associated to Myrtaceae plants contributed to the high modularity of the plant-galling network, since the family forms a compartment of interactions within the network. Similarly, *Guapira opposita*, which was the host plant species that sheltered more gall-midge species with seven species, it also contributed to the formation of a module within the network. This species is one of the most expressive plants in Quaternary coastal plains of the Atlantic Coast of Southern Brazil, very frequent at restingas, where it is widespread and one of the dominant species (Reitz, 1970).

The frequency and abundance of these plant taxa can explain the great diversity of gall-inducers associated with them. In fact, Myrtaceae have been cited in several gall inventories at restinga areas as super host family, not only in the State of Rio Janeiro, as Maricá and Carapebus (Maia, 2001), Grumari (Oliveira & Maia, 2005), Ilha da Marambaia (Rodrigues *et al.*, 2014), Ilha Grande (Maia & Oliveira, 2010), Região dos Lagos (Carvalho-Fernandes *et al.*, 2016), but also in Espírito-Santo (in Guarapari) (Bregonci *et al.*, 2010), São Paulo (in Bertioga) (Maia *et al.*, 2008), and Santa Catarina (in Babitonga and São Francisco do Sul) (Melo-Júnior *et al.*, 2018; Arriola *et al.*, 2015). The frequent presence of Myrtaceae in gall inventories at Brazilian restinga is an indication of the importance of this family for the structuring of plant-galling communities in these ecosystems. Similarly, *Guapira opposita* is cited as super host species in almost all inventories at restinga (review in Maia, 2013), except in Grumari and Guarapari. Recent evidence suggests that the presence of super host taxa can modify the structure of plant-galling networks in Neotropical environments, increasing the diversity and connectivity of interactions

(Araújo *et al.*, 2019c). In addition, the presence of super host species can impact the robustness of the network, because although it increases the robustness for random extinctions, the presence of closely connected species makes the network more vulnerable to directional attack (Iyer *et al.*, 2013). These evidences suggest that *Guapira opposita* may have a great importance in structuring plant-galling networks in restingas, but more data are needed to measure its real role.

There is a large Linear gap in the knowledge of Neotropical cecidomyiids (Araújo *et al.*, 2019a), which is one of the main limitations for the advancement of studies on the biology and ecology of gall-midge interactions with other species. In the present study, by using a taxonomically well-defined trophic assemblage, we elucidated for the first time the structure of a network involving host plants and gall midges in the Neotropical region. Our results show highly specialized patterns both for the interactions of gall midges with their plants. The low connectance and high modularity observed for plant-galling interactions indicates a high level of ecological and phylogenetic restrictions for the structuring of interactions within the network, which demonstrates that eventual losses of species or interactions can be hardly substituted. Thus, this high level of specificity reinforces the important of conserving this so threatened ecosystem, as each restinga area has a peculiar flora and consequently a unique assemblage of host plants and gall-midge species.

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AUTHORS' CONTRIBUTIONS

W.S.A.: Conceptualization, Formal analysis, Writing – original draft, Visualization, Investigation, Writing – review & editing. V.C.M.: Conceptualization, Methodology, Data curation, Writing – original draft, Visualization, Investigation, Writing – review & editing. All the authors actively participated in the discussion of the results, they reviewed and approved the final version of the paper. Authors declare there are no conflicts of interest.

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APPENDIX S1

List of published data compiled in the present study.

RESTINGA OF THE BARRA DE MARICÁ (APA)

- 1) **Host plant:** *Fridericia conjugata* (Vell.) L.G. Lohmann (Bignoniaceae) (= *Arrabidaea conjugata*) (native to Brazil)
Galler: *Arrabidaeamyia serrata* Maia 2001a
Parasitoid: *Eurytoma* sp. 1 (Eurytomidae)
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 2) **Host plant:** *Borreria verticillata* (L.) G. Mey. (Rubiaceae) (native to Brazil)
Galler: *Asphondylia borreriae* Rübsaamen 1905
Parasitoids: *Horismenus* sp. (Eulophidae), Eupelmidae, *Rileyia* sp. 7 (Eurytomidae)
Refs.: Rübsaamen 1905, Maia 2001b, Maia & Azevedo 2009
- 3) **Host plant:** *Ximenia americana* L. (Olacaceae) (native to Brazil)
Galler: *Asphondylia communis* Maia & Couri 1992
Parasitoids: Encyrtidae, Eupelmidae
Refs.: Maia & Couri 1992, Maia 2001b, Maia & Azevedo 2009
- 4) **Host plant:** *Varronia curassavica* Jacq. (= *Cordia verbenacea* DC. = *Cordia curassavica* (Jacq.) Roem. & Schult.) (Boraginaceae) (native to Brazil)
Galler: *Asphondylia cordiae* Möhn 1959
Parasitoid: *Eurytoma* sp. 2 (Eurytomidae)
Refs.: Möhn 1959, Maia 2001b, Maia & Azevedo 2009
Galler: *Cordiamyia globosa* Maia 1996a
Parasitoids: *Cirrospilus* sp. 1, *Galeopsomyia* sp. 1 (Eulophidae), *Synopeas* sp. (Platygastridae), *Lyrcus* sp. (Pteromalidae), *Dimeromicrus cecidomyiae*, *Torymoides* sp.; *Torymus* sp. (Torymidae)
Refs.: Maia 1996a, Maia 2001b, Maia & Azevedo 2009
- 5) **Host plant:** *Struthanthus taubatensis* Eichler (= *S. maricensis* Rizzini ex Profice (Loranthaceae) (endemic to Brazil)
Galler: *Asphondylia maricensis* Maia & Couri 1992
Parasitoids: Eurytomidae, *Platygaster* sp. (Platygastridae)
Refs.: Maia & Couri 1992, Maia 2001b, Maia & Azevedo 2009
- 6) **Host plant:** *Peplonia asteria* (Vell.) Fontella & E.A. Schwarz (Asclepiadaceae) (endemic to Atlantic Forest)
Galler: *Asphondylia peploniae* Maia 2001a
Parasitoids: Eulophidae, *Rileyia* sp. 1 (Eurytomidae), Torymidae
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 7) **Host plant:** *Senna bicapsularis* (L.) Roxb. (Fabaceae) (exotic)
Galler: *Asphondylia sennae* Maia & Couri 1992
Parasitoids: No parasitoids.
Refs.: Maia & Couri 1992
- 8) **Host plant:** *Guapira opposita* (Vell.) Reitz (Nyctaginaceae) (native to Brazil)
Galler: *Bruggmannia acaudata* Maia 2004
Parasitoids: *Galeopsomyia* sp. 1 (Eulophidae), Eupelmidae, *Eurytoma* sp. 9, *Rileyia* sp. 3 (Eurytomidae), Torymidae
Refs.: Maia 2001b, Maia 2004, Maia & Azevedo 2009
Galler: *Bruggmannia elongata* Maia & Couri 1993
Parasitoids: Eupelmidae, *Galeopsomyia* sp. 1, *Chrysotomyia* sp., *Cirrospilus* sp. (Eulophidae), *Rileyia* sp. 3, *Eurytoma* sp. 9 (Eurytomidae), *Platygaster* sp. (Platygastridae)
Refs.: Maia & Couri 1993, Maia 2001b, Maia & Azevedo 2009
Galler: *Bruggmannia monteiroi* Maia & Couri 1993
Parasitoids: No parasitoids.
Refs.: Maia & Couri 1993
Galler: *Bruggmannia robusta* Maia & Couri 1993
Parasitoids: Eupelmidae, *Galeopsomyia* sp. 1, *Chrysotomyia* sp. (Eulophidae), *Eurytoma* sp., *Rileyia* sp. 3 (Eurytomidae), *Platygaster* sp. (Platygastridae)
Refs.: Maia & Couri 1993, Maia 2001b, Maia & Azevedo 2009
Galler: *Pisphondylia brasiliensis* Couri & Maia 1992
Parasitoids: No parasitoids.
Refs.: Couri & Maia 1992, Maia 2001b
Galler: *Proasphondylia formosa* Maia 1994a
Parasitoids: No parasitoids.
Refs.: Maia 1994a, Maia & Azevedo 2009
Galler: *Proasphondylia guapirae* Maia 1994a

- Parasitoids:** Eupelmidae, *Rileyia* sp. 3, 5, 7 (Eurytomidae), Platygasteridae
Refs.: Maia 1994a, Maia 2001b, Maia & Azevedo 2009
- 9) **Host plant:** *Byrsonima sericea* DC. (Malpighiaceae) (native to Brazil)
Galler: *Bruggmanniella byrsonimae* (Maia & Couri 1992)
Parasitoids: Encyrtidae, Eupelmidae, Eurytomidae, Torymidae
Refs.: Maia & Couri 1992, Maia 2001b, Maia & Azevedo 2009
Galler: *Dasineura byrsonimae* Maia 2010
Parasitoids: Mymaridae, Eulophidae
Refs.: Maia 2001b, Maia 2010, Maia & Azevedo 2009
- 10) **Host plant:** *Monteverdia obtusifolia* (Mart.) Biral (= *Maytenus obtusifolia* Mart.) (Celastraceae) (endemic to Brazil)
Galler: *Bruggmanniella maytenuse* (Maia & Couri 1992)
Parasitoid: Eulophidae
Refs.: Maia & Couri 1992, Maia 2001a, b, Maia & Azevedo 2009
Galler: *Mayteniella distincta* Maia 2001a
Parasitoids: *Xanthellum* sp. 1, Tetrastichinae (gen. nov.) (Eulophidae), Eupelmidae, *Platygaster* sp. (Platygasteridae), Pteromalidae, *Dimeromicrus cecidomyiae* (Torymidae)
Refs.: Maia 2001a, Maia & Azevedo 2009
- 11) **Host plant:** *Microstachys corniculata* (Vahl) Griseb. (= *Sebastiania glandulosa* (Mart.) Pax.) (Euphorbiaceae) (native to Brazil)
Galler: *Clinodiplosis conica* Oliveira & Maia 2008
Parasitoid: Eulophidae
Refs.: Maia 2001b, Oliveira & Maia 2008, Maia & Azevedo 2009
Galler: *Schizomyia spherica* Maia & Oliveira 2007
Parasitoids: Eulophidae, *Rileyia* sp. 3 (Eurytomidae), Platygasteridae, Pteromalidae, *Dimeromicrus cecidomyiae* (Torymidae)
Refs.: Maia 2001b, Maia & Oliveira 2007, Maia & Azevedo 2009
- 12) **Host plant:** *Paullinia weinmanniifolia* Mart. (Sapindaceae) (endemic to Atlantic Forest)
Galler: *Clinodiplosis costai* Maia 2005a
Parasitoids: No parasitoids.
Refs.: Maia 2005a
Galler: *Paulliniomyia ampla* Maia 2001
Parasitoids: Braconidae, gen. nov. 2 sp. nov. 2, gen. nov. 5 sp. nov. 1, *Aprostocetus* sp. 1 (Eulophidae), *Rileyia* sp. 8 (Eurytomidae), Eupelmidae, *Leptacis* sp. (Platygasteridae), *Dimeromicrus cecidomyiae* (Torymidae)
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 13) **Host plant:** *Heteropterys nitida* (Lam.) DC. (Malpighiaceae) (native to Brazil)
Free-living herbivore: *Clinodiplosis floricola* Novo-Guedes & Maia 2008
Parasitoid: *Aprostocetus* sp. 1 (Eulophidae)
Refs.: Maia 2001b, Novo-Guedes & Maia 2008, Maia & Azevedo 2009
- 14) **Host plant:** *Erythroxylum ovalifolium* Peyr. (Erythroxylaceae) (endemic to Atlantic Forest)
Galler: *Dasineura ovalifoliae* Fernandes & Maia 2011
Parasitoids: Eupelmidae, Mymaridae, Pteromalidae, Torymidae, gen. nov. 6 sp. nov. 1 (Eulophidae)
Refs.: Maia 2001b, Fernandes & Maia 2011, Maia & Azevedo 2009
Galler: *Lopesia erythroxylis* Rodrigues & Maia 2010
Parasitoids: Eupelmidae, *Eurytoma* sp. 6 (Eurytomidae), Mymaridae, Pteromalidae, gen. nov. 6 sp. nov. 3 (Eulophidae)
Refs.: Maia 2001b, Rodrigues & Maia 2010, Maia & Azevedo 2009
- 15) **Host plant:** *Eugenia uniflora* L. (Myrtaceae) (native to Brazil)
Galler: *Clinodiplosis profusa* Maia 2001a
Parasitoids: *Chrysonotomyia* sp., gen. nov. 2 sp. nov. 1, *Aprostocetus* sp. 1 (Eulophidae), Eupelmidae, *Eurytoma* sp. 8, *Rileyia* sp. 3, 7 (Eurytomidae), Mymaridae, Platygasteridae, Torymidae
Refs.: Maia 2001a, Maia & Azevedo 2009
Galler: *Eugeniomyia triangularis* Maia & Nava 2011
Parasitoids: No parasitoids.
Refs.: Maia & Nava 2011
Galler: *Neolasioptera eugeniae* Maia 1993
Parasitoids: Eulophidae, Eurytomidae
Refs.: Maia 1993, Maia 2001b, Maia & Azevedo 2009
- 16) **Host plant:** *Clusia lanceolata* Cambess. (Clusiaceae) (endemic to Atlantic Forest)
Galler: *Clusiamyia nitida* Maia 1997
Parasitoids: *Encarsia* sp. (Aphelinidae), Eulophidae, Eupelmidae, *Eurytoma* sp. 5 (Eurytomidae), *Inostemma* sp., *Platygaster* sp. (Platygasteridae), Pteromalidae
Refs.: Maia 1997, Maia 2001b, Maia & Azevedo 2009

- 17) **Host plant:** *Melissa officinalis* L. (Lamiaceae) (exotic)
Galler: *Clinodiplosis melissae* Maia 1994b
Parasitoids: No parasitoids.
Refs.: Maia 1994b
- 18) **Host plant:** *Psittacanthus dichroos* (Mart.) Mart. (Loranthaceae) (endemic to Brazil)
Galler: *Costadiplosis maricaensis* Viceconte & Maia 2009
Parasitoids: *Aprostocetus* sp. 1 (Eulophidae), Pteromalidae
Refs.: Maia 2001b, Viceconte & Maia 2009, Maia & Azevedo 2009
- 19) **Host plant:** *Couepia ovalifolia* (Schott) Benth. ex Hook.f. (Chrysobalanaceae) (endemic to Atlantic Forest)
Galler: *Dasineura couepiae* Maia 2001a
Parasitoids: Aphelinidae, Braconidae, Eulophidae, Eupelmidae, Torymidae
Refs.: Maia 2001a, b, Maia & Azevedo 2009
Galler: *Lopesia marginalis* Maia 2001a
Parasitoids: Eupelmidae, Pteromalidae, Torymidae
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 20) **Host plant:** *Eugenia astringens* Cambess. (= *Eugenia rotundifolia* Casar) (Myrtaceae) (endemic to Atlantic Forest)
Galler: *Dasineura globosa* Maia 1996b
Parasitoids: Eulophidae, *Platygaster* sp. (Platygastridae), Torymidae
Refs.: Maia 1996b, Maia 2001b, Maia & Azevedo 2009
Galler: *Dasineura marginalis* Maia 2005b
Parasitoids: *Closterocerus* sp. 1, *Pentastichus* sp. 1, gen. nov. 6 sp. nov. 2, gen. nov. 4 sp. nov. 1 (Eulophidae), Torymidae
Refs.: Maia 2001b, Maia 2005b, Maia & Azevedo 2009
Galler: *Stephomyia rotundifoliorum* Maia 1994c
Parasitoids: *Donquickeia* sp. (Braconidae), Eulophidae, *Brasema* sp. (Eupelmidae), *Rileyia* sp. 5, *Eurytoma* sp. 7 (Eurytomidae), Platygastridae,
Dimeromicrus cecidomyiae (Torymidae)
Refs.: Maia 1994c, Maia 2001b, Maia & Azevedo 2009
- 21) **Host plant:** *Myrciaria floribunda* (H. West ex Willd.) O. Berg (Myrtaceae) (native to Brazil)
Galler: *Dasineura myrciariae* Maia 1996
Parasitoids: *Dimeromicrus cecidomyiae* (Torymidae)
Refs.: Maia 1996b, Maia 2001b, Maia & Azevedo 2009
Galler: *Myrciariomyia bivalva* Maia 1995
Parasitoids: Encyrtidae, Pteromalidae, gen. nov. 3 sp. nov. (Eulophidae)
Refs.: Maia 1995, Maia 2001b, Maia & Azevedo 2009
- 22) **Host plant:** *Neomitranthes obscura* (DC.) N. Silveira (Myrtaceae) (endemic to Atlantic Forest)
Galler: *Neomitranthella robusta* Maia 1996c
Parasitoids: *Quadrastichus* sp., Tetrastichinae (gen. nov.) (Eulophidae)
Refs.: Maia 1996c, Maia 2001b, Maia & Azevedo 2009
Galler: *Stephomyia mina* Maia 1994c
Parasitoids: Braconidae, *Quadrastichus* sp., *Aprostocetus* sp. 4 (Eulophidae), Eupelmidae, Eurytomidae, Platygastridae
Refs.: Maia 1994c, Maia 2001b, Maia & Azevedo 2009
- 23) **Host plant:** *Dalbergia ecastophyllum* (L.) Taub. (Fabaceae) (native to Brazil)
Galler: *Lopesia grandis* Maia 2001a
Parasitoid: Torymidae
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 24) **Host plant:** *Protium brasiliense* (Spreng.) Engl. (Burseraceae) endemic to Brazil)
Galler: *Lopesia maricaensis* Rodrigues & Maia 2010
Parasitoids: *Goniozus* sp. (Bethyilidae), *Aprostocetus* sp. (Eulophidae), *Brasema* sp. (Eupelmidae)
Refs.: Maia 2001b, Rodrigues & Maia 2010, Maia & Azevedo 2009
- 25) **Host plant:** *Pouteria venosa* (Mart.) Baehni (Sapotaceae) (native to Brazil)
Galler: *Lopesia singularis* Maia 2001a
Parasitoids: Tetrastichinae (gen. nov.) (Eulophidae), Eupelmidae, Eurytomidae, Platygastridae, Torymidae
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 26) **Host plant:** *Manilkara subsericea* (Mart.) Dubard (Sapotaceae) (endemic to Atlantic Forest)
Galler: *Manilkaramyia notabilis* Maia 2001a
Parasitoids: No parasitoids.
Refs.: Maia 2001a, b
- 27) **Host plant:** *Myrcia ovata* Cambess. (Myrtaceae) (endemic to Atlantic Forest)
Galler: *Myrciariomyia maricaensis* Maia 1996c
Parasitoids: gen. nov. 1 sp. nov. 1, gen. nov. 3 sp. nov. 1, *Aprostocetus* sp. 3 (Eulophidae)
Refs.: Maia 1996c, Maia 2001b, Maia & Azevedo 2009

- 28) **Host plant:** *Hylocereus setaceus* (Salm-Dyck) R. Bauer (= *Selenicereus setaceus* (Salm-Dyck) Berg (Cactaceae) (native to Brazil)
Galler: *Neolasioptera cerei* (Rübsaamen 1905):
Parasitoids: No parasitoids.
Refs.: Rübsaamen 1905, Maia 2001b
- 29) **Host plant:** *Clusia fluminensis* Planch. & Triana (Clusiaceae) (endemic to Atlantic Forest)
Galler: *Parazalepidota clusiae* Maia 2001a
Parasitoid: *Rileyia* sp. 2 (Eurytomidae)
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 30) **Host plant:** *Microgramma vacciniifolia* (Langsd. & Fisch.) Copel. (Polypodiaceae) (native to Brazil)
Galler: *Primadiplosis microgramma* Maia 2011
Parasitoids: Eulophidae, Torymidae
Refs.: Maia 2011, Maia & Santos 2015
- 31) **Host plant:** *Lantana camara* L. (Verbenaceae) (naturalised)
Galler: *Schimatodiplosis lantanae* (Rübsaamen 1908)
Parasitoids: Eulophidae, Platygastridae, Pteromalidae, Scelionidae
Refs.: Rübsaamen 1908, Maia 2001b, Maia & Azevedo 2009
- 32) **Host plant:** *Tetrapterys phlomoides* (Spreng.) Nied. (Malpighiaceae) (native to Brazil)
Galler: *Schizomyia maricaensis* Sousa & Maia 2007
Parasitoids: No parasitoids.
Refs.: Maia 2001b, Sousa & Maia 2007
- 33) **Host plant:** *Jacquemontia holosericea* (Weinm.) O'Donnell (Convolvulaceae) (native to Brazil)
Galler: *Schizomyia santosi* Maia & Araújo 2009
Parasitoids: No parasitoids.
Refs.: Maia 2001b, Maia & Araújo 2009
- 34) **Host plant:** *Smilax rufescens* Griseb. (Smilacaceae) (endemic to Brazil)
Galler: *Smilasioptera candelariae* Möhn 1975
Parasitoids: *Pentastichus* sp. 3 (Eulophidae), Eupelmidae
Refs.: Möhn 1975, Maia 2001b, Maia & Azevedo 2009
- 35) **Host plant:** *Eugenia copacabanensis* Kiaersk. (Myrtaceae) (endemic to Atlantic Forest)
Galler: *Stephomyia spiralis* Maia 1994c
Parasitoid: Tetrastichinae (gen. nov.) (Eulophidae)
Refs.: Maia 1994c, Maia 2001b, Maia & Azevedo 2009
Galler: *Stephomyia tetralobae* Maia 1994c
Parasitoids: Eupelmidae, *Rileyia* sp. 6 (Eurytomidae)
Refs.: Maia 1994c, Maia 2001b, Maia & Azevedo 2009
- 36) **Host plant:** *Pouteria caimito* (Ruiz & Pav.) Radlk (= *Pouteria caimito* var. *aurifolia*) (Sapotaceae) (native to Brazil)
Galler: *Youngomyia pouteriae* Maia 2001a
Parasitoids: *Xanthobium* sp. (Eulophidae), Eupelmidae, Platygastridae, *Dimeromicrus cecidomyiae* (Torymidae)
Refs.: Maia 2001a, b, Maia & Azevedo 2009

RESTINGA OF THE ITAIPUAÇU

- 1) **Host plant:** *Fridericia conjugata* (Vell.) L.G. Lohmann (Bignoniaceae) (= *Arrabidaea conjugata*) (native to Brazil)
Galler: *Arrabidaeamyia serrata* Maia 2001a
Parasitoid: *Eurytoma* sp. 1 (Eurytomidae)
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 2) **Host plant:** *Ximenia americana* L. (Olacaceae) (native to Brazil)
Galler: *Asphondylia communis* Maia & Couri 1992
Parasitoids: Encyrtidae, Eupelmidae
Refs.: Maia & Couri 1992, Maia 2001b, Maia & Azevedo 2009
- 3) **Host plant:** *Varronia curassavica* Jacq. (= *Cordia verbenacea* DC. = *Cordia curassavica* (Jacq.) Roem. & Schult.) (Boraginaceae) (native to Brazil)
Galler: *Asphondylia cordiae* Möhn 1959
Parasitoid: *Eurytoma* sp. 2 (Eurytomidae)
Refs.: Möhn 1959, Maia 2001b, Maia & Azevedo 2009
Galler: *Cordiomyia globosa* Maia 1996a
Parasitoids: *Cirrospilus* sp. 1, *Galeopsomyia* sp. 1 (Eulophidae), *Synopeas* sp. (Platygastridae), *Lycus* sp. (Pteromalidae), *Dimeromicrus cecidomyiae*, *Torymoides* sp.; *Torymus* sp. (Torymidae)
Refs.: Maia 1996a, Maia 2001b, Maia & Azevedo 2009

- 4) **Host plant:** *Struthanthus taubatensis* Eichler (= *S. maricensis* Rizzini ex Profice (Loranthaceae) (endemic to Brazil)
Galler: *Asphondylia maricensis* Maia & Couri 1992
Parasitoids: Eurytomidae, *Platygaster* sp. (Platygastridae)
Refs.: Maia & Couri 1992, Maia 2001b, Maia & Azevedo 2009
- 5) **Host plant:** *Peplonia asteria* (Vell.) Fontella & E.A. Schwarz (Asclepiadaceae) (endemic to Atlantic Forest)
Galler: *Asphondylia peploniae* Maia 2001a
Parasitoids: Eulophidae, *Rileyia* sp. 1 (Eurytomidae), Torymidae
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 6) **Host plant:** *Guapira opposita* (Vell.) Reitz (Nyctaginaceae) (native to Brazil)
Galler: *Bruggmannia acaudata* Maia 2004
Parasitoids: *Galeopsomyia* sp. 1 (Eulophidae), Eupelmidae, *Eurytoma* sp. 9, *Rileyia* sp. 3 (Eurytomidae), Torymidae
Refs.: Maia 2001b, Maia 2004, Maia & Azevedo 2009
Galler: *Bruggmannia elongata* Maia & Couri 1993
Parasitoids: Eupelmidae, *Galeopsomyia* sp. 1, *Chrysotomyia* sp., *Cirrospilus* sp. (Eulophidae), *Rileyia* sp. 3, *Eurytoma* sp. 9 (Eurytomidae), *Platygaster* sp. (Platygastridae)
Refs.: Maia & Couri 1993, Maia 2001b, Maia & Azevedo 2009
Galler: *Bruggmannia robusta* Maia & Couri 1993
Parasitoids: Eupelmidae, *Galeopsomyia* sp. 1, *Chrysotomyia* sp. (Eulophidae), *Eurytoma* sp., *Rileyia* sp. 3 (Eurytomidae), *Platygaster* sp. (Platygastridae)
Refs.: Maia & Couri 1993, Maia 2001b, Maia & Azevedo 2009
Galler: *Proasphondylia guapirae* Maia 1994a
Parasitoids: Eupelmidae, *Rileyia* sp. 3, 5, 7 (Eurytomidae), Platygastridae
Refs.: Maia 1994a, Maia 2001b, Maia & Azevedo 2009
- 7) **Host plant:** *Byrsonima sericea* DC. (Malpighiaceae) (native to Brazil)
Galler: *Dasineura byrsonimae* Maia 2010
Parasitoids: Mymaridae, Eulophidae
Refs.: Maia 2001b, Maia 2010, Maia & Azevedo 2009
- 8) **Host plant:** *Monteverdia obtusifolia* (Mart.) Biral (= *Maytenus obtusifolia* Mart.) (Celastraceae) (endemic to Brazil)
Galler: *Mayteniella distincta* Maia 2001a
Parasitoids: *Xanthellum* sp. 1, Tetrastichinae (gen. nov.) (Eulophidae), Eupelmidae, *Platygaster* sp. (Platygastridae), Pteromalidae, *Dimeromicrus cecidomyiae* (Torymidae)
Refs.: Maia 2001a, Maia & Azevedo 2009
- 9) **Host plant:** *Microstachys corniculata* (Vahl) Griseb. (= *Sebastiania glandulosa* (Mart.) Pax.) (Euphorbiaceae) (native to Brazil)
Galler: *Clinodiplosis conica* Oliveira & Maia 2008
Parasitoid: Eulophidae
Refs.: Maia 2001b, Oliveira & Maia 2008, Maia & Azevedo 2009
- 10) **Host plant:** *Paullinia weinmanniifolia* Mart. (Sapindaceae) (endemic to Atlantic Forest)
Galler: *Clinodiplosis costai* Maia 2005
Parasitoids: No parasitoids.
Refs.: Maia 2005a
Galler: *Paulliniomyia ampla* Maia 2001
Parasitoids: Braconidae, gen. nov. 2 sp. nov. 2, gen. nov. 5 sp. nov. 1, *Aprostocetus* sp. 1 (Eulophidae), *Rileyia* sp. 8 (Eurytomidae), Eupelmidae, *Leptacis* sp. (Platygastridae), *Dimeromicrus cecidomyiae* (Torymidae)
Refs.: Maia 2001a, b, Maia & Azevedo 2009
- 11) **Host plant:** *Heteropterys nitida* (Lam.) DC. (Malpighiaceae) (native to Brazil)
Free-living herbivore: *Clinodiplosis floricola* Novo-Guedes & Maia 2008
Parasitoid: *Aprostocetus* sp. 1 (Eulophidae)
Refs.: Maia 2001b, Novo-Guedes & Maia 2008, Maia & Azevedo 2009
- 12) **Host plant:** *Erythroxylum ovalifolium* Peyr. (Erythroxylaceae) (endemic to Atlantic Forest)
Galler: *Dasineura ovalifoliae* Fernandes & Maia 2011
Parasitoids: Eupelmidae, Mymaridae, Pteromalidae, Torymidae, gen. nov. 6 sp. nov. 1 (Eulophidae), cecidophagous – *Clinodiplosis maricaensis* Fernandes & Maia 2011
Refs.: Maia 2001b, Fernandes & Maia 2011, Maia & Azevedo 2009
Galler: *Lopesia erythroxylifolia* Rodrigues & Maia 2010
Parasitoids: Eupelmidae, *Eurytoma* sp. 6 (Eurytomidae), Mymaridae, Pteromalidae, gen. nov. 6 sp. nov. 3 (Eulophidae)
Refs.: Maia 2001b, Rodrigues & Maia 2010, Maia & Azevedo 2009
- 13) **Host plant:** *Eugenia uniflora* L. (Myrtaceae) (native to Brazil)
Galler: *Clinodiplosis profusa* Maia 2001a
Parasitoids: *Chrysotomyia* sp., gen. nov. 2 sp. nov. 1, *Aprostocetus* sp. 1 (Eulophidae), Eupelmidae, *Eurytoma* sp. 8, *Rileyia* sp. 3, 7 (Eurytomidae), Mymaridae, Platygastridae, Torymidae

- Refs.:** Maia 2001a, Maia & Azevedo 2009
- 14) **Host plant:** *Clusia lanceolata* Cambess. (Clusiaceae) (endemic to Atlantic Forest)
Galler: *Clusiamyia nitida* Maia 1997
Parasitoids: *Encarsia* sp. (Aphelinidae), Eulophidae, Eupelmidae, *Eurytoma* sp. 5 (Eurytomidae), *Inostemma* sp., *Platygaster* sp. (Platygastridae), Pteromalidae
- Refs.:** Maia 1997, Maia 2001b, Maia & Azevedo 2009
- 15) **Host plant:** *Eugenia astringens* Cambess. (= *Eugenia rotundifolia* Casar) (Myrtaceae) (endemic to Atlantic Forest)
Galler: *Dasineura globosa* Maia 1996b
Parasitoids: Eulophidae, *Platygaster* sp. (Platygastridae), Torymidae
- Refs.:** Maia 1996b, Maia 2001b, Maia & Azevedo 2009
Galler: *Dasineura marginalis* Maia 2005b
Parasitoids: *Closterocerus* sp. 1, *Pentastichus* sp. 1, gen. nov. 6 sp. nov. 2, gen. nov. 4 sp. nov. 1 (Eulophidae), Torymidae
- Refs.:** Maia 2001b, Maia 2005b, Maia & Azevedo 2009
Galler: *Stephomyia rotundifoliorum* Maia 1994c
Parasitoids: *Donquickeia* sp. (Braconidae), Eulophidae, *Brasema* sp. (Eupelmidae), *Rileyia* sp. 5, *Eurytoma* sp. 7 (Eurytomidae), Platygastridae, *Dimeromicrus cecidomyiae* (Torymidae)
- Refs.:** Maia 1994c, Maia 2001b, Maia & Azevedo 2009
- 16) **Host plant:** *Myrciaria floribunda* (H. West ex Willd.) O. Berg (Myrtaceae) (native to Brazil)
Galler: *Dasineura myrciariae* Maia 1996
Parasitoids: *Dimeromicrus cecidomyiae* (Torymidae)
- Refs.:** Maia 1996b, Maia 2001b, Maia & Azevedo 2009
- 17) **Host plant:** *Pouteria venosa* (Mart.) Baehni (Sapotaceae) (native to Brazil)
Galler: *Lopesia singularis* Maia 2001a
Parasitoids: Tetrastichinae (gen. nov.) (Eulophidae), Eupelmidae, Eurytomidae, Platygastridae, Torymidae
- Refs.:** Maia 2001a, b, Maia & Azevedo 2009
- 18) **Host plant:** *Hylocereus setaceus* (Salm-Dyck) R. Bauer (= *Selenicereus setaceus* (Salm-Dyck) Berg (Cactaceae) (native to Brazil)
Galler: *Neolasioptera cerei* (Rübsaamen 1905)
Parasitoids: No parasitoids.
- Refs.:** Rübsaamen 1905, Maia 2001b
- 19) **Host plant:** *Jacquemontia holosericea* (Weinm.) O'Donnell (Convolvulaceae) (native to Brazil)
Galler: *Schizomyia santosi* Maia & Araújo 2009
Parasitoids: No parasitoids.
- Refs.:** Maia 2001b, Maia & Araújo 2009
- 20) **Host plant:** *Smilax rufescens* Griseb. (Smilacaceae) (endemic to Brazil)
Galler: *Smilasioptera candelariae* Möhn 1975
Parasitoids: *Pentastichus* sp. 3 (Eulophidae), Eupelmidae
- Refs.:** Möhn 1975, Maia 2001b, Maia & Azevedo 2009
- 21) **Host plant:** *Pouteria caimito* (Ruiz & Pav.) Radlk (= *Pouteria caimito* var. *laurifolia*) (Sapotaceae) (native to Brazil)
Galler: *Youngomyia pouteriae* Maia 2001c
Parasitoids: *Xanthobium* sp. (Eulophidae), Eupelmidae, Platygastridae, *Dimeromicrus cecidomyiae* (Torymidae)
- Refs.:** Maia 2001a, c, Maia & Azevedo 2009

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