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Insect galls of a protected remnant of the Atlantic Forest tableland from Rio de Janeiro State (Brazil)

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ABSTRACT

Insect galls of a protected remnant of the Atlantic Forest tableland from Rio de Janeiro State (Brazil): Galling insects in Rio de Janeiro state are known by their great diversity, despite most of the surveys have been done in restinga. This paper investigated the insect galls from a remnant of Atlantic Forest located in São Francisco de Itabapoana municipality, Rio de Janeiro state, Brazil. The galling insect fauna was surveyed from March, 2013 to April, 2014 at the Estação Ecológica Estadual de Guaxindiba. 143 gall morphotypes were found in 31 plant families, 60 genera and 82 species. Fabaceae, Myrtaceae and Sapindaceae were the main host families, being *Trichilia*, *Tontelea* and *Eugenia* the main host genera. Most galls occured on leaves, with globose shape, green and glabrous. Diptera (Cecidomyiidae), Hemiptera, and Lepidoptera were the inducing orders and the associated fauna comprised parasitoids (Hymenoptera), inquilines (Lepidoptera, Coleoptera, and Hemiptera: Coccoidea), successors (Psocoptera, Collembola and Acari), and predators (Pseudoscorpiones). Three plant genera and nine plant species are recorded for the first time as host of galls in Brazil. All the records are new to the municipality, and the distribution of 15 galling species is extended to the North of the state of Rio de Janeiro.

Introduction

The Atlantic Forest comprises several phytophysiognomies, one of them is the lowland semideciduous seasonal rainforest, also called “Tableland Forest” or “Tabuleiro Forest”. This physiognomy is distinguished from the other Atlantic Forest formation by occupying an extensive plain or coastal “tabuleiro” of Tertiary origin. The botanical species are distributed along a climatic gradient from the coast to the interior (Rizzini, 1979) and the interior generally presents low density of crawling vegetation and the occurrence of epiphyte species (Ruschi, 1950). The plants sclerophylly is other distinguishing characteristic (Rizzini, 1979).

Insect gall inventories have been developed in Atlantic Forest areas of the state of Rio de Janeiro (Maia, 2013a,b; Rodrigues et al., 2014), as well as in other Brazilian states of the Southeastern Region, such as São Paulo (Maia et al., 2008), Espírito Santo (Bregonci et al., 2010; Maia et al., 2014), and Minas Gerais (Maia, 2013b, 2014). These inventories focused mainly on restingas, but ombrophilous forest and altitude fields have been also investigated. The restinga inventories totaled 476 gall morphotypes, which are induced by Diptera, Lepidoptera, Hemiptera, Coleoptera, Thysanoptera, and Hymenoptera species, being Cecidomyiidae (Diptera) the most frequent galling taxon (Maia, 2013a). The ombrophilous forest and altitude fields together totaled 518 morphotypes and include the same galling insect taxa. No study has been performed in Tabuleiro Forest.

The galling insects are considered the one of the most sophisticated herbivores, as they are able to control and redirect the host plant to their advantage (Abrahamson and Weis, 1997; Shorthouse et al., 2005). They induce galls, abnormal increases in the number and/or size of plant cells resulting in the formation of a symmetrical structure(s) on one or more organs of a host plant (Mani, 1964; Raman, 2007).

The Estação Ecológica Estadual de Guaxindiba (EEEG) (21°24′28″S-41°5′33″W) is situated in the northeast portion of the state of Rio de Janeiro, in the municipality of São Francisco de Itabapoana, and is the biggest Tabuleiro Forest remnant of the state. The EEEG spreads over 3,260 hectares, but the forest is distributed along a stretch of 12,000 hectares. It hosts rare and typical plants of Tabuleiro Forest, such as *Paratecoma peroba* Kuhlm (Bignoniaceae), commonly known as “ipê peroba”, as well as plants of high economic value, namely, *Aspidosperma polyneurum* Müll. Arg. (Apocynaceae), *Tabebuia* spp.Gomes ex DC (Bignoniaceae), *Copaifera lucens* Dwyer (Fabaceae), and *Cariniana*

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legalis (Mart.) Kuntze (Lecythidaceae). It is internationally known as a world heritage site by UNESCO, being characterized as core area of Atlantic Forest Biosphere Reserve (Inea, 2015).

The present study represents the first contribution to the knowledge of the galling insect fauna from an area of Tabuleiro Forest.

Material and methods

The EEEG was investigated for insect galls during March, May, July, and September 2013, and April, 2014, totalizing five scientific expeditions. The vegetation of four trails was examined: Marcelo Trindade (S21° 24′55″-WO41° 04′38″), Colégio Agrícola (S21° 23′56.1″-WO4° 04′44.0″), Vera (S21° 24′26″-WO41° 04′59″), and Abelha (S21°24′40.7″-WO41°04′53.7″) in each expedition, as well as in the surrounding area of the Charco (S21°24′59.7″-W041°04′35.5″). Each trail and the Charco area were investigated by four hours per expedition. All plant organs were examined, except for the subterraneous roots. Galled plants were pressed for identification and preservation. Dried plants were deposited in the herbarium of the Universidade Federal Rural da Amazônia (UFRAM). The plants were identified by Dr. Gracialda Costa Ferreira (UFRAM), according to APGIII. All botanic names were updated based on the Lista de Espécies da Flora do Brasil (2015), and each species was classified as native or endemic of Brazil based on the same site. All gall morphotypes were photographed, using a digital camera. Each morphotype was characterized based on shape, plant organ, color, presence or absence of trichomes, number of internal chambers, and inducing insect, as in other Brazilian inventories (Maia, 2013b, 2014; Maia et al., 2014). For each gall morphotype, previous records from other Brazilian inventories are provided.

To obtain the galling insects, each gall morphotype was individually kept in labeled plastic pots layered at the bottom with damp cotton and covered by fine screening. All pots were checked daily for emergence. The specimens were preserved in 70% alcohol and later mounted on microscope slides following the method in Gagné (1994). The gall midges were identified by VCM based on the gall morphology, host plant and original descriptions. All material is deposited in the entomological collection of Museu Nacional/Universidade Federal do Rio de Janeiro (MNRJ).

Results and discussion

A total of 143 gall morphotypes were found in 31 plant families, 60 genera and 82 species. The average number of gall morphotypes per plant species was 1.74. In other Atlantic Forest inventories, the gall richness has ranged from 36 (Ilha Grande, Angra dos Reis, RJ) to 265 (Santa Teresa, ES), but similar values were recorded in Marambaia, RJ ($n = 147$) and São Tomé das Letras, MG ($n = 152$), the former comprises restinga areas and the latter forests and altitudinal fields. This range can be explained by different collecting efforts as well as by differences in plant richness.

Fabaceae was the botanical family with the greatest number of galled species ($n = 12$) and the highest richness of galls ($n = 28$), followed by Myrtaceae and Sapindaceae, both with 13 gall morphotypes in eight and four galled plant species, respectively. Bignoniaceae were the fourth family in number of galled species ($n = 11$), followed by Meliaceae ($n = 9$). The other families presented four or less galled species and nine or less gall morphotypes (Table 1).

In several Brazilian inventories, Fabaceae and Myrtaceae have been indicated as the richest plant families in number of gall morphotypes (Santos et al., 2011b; Costa et al., 2014; Maia et al., 2014). Sapindaceae and Bignoniaceae are commonly present in these inventories, but not as super host families.

The genera with the highest gall richness were *Trichilia* P. Browne (Meliaceae) with nine morphotypes, *Tontelea* Miers

Table 1
Richness of gall morphotypes by plant families in Estação Ecológica Estadual de Guaxindiba (São Francisco de Itabapoana, RJ, Brazil).

Galled families	Number of galled genera	Number of galled species	Number of gall morphotypes
Anacardiaceae	02	02	04
Annonaceae	01	01	01
Apocynaceae	01	01	01
Bignoniaceae	05	07	11
Boraginaceae	01	01	03
Burseraceae	01	01	04
Celastraceae	01	01	02
Chrysobalanaceae	01	01	01
Combretaceae	01	01	01
Erythroxylaceae	01	01	01
Euphorbiaceae	03	03	03
Fabaceae	12	12	28
Hippocrateaceae	01	02	07
Hypericaceae	01	01	01
Malpighiaceae	03	03	06
Malvaceae	01	01	02
Meliaceae	01	09	09
Moraceae	01	02	03
Myrtaceae	04	08	13
Nyctaginaceae	01	02	04
Ochnaceae	01	01	01
Olacaceae	01	01	02
Peraceae	01	01	01
Phyllantheaceae	01	01	02
Rubiaceae	01	01	01
Rutaceae	02	02	06
Salicaceae	01	03	03
Sapindaceae	03	04	13
Sapotaceae	02	03	05
Smilacaceae	01	01	01
Verbenaceae	01	02	01
Total	60	82	143

(Hippocrateaceae), *Eugenia* L. (Myrtaceae), *Serjania* Mill. (Sapindaceae) each with seven morphotypes, *Albizia* Durazz. (Fabaceae) (Meliaceae) and *Machaerium* Pers. with six gall morphotypes. Among them, only *Eugenia* was already cited as super host genus in Brazilian inventories (Maia et al., 2014).

Protium heptaphyllum (Aubl.) Marchand (Burseraceae) presented the highest number of gall morphotypes ($n = 4$) among the identified plant species, but it cannot be considered as a super host, because four other plants (identified only at genus level) showed six or seven morphotypes.

Among the host plants, 11 are endemic of Brazil: *Erythroxylum pauferrense* Plowman (Erythroxylaceae), *Eugenia bunchosiifolia* Nied. (Myrtaceae), *Manilkara subsericea* (Mart.) Dubard. (Sapotaceae), *Ouratea cuspidata* (A. St.-Hil.) Engl. (Ochnaceae), *Paullinia racemosa* Wawra, *Paullinia weinmanniifolia* Mart., *Matayba juglandifolia* (Cambess.) Radlk. (Sapindaceae), *Stigmaphyllon lalandianum* A. Juss. (Malpighiaceae), *Neoraputia alba* (Nees & Mart.) Emmerich ex Kallunki (Rutaceae), *Smilax kukrovii* Griseb. (Smilacaceae), and *Trichilia elegans* A. Juss. (Meliaceae). The others are native. No exotic plant species was found as galls host in EEEG.

Among the endemic plants, *T. elegans, P. racemosa*, and *P. weinmanniifolia* have the widest geographical distribution in Brazil. The first has been recorded in Acre, Pará (North Region), Bahia, Ceará, Maranhão (Northeast Region), Distrito Federal, Goiás, Mato Grosso do Sul, Mato Grosso (Midwest Region), Espírito-Santo, Minas Gerais, Rio de Janeiro, São Paulo (Southeast Region), Paraná, Rio Grande do Sul, and Santa Catarina (South Region); the second in Pará (North Region), Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Rio Grande do Norte (Northeast Region), Espírito Santo, Minas Gerais, Rio de Janeiro and São Paulo (Southeast Region); the third in Alagoas, Bahia, Paraíba, Pernambuco, Rio Grande do Norte and Sergipe (Northeast Region), Espírito Santo and Rio de Janeiro (Southeast Region). *M. juglandifolia* occurs in Bahia (Northeast Region), Goiás (Midwest Region), Minas Gerais, Rio de Janeiro and São Paulo (Southeast Region). *N. alba* is restricted to Bahia, Espírito Santo, Minas Gerais and Rio de Janeiro. *E. bunchosiifolia* occurs only in the Southeast (Rio de Janeiro and São Paulo) and South regions (Paraná); *M. sericea* too (in Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Santa Catarina). *S. lalandianum* has a more restricted distribution, which includes only the Southeast Region, and *E. pauferrense* is restricted to a single state, Paraíba, in the Northeast Region (Lista de Espécies da Flora do Brasil, 2015). So, this is the first record of *E. pauferrense* in the Southeast Region.

The endemic plants host 19 gall morphotypes. As the gallers are species-specific and monophagous, these 19 morphotypes can be considered as endemic too. Among them, only two morphotypes were already known (on *P. weinmaniifolia* and *Ouratea cuspidata*). The others ($n = 17$) represent new gall morphotypes.

Three plant genera and nine plant species are recorded for the first time as host of galls in Brazil: *Albizia* Durazz., *Tontelea* Miers. (Hippocrateaceae), *Metrodorea* A. St.-Hil. (Rutaceae), *Martinella obovata* (Kunth) Bureau & K. Schum (Bignoniaceae), *Erythroxylum pauferrense* Plown (Erythroxylaceae), *Pachystroma longifolium* (Nees.) I. M. Johnst (Euphorbiaceae), *Chloroleucon acacioides* (Ducke) Barneby & J. W. Grimes, *Trichilia rubra* C. DC. (Meliaceae), *Eugenia bunchosiifolia* Nied. (Myrtaceae), *Neoraputia alba* (Nees & Mart.) Emmerich ex Kallunki (Rutaceae), *Matayba juglandifolia* (Cambess.) Radlk. (Sapindaceae), and *Smilax krukovii* A. C. Sm. (Smilacaceae).

Galls were found on leaves (petiole, veins and leaf surface), stems, tendrils, buds, flower buds and inflorescence. Leaves comprised the greatest richness of gall morphotypes ($n = 101$) (Table 2). This result represents a global pattern pointed by Felt (1940) and confirmed in several inventories (Maia et al., 2014). The majority of the galls showed plant organ especificity ($n = 134$). This specificity is cited by several authors (Dreger-Jauffret and Shorthouse, 1992; Floate et al., 1996).

Table 2
Number of insect gall morphotypes per plant organs in Estação Ecológica Estadual de Guaxindiba (São Francisco de Itabapoana, RJ, Brazil).

Plant organs	Number of gall morphotypes
Leaf	101
Stem	17
Bud	13
Inflorescence or flower bud	02
Fruit	01
Tendril + leaf (vein)	01
Petiole + stem	02
Stem + tendril	01
Stem + leaf (vein)	01
Tendril + leaf (vein) + petiole + stem	04

Table 3
Number of insect gall morphotypes per shapes in Estação Ecológica Estadual de Guaxindiba (São Francisco de Itabapoana, RJ, Brazil).

Shapes	Number of gall morphotypes
Globose	38
Fusiform	36
Conical	20
Circular	18
Roll	11
Cylindrical	11
Ovoid	04
Discoid	02
Circular-globose	01
Fold	01
Kidney-shaped	01

The majority of the morphotypes were globose, glabrous and one-chambered, as in all other Brazilian inventories (Table 3) (Maia et al., 2014). Only 7% ($n = 10$) presented trichomes or micropubescence; 5.5% were multi-chambered ($n = 8$), two gall morphotypes (1.4%) had one or more internal chamber and a single morphotype was massive (without chamber) (probably the gall is still young). There was an evident predominance of green ($n = 87$) and brown ($n = 46$) galls, the colors of the most galled plant organs (leaves and stem, respectively). But, yellow ($n = 2$) and reddish ($n = 3$) galls were also found. In four morphotypes, the color varied (green, white or red) and this variation was not related to the gall maturity, as young and mature galls presented both colors. These colors are usually mentioned in Brazilian inventories, as well as the predominance of green and brown colors (Maia et al., 2014).

About 32% of the gallers ($n = 46$) were identified at least at order category. The remaining inducers were not identified by three reasons: (1) the galls were already empty, (2) two or more different dwellers were obtained from the same gall and their food habit could not be determined and (3) only parasitoid wasps were obtained. Among the identified gallers, three insect orders were represented: Diptera (Cecidomyiidae), Hemiptera, and Lepidoptera, with a clear predominance of the first (Table 4). Cecidomyiidae are in fact the main galling taxon throught the world (Felt, 1940).

Table 4
Number of insect gall morphotypes per galling insect order in Estação Ecológica Estadual de Guaxindiba (São Francisco de Itabapoana, RJ, Brazil).

Insect order	Number of gall morphotypes
Diptera	39
Hemiptera	06
Lepidoptera	01
Not determined	97

Table 5
Arthropod fauna associated with insect galls in Estação Ecológica Estadual de Guaxindiba (São Francisco de Itabapoana, RJ, Brazil).

Family	Host Plant	Galler	Gall morphotype	Associated fauna	Guild	Figure
Anacardiaceae	*Schinus terebinthifolius*	Not determined	Globose stem gall	Acarina	successor	2
Bignoniaceae	*Bignonia* sp. 1	Cecidomyiidae	Stem, vein, petiole, tendril swelling	Hymenoptera	parasitoid	7
	Martinella obovata	Cecidomyiidae	Stem, vein, petiole, tendril swelling	Hymenoptera	parasitoid	11
	Pyrostegia sp.	Cecidomyiidae	Conical leaf gall	Hymenoptera	parasitoid	12
	Bignoniaceae sp. 1	Cecidomyiidae	Fusiform vein gall	Hymenoptera	parasitoid	14
Erythroxylaceae	*Erytyhroxylum pauferrense*	Not determined	Conical leaf gall	Hymenoptera	parasitoid	20
Fabaceae	*Acacia* sp.	Not determined	Stem swelling	Hymenoptera	parasitoid	25
	Acacia sp.	Not determined	Bud gall	Hymenoptera	parasitoid	26
	Albizia sp.	Cecidomyiidae	Circular leaf gall	Acarina	successor	29
	Machaerium sp.	Not determined	Globose leaf gall	Hymenoptera	parasitoid	43
	Machaerium sp.	Not determined	Bud gall	Hymenoptera	parasitoid	45
Hippocrateaceae	*Tontelea* sp. 1	Not determined	Stem swelling	Baridinae (Coleoptera, Curculionidae)	inquiline	56
Hypericaceae	Hypericaceae sp.	Not determined	Conical leaf gall	Hymenoptera	parasitoid	59
Meliaceae	*Trichilia elegans*	Not determined	Stem swelling	Hymenoptera	parasitoid	67
	Trichilia sp. 3	Not determined	Stem swelling	Hymenoptera	parasitoid	71
	Trichilia sp. 7	Not determined	Stem swelling	Hymenoptera	parasitoid	75
Moraceae	*Ficus* sp. 1	Not determined	Circular leaf gall	Hymenoptera	parasitoid	76
Myrtaceae	*Eugenia bunchosiifolia*	Cecidomyiidae	Marginal leaf roll	Hymenoptera	parasitoid	79
	Eugenia bunchosiifolia	Cecidomyiidae	Marginal leaf roll	Lepidoptera	inquiline	79
	Eugenia bunchosiifolia	Cecidomyiidae	Marginal leaf roll	Coccoidea (Hemiptera)	inquiline	79
	Eugenia bunchosiifolia	Cecidomyiidae	Marginal leaf roll	Psocoptera	successor	79
	Eugenia bunchosiifolia	Cecidomyiidae	Marginal leaf roll	Collembola	successor	79
	Eugenia sp. 1	Not determined	Conical leaf gall	Hemiptera	inquiline	82
	Eugenia sp. 3	Not determined	Globose leaf gall	Collembola	successor	84
	Eugenia sp. 3	Not determined	Globose leaf gall	Hymenoptera	parasitoid	84
Olacaceae	Olacaceae (not determined)	Not determined	Globose leaf gall	Pseudoscorpiones	predator	94
Salicaceae	*Casearia* sp. 3	Not determined	Bud gall	Hymenoptera	parasitoid	106
Sapindaceae	*Serjania* sp.	Not determined	Cylindrical leaf gall	Hymenoptera	parasitoid	114
	Serjania sp.	Cecidomyiidae	Stem,tendril, petiole, vein swelling	Hymenoptera	parasitoid	115
Sapotaceae	*Pouteria* sp. 2	Not determined	Bud gall	Hymenoptera	parasitoid	122
Verbenaceae	*Lantana camara*	Cecidomyiidae	Stem and petiole swelling	Hymenoptera	parasitoid	124

All gall records are new to São Francisco de Itabapoana and the geographical distribution of 15 galling species is extended to the North of the state of Rio de Janeiro: *Calophya terebinthifolii* Burckhardt and Basset, 2000 (Psyllidae, Hemiptera), *Asphondylia cf. cordiae* Möhn, 1959, *Bruggmannia acaudata* Maia, 2004a,b, *Bruggmanniella byrsonimae* Maia and Couri, 1992, *Bruggmannia elongata* Maia and Couri, 1993, *Bruggmanniella maytenuse* Maia and Couri, 1992, *Bruggmannia robusta* Maia and Couri, 1993, *Cordiamyia globosa* Maia, 1996, *Dactylodiplosis heptaphylli* Maia, 2004a,b, *Dasineura byrsonimae* Maia, 2010, *Dasineura myrciariae* Maia, 1993, *Iatrophobia brasiliensis* Rübsaamen, 1916, *Mayteniella distincta* Maia, 2001, *Neolasioptera* sp., and *Paulliniamyia ampla* Maia, 2001 (Cecidomyiidae).

The most common gall shapes were globose ($n = 39$) and fusiform ($n = 36$), as in other Brazilian inventories (Maia et al., 2014). But other shapes were verified, such as conical, cylindrical, circular, ovoid, among others.

The associated fauna comprised parasitoids (Hymenoptera), inquilines (Lepidoptera, Coleoptera and Hemiptera: Coccoidea), successors (Psocoptera, Collembola and Acari), and predators (Pseudoscorpiones) (Table 5). Hymenoptera were the most common, being obtained from 21 gall morphotypes, whereas the others were obtained from two or one morphotype only. All of these taxa have already been recorded as associated fauna (Maia, 2001a; Maia and Fernandes, 2004). Nevertheless, some of them are very rare, as pseudoscorpion in galls (Maia, 2001a). In Brazil, only three records of pseudoscorpions in galls are known: *Novohorus* sp. 1 (Olpiidae) in galls of *Stephomyia rotundifoliorum* Maia, 1994 (Cecidomyiidae) on *Eugenia astringens* Camb. (Myrtaceae) in Maricá (RJ), *Novohorus* sp. 2 in galls of *Houardodiplosis rochae* Tavares, 1925 (Cecidomyiidae) on *Combretus leprosum* Mart. (Combretaceae) in Fortaleza (Ceará), and a not determined species in stem galls of *Myrcia tomentosa* (Aubl.) DC. (Myrtaceae) in Caetité (Bahia) (Maia, 2001a, 2002; Costa et al., 2014).

Data on insect galls are presented here under host plant families, genera and species in alphabetical order. They include gall morphological characterization, associated fauna and previous records in Brazil.

Anacardiaceae (n = *4)*

Astronium *sp. (native genus)*

Leaf gall, globose, green, glabrous, one-chambered. Galler: Hemiptera. Trail: Charco (21/V/2013) and Marcelo Trindade (09/VII/2013) (Fig. 1).

Previous records: Galls on *Astronium* spp. were recorded in Porto de Trombetas (Pará), Serra de São José (MG), and Maricá (RJ). Refs.: Almada and Fernandes (2011), Maia (2001a), Maia and Fernandes (2004).

Schinus terebinthifolius *Raddi (native species)*

Leaf gall, circular, green, glabrous, one-chambered. Galler: *Calophya terebinthifolii* Burckhardt and Basset, 2000 (Psyllidae, Hemiptera). Trail: Marcelo Trindade (11/III/2013). Previous records: Cabo Frio (RJ), Maricá (RJ), Ilha Grande (Angra dos Reis, RJ), Paraty (RJ). Refs.: Fig. 3 in Maia and Oliveira (2010), Monteiro et al. (1994).

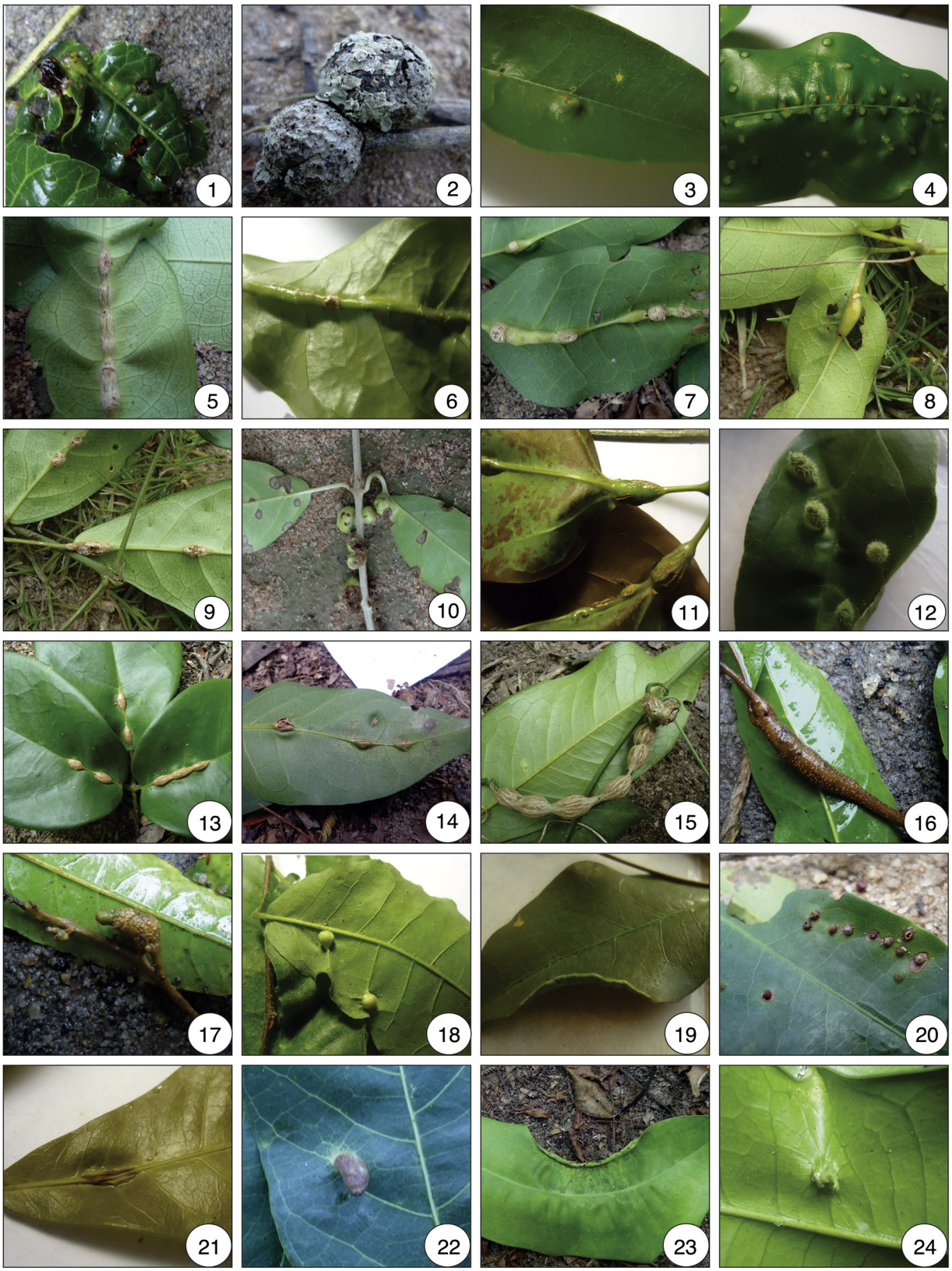
Stem swelling, globose, brown, glabrous, multi-chambered. Galler: not determined. Other dwellers: Acari (successors). Trail: Marcelo Trindade (12/III/2013). No previous record (Fig. 2).

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: Lepidoptera. Trail: Charco (21/V/2013). Previous records: Cabo Frio (RJ), Maricá (RJ), Ilha da Marambaia (Mangaratiba, RJ). Refs.: Maia (2006), Fig. 1 in Maia and Souza (2013), Rodrigues et al. (2014).

Annonaceae (n = *1)*

Xylopia *sp. (native genus)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (22/V/2013) (Fig. 3).



Figs. 1–24. Insect galls of Guaxindiba. 1. *Astronium* sp., globose leaf gall; 2. *Schinus terebinthifolius*, globose stem gall; 3. *Xylopia* sp., conical leaf gall; 4. *Aspidosperma* sp., circular leaf gall; 5. *Adenocalymma* sp., fusiform vein/tendril gall; 6. *Amphilophium* sp., globose vein gall; 7. *Bignonia* sp. 1, fusiform vein gall; 8. *Bignonia* sp. 2, vein swelling; 9. *Bignonia* sp. 3, vein swelling; 10 and 11. *Martinella obovata*, 10: globose bud gall; 11: petiole/vein gall; 12 and 13. *Pyrostegia* sp., 12: conical leaf gall; 13: vein swelling; 14. Bignoniaceae sp. 1, vein swelling; 15. Bignoniaceae sp. 2, tendril/petiole swelling; 16 and 17. *Protium heptaphyllum*, 16: stem gall; 17: bud gall; 18. *Licania* sp., globose vein gall; 19. *Buchenavia* sp., marginal leaf roll; 20. *Erythroxylum pauferrense*, conical leaf gall; 21. *Dodecastigma* sp., vein swelling; 22. *Manihot* sp., cylindrical leaf gall; 23-24. *Pachystroma longifolium*, 23: marginal leaf roll; 24: conical leaf gall.

Previous records: Galls on *Xylopia* spp. were recorded in the states of Minas Gerais, Rio de Janeiro, and São Paulo. Refs.: Fernandes et al. (1997), Gonçalves-Alvim and Fernandes (2001), Rodrigues et al. (2014), Saito and Urso-Guimarães (2012).

Apocynaceae (n = *11*)

Aspidosperma *sp. (native genus)*

Leaf gall, circular, yellow, glabrous, one-chambered. Galler: Cecidomyiidae. Trail: Abelha (22/V/2013, 09/VII/2013), Colégio Agrícola (08/VII/2013, 11/IX/2013), Vera (11/III/2013, 11/IX/2013) (Fig. 4).

Previous records: Leaf galls on *Aspidosperma* spp. were recorded in the states of Pará, Goiás, Mato Grosso do Sul, Minas Gerais, and Rio de Janeiro. Refs.: Almada and Fernandes (2011), Araújo et al. (2011), Coelho et al. (2009), Fernandes et al. (1988, 1997), Maia (2014), Rodrigues et al. (2014).

Bignoniaceae (n = *11*)

Adenocalymma *sp. (native genus)* (Memora *sp.)*

Tendril and vein swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (11/IX/2013) (Fig. 5).

Previous records: Galls were recorded in *Adenocalymma* spp. (as *Memora*) in the state of Pará. Refs.: Almada and Fernandes (2011), Maia (2011a).

Amphilophium *sp. (native genus)*

Vein swelling, globose, green, glabrous, one-chambered. Galler: Cecidomyiidae. Trail: Abelha (13/III/2013, 22/V/2013, 29/IV/2014) (Fig. 6).

No previous record.

Bignonia *sp. 1 (native genus)*

Stem, tendril, vein and petiole swelling, fusiform, green, glabrous, one-chambered. Galler: Cecidomyiidae. Other dwellers: Hymenoptera (parasitoid). Trail: Abelha (22/V/2013), Colégio Agrícola (08/VII/2013), Marcelo Trindade (22/V/2013, 10/IX/2013), Vera (12/III/2013, 20/V/2013) (Fig. 7).

Bignonia *sp. 2*

Vein swelling, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 8).

Bignonia *sp. 3*

Vein swelling, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 9).

Previous records: A gall morphotype on stem was recorded on *Bignonia* sp. in Rio Grande do Sul. Ref.: Tavares (1909).

Martinella obovata *(Kunth) Bureau & K. Schum (native species)*

Bud gall, globose, with superficial grooves, green, rough, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (08/VII/2013) (Fig. 10).

Stem, vein, petiole or tendril swelling, fusiform, green, glabrous, one-chambered. Galler: Cecidomyiidae. Other dwellers: Hymenoptera (parasitoid). Trail: Abelha (13/II/2013, 09/VII/2013, 10/IX/2013, 29/IV/2014), Colégio Agrícola (13/III/2013, 08.VII.2013, 29/IV/2014), Marcelo Trindade (22.V.2013), Vera (11-12/III/2013, 21/V/2013, 10/VII/2013, 11/IX/2013) (Fig. 11).

No previous record.

Pyrostegia *sp. (native genus)*

Leaf gall, conical, green, hairy, one-chambered. Galler: Cecidomyiidae. Other dwellers: Hymenoptera (parasitoid). Trail: Abelha (13/III/2013) (Fig. 12).

Stem or vein swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Trails: Colégio Agrícola (11/IX/2013), Marcelo Trindade (22/V/2013, 09/VII/2013), Vera (21/V/2013) (Fig. 13).

Previous records: A similar stem gall was recorded in Vale do Jequitinhonha (MG). Ref.: Fernandes et al. (1997).

Not determined Bignoniaceae sp. 1

Vein swelling, fusiform, green, glabrous, one-chambered. Galler: Cecidomyiidae. Other dwellers: Hymenoptera (parasitoid). Trails: Vera (12/III/2013, 21/V/2013, 11/IX/2013), Abelha (29/IV/2014) (Fig. 14).

Not determined Bignoniaceae sp. 2

Tendril and petiole swelling, fusiform, green, glabrous, one-chambered. Galler: Cecidomyiidae. Trails: Vera (12/III/2013), Abelha (09/VII/2013, 10/IX/2013), Colégio Agrícola (21/V/2013, 08/VII/2013) (Fig. 15).

Boraginaceae (n = *3*)

Varronia curassavica *Jacq. (native species)*

Leaf gall, globose, green, hairy, one-chambered. Galler: *Cordiamyia globosa* Maia, 1996 (Cecidomyiidae). Trails: Charco (21/V/2013), Colégio Agrícola (13/III/2013, 08/VII/2013, 29/IV/2014), Marcelo Trindade (11/III/2013, 10/IX/2013), Vera (21/V/2013). Previous records: Jurubatiba (RJ), Carapebus (RJ), Cabo Frio (RJ), Belo Horizonte (MG), Guarapari (ES). Refs.: Bregonci et al. (2010), Fernandes et al. (1988), Maia (1996, 2001a), Fig. 30 in Maia et al. (2008), Monteiro et al. (1994, 2004).

Vein leaf gall, conical, green, hairy, one-chambered. Galler: Lopesiini (Cecidomyiidae). Trails: Charco (21/V/2013), Vera (21/V/2013), Colégio Agrícola (08/VII/2013, 11/IX/2013), Marcelo Trindade (11/III/2013, 10/IX/2013). Previous records: Cabo Frio (RJ), Maricá (RJ), Bertioga (SP). Refs.: Maia (2001a), Fig. 33 in Maia et al. (2008).

Inflorescence gall, ovoid, green, hairy, one-chambered. Galler: *Asphondylia cfr. cordiae* Möhn, 1959 (Cecidomyiidae). Trails: Charco (21/V/2013), Marcelo Trindade (11/III/2013, 10/IX/2013), Vera (21/V/2013). Previous records: Jurubatiba (RJ), Cabo Frio (RJ), Maricá (RJ), Bertioga (SP). Refs.: Maia (2001a), Fig. 32 in Maia et al. (2008), Monteiro et al. (2004).

Burseraceae (n = *4*)

Protium heptaphyllum *(Aubl.) Marchand (native species)*

Leaf gall, circular, green, glabrous, one-chambered. Galler: Psyllidae (Hemiptera). Trail: Marcelo Trindade (09/VII/2013). Previous records: Serra de São José (MG), São Tomé das Letras, Vale do Rio Doce (MG), Jurubatiba (RJ), Arraial do Cabo (RJ), Maricá (RJ). Refs.: Fig. 16 in Maia (2013b), Maia and Fernandes (2004), Monteiro et al. (1994, 2004).

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (09/VII/2013). No previous record (Fig. 16).

Bud gall, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (09/VII/2013). No previous record (Fig. 17).

Leaf gall, conical, reddish, glabrous, one-chambered. Galler: *Dactylodiplosis heptaphylli* Maia, 2004a,b (Cecidomyiidae). Trail: Marcelo Trindade (09/VII/2013). Previous records: Pirineus (GO),

Ingaí (MG), Serra de São José (MG), São Tomé das Letras (MG), Carapebus (RJ). Refs.: Araújo et al. (2011), Fig. 18 in Maia (2013b), Malves and Frieiro-Costa (2012), Narahara et al. (2004).

Celastraceae (n = *2*)

Maytenus obtusifolia *Mart. (native species)*

Leaf gall, globose, thick and hard, green or red, glabrous, one-chambered. Galler: *Mayteniella distincta* Maia, 2001 (Cecidomyiidae). Trails: Charco (21/V/2013), Marcelo Trindade (11/III/2013, 22/V/2013, 09/VII/2013, 10/IX/2013), Vera (10/VII/2013). Previous records: Arraial do Cabo (RJ), Maricá (RJ), Grumari (Rio de Janeiro, RJ), Ilha da Marambaia (Mangaratiba, RJ). Refs.: Fig. 22 in Maia (2001a), Monteiro et al. (1994, 2004), Oliveira and Maia (2005), Rodrigues et al. (2014).

Fruit gall, ovoid, red, glabrous, one to three-chambered, externally not perceptible. Galler: *Bruggmanniella maytenuse* (Maia and Couri, 1992) (Cecidomyiidae). Trail: Marcelo Trindade (11/III/2013). Previous record: Maricá (RJ). Ref.: Maia (2001a).

Chrysobalanaceae (n = *1*)

Licania *sp. (native genus)*

Vein swelling, globose, green, glabrous, one-chambered. Galler: not determined. Trail: Vera (12/III/2013) (Fig. 18).

Previous records: Galls on *Licania* spp. were recorded in the states of Pará, Goiás, Minas Gerais, and São Paulo. Refs.: Almada and Fernandes (2011), Araújo et al. (2014), Maia (2014), Maia and Fernandes (2004).

Combretaceae (n = *1*)

Buchenavia *sp. (native genus)*

Marginal leaf roll, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (13/III/2013) (Fig. 19).

Previous records: Leaf galls on *Buchenavia* sp. were recorded in the state of Pará. Ref.: Almada and Fernandes (2011).

Erythroxylaceae (n = *1*)

Erythroxylum pauferrense *Plowman (endemic species of Brazil)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Trails: Charco (21/V/2013), Marcelo Trindade (12/III/2013, 10/IX/2013). Other dwellers: Hymenoptera (parasitoid) (Fig. 20).

No previous record.

Euphorbiaceae (n = *4*)

Dodecastigma *sp. (native genus)*

Vein swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Trail: Vera (12/III/2013) (Fig. 21).

This plant genus was previously recorded in the North (Acre, Amazonas, Amapá, and Pará) and Northeast (Maranhão) regions of Brazil. This is the first record in the Southeast Region.

No previous record of galls.

Manihot *sp. (native genus)*

Leaf gall, cylindrical, green or red, glabrous, one-chambered. Galler: *Iatrophobia brasiliensis* Rübsaamen, 1916 (Cecidomyiidae). Trail: Colégio Agrícola (11/III/2013, 20/V/2013, 08/VII/2013, 29/IV/2014) (Fig. 22).

Previous records: Similar galls on *Manihot* spp. were recorded in Goiás, Minas Gerais, and São Paulo. Refs.: Araújo et al. (2011), Carneiro et al. (2009), Maia et al. (2008), Saito and Urso-Guimarães (2012).

Pachystroma longifolium *(Nees) I. M. Johnst. (native species)*

Marginal roll, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (10/IX/2013), Colégio Agrícola (11/IX/2013) (Fig. 23).

Leaf gall, conical, green, glabrous, one-chambered. Galler: Hemiptera. Trails: Abelha (13/III/2013, 10/IX/2013), Colégio Agrícola (08/VII/2013), Vera (29/IV/2014) (Fig. 24).

No previous record.

Fabaceae (n = *35*)

Acacia *sp. (native genus)*

Stem swelling, fusiform, brown, glabrous, multi-chambered. Galler: not determined. Other dwellers: Hymenoptera (parasitoid). Trail: Vera (12/III/2013, 21/V/2013) (Fig. 25).

Bud gall, globose, brown, glabrous, one-chambered. Galler: not determined. Other dwellers: Hymenoptera (parasitoid). Trail: Vera (12/III/2013) (Fig. 26).

Previous records: Galls were recorded on this plant genus in the states of Pará, Pernambuco and Minas Gerais Refs.: Almada and Fernandes (2011), Coelho et al. (2009), Fernandes and Negreiros (2006), Fernandes et al. (1997), Santos et al. (2011a).

Albizia *sp. (native genus)*

Apical bud gall, globose, brown, glabrous, one-chambered. Galler: not determined. Trail: Abelha (29/IV/2014) (Fig. 27).

Apical bud gall, fusiform, brown, glabrous, multi-chambered. Galler: not determined. Trail: Abelha (22/V/2013) (Fig. 28).

Leaf gall, circular, green, glabrous, one-chambered. Galler: Cecidomyiidae. Other dwellers: Acari (successors). Trail: Abelha (13/III/2013, 22/V/2013, 10/IX/2013), Colégio Agrícola (13/III/2013), Vera (12/III/2013, 21/V/2013) (Fig. 29).

Vein swelling, fusiform, green, glabrous, multi-chambered. Galler: not determined. Trail: Abelha (22/V/2013) (Fig. 30).

Marginal roll, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (22/V/2013) (Fig. 31).

Leaf gall, globose, brown, glabrous, one-chambered. Galler: Cecidomyiidae. Trail: Abelha (13/III/2013) (Fig. 32).

No previous record.

Bauhinia *sp. (native genus)*

Leaf gall, cylindrical, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 33).

Previous records: Several galls were recorded on *Bauhinia* spp. in many Brazilian states: Amazonas, Pernambuco, Goiás, Mato Grosso do Sul, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo. Refs.: Carneiro et al. (2009), Coelho et al. (2009), Fernandes et al. (1988), Fernandes et al. (2001), Julião et al. (2002), Maia et al. (2014), Rübsaamen (1907), Santos et al. (2010), Saito and Urso-Guimarães (2012), Santos et al. (2011b), Tavares (1920), Urso-Guimarães and Scarelli-Santos (2006), Urso-Guimarães et al. (2003).

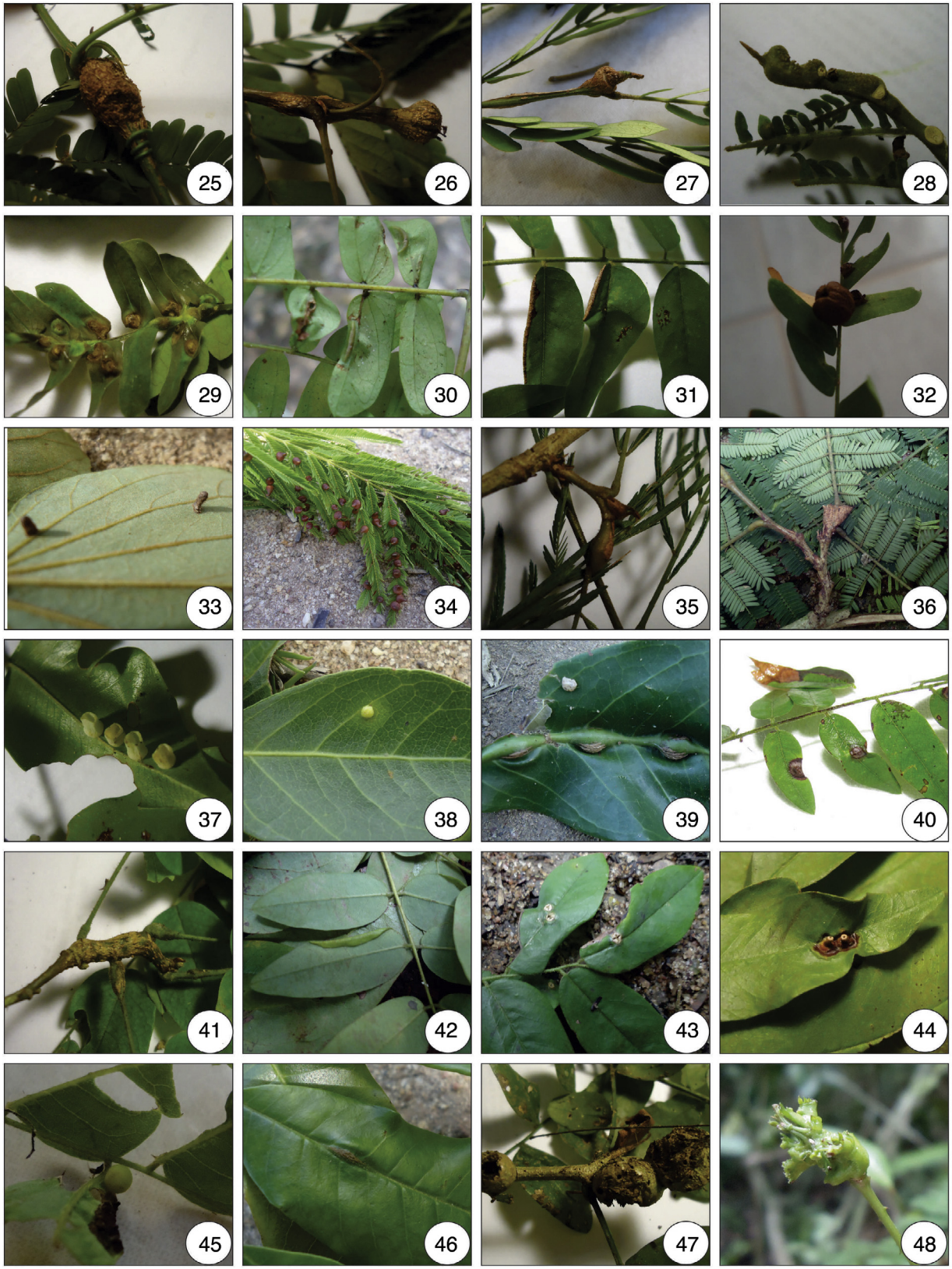
Chloroleucon acacioides *(Ducke) Barneby & J.W. Grimes (native species)*

Leaf gall, formed by the coalescence of two folioles, conical, brown, glabrous, one-chambered. Galler: Cecidomyiidae. Trails: Colégio Agrícola (13/III/2013), Marcelo Trindade (12/III/2013), Vera (11/III/2013, 21/V/2013) (Fig. 34).

Petiole or stem swelling, conical, glabrous, brown, one-chambered. Galler: not determined. Trail: Abelha (10.IX.2013), Colégio Agrícola (21/V/2013) (Fig. 35).

Bud gall, globose, brown, glabrous, one-chambered. Galler: not determined. Trail: Vera (10/VII/2013) (Fig. 36).

No previous record.



Figs. 25–48. Insect galls of Guaxindiba. 25 and 26. *Acacia* sp., 25: fusiform stem gall; 26: globose bud gall; 27–32. *Albizia* sp., 27: globose bud gall; 28: fusiform bud gall; 29: circular leaf gall; 30: vein swelling; 31: marginal leaf roll; 32: globose leaf gall; 33. *Bauhinia* sp., cylindrical leaf gall; 34–36. *Chloroleucon acacioides*, 34: conical gall on folioles; 35: conical petiole gall; 36: globose bud gall; 37. *Copaifera* sp., cylindrical leaf gall; 38 and 39. *Inga laurina*, 38: globose leaf gall; 39: vein swelling; 40–45. *Machaerium* sp., 40: circular leaf gall; 41: fusiform stem gall; 42: marginal leaf roll; 43: circular leaf gall; 44: conical leaf gall; 45: globose bud gall; 46. *Ormosia* sp., vein swelling; 47. *Pterodon* sp., globose stem gall; 48. *Senegalia* sp., globose bud gall.

Copaifera *sp. (native genus)*

Leaf gall, circular-globose, green, glabrous, one-chambered. Galler: not determined. Trail: Vera (29/IV/2014).

Leaf gall, cylindrical, green, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (22/V/2013) (Fig. 37).

Previous records: Galls on *Copaifera* spp. were recorded in the states of Pernambuco, Minas Gerais, Espírito Santo, Rio de Janeiro, and São Paulo. Refs.: Maia and Souza (2013), Maia and Fernandes (2004), Maia et al. (2014).

Inga laurina *(Sw.) Willd (native species)*

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Trails: Marcelo Trindade (10/IX/2013), Vera (21/V/2013). Previous records: Porto Trombetas (PA). Ref.: Almada and Fernandes (2011) (Fig. 38).

Vein swelling, fusiform, green, glabrous, one-chambered. Galler: *Neolasioptera* sp. (Cecidomyiidae). Trail: Marcelo Trindade (08/VII/2013, 10/IX/2013). Previous records: Maricá (RJ), Porto Trombetas (PA). Refs.: Almada and Fernandes (2011), Maia et al. (2002) (Fig. 39).

Machaerium *sp. (native genus)*

Leaf gall, circular, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (22/V/2013), Marcelo Trindade (22/V/2013), Vera (10/VII/2013, 29/IV/2014) (Fig. 40).

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Vera (21/V/2013) (Fig. 41).

Marginal leaf roll, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (13/III/2013, 22/V/2013, 29/IV/2014), Colégio Agrícola (13/II/2013, 22/V/2013, 08/VII/2013), Marcelo Trindade (22/V/2013, 09/VII/2013), Vera (12/III/2013, 21/V/2013, 10/VII/2013) (Fig. 42).

Leaf gall (foliole), circular, green, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trails: Abelha (13/III/2013, 09/VII/2013), Colégio Agrícola (13/III/2013) (Fig. 43).

Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (21/V/2013). (Fig. 44)

Bud gall, globose, green, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trails: Abelha (13.III.2013) (Fig. 45).

Previous records: Several galls were recorded on *Machaerium* spp. in the states of Pará, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, and Santa Catarina. Refs.: Almada and Fernandes (2011), Fernandes and Negreiros (2006), Fernandes et al. (1988), Fernandes et al. (2001), Gagné (1994), Maia et al. (2008), Maia et al. (2014), Malves and Frieiro-Costa (2012), Rübsaamen (1907), Tavares (1916, 1920).

Ormosia *sp. (native genus)*

Vein swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Trails: Colégio Agrícola (20/V/2013), Marcelo Trindade (12/III/2013, 09/VII/2013, 29/IV/2014) (Fig. 46).

Previous records: Other leaf gall morphotype was recorded on *Ormosia paraensis* Ducke in Porto de Trombetas (Pará). Ref: Almada and Fernandes (2011).

Pterodon *sp. (native genus)*

Stem swelling, globose, brown, glabrous, multi-chambered. Galler: not determined. Trail: Vera (21/V/2013) (Fig. 47).

No previous record.

Senegalia *sp. (native genus)*

Bud gall, globose, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (22/V/2013), Marcelo Trindade (09/VII/2013), Vera (29/IV/2014, 20/V/2013) (Fig. 48).

Previous records: Similar gall was recorded on *Senegalia polyphylla* (DC.) Britton & Rose in Cabo Frio (RJ). Ref.: Maia and Souza (2013).

Senna *sp. (native genus)*

Marginal leaf roll, green, glabrous, one-chambered. Galler: not determined. Trails: Colégio Agrícola (21/V/2013, 11/IX/2013), Marcelo Trindade (12/III/2013) (Fig. 49).

Leaf gall, globose, brown, hairy, one-chambered. Galler: not determined. Trail: Marcelo Trindade (12/III/2013) (Fig. 50).

Previous records: Galls on this host plant genus were recorded in the states of Rio de Janeiro, Minas Gerais and São Paulo. Refs.: Carneiro et al. (2009), Maia et al. (1992), Saito and Urso-Guimarães (2012).

Zollernia ilicifolia *(Brongn.) Vogel (native species)*

Leaf gall, circular, green, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 51).

Previous records: Coleopteran galls were recorded on *Z. glabra* (Spreng.) Yakovlev in Ilha da Marambaia (Mangaratiba, RJ). Ref.: Rodrigues et al. (2014).

Hippocrateaceae (n = *7)*

Tontelea *sp. 1 (native genus)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (10/IX/2013) (Fig. 52).

Stem swelling, globose, reddish, glabrous, one-chambered. Galler: not determined. Trail: Abelha (10/IX/2013) (Fig. 53).

Leaf gall, discoid, brown, glabrous, one-chambered. Galler: not determined. Trail: Abelha (09/VII/2013, 10/IX/2013) (Fig. 54).

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (13/III/2013) (Fig. 55).

Stem swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Dwellers: Baridinae (Coleoptera, Curculionidae). Trail: Abelha (13/III/2013) (Fig. 56).

Marginal roll, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (13/II/2013, 10/IX/2013) (Fig. 57).

Tontelea *sp 2*

Leaf gall, circular, green, glabrous, one-chambered. Galler: not determined. Trail: Vera (11/IX/2013) (Fig. 58).

No previous record.

Hypericaceae (n = *1)*

Not determined Hypericaeae

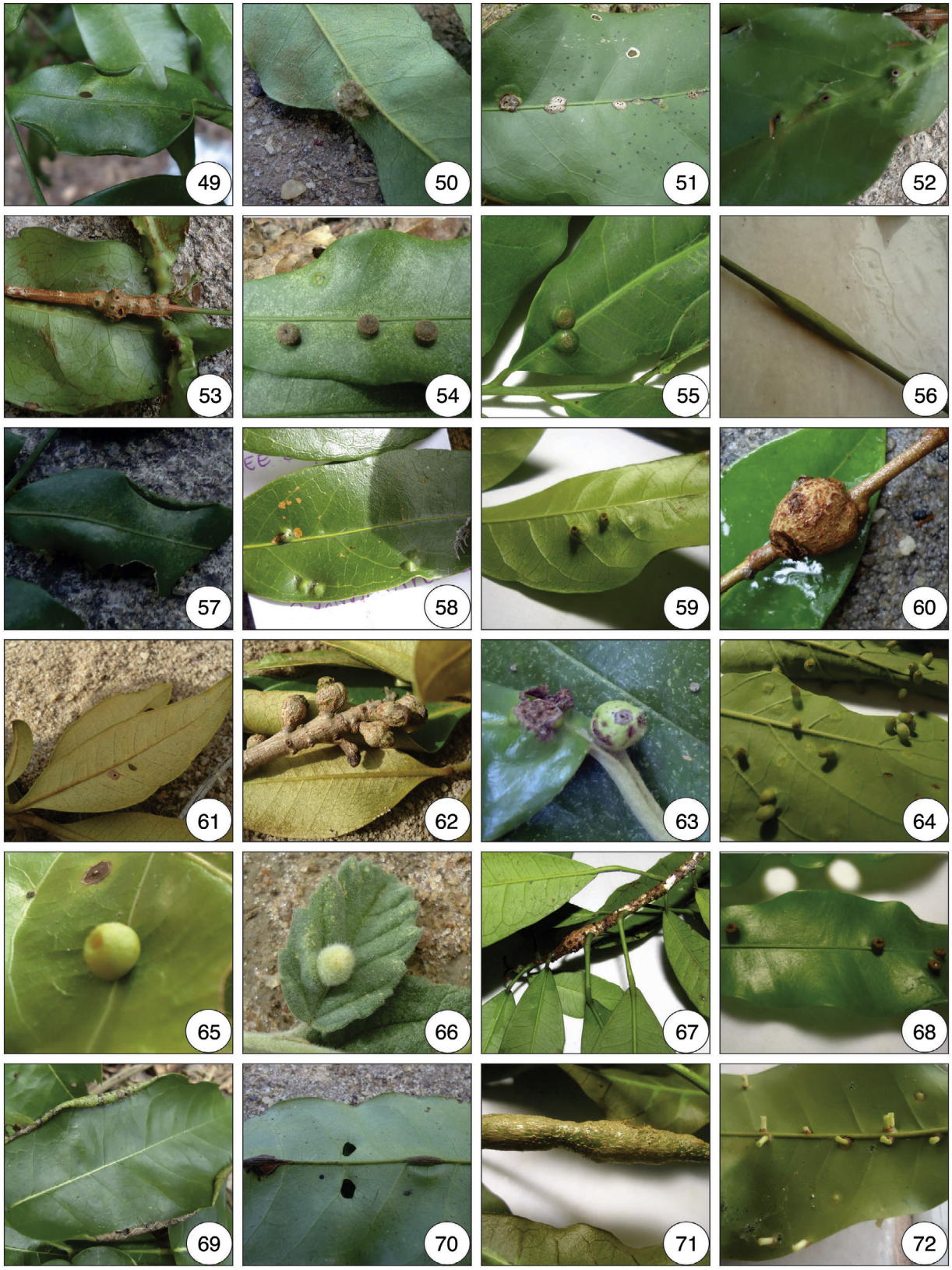
Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trail: Vera (20/V/2013) (Fig. 59).

Malpighiaceae (n = *6)*

Byrsonima sericea *DC. (native species)*

Stem swelling, globose, brown, glabrous, one-chambered. Galler: Cecidomyiidae. Trail: Marcelo Trindade (22/V/2013, 08-09/VII/2013, 10/IX/2013, 29/IV/2014). Previous records: Pernambuco, Ilha Grande (Angra dos Reis, RJ), Ilha da Marambaia (Mangaratiba, RJ), Guarapari (ES), Jurubatiba (RJ), Carapebus (RJ), Arraial do Cabo (RJ), Maricá (RJ), Grumari (Rio de Janeiro, RJ), Vale do Jequitinhonha (MG). Refs.: Bregonci et al. (2010), Fernandes et al. (1997), Maia (2001a), Maia and Oliveira (2010), Monteiro et al. (1994, 2004), Oliveira and Maia (2005), Rodrigues et al. (2014), Santos et al. (2011b) (Fig. 60).

Leaf gall, circular, brown, glabrous, one-chambered. Galler: *Dasineura byrsonimae* Maia, 2010 (Cecidomyiidae). Trails:



Figs. 49–72. Insect galls of Guaxindiba. 49 and 50. *Senna* sp., 49:marginal leaf roll; 50: globose leaf gall; 51. *Zollernia ilicifolia*, circular leaf gall; 52–57. *Tontelea* sp. 1, 52: conical leaf gall; 53: globose stem gall; 54: discoid leaf gall; 55: globose leaf gall; 56: fusiform stem gall; 57: marginal leaf roll; 58. *Tontelea* sp. 2, circular leaf gall; 59. Hypericaceae sp., conical leaf gall; 60–62. *Byrsonima sericea*, 60: globose stem gall; 61: circular leaf gall; 62: fower bud gall; 63: *Mascagnia* sp., globose leaf gall; 64–65. *Stigmaphyllon lalandianum*, 64: conical leaf gall; 65. globose leaf gall; 66. *Sidastrum micranthum*, globose leaf gall; 67. *Trichilia elegans*, fusiform stem gall; 68. *Trichilia rubra*, cylindrical leaf gall; 69. *Trichilia* sp. 1, marginal leaf roll; 70. *Trichilia* sp. 2, vein swelling; 71. *Trichilia* sp. 3, fusiform stem gall; 72. *Trichilia* sp. 4, cylindrical leaf gall.

Charco (21/V/2013), Marcelo Trindade (12/III/2013, 09/VII/2013, 10/IX/2013). Previous records: Guarapari (ES), Jurubatiba (RJ), Carapebus (RJ), Maricá (RJ), Grumari (Rio de Janeiro, RJ), Ilha da Marambaia (Mangaratiba, RJ), Ilha Grande (Angra dos Reis, RJ), Vale do Jequitinhonha (MG). Refs.: Bregonci et al. (2010), Fernandes et al. (1997), Maia (2001a, 2010), Maia and Oliveira (2010), Monteiro et al. (2004), Oliveira and Maia (2005), Rodrigues et al. (2014) (Fig. 61).

Flower bud gall, ovoid, brown, glabrous, multi-chambered. Galler: *Bruggmanniella byrsonimae* (Maia and Couri, 1992) (Cecidomyiidae). Trails: Charco (21/V/2013), Marcelo Trindade (08/VII/2013, 10/IX/2013). Previous records: Jurubatiba (RJ), Carapebus (RJ), Maricá (RJ), Ilha da Marambaia (Mangaratiba, RJ). Refs.: Maia (1999, 2001a), Monteiro et al. (1994, 2004), Rodrigues et al. (2014) (Fig. 62).

Mascagnia *sp.*

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (11/IX/2013) (Fig. 63).

Previous records: Two gall morphotypes were recorded on this plant genus in the state of Espírito Santo and Minas Gerais. Refs.: Maia (2013b), Maia et al. (2014).

Stigmaphyllon lalandianum *A. Juss. (endemic species of Brazil)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: Cecidomyiidae. Trails: Abelha (13/III/2013, 20/V/2013), Colégio Agrícola (29/IV/2014), Marcelo Trindade (11/III/2013) (Fig. 64).

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (08/VII/2013, 11/IX/2013) (Fig. 65).

Previous record: An elongate-ovoid leaf gall was recorded in Minas Gerais on this same plant species. Ref.: Fernandes et al. (1988).

Malvaceae (n = *2)*

Sidastrum micranthum *(A. St.-Hil.) Fryxell (*= Sida micrantha *A. St.-Hil.) (native species)*

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013).

Leaf gall, globose, yellow, hairy, one-chambered. Galler: not determined. Trail: Colégio Agrícola (08/VII/2013, 11/IX/2013) (Fig. 66).

Previous records: Galls on *Sidastrum* spp. (as *Sida*) were recorded in the states of Rio de Janeiro and Minas Gerais. Refs.: Coelho et al. (2009), Fernandes et al. (1997), Rodrigues et al. (2014).

Meliaceae (n = *9)*

Trichilia elegans *A. Juss. (endemic species of Brazil)*

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trails: Colégio Agrícola (08/VII/2013), Vera (10/VII/2013, 11/IX/2013) (Fig. 67).

Trichilia rubra *C.DC. (native species)*

Leaf gall, cylindrical, brown, glabrous, one-chambered. Galler: not determined. Trail: Vera (12/III/2013, 11/IX/2013) (Fig. 68).

Trichilia *sp. 1*

Marginal leaf roll, green, glabrous, one-chambered. Galler: Cecidomyiidae. Trails: Abelha (13/III/2013, 22/V/2013, 09/VII/2013, 10/IX/2013), Vera (11-12/III/2013, 10/VII/2013, 11/IX/2013) (Fig. 69).

Trichilia *sp. 2*

Vein swelling, fusiform, brown, glabrous, one-chambered. Galler: Cecidomyiidae. Trail: Marcelo Trindade (12/III/2013, 22/V/2013) (Fig. 70).

Trichilia *sp. 3*

Stem swelling, fusiform, brown, glabrous, multi-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid) (Fig. 71).

Trichilia *sp. 4*

Leaf gall, cylindrical (tubular), green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (13/III/2013) (Fig. 72).

Trichilia *sp. 5*

Leaf gall, globose, green, glabrous, one or multi-chambered. Galler: Cecidomyiidae. Trail: Vera (12/III/2013, 21/V/2013) (Fig. 73).

Trichilia sp. 6

Vein swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 74).

Trichilia *sp. 7*

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trail: Vera (11/IX/2013) (Fig. 75).

No previous record.

Moraceae (n = *3)*

Ficus *sp. 1 (native genus)*

Leaf gall, circular, green or red, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trail: Marcelo Trindade (12/III/2013, 10/IX/2013) (Fig. 76).

Leaf gall, globose, green or white, hairy, one-chambered. Galler: not determined. Trails: Charco (21/V/2013), Marcelo Trindade (12/III/2013, 10/IX/2013) (Fig. 77).

Ficus *sp. 2*

Leaf gall, conical, green, glabrous, one-chambered. Galler: Cecidomyiidae. Trail: Colégio Agrícola (21/V/2013) (Fig. 78).

Previous records: Galls on *Ficus* sp. were recorded in the states of Pará, Mato Grosso do Sul and Rio de Janeiro. Refs.: Almada and Fernandes (2011), Julião et al. (2002), Rodrigues et al. (2014).

Myrtaceae (n = *13)*

Eugenia bunchosiifolia *Nied. (*= Eugenia santensis *Kiaersk.) (endemic species of Brazil)*

Marginal roll, green, glabrous, one-chambered. Galler: Cecidomyiidae. Other dwellers: Coccoidea, catterpilars (Lepidoptera) (inquilines), Psocoptera (successors), Hymenoptera (parasitoid). Trails: Charco (21/V/2013), Colégio Agrícola (11/IX/2013), Marcelo Trindade (11/III/2013, 12/III/2013, 22/V/2013, 09/VII/2013),Vera (11/IX/2013) (Fig. 79).

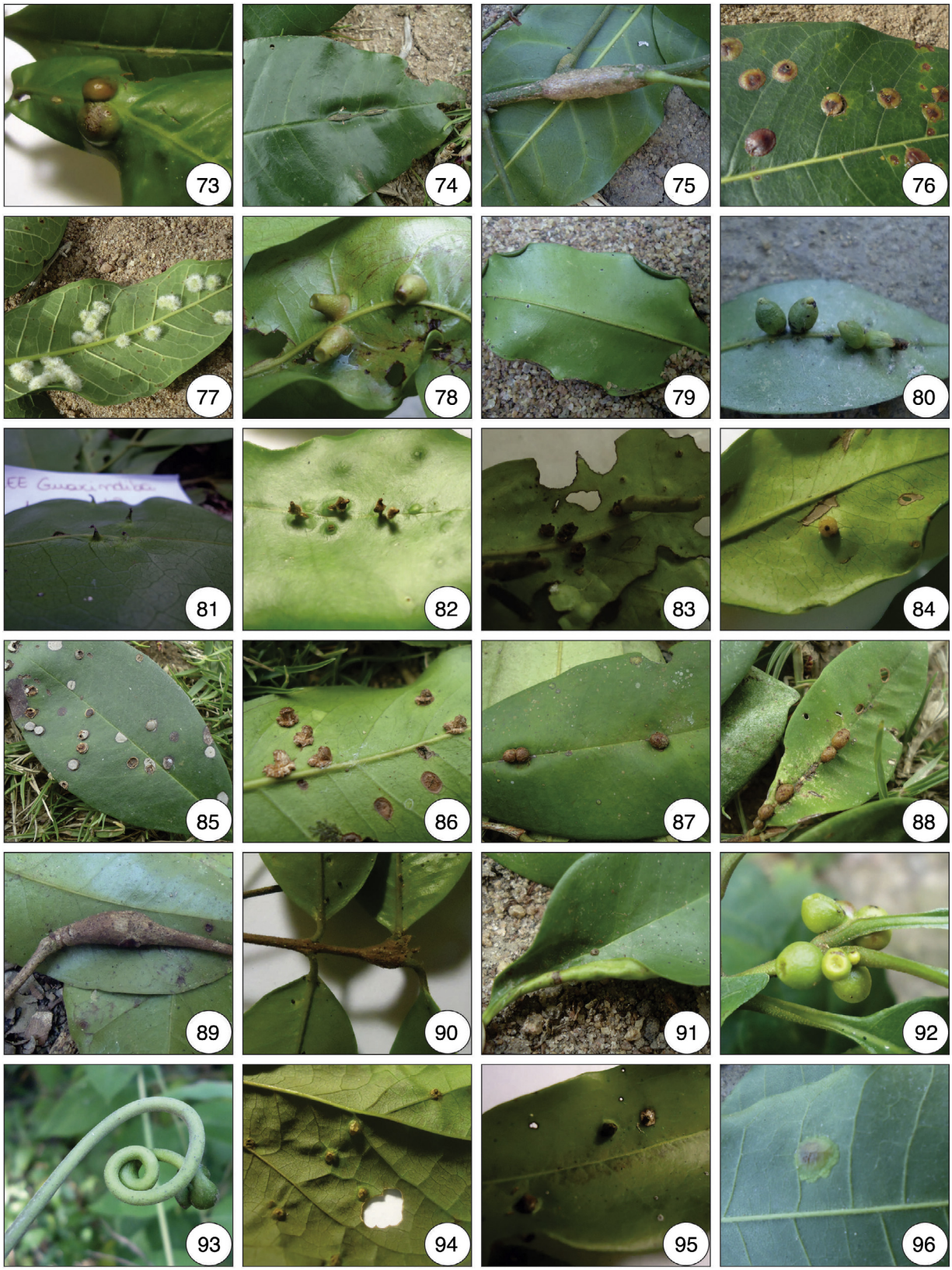
Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Trails: Colégio Agrícola (11/IX/2013), Vera (11/IX/2013) (Fig. 80).

No previous record.

Eugenia *sp. 1*

Leaf gall, cylindrical, green, glabrous, one-chambered. Galler: not determined. Trail: Vera (11/IX/2013) (Fig. 81).

Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Dwellers: Hemiptera (successors). Trails: Abelha



Figs. 73–96. Insect galls of Guaxindiba. 73. *Trichilia* sp. 5, globose leaf gall; 74. *Trichilia* sp. 6, vein swelling; 75. *Trichilia* sp. 7, fusiform stem gall; 76. *Ficus* sp. 1, circular leaf gall; 77. *Ficus* sp. 2, globose leaf gall.; 78. *Ficus* sp. 2, conical leaf gall; 79–80. *Eugenia bunchosiifolia*, 79: marginal leaf roll; 80: conical leaf gall; 81–82. *Eugenia* sp. 1, 81: conical leaf gall; 82: cylindrical leaf gall; 83. *Eugenia* sp. 2, cylindrical leaf gall; 84. *Eugenia* sp. 3, globose leaf gall; 85. *Eugenia* sp. 4, discoid leaf gall; 86. *Marlierea* sp., gobose leaf gall; 87–90. *Myrcia* sp., 87: globose leaf gall; 88: ovoid leaf gall; 89: fusiform stem gall; 90: fusiform bud gall; 91. *Myrciaria floribunda*, marginal leaf roll; 92. *Guapira* sp., globose bud gall; 93–94. Olacaceae not determined, 93: tendril swelling; 94: globose leaf gall; 95. *Pera glabrata*, conical leaf gall; 96. *Phyllanthus* sp., circular leaf gall.

(10/IX/2013), Colégio Agrícola (12/III/2013), Vera (20/V/2013, 10/VII/2013, 29/IV/2014) (Fig. 82).

Eugenia *sp. 2*

Leaf gall, cylindrical (tubular), green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (13/III/2013) (Fig. 83).

Eugenia *sp. 3*

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid) and Collembola (successor). Trails: Abelha (29/IV/2014), Charco (21/V/2013), Colégio Agrícola (29/IV/2014), Marcelo Trindade (11/III/2013, 12/III/2013, 22/V/2013, 09/VII/2013) (Fig. 84).

Eugenia *sp. 4*

Leaf gall, discoid, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 85).

Marlierea *sp. (native genus)*

Leaf gall, globose, brown, glabrous, massive. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 86).

Previous records: Five different gall morphotypes are recorded on this host plant genus in Minas Gerais. Ref.: Maia (2014).

Myrcia *sp.*

Leaf gall (vein), globose, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 87).

Leaf gall (vein), ovoid, brown, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 88).

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Abelha (09/VII/2013, 10/IX/2013) (Fig. 89).

Bud gall, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Abelha (22/V/2013) (Fig. 90).

Previous records: Galls on *Myrcia* spp. were recorded in Goiás, Pernambuco, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, and Rio Grande do Sul. Refs.: Araújo et al. (2014), Maia (2013a,b), Maia (2014), Maia et al. (2014), Toma and Mendonça (2013).

Myrciaria floribunda *(West ex Willdenow) Berg. (native species)*

Marginal roll, green, glabrous, one-chambered. Galler: *Dasineura myrciariae* Maia, 1993 (Cecidomyiidae). Trail: Abelha (10/IX/2013, 29/IV/2014). Previous records: Guarapari (ES), Santa Teresa (ES), Jurubatiba (RJ), Carapebus (RJ), Maricá (RJ). Refs.: Bregonci et al. (2010), Maia (1993), Maia et al. (2014), Monteiro et al. (1994, 2004) (Fig. 91).

Nyctaginaceae (n = *4)*

Guapira opposita *(Vell.) Reitz (native species)*

Leaf gall, globose, red or green, hairy, one-chambered. Galler: *Bruggmannia robusta* Maia and Couri, 1993 (Cecidomyiidae). Trail: Marcelo Trindade (12/III/2013, 09/VII/2013, 10/IX/2013). Previous records: Jurubatiba (RJ), Arraial do Cabo (RJ), Maricá (RJ), Ilha Grande (Angra dos Reis, RJ), Ilha da Marambaia (Mangaratiba, RJ), Bertioga (SP). Refs.: Maia and Couri (1993), Maia (2001a), Fig. 29 in Maia and Oliveira (2010), Maia et al. (2008), Monteiro et al. (2004), Rodrigues et al. (2014).

Leaf gall, conical, green, glabrous, one-chambered. Galler: *Bruggmannia acaudata* Maia, 2004a (Cecidomyiidae). Trail: Vera (21/V/2013). Previous records: Santa Teresa (ES), Jurubatiba (RJ), Carapebus (RJ), Maricá (RJ), Ilha Grande (Angra dos Reis, RJ). Refs.: Maia (2001a, 2004a), Fig. 30 in Maia and Oliveira (2010), Maia et al. (2014), Monteiro et al. (2004), Rodrigues et al. (2014).

Leaf gall, circular, green, glabrous, one-chambered. Galler: *Bruggmannia elongata* Maia and Couri, 1993 (Cecidomyiidae). Trail: Marcelo Trindade (22/V/2013). Previous records: Bertioga (SP), Jurubatiba (RJ), Carapebus (RJ), Arraial do Cabo (RJ), Maricá (RJ), Ilha da Marambaia (Mangaratiba, RJ), Ilha Grande (Angra dos Reis, RJ). Refs.: Maia (2001a), Maia and Couri (1993), Fig. 28 in Maia and Oliveira (2010), Maia et al. (2008), Monteiro et al. (1994), Rodrigues et al. (2014).

Guapira sp.

Bud gall, globose, green, glabrous, one-chambered. Galler: Cecidomyiidae. Trail: Abelha (22/V/2013) (Fig. 92).

Ochnaceae (n = *1)*

Ouratea cuspidata *(A. St.-Hil.) Engl. (endemic species of Brazil)*

Leaf gall, cylindrical, brown, glabrous, one-chambered. Galler: *Contarinia* (Cecidomyiidae). Trail: Abelha (09/VII/2013). Previous records: Grumari (Rio de Janeiro, RJ), Ilha Grande (Angra dos Reis, RJ), Maricá (RJ), Jurubatiba (RJ), Guarapari (ES). Refs.: Bregonci et al. (2010), Maia (2001a), Fig. 33 in Maia and Oliveira (2010), Monteiro et al. (2004), Oliveira and Maia (2005).

Olacaceae (n = *2)*

Not determined species

Stem and tendril swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trails: Colégio Agrícola (21/V/2013), Marcelo Trindade (12/III/2013, 22/V/2013) (Fig. 93).

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Other dwellers: Pseudoscorpiones (predator). Trail: Colégio Agrícola (13/III/2013) (Fig. 94).

Peraceae (n = *1)*

Pera glabrata *(Schott) Poepp. ex Baill. (native species)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (22/V/2013) (Fig. 95).

Previous records: A gall morphotype on buds was recorded on this same plant species in Minas Gerais. Refs.: Maia (2011b).

Phyllanthaceae (n = *2)*

Phyllanthus *sp. (native genus)*

Leaf gall, circular, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (29/IV/2014), Vera (11/IX/2013) (Fig. 96).

Leaf gall, globose (kidney-shaped), green, glabrous, one-chambered. Galler: Cecidomyiidae. Trails: Abelha (13/III/2013) (Fig. 97).

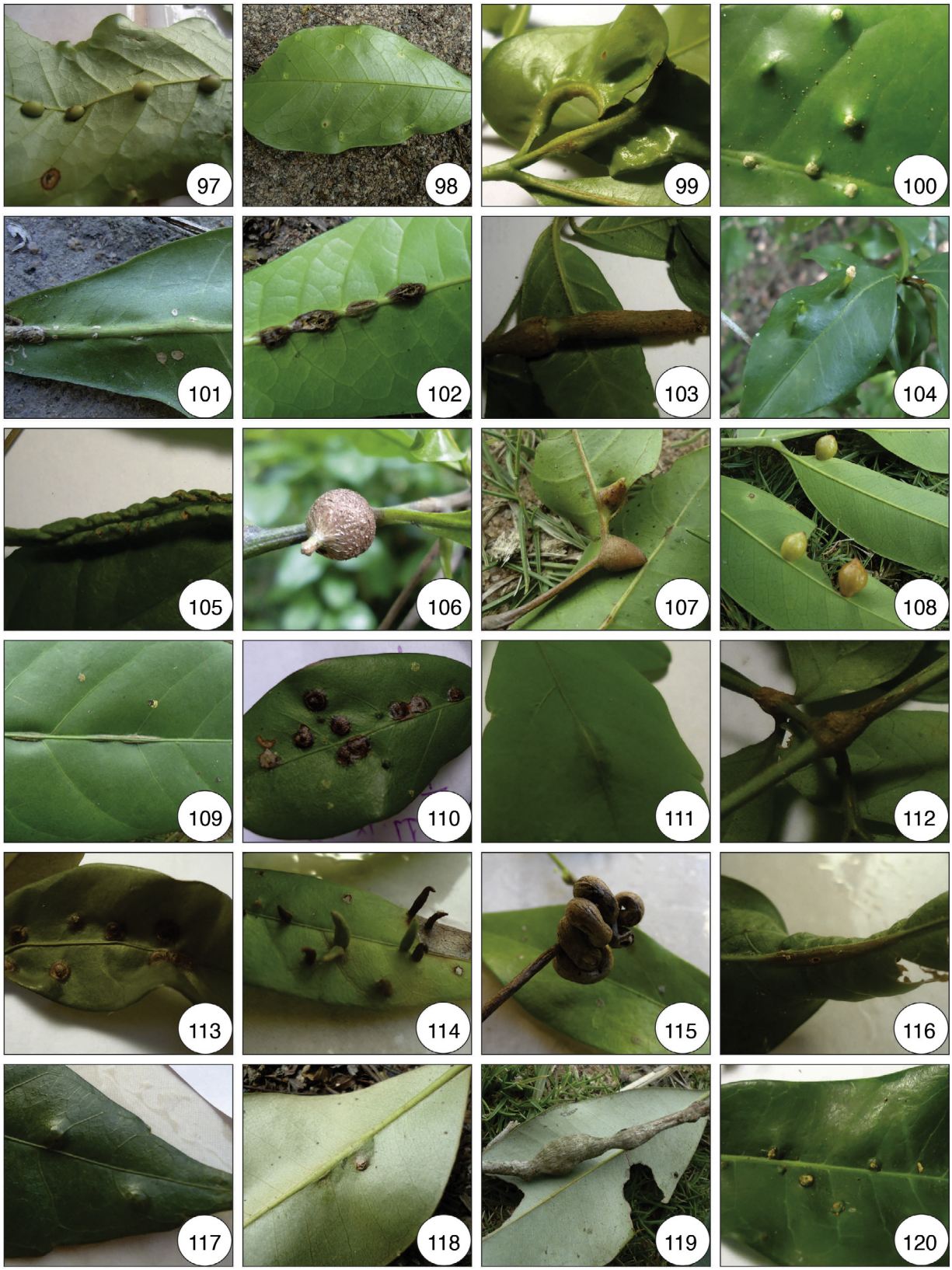
Previous records: A similar globose gall was recorded on this plant genus in Santa Teresa (ES). Refs.: Maia et al. (2014).

Rubiaceae (n = *1)*

Psychotria *sp. (native genus)*

Stem swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Vera (21/V/2013) (Fig. 98).

Previous records: Several galls on *Psychotria* spp. were recorded in Pernambuco, Mato Grosso do Sul, Minas Gerais, Rio de Janeiro, São Paulo, and Rio Grande do Sul. Refs.: Maia (2014), Maia et al. (2014).



Figs. 97–120. Insect galls of Guaxindiba. 97. *Phyllanthus* sp., globose leaf gall; 98. *Psychotria* sp., fusiform stem gall; 99–100. *Metrodorea* sp., 99. circular leaf gall; 100. vein swelling; 101–103. *Neoraputia alba*, 101: globose leaf gall; 102: fusiform leaf gall at petiole basis; 103: vein swelling; 104. *Casearia* sp. 1, cylindrical leaf gall; 105. *Casearia* sp. 2, leaf roll; 106. *Casearia* sp. 3, globose bud gall; 107–108. *Matayba juglandifolia*, 107: conical leaf gall; 108: globose leaf gall; 109–110. *Paullinia racemosa*, 109: midvein swelling; 110: circular leaf gall; 111–117. *Serjania* sp., 111: vein swelling; 112: fusiform bud gall; 113: circular leaf gall; 114: cylindrical leaf gall; 115: tendril swelling; 116: midvein swelling; 117: globose leaf gall; 118–119. *Manilkara subsericea*, 118: circular leaf gall; 119: globose stem gall; 120. *Pouteria* sp. 1, circular leaf gall.

Rutaceae (n = *6)*

Metrodorea *sp. (native genus)*

Marginal roll, green, glabrous, one-chambered. Galler: not determined. Trails: Colégio Agrícola (29/IV//2014), Vera (10/VII/2013, 11/IX/2013)

Leaf gall, circular, green, glabrous, one-chambered. Galler: Hemiptera. Trails: Abelha (22/V/2013, 10/IX/2013, 29/IV/2014), Colégio Agrícola (13/III/2013, 11/IX/2013, 29/IV/2014), Marcelo Trindade (12/III/2013, 22/V/2013), Vera (12/III/2013, 20-21/V/2013, 10/VII/2013, 29/IV/2014) (Fig. 99).

Vein swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (13/III/2013, 10/IX/2013, 29/IV/2014), Colégio Agrícola (13.III.2013, 21/V/2013, 11/IX/2013), Marcelo Trindade (12/III/2013, 22/V/2013, 29/IV/2014), Vera (11-12/III/2013, 20/V/2013, 10/VII/2013, 11/IX/2013, 29/IV/2014) (Fig. 100).

No previous record.

Neoraputia alba *(Nees & Mart.) Emmerich ex Kallunki (endemic species of Brazil)*

Leaf gall, globose, brown, glabrous, one-chambered. Galler: not determined. Trail: Vera (11/IX/2013) (Fig. 101).

Leaf gall, at petiole basis, fusiform, green, glabrous, one-chambered. Galler: not determined. Trail: Abelha (22/V/2013) (Fig. 102).

Vein swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (13/III/2013, 22/V/2013), Colégio Agrícola (13/III/2013), Vera (12/III/2014, 21/V/2013, 10/VII/2013) (Fig. 103).

No previous record.

Salicaceae (n = *3)*

Casearia *sp. 1 (native genus)*

Leaf gall, cylindrical, green, glabrous, one-chambered. Galler: Hemiptera. Trails: Abelha (09/VII/2013), Marcelo Trindade (12/III/2013, 22/V/2013, 29/IV/2014) (Fig. 104).

Casearia *sp. 2*

Leaf roll, green, glabrous, one-chambered. Galler: not determined. Trail: Vera (21/V/2013, 10/VII/2013) (Fig. 105).

Casearia *sp. 3*

Bud gall, globose, spongy, brown, micropubescent, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trail: Abelha (22/V/2013) (Fig. 106).

Previous records: Galls on *Casearia* spp. were recorded in the states of Pará, Goiás, Pernambuco, Minas Gerais, and Rio de Janeiro. Refs.: Araújo et al. (2014), Maia et al. (2014), Rodrigues et al. (2014).

Sapindaceae (n = *13)*

Matayba juglandifolia *(Cambess.) Radlk. (endemic species of Brazil)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (10/IX/2013) (Fig. 107).

Vein swelling, fusiform, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (20/V/2013)

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Trails: Charco (21/V/2013), Marcelo Trindade (10/IX/2013) (Fig. 108).

No previous record.

Paullinia racemosa *Wawra (endemic species of Brazil)*

Midvein swelling, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trails: Colégio Agrícola (11/IX/2013), Marcelo Trindade (10/IX/2013) (Fig. 109).

Leaf gall, circular, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (10/IX/2013), Vera (20/V/2013, 11/IX/2013) (Fig. 110).

Previous records: Clavate leaf galls were recorded in Cabo Frio (RJ) and petiole galls in Pernambuco on this host plant genus. Refs.: Maia and Souza (2013), Santos et al. (2011b).

Paullinia weinmanniifolia *Mart. (endemic species of Brazil)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: *Paulliniamyia ampla* Maia, 2001 (Cecidomyiidae). Trails: Marcelo Trindade (12/III/2013, 10/IX/2013), Vera (20/V/2013). Previous records: Jurubatiba (RJ), Arraial do Cabo (RJ), Maricá (RJ). Refs.: Fig. 86 in Maia (2001a), Maia (2001b), Monteiro et al. (1994, 2004).

Serjania *sp. (native genus)*

Vein swelling, fusiform, little evident, green, glabrous, one-chambered. Galler: not determined. Trail: Vera (10/VII/2013) (Fig. 111).

Bud gall, fusiform, brown, glabrous, one-chambered. Galler: not determined. Trail: Vera (21/V/2013) (Fig. 112).

Leaf gall (vein), circular, green, glabrous, one-chambered. Galler: not determined. Trails: Abelha (13/III/2013, 29/IV/2014), Colégio Agrícola (21/V/2013), Marcelo Trindade (12/III/2013, 20-21/V/2013, 10/IX/2013), Vera (12/III/2013, 20-21/V/2013, 10/VII/2013, 11/IX/2013) (Fig. 113).

Leaf gall, cylindrical, green, glabrous, one-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trails: Colégio Agrícola (13/III/2013, 21/V/2013, 08/VII/2013), Marcelo Trindade (13/III/2013, 21/V/2013, 08/VII/2013, 10/IX/2013), Vera (12/III/2013, 11/IX/2013) (Fig. 114).

Stem, tendril, petiole, vein swelling, globose, brown, glabrous, one-chambered. Galler: Cecidomyiidae. Other dwellers: Hymenoptera (parasitoid). Trails: Abelha (22/V/2013, 10/IX/2013, 29/IV/2014), Colégio Agrícola (13/III/2013), Marcelo Trindade (12/III/2013, 22/V/2013), Vera (21/V/2013) (Fig. 115).

Midvein swelling (causing leaf fold), fusiform, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (13/III/2013) (Fig. 116).

Leaf gall, globose, green, glabrous, one-chambered. Galler: not determined. Trail: Colégio Agrícola (13/III/2013) (Fig. 117).

Previous records: Several galls were recorded on *Serjania* spp. in Amazonas, Pará, Goiás, Mato Grosso do Sul, Pernambuco, Minas Gerais, Espírto Santo, Rio de Janeiro, and São Paulo. Refs.: Maia (2013a,b), Maia (2014), Maia et al. (2014), Rodrigues et al. (2014).

Sapotaceae (n = *5)*

Manilkara subsericea *(Mart.) Dubard. (endemic species of Brazil)*

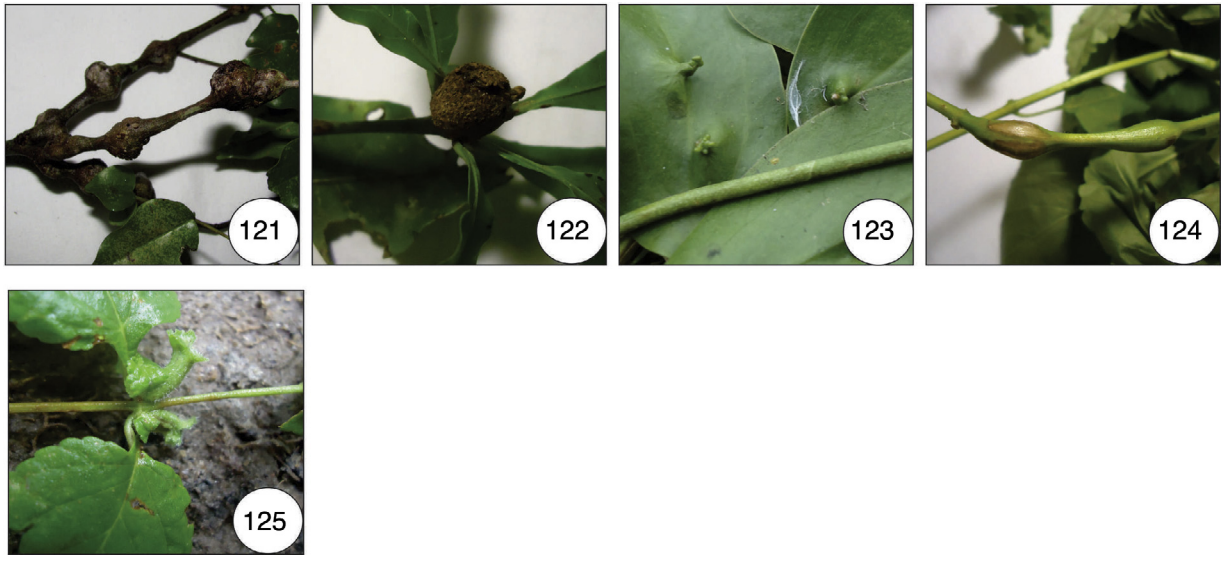
Leaf gall, circular, green, glabrous, one-chambered. Galler: not determined. Trail: Marcelo Trindade (09/VII/2013, 10/IX/2013) (Fig. 118).

Stem swelling, globose, brown, glabrous, one-chambered. Galler: not determined. Trails: Charco (21/V/2013), Marcelo Trindade (11/III/2013, 29/IV/2014, 22/V/2013, 09/VII/2013, 10/IX/2013) (Fig. 119).

Previous records: Some galls were recorded in this plant species in the states of Espírito Santo and Rio de Janeiro. Refs.: (Maia, 2014).

Pouteria *sp. 1 (native genus)*

Leaf gall, circular, green, glabrous, one-chambered. Galler: Cecidomyiidae. Trails: Abelha (10/IX/2013), Colégio Agrícola



Figs. 121–125. Insect galls of Guaxindiba. 121 and 122. *Pouteria* sp. 2, 121: globose stem gall; 122: globose bud gall; 123. *Smilax krukovii*, conical leaf gall; 124. *Lantana camara*, fusiform stem gall; 125. *Lantana* sp., cylindrical leaf gall.

(13/III/2013, 084/VII/2013, 29/IV/2014), Vera (11-12/III/2013, 20/V/2013, 10/VII/2013) (Fig. 120).

Pouteria *sp. 2*

Stem swelling, globose, brown, glabrous, one-chambered. Galler: not determined. Trails: Abelha (09/07/2013), Vera (11/IX/2013) (Fig. 121).

Bud gall, globose, brown, glabrous, multi-chambered. Galler: not determined. Dwellers: Hymenoptera (parasitoid). Trails: Abelha (22/V/2013, 10/IX/2013), Vera (20/V/2013) (Fig. 122).

Previous records: Several galls on *Pouteria* spp. were recorded in the states of Pará, Goiás, Mato Grosso do Sul, Minas Gerais, Espírito Santo, Rio de Janeiro and São Paulo. Refs.: Araújo et al. (2014), Maia (2014), Maia et al. (2014).

Smilacaceae (n = *1*)

Smilax krukovii *A. C. Sm. (endemic species of Brazil)*

Leaf gall, conical, green, glabrous, one-chambered. Galler: Hemiptera. Trails: Charco (21/V/2013), Marcelo Trindade (22/V/2013, 09/07/2013, 10/IX/2013) (Fig. 123).

No previous records.

Verbenaceae (n = *2*)

Lantana camara *L. (native species)*

Stem and petiole swelling, fusiform, green, glabrous, one-chambered. Galler: Cecidomyiidae. Other dwellers: Hymenoptera (parasitoid). Trail: Colégio Agrícola (13/III/2013, 21/V/2013, 08/VII/2013) (Fig. 124). Previous records: Vale do Rio Doce (MG). Ref.: Fernandes et al. (2001).

Lantana *sp.*

Leaf gall, cylindrical (tubular), green, micropubescent, one-chambered. Galler: Cecidomyiidae. Trails: Colégio Agrícola (13/III/2013, 08/VII/2013), Marcelo Trindade (09/VII/2013),Vera (20/V/2013) (Fig. 125).

Conclusions

The only surveyed area of Tabuleiro Forest in Brazil presented a great richness of insect galls. The most galled botanical taxa and plant organs, the most frequent galler taxon, the most common gall morphology (shape, color and indumentary) and the composition of the associated fauna confirm the known patterns of Brazil and Atlantic Forest.

Conflicts of interest

The authors declare no conflicts of interest.

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