**Plant-galling insect interactions: A data set of host plants and their gall-inducing insects for the Cerrado**

Fernanda C. F. Cintra¹, Walter S. de Araújo2, Valéria C. Maia3, Maria V. Urso-Guimarães4, Henrique Venâncio¹, Janete F. Andrade5, Marco A. A. Carneiro6, Wanessa R. de Almeida7 & Jean C. Santos7\*

\* Correspondence and requests for materials should be addressed to Jean Carlos Santos (email: [jcsantosbio@gmail.com](mailto:jcsantosbio@gmail.com)).

1 Programa de Pós-Graduação em Entomologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil.

2 Departamento de Biologia Geral, Universidade Estadual de Montes Claros (UNIMONTES), Montes Claros, Minas Gerais, Brazil.

3 Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil.

4 Departamento de Biologia, Universidade Federal de São Carlos, São Carlos, São Paulo, Brazil.

5 Programa de Pós-graduação em Biologia Vegetal, Universidade Federal de Pernambuco, Recife, Pernambuco, Brazil.

6 Departamento Biodiversidade, Evolução e Meio Ambiente, Instituto de Ciências Exatas e Biológicas, Universidade Federal de Ouro Preto, Ouro Preto, Minas Gerais, Brazil.

7 Departamento de Ecologia, Universidade Federal de Sergipe, São Cristóvão, Sergipe, Brazil.

**Introduction**

Galling insects are considered the most specialized guild of phytophagous insects. Their unique ability to modify plant tissues before their consumption is remarkable (Shorthouse et al. 2005). Such changes in plant tissues are attributed to abnormal growth and development of plant cells (hyperplasia and hypertrophy) induced by specific stimuli from an ovipositing female and/or her prole (Hartley 1998, Moura et al. 2008, Giron et al. 2016). This ability has evolved independently in many different taxa within six insect orders: Diptera, Hemiptera, Hymenoptera, Coleoptera, Thysanoptera and Lepidoptera (Shorthouse et al. 2005, Price 2005). There exists great diversity of galling insects in the Neotropics (Gagné 1994, Fernandes and Santos 2014), but mainly in the Cerrado (Brazilian Savannah) of central Brazil (Araújo et al. 2014), which includes campos rupestres (rupestrian fields; Lara and Fernandes 1996)

The Cerrado is the second largest phytogeographic biome in Brazil, occupying ca. 2 million km2 or 23% of the national territory (Oliveira and Ratter 2002). As a continuous area, the Cerrado completely covers the states of Goiás and Tocantins and the Federal District, as well as portions of the states of Bahia, Ceará, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Piauí, Rondônia and São Paulo. Disjointed areas also occur the north, in the states of Amapá, Amazonas, Pará and Roraima, and in the south, as small “islands” in the state of Paraná (Ribeiro and Walter 2008). The Cerrado is among the most botanically diverse biome in the world with over 12,000 species (Klink and Machado 2005, Mendonça et al. 2008), which represent potential host plants for galling insects (Fernandes and Gonçalves-Alvim 2006).

The Cerrado includes a wide variety of phytophysiognomies, such grassland, savanna and forest formations (Ribeiro and Walter 2008). Differences among habitat types can directly affect the distribution of galling species (Fernandes and Price 1992). There have been many inventories of insect gall diversity in mesic (non-sclerophyllous) and xeric (sclerophyllous) vegetation of the Cerrado (review in Araújo et al. 2019). Recent evidence indicates that interactions between galling insects and host plants can form complex ecological networks in the Cerrado (Araújo et al. 2019). Despite advances in knowledge of local interactions, there has been no synthesis to better understand patterns at regional and macroecological scales.

The present study compiled data from several inventories of galling insects in the Cerrado biome, community studies about species of Diptera with gall-inducing habit and host plants attacked by several galling insect species. The resulting data set contains 49 described species of Diptera (Cecidomyiidae and Tephritidae) and 505 species of host plants of 32 communities distributed throughout the Cerrado. All records of galling species were confirmed and the taxonomic nomenclature of host plants was updated to assure all data are robust and reliable. The aim of compiling this dataset was to fill a knowledge gap about the geographical distribution of host plants and gall-inducing insects in an area considered a global biodiversity hotspot.

The data set can contribute to several areas of knowledge, including natural history, ecology, botany, zoology and evolution. Gall-inducing insects have proven to be good study models because they: (a) have high taxonomic and ecological diversity; (b) are sedentary during the larval phase, which facilitates sampling on host plants; (c) are abundant on host plants; (d) occur in all biogeographic regions of the world; (e) possess a high level of specificity for their host plants; (f) are easily identified through gall morphology since galls are considered an extended phenotype of gall inducers; (g) have an important functional role in ecosystems through herbivory; and (h) have predictable responses to environmental variation as a function of their close relationship with host plant species. For all these reasons, gall-inducing insects are good tool for basic, applied and experimental studies. They are also useful for understanding ecological, evolutionary and mechanistic aspects, such as: host-plant preferences and selection; the process of adaptive radiation; how patterns of geographic distribution and diversity of host plants affect galling insects; phytochemical patterns in host plants; plant defense against gall induction; theory of island biogeography applied to host plants; and several hypotheses about plant architecture, plant vigor and preference performance, among others (Price et al. 2004, Price 2005, Fernandes et al. 2011, Stone & Schönrogge 2003, Fernandes and Santos 2014, Tooker and Helms 2014, Carneiro et al. 2015, Grandez-Rios et al. 2015, Giron et al. 2016, Oates et al. 2016).

**Metadata**

**Class I. Data set descriptors**

**A. Data set identity:**

**Title:** Plant-galling insect interactions: a data set of host plants and their gall-inducing insects for the Cerrado.

**B. Data set and metadata identification codes:**

**Suggested data set identity codes:**

plant-galling\_insect\_diptera.csv

plant-galling\_insect\_host\_plants\_information.csv

plant-galling\_insect\_host\_plant\_references.csv

**C. Data set description**

**Principal investigators:**

1. *Fernanda Cristina Franco Cintra.* Programa de Pós-Graduação em Entomologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil.
2. *Walter Santos de Araújo.* Departamento de Biologia Geral, Universidade Estadual de Montes Claros (UNIMONTES), Montes Claros, Minas Gerais, Brazil.
3. *Valéria Cid Maia.* Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil.
4. *Maria Virginia Urso-Guimarães.* Departamento de Biologia, Universidade Federal de São Carlos, São Carlos, São Paulo, Brazil.
5. *Henrique Venâncio.* Programa de Pós-Graduação em Entomologia, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil.
6. *Janete Ferreira Andrade.* Programa de Pós-graduação em Biologia Vegetal, Universidade Federal de Pernambuco, Recife, Pernambuco, Brazil.
7. *Marco Antônio Alves Carneiro.* Instituto de Ciências Exatas e Biológicas, Universidade Federal de Ouro Preto, Ouro Preto, Minas Gerais, Brazil.
8. *Wanessa Rejane de Almeida.* Departamento de Ecologia, Universidade Federal de Sergipe, São Cristóvão, Sergipe, Brazil.
9. *Jean Carlos Santos.* Departamento de Ecologia, Universidade Federal de Sergipe, São Cristóvão, Sergipe, Brazil.

**Abstract:** Recent decades have seen increased research interest in the processes and mechanisms related to insect gall richness and host plants. The data set provided here includes 968 records of interactions between galling insects and host plants for the Cerrado biome. The data set comprises 505 species of 222 genera and 67 families of host plants. The botanical families most represented in the data set are Asteraceae, Fabaceae, Myrtaceae, Malpighiaceae and Melastomataceae, which account for ca. 48.5% of all records and 52% of the total number of species. The gall-inducing insects listed in the data set include 48 species of Cecidomyiidae and one species of Tephritidae. This data set is the first to compile inventories of plant-galling insect communities and information about the diversity and distribution of insect galls and their host plants in the Cerrado. The data set reveals knowledge gaps and opportunities for future research on patterns of diversity and distribution, and provides a basis for generating and testing new ecological hypotheses.

**D. Key words:** Asteraceae, insect galls, Fabaceae, Neotropical savannah, host plant communities, Diptera, Cecidomyiidae, Tephritidae

**E. Description:** The data set developed here is restricted to the Cerrado biome and comprises data only from peer reviewed scientific publications. The Cerrado has been the most studied Brazilian biome with regard to galling insects (Araújo et al. 2019). The data set includes only the occurrence of insect-gall host plants and gall-inducing species of Diptera, and excludes all other galling insect taxa (e.g., Hemiptera, Hymenoptera and Lepidoptera). In addition, other gall-inducing interactions are not included, such as those involving mites, nematodes, fungi, bacteria and viruses. The data set of consists of 968 records of 505 species, 222 genera and 67 families of host plants. Nine of the species are considered either Vulnerable (VU) or Endangered (EN), according to the red list of flora in Brazil (MMA Ordinance # 443/2014; CNCFlora 2020). The three Vulnerable species are *Baccharis concinna* G.M.Barroso (Asteraceae), *Lychnophora ramosissima* Gardner (Asteraceae) and *Lychnophora tomentosa* (Mart. ex DC.) Sch.Bip. (Asteraceae). The six Endangered species are *Anemopaegma arvense* (Vell.) Stellfeld ex de Souza (Bignoniaceae), *Lychnophoriopsis candelabrum* (Sch.Bip.) H.Rob. (Asteraceae), *Baccharis elliptica* Gardner (Asteraceae), *Mikania glabra* D.J.N.Hind (Asteraceae), *Mikania glauca* Mart. ex Baker (Asteraceae) and *Peixotoa cipoana* C.E.Anderson (Malpighiaceae).

Most of the sampled communities are located in the states of Minas Gerais (n=13; 41%), Goiás (n=9; 28%) and Bahia (n=7; 22%), which accounted for ca. 91% of all the communities in the data set (Figure 1). The concentration of most of the sampling effort in these states is a consequence of logistics, with it being dominated by just a few research groups based in Minas Gerais, Goiás and Bahia.

More studies were conducted outside (n=18; 62%) than inside (n=11; 38%) protected areas; two studies (6%) did not state whether they occurred in a protected area or not, while only one study (6%) was conducted both inside and outside of a protected area (see Carneiro et al. 2009). Among the studies conducted in protected areas, 55% (N=6) occurred in state protected areas, 36% (N=4) in federal protected areas and one (9%) in a Private Natural Heritage Reserve and in state-level protected areas (see Carneiro et al. 2009). Multiple phytophysiognomies of the Cerrado were sampled, including: Cerrado-Caatinga transition, cerrado *sensu stricto*, campo rupestre (rupestrian fields), campo cerrado, campo sujo, cerradão, cerrado rochoso, campo limpo, seasonal forest, seasonal deciduous forest, seasonal semideciduous forest, riparian rainforest, gallery forest, ciliary forest, dry forest, and semideciduous forest. In addition, many studies did not report the phytophysiognomy in which they took place (see Oliveira-Filho and Ratter 2002 for the classification system of Cerrado phytophysiognomies).

Uma imagem contendo texto, screenshot

Descrição gerada automaticamente

**Figure 1.** Number of communities sampled per Brazilian states in this study, from a total of 32 communities. The abbreviations of states are: BA = Bahia, GO = Goiás, MG = Minas Gerais, MS = Mato Grosso do Sul and SP = São Paulo.

The fourteen most frequently recorded plant species represent about 14.7% of all the records: *Copaifera langsdorffii* Desf. (Fabaceae), *Duguetia furfuracea* (A.St.-Hil.) Saff. (Annonaceae), *Erythroxylum suberosum* A.St.-Hil. (Erythroxylaceae), *Qualea parviflora* Mart. (Vochysiaceae), *Roupala montana* Aubl. (Proteaceae), *Caryocar brasiliense* Cambess. (Caryocaraceae), *Qualea grandiflora* Mart. (Vochysiaceae), *Eugenia punicifolia* (Kunth) DC. (Myrtaceae), *Protium heptaphyllum* (Aubl.) Marchand (Burseraceae), *Bauhinia brevipes* Vogel (Fabaceae), *Eremanthus erythropappus* (DC.) MacLeish (Asteraceae), *Handroanthus ochraceus* (Cham.) Mattos (Bignoniaceae), *Palicourea rigida* Kunth (Rubiaceae) and *Terminalia argentea* Mart. (Combretaceae). Many of these species are typical of the Cerrado and are widely distributed throughout the biome. Of the 505 species recorded, 328 (ca. 65%) are registered only once, which represents about 34% of all the records.

Eight plant genera stand out for having large numbers of records: *Baccharis* N=62, 6.4%), *Byrsonima* (N=36, 3.7%), *Erythroxylum* (N=30, 3.1%), *Qualea* (N=30, 3.1%), *Bauhinia* (N=29, 3.0%), *Eugenia* (N=29, 3.0%), *Myrcia* (N=25, 2.6%) and *Copaifera* (N=21, 2.2%; Table 1). These eight genera account for ca. 27% of the recorded plant species. The genera with the most recorded species are: *Baccharis* (N=44 spp., 8.7%), *Byrsonima* (N=14 spp., 2.8%), *Myrcia* (N=12 spp., 2.4%), *Eugenia* (N=11 spp., 2.2%), *Bauhinia* (N=10 spp., 2%), *Erythroxylum* (N=10 spp., 2%), *Chamaecrista* (N=9 spp., 1.8%) and *Croton* (N=9 spp., 1.8). These results show the importance of the diversity of *Baccharis* as a super host genus of insect galls.

**Table 1.** Genera of host plants of galling insects from the Cerrado. Also includes the number of records and the number of species for each genus.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Host genera** | **Species records (N)** | **Species records (%)** | **Host plant richness (N)** | **Host plant richness (%)** |
| *Achyrocline* | 2 | 0.2 | 2 | 0.4 |
| *Acritopappus* | 1 | 0.1 | 1 | 0.2 |
| *Aegiphila* | 1 | 0.1 | 1 | 0.2 |
| *Ageratum* | 1 | 0.1 | 1 | 0.2 |
| *Agrianthus* | 1 | 0.1 | 1 | 0.2 |
| *Alibertia* | 1 | 0.1 | 1 | 0.2 |
| *Amorimia* | 1 | 0.1 | 1 | 0.2 |
| *Amphilophium* | 1 | 0.1 | 1 | 0.2 |
| *Anacardium* | 6 | 0.6 | 2 | 0.4 |
| *Anadenanthera* | 8 | 0.8 | 2 | 0.4 |
| *Andira* | 8 | 0.8 | 4 | 0.8 |
| *Anemopaegma* | 1 | 0.1 | 1 | 0.2 |
| *Annona* | 11 | 1.1 | 6 | 1.2 |
| *Aspidosperma* | 12 | 1.2 | 6 | 1.2 |
| *Aspilia* | 4 | 0.4 | 4 | 0.8 |
| *Astronium* | 2 | 0.2 | 2 | 0.4 |
| *Baccharis* | 62 | 6.4 | 44 | 8.7 |
| *Banisteriopsis* | 6 | 0.6 | 6 | 1.2 |
| *Bauhinia* | 29 | 3.0 | 10 | 2.0 |
| *Blepharocalyx* | 1 | 0.1 | 1 | 0.2 |
| *Bocageopsis* | 1 | 0.1 | 1 | 0.2 |
| *Bowdichia* | 3 | 0.3 | 1 | 0.2 |
| *Bredemeyera* | 1 | 0.1 | 1 | 0.2 |
| *Brosimum* | 3 | 0.3 | 1 | 0.2 |
| *Buchenavia* | 1 | 0.1 | 1 | 0.2 |
| *Buchnera* | 1 | 0.1 | 1 | 0.2 |
| *Bunchosia* | 1 | 0.1 | 1 | 0.2 |
| *Byrsonima* | 36 | 3.7 | 14 | 2.8 |
| *Calliandra* | 6 | 0.6 | 4 | 0.8 |
| *Callisthene* | 2 | 0.2 | 2 | 0.4 |
| *Calolisianthus* | 1 | 0.1 | 1 | 0.2 |
| *Calophyllum* | 3 | 0.3 | 1 | 0.2 |
| *Campomanesia* | 4 | 0.4 | 3 | 0.6 |
| *Cantinoa* | 2 | 0.2 | 2 | 0.4 |
| *Capsicum* | 1 | 0.1 | 1 | 0.2 |
| *Caryocar* | 10 | 1.0 | 1 | 0.2 |
| *Casearia* | 5 | 0.5 | 2 | 0.4 |
| *Cassia* | 1 | 0.1 | 1 | 0.2 |
| *Celtis* | 8 | 0.8 | 2 | 0.4 |
| *Chamaecrista* | 9 | 0.9 | 9 | 1.8 |
| *Cheiloclinium* | 1 | 0.1 | 1 | 0.2 |
| *Chomelia* | 1 | 0.1 | 1 | 0.2 |
| *Chromolaena* | 3 | 0.3 | 3 | 0.6 |
| *Chrysophyllum* | 2 | 0.2 | 1 | 0.2 |
| *Chusquea* | 1 | 0.1 | 1 | 0.2 |
| *Cissampelos* | 1 | 0.1 | 1 | 0.2 |
| *Cissus* | 1 | 0.1 | 1 | 0.2 |
| *Coccoloba* | 1 | 0.1 | 1 | 0.2 |
| *Cochlospermum* | 1 | 0.1 | 1 | 0.2 |
| *Combretum* | 4 | 0.4 | 1 | 0.2 |
| *Connarus* | 7 | 0.7 | 1 | 0.2 |
| *Copaifera* | 21 | 2.2 | 4 | 0.8 |
| *Cordia* | 4 | 0.4 | 2 | 0.4 |
| *Cordiera* | 2 | 0.2 | 2 | 0.4 |
| *Couepia* | 3 | 0.3 | 1 | 0.2 |
| *Croton* | 14 | 1.4 | 9 | 1.8 |
| *Cupania* | 1 | 0.1 | 1 | 0.2 |
| *Cuphea* | 1 | 0.1 | 1 | 0.2 |
| *Cyanocephalus* | 1 | 0.1 | 1 | 0.2 |
| *Cyrtocymura* | 1 | 0.1 | 1 | 0.2 |
| *Dalbergia* | 5 | 0.5 | 1 | 0.2 |
| *Dasyphyllum* | 1 | 0.1 | 1 | 0.2 |
| *Davilla* | 9 | 0.9 | 3 | 0.6 |
| *Deguelia* | 1 | 0.1 | 1 | 0.2 |
| *Dimorphandra* | 2 | 0.2 | 1 | 0.2 |
| *Diospyros* | 4 | 0.4 | 1 | 0.2 |
| *Diplopterys* | 5 | 0.5 | 1 | 0.2 |
| *Diplusodon* | 5 | 0.5 | 4 | 0.8 |
| *Dipteryx* | 1 | 0.1 | 1 | 0.2 |
| *Drimys* | 2 | 0.2 | 1 | 0.2 |
| *Duguetia* | 12 | 1.2 | 1 | 0.2 |
| *Epidendrum* | 1 | 0.1 | 1 | 0.2 |
| *Eremanthus* | 10 | 1.0 | 3 | 0.6 |
| *Eriope* | 1 | 0.1 | 1 | 0.2 |
| *Eriotheca* | 8 | 0.8 | 3 | 0.6 |
| *Erythroxylum* | 30 | 3.1 | 10 | 2.0 |
| *Eugenia* | 29 | 3.0 | 11 | 2.2 |
| *Eumachia* | 1 | 0.1 | 1 | 0.2 |
| *Fridericia* | 2 | 0.2 | 2 | 0.4 |
| *Galipea* | 1 | 0.1 | 1 | 0.2 |
| *Gaylussacia* | 2 | 0.2 | 2 | 0.4 |
| *Gochnatia* | 4 | 0.4 | 2 | 0.4 |
| *Grazielia* | 1 | 0.1 | 1 | 0.2 |
| *Guapira* | 6 | 0.6 | 3 | 0.6 |
| *Guarea* | 1 | 0.1 | 1 | 0.2 |
| *Guatteria* | 1 | 0.1 | 1 | 0.2 |
| *Guazuma* | 1 | 0.1 | 1 | 0.2 |
| *Guettarda* | 1 | 0.1 | 1 | 0.2 |
| *Handroanthus* | 11 | 1.1 | 4 | 0.8 |
| *Heterocondylus* | 2 | 0.2 | 1 | 0.2 |
| *Heteropterys* | 6 | 0.6 | 2 | 0.4 |
| *Himatanthus* | 1 | 0.1 | 1 | 0.2 |
| *Hirtella* | 4 | 0.4 | 3 | 0.6 |
| *Hololepis* | 2 | 0.2 | 1 | 0.2 |
| *Hymenaea* | 10 | 1.0 | 3 | 0.6 |
| *Hyptidendron* | 1 | 0.1 | 1 | 0.2 |
| *Hyptis* | 1 | 0.1 | 1 | 0.2 |
| *Ilex* | 3 | 0.3 | 2 | 0.4 |
| *Inga* | 6 | 0.6 | 5 | 1.0 |
| *Ipomoea* | 1 | 0.1 | 1 | 0.2 |
| *Jacaranda* | 2 | 0.2 | 1 | 0.2 |
| *Kielmeyera* | 8 | 0.8 | 4 | 0.8 |
| *Lantana* | 4 | 0.4 | 1 | 0.2 |
| *Lavoisiera* | 1 | 0.1 | 1 | 0.2 |
| *Leandra* | 4 | 0.4 | 1 | 0.2 |
| *Leonotis* | 1 | 0.1 | 1 | 0.2 |
| *Lepidaploa* | 1 | 0.1 | 1 | 0.2 |
| *Leptolobium* | 6 | 0.6 | 1 | 0.2 |
| *Lessingianthus* | 9 | 0.9 | 7 | 1.4 |
| *Licania* | 5 | 0.5 | 3 | 0.6 |
| *Lippia* | 6 | 0.6 | 5 | 1.0 |
| *Lithraea* | 2 | 0.2 | 1 | 0.2 |
| *Lonchocarpus* | 2 | 0.2 | 1 | 0.2 |
| *Lourteigia* | 1 | 0.1 | 1 | 0.2 |
| *Luehea* | 4 | 0.4 | 1 | 0.2 |
| *Lychnophora* | 5 | 0.5 | 5 | 1.0 |
| *Lychnophoriopsis* | 1 | 0.1 | 1 | 0.2 |
| *Mabea* | 1 | 0.1 | 1 | 0.2 |
| *Macairea* | 4 | 0.4 | 1 | 0.2 |
| *Machaerium* | 7 | 0.7 | 4 | 0.8 |
| *Magonia* | 2 | 0.2 | 1 | 0.2 |
| *Manihot* | 3 | 0.3 | 2 | 0.4 |
| *Maprounea* | 5 | 0.5 | 1 | 0.2 |
| *Marcetia* | 3 | 0.3 | 1 | 0.2 |
| *Mascagnia* | 1 | 0.1 | 1 | 0.2 |
| *Matayba* | 3 | 0.3 | 2 | 0.4 |
| *Medusantha* | 1 | 0.1 | 1 | 0.2 |
| *Merremia* | 2 | 0.2 | 1 | 0.2 |
| *Mesosphaerum* | 1 | 0.1 | 1 | 0.2 |
| *Metrodorea* | 1 | 0.1 | 1 | 0.2 |
| *Miconia* | 11 | 1.1 | 5 | 1.0 |
| *Microlicia* | 8 | 0.8 | 7 | 1.4 |
| *Microstachys* | 1 | 0.1 | 1 | 0.2 |
| *Mikania* | 9 | 0.9 | 8 | 1.6 |
| *Mimosa* | 6 | 0.6 | 2 | 0.4 |
| *Minaria* | 1 | 0.1 | 1 | 0.2 |
| *Moquiniastrum* | 2 | 0.2 | 2 | 0.4 |
| *Myracrodruon* | 1 | 0.1 | 1 | 0.2 |
| *Myrcia* | 25 | 2.6 | 12 | 2.4 |
| *Myrciaria* | 2 | 0.2 | 2 | 0.4 |
| *Myrsine* | 4 | 0.4 | 3 | 0.6 |
| *Nectandra* | 3 | 0.3 | 1 | 0.2 |
| *Neea* | 2 | 0.2 | 1 | 0.2 |
| *Ocotea* | 6 | 0.6 | 5 | 1.0 |
| *Oocephalus* | 1 | 0.1 | 1 | 0.2 |
| *Ouratea* | 16 | 1.7 | 7 | 1.4 |
| *Oxalis* | 1 | 0.1 | 1 | 0.2 |
| *Palicourea* | 8 | 0.8 | 1 | 0.2 |
| *Peixotoa* | 2 | 0.2 | 2 | 0.4 |
| *Peltogyne* | 1 | 0.1 | 1 | 0.2 |
| *Periandra* | 1 | 0.1 | 1 | 0.2 |
| *Phoradendron* | 1 | 0.1 | 1 | 0.2 |
| *Piper* | 5 | 0.5 | 1 | 0.2 |
| *Piptadenia* | 3 | 0.3 | 1 | 0.2 |
| *Piptocarpha* | 4 | 0.4 | 1 | 0.2 |
| *Piptolepis* | 1 | 0.1 | 1 | 0.2 |
| *Piriqueta* | 1 | 0.1 | 1 | 0.2 |
| *Platymiscium* | 1 | 0.1 | 1 | 0.2 |
| *Plenckia* | 2 | 0.2 | 1 | 0.2 |
| *Pleroma* | 5 | 0.5 | 4 | 0.8 |
| *Plinia* | 1 | 0.1 | 1 | 0.2 |
| *Porophyllum* | 1 | 0.1 | 1 | 0.2 |
| *Pouteria* | 10 | 1.0 | 2 | 0.4 |
| *Prestonia* | 1 | 0.1 | 1 | 0.2 |
| *Prockia* | 1 | 0.1 | 1 | 0.2 |
| *Protium* | 9 | 0.9 | 1 | 0.2 |
| *Pseudobombax* | 2 | 0.2 | 1 | 0.2 |
| *Pseudobrickellia* | 3 | 0.3 | 2 | 0.4 |
| *Pseudopiptadenia* | 2 | 0.2 | 1 | 0.2 |
| *Psidium* | 5 | 0.5 | 5 | 1.0 |
| *Psychotria* | 4 | 0.4 | 4 | 0.8 |
| *Pterandra* | 1 | 0.1 | 1 | 0.2 |
| *Pyrostegia* | 1 | 0.1 | 1 | 0.2 |
| *Qualea* | 30 | 3.1 | 5 | 1.0 |
| *Randia* | 1 | 0.1 | 1 | 0.2 |
| *Remijia* | 1 | 0.1 | 1 | 0.2 |
| *Rhamnidium* | 1 | 0.1 | 1 | 0.2 |
| *Rollinia* | 1 | 0.1 | 1 | 0.2 |
| *Roupala* | 11 | 1.1 | 1 | 0.2 |
| *Rourea* | 2 | 0.2 | 1 | 0.2 |
| *Ruellia* | 1 | 0.1 | 1 | 0.2 |
| *Sabicea* | 1 | 0.1 | 1 | 0.2 |
| *Salacia* | 1 | 0.1 | 1 | 0.2 |
| *Sapium* | 1 | 0.1 | 1 | 0.2 |
| *Schefflera* | 6 | 0.6 | 3 | 0.6 |
| *Schinus* | 2 | 0.2 | 1 | 0.2 |
| *Senegalia* | 4 | 0.4 | 2 | 0.4 |
| *Senna* | 1 | 0.1 | 1 | 0.2 |
| *Serjania* | 7 | 0.7 | 5 | 1.0 |
| *Sida* | 3 | 0.3 | 3 | 0.6 |
| *Sidastrum* | 1 | 0.1 | 1 | 0.2 |
| *Siparuna* | 5 | 0.5 | 1 | 0.2 |
| *Smilax* | 6 | 0.6 | 5 | 1.0 |
| *Solanum* | 2 | 0.2 | 1 | 0.2 |
| *Stachytarpheta* | 3 | 0.3 | 3 | 0.6 |
| *Stigmaphyllon* | 1 | 0.1 | 1 | 0.2 |
| *Strychnos* | 5 | 0.5 | 3 | 0.6 |
| *Stryphnodendron* | 4 | 0.4 | 3 | 0.6 |
| *Styrax* | 9 | 0.9 | 3 | 0.6 |
| *Symphyopappus* | 4 | 0.4 | 3 | 0.6 |
| *Tabebuia* | 2 | 0.2 | 1 | 0.2 |
| *Tachigali* | 5 | 0.5 | 2 | 0.4 |
| *Talisia* | 1 | 0.1 | 1 | 0.2 |
| *Tanaecium* | 1 | 0.1 | 1 | 0.2 |
| *Tapirira* | 3 | 0.3 | 1 | 0.2 |
| *Terminalia* | 10 | 1.0 | 2 | 0.4 |
| *Ternstroemia* | 1 | 0.1 | 1 | 0.2 |
| *Tibouchina* | 4 | 0.4 | 3 | 0.6 |
| *Toulicia* | 1 | 0.1 | 1 | 0.2 |
| *Trema* | 1 | 0.1 | 1 | 0.2 |
| *Trembleya* | 2 | 0.2 | 2 | 0.4 |
| *Trichilia* | 1 | 0.1 | 1 | 0.2 |
| *Trichogonia* | 2 | 0.2 | 2 | 0.4 |
| *Trigonia* | 3 | 0.3 | 1 | 0.2 |
| *Vachellia* | 1 | 0.1 | 1 | 0.2 |
| *Varronia* | 3 | 0.3 | 1 | 0.2 |
| *Verbesina* | 1 | 0.1 | 1 | 0.2 |
| *Vernomia* | 1 | 0.1 | 1 | 0.2 |
| *Vernonanthura* | 5 | 0.5 | 1 | 0.2 |
| *Virola* | 2 | 0.2 | 1 | 0.2 |
| *Vochysia* | 3 | 0.3 | 2 | 0.4 |
| *Xylopia* | 6 | 0.6 | 2 | 0.4 |
| **All genera** | **968 records** | **100** | **505 species** | **100** |

The plant families with the most records are: Fabaceae (N=155, 16%), Asteraceae (N=145, 15%), Myrtaceae (N=67, 6.9%), Malpighiaceae (N=60, 6.2%) and Melastomataceae (N=42, 4.3%) (Figure 2A). These five families account for ca. 48.5% of the recorded plant species. The plant families with the most recorded species are: Asteraceae (N=104 spp., 21%), Fabaceae (N=70 spp., 14%), Myrtaceae (N=35 spp., 7%), Malpighiaceae (N=30 spp., 6%) and Melastomataceae (N=25 spp., 5%) (Figure 2B), which together account for ca. 52% of the species found. These results indicate that, as host plant families, Fabaceae is well represented and that Asteraceae is well diversified.

Uma imagem contendo screenshot

Descrição gerada automaticamente

**Figure 2.** Rank plots of the number of records (A) and number of host plant species (B). In the right corner, we show the five families with the highest number of records (%), highest number of host plant species (%) and the greatest proportion of 62 other families.

Only gall-inducing insect species of the families Cecidomyiidae and Tephritidae were recorded (Table 2). Cecidomyiidae is the most predominant family with 48 species of 26 genera, while Tephritidae is represented by a single species: *Tomoplagia rudolphi* (Lutz and Lima 1918). The most speciose cecidomyiid genera are *Lopesia* (N=11 spp., 22.9%), *Asphondylia* (N=6 spp., 12.5%) and *Bruggmanniella* (N=3 spp., 6.3%), which together account for ca. 41% of species recorded. The genera *Clinodiplosis*, *Myrciariamyia*, *Schizomyia* and *Youngomyia* are represented by two species each while the remaining 19 cecidomyiid genera are represented by a single species.

This study is unprecedented since it provides the first data set of host plants and their gall-inducing insects for the Cerrado, a global biodiversity hotspot. Highlights of the data set include: (a) there are at least 505 species of host plants in the Cerrado, and given the enormous diversity of plants in the Cerrado (about 12,400 spp.) the number of host plants must be much greater; (b) the number of gall-inducing insect species (Diptera) is relatively low (49 spp.) compared to the number of host plants recorded in this study – if there are, on average, two species of galling insects per host plant species, then, just for the 505 species of host plants in the present data-set, there would be at least 1,010 spp. of gall-inducing insect species in the Cerrado, 95% of which are unknown; (c) more inventories of galling insects and their host plants are needed in the Cerrado; (d) galling insects represent a hidden diversity and should be further investigated; and (e) threatened plants can host several specialized species of galling insects, which raises concerns about the impact of modern extinctions on co-dependents of host plants. We hope that the compiled data set of host plants and gall-inducing insects encourages researchers to explore new ecological processes and patterns involving plant-insect interactions.

**Class II. Research origin descriptors**

**A. Overall project description**

**1. Identity:** A compilation of host plants for communities of gall-inducing insects and species of Cecidomyiidae of the Cerrado biome.

**2. Originators:** The project *Plant-galling insect interactions for the Cerrado* is part of the doctoral thesis of Fernanda Cintra at USP. Host plant inventories were coordinated by Dr. Jean Carlos Santos and Dr. Wanessa Rejane de Almeida from Universidade Federal de Sergipe (UFS). Taxonomic revision of cecidomyiids was coordinated by Dr. Valeria Cid Maia (Museu Nacional) and Dr. Maria V. Urso-Guimarães (UFSCar). All databases were assembled with help from all the other authors. This is part of the *Insect Galls-Host Plants in Biomes Series*, led by Dr. Jean Carlos Santos (UFS).

**3. Period of Study:** Data sampling occurred from 1949 to 2019.

**4. Objectives:** The aims of this data paper were to: (i) compile information available in the literature (Portuguese and English) about sites sampled for insect galls and their host plant communities in the Cerrado, focusing on cecidomyiid and tephritid taxa and taxonomic revision of host plants; (ii) communicate the current state of knowledge of plant-galling insect communities of the Cerrado biome; (iii) provide data for future sampling efforts of insect galls and their host plants; and (iv) promote future testing of hypotheses at a variety of local, regional, and landscape ecological scales.

**5. Abstract:** Same as above.

**6. Sources of funding:** The compilation of this data set was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) [CNPq grants 312752/2018-0 (JC Santos) and fellowships 140128/2019-0 (FCF Cintra) and 140158/2018-9 (H Venâncio)].

**B. Specific subproject description**

**1. Site description:** We adopted a broad delimitation of the Cerrado biome because it is an important biodiversity hotspot (Myers et al. 2000). The Cerrado is in an area highly anthropized by deforestation and land-use change and more than 50% of its area has been transformed to pasture (cattle ranching), monoculture crops, hydroelectric reservoirs and urban areas (Ratter et al. 1997, Cavalcanti and Joly 2002). In addition, ~20 million people live in the Cerrado. This anthropic pressure has contributed to the drastic deterioration of this ecosystem (Klink and Machado 2005). Conservation of the Cerrado is critical now, with protected areas accounting for only 8.3% of the original biome, and only 6.5% if only native vegetation is considered (Françoso et al. 2015). As a consequence, 645 plant species of the Cerrado (~30% of all endangered plants in Brazil) now figure in the Brazilian list of threatened species (Martinelli and Moraes 2013).

The Cerrado is considered to have the greatest floral richness among the world’s savannas (Klink and Machado 2005). It supports at least 12,420 species, 1,662 genera and 187 families of angiosperms (FLORA 2020). The Cerrado has one of the highest rates of endemism (~44% in vascular plants) in the world (Silva and Bates 2002, Mendonça et al. 2008). The biome possesses remarkable physiognomic variation comprising a mosaic of savannas, grasslands and forests with highly heterogeneous environmental conditions (Oliveira-Filho and Ratter 2002).

**2. Data set source:** Data for host plants were obtained only from published literature (32 papers). We searched for potential studies using online academic databases: ISI Web of Knowledge, Google Scholar, Scielo, Scopus and JStor. The search terms used were: “insect gall”, “inventories”, “richness”, “Brazilian Savanah” and “Cerrado”, which were combined in different ways. Searches were conducted in English and Portuguese since, to our knowledge, no relevant article has been published in any other language (e.g., Spanish).

There are two families of Diptera for which galls have been registered: Cecidomyiidae and Tephritidae. The data for cecidomyiids described until 2016 was extracted from the fourth edition of A Catalogue of the Cecidomyiidae of the World (Gagné and Jaschhof 2017). Species described from 2017 to 2019 were checked in MNRJ (Museu Nacional of Universidade Federal do Rio de Janeiro) and MZUSP (Museu de Zoologia of Universidade de São Paulo).

**3. Compilation methods:** The data set is the result of compiling records of galling insects and their host plant communities in different localities in the Cerrado. For host plants we only recorded their identity. Morphotypes of insect galls were not included in the compilations since galls are used as a phenotypic trait representing insect species, which are already represented in Table 2. We selected all available publications about inventories and/or communities of galling insects and their host plants. We discarded articles that contained only case studies (e.g., studies involving ecology, zoology and botany). We also recorded basic information for each study (author, title, year, journal, volume, publisher and the link or DOI to the document), the geographical location when provided (latitude, longitude, locality, municipality and state), conservation status of each area based on Brazilian conservation units, and type of phytophysiognomy. The FLORA 2020 data set also provided us with the following information for each plant: national threat status, life form, vegetation type, occurrence, establishment and domain. Missing information was indicated as “NA”.

Data for Diptera were extracted from Gagné and Jaschhof (2017), original papers (Table 2) and museum specimens. We recorded basic information for each species: family and species of host plants; family and species of gall-inducing insects; author of host plant and gall-inducing insect species; state, municipality, and specific sites of sampling; vegetation and phytophysiognomy types; and year of publication of the gall-inducing insect species description or mention of the species.

Host plants communities were compiled from the following literature: Fernandes et al. (1988), Fernandes et al. (1996), Fernandes et al. (1997), Gonçalves-Alvim and Fernandes (2001), Urso-Guimarães (2003), Maia and Fernandes (2004), Urso-Guimarães and Scareli-Santos (2006), Araújo et al. (2007a), Araújo et al. (2007b), Coelho et al. (2009), Carneiro et al. (2009), Araújo et al. (2011), Saito and Urso-Guimarães (2012), Santos et al. (2012), Luz et al. (2012), Malves and Frieiro-Costa (2012), Coelho et al. (2013a), Coelho et al. (2013b), Costa et al. (2014a), Costa et al. (2014b), Araújo et al. (2014), Maia et al. (2014), Araújo et al. (2015), Silva et al. (2015), Nogueira et al. (2016), Urso-Guimarães et al. (2017), Bergamini et al. (2017), Silva et al. (2018a), Silva et al. (2018b), Vieira et al. (2018), Santos et al. (2018), and Lima and Calado (2018).

Diptera species were compiled from the following literature: Felt (1907), Tavares (1917), Lutz and Lima (1918), Tavares (1918), Tavares (1920), Gagné (1984), Maia (2001), Madeira et al. (2002), Urso-Guimarães and Amorim (2002), Urso-Guimarães et al. (2003), Maia (2004), Maia and Fernandes (2005), Urso-Guimarães and Amorim (2005), Scarelli-Santos and Urso-Guimarães (2006), Maia and Fernandes (2007), Maia and Santos (2007), Maia et al. (2008), Maia et al. (2009), Maia and Carneiro (2012), Saito and Urso-Guimarães (2012), Pereira-Colavite and Urso-Guimarães (2013), Urso-Guimarães et al. (2014), Urso-Guimarães and Carmo-Neto (2015), Maia and Araújo (2016), Garcia et al. (2017), Urso-Guimarães et al. (2017), Garcia and Urso-Guimarães (2018), Maia and Flor (2018), Maia and Oliveira (2018), Proença and Maia (2018), Urso-Guimarães (2018a,b,c), Proença and Maia (2019), Ribeiro et al. (2019), Savaris et al. (2019), and Urso-Guimarães (2019a,b).

**4. Taxonomic data:** All species records (host plants and cecidomyiids) had their taxonomic classification revised and updated. For taxonomic information on host plant species we used FLORA 2020, and for dipteran species we used Gagné and Jaschhof (2017). We discarded taxonomically-uncertain records in species lists for the following situations: (a) cases where plants had a record of galling insects, but were not identified to species and family levels; (b) cases of host plant species where the family was identified, but the species was not (contained only sp.); (c) cases where host plant genus was identified followed by “sp.” or “cf.” species; (d) a single case where the plant genus *Landia* was distributed in *Krameria*, *Mussaenda* and *Bremeria*; (e) a single case where the host plant was attacked by nematode galls [*Miconia albicans* (Sw.) Triana and *Miconia corallina* Spring] and was included as a host for galling insects; (f) a single case where host plant species names (*Koanophyllon hebecladum* and *Sapium lenheirensis*) were not found in any database; and (g) a single case where a host plant species, *Miconia theizans* (Bonpl.) Cogn., had the name misspelled and undefined status.

We discarded taxonomically uncertain records of dipterans in species lists when the gall-inducing insects were not identified to species. We also provide host plant species information for each cecidomyiid species. In these cases, we kept unidentified plant species (e.g., genus followed by “sp.”) because galler identity was more important in this circumstance. We also checked plant taxonomy according to the FLORA 2020.

**5. Statistical analysis:** We provide some preliminary, descriptive statistical analyses for an overview of the data.

**C. Data limitations and potential enhancements:**

We recognize that documenting all host plants and galling insect interactions in a megadiverse ecosystem such as the Cerrado is a challenging task. The present data set is, therefore, only a subset of possible interactions. Therefore, caution is needed when drawing conclusions from this data set. The first limitation of our data is its representativeness. Our data set is arguably biased toward community studies only; we excluded case studies. Galling insects have been reported on numerous plant species, and there are several case studies in which these interactions are described. Another limitation is that some interactions are missing due to the lack of taxonomic identification of host plants. For example, many studies failed to identify the host plant to the species level. For this reason, many families and genera were not represented, which significantly reduced the representativeness of these host plant families and genera and thus limiting the data potentiality.

We designed the data set to (i) encourage new galling insect-host plant inventories in different locations; (ii) provide original information on the species richness of host plants of galling insects and on cecidomyiid species; and (iii) encourage the investigation of ecological and biogeographical patterns.

**Class III. Data set status and accessibility**

**A. Status**

**Latest update:** September 2019

**Latest archive date:** September 2019

**Metadata status:** Last update September 2019, version submitted

**Data verification:** We checked all the information such as species records and localization. Taxonomic information was homogenized. Any transcription errors were corrected.

**B. Accessibility**

**Contact person:** Jean Carlos Santos. Departamento de Ecologia. Universidade Federal de Sergipe. Campus São Cristóvão. Cidade Universitária Prof. José Aloísio de Campos. Av. Marechal Rondon, s/n, Bairro Jardim Rosa Elze. São Cristóvão. Sergipe. CEP: 49100-000, Brazil. E-mail: [jcsantosbio@gmail.com](mailto:jcsantosbio@gmail.com).

**Storage location and supporting information:** The original PLANT-GALLING INSECT INTERACTIONS data set can be accessed in the ECOLOGY repository. Updated versions of this data set can be accessed at: <https://github.com/LEBIO-UFS/Brazil_galls_series>.

**Copyright restrictions:** None.

**Proprietary restrictions:** Please cite this data paper when using the current data in publications and let us know how the data are used in the publications.

**Costs:** None.

**Class IV. Data structural descriptors**

We divided the data set into three complementary files. The first file (plant-galling\_insect\_diptera.csv) contains the description of the fields related with the Diptera species (Table 2). The second file (plant-galling\_insect\_host\_plants\_information.csv) contains data on the study area and host plant species information for each plant reported (states, municipality, study location, coordinates, conservation unit, phytophysiognomy type, plant species names, taxonomic information, threat status, life form, vegetation type, plant distribution and biogeographical domain) (Table 3). The third file (plant-galling\_insect\_host\_plants\_references.csv) describes the reference information for host plants (Table 4).

**A. Data set file**

**Identity:** plant-galling\_insect\_diptera.csv

**Size:** 13 columns and 49 records, including header row, 90 KB.

**Format and storage mode:** comma-separated values (.csv)

**Header information:** See column descriptions in section B.

**Alphanumeric attributes:** Mixed.

**Data anomalies:** Missing information was classified as “NA” in each cell.

**Identity:** plant-galling\_insect\_host\_plants\_information.csv

**Size:** 17 columns and 969 records, including header row, 117 KB.

**Format and storage mode:** comma-separated values (.csv)

**Header information:** See column descriptions in section B.

**Alphanumeric attributes:** Mixed.

**Data anomalies:** Missing information was classified as “NA” in each cell.

**Identity:** plant-galling\_insect\_host\_plants\_references.csv

**Size:** 04 columns and 33 records, including header row, 76 KB.

**Format and storage mode:** comma-separated values (.csv)

**Header information:** See column descriptions in section B.

**Alphanumeric attributes:** Mixed.

**Data anomalies:** Missing information was classified as “NA” in each cell.

**B. Variable information**

**Table 2.** Reference information in the plant-galling insect data set. Description of the fields related to the Diptera information found in the file plant-galling\_insect\_diptera.csv.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of**  **information** | **Field** | **Description** | **Levels** | **Examples** |
| **Diptera information** | Diptera\_family | Family taxonomic classification for Diptera | 2 | Cecidomyiidae |
| Diptera\_species | Current and specific taxonomic classification | Several | *Asteromyia modesta* (Felt, 1907) |
| Species\_authors\_  Diptera | Species authors | Several | Maia, 2012 |
| Species\_authors\_  galls | Studies related to galls | Several | Maia and Carneiro, 2012 |
| Sampling\_year | Specimen collection year | 1917-2019 | 2012 |
| **Host plants information** | Genus/Species\_  host\_plant\_adjusted | Current and specific taxonomic classification | Several | *Eremanthus erythropappus* (DC.) MacLeish |
| Genus/Species\_  host\_plant\_original\_paper | taxonomic classification reported originally by the authors | Several | *Vanilosmopsis erythropappa* DC. |
| Host\_plant\_  family | Family taxonomic classification for host plants | Several | Asteraceae |
| **Site information** | Site\_states | Brazilian states in which the insects were found | Several | Minas Gerais |
| Site\_municipality | Brazilian municipalities in which the insects were found | Several | Luz |
| Study\_location | Name of each study site | Several | Serra de São José |
| Vegetation\_type | Cerrado phytophysiognomy type reported by the authors | Several | Transição caatinga-cerrado |
| **Reference information** | Complete\_  references | Complete references of the authors who described the Diptera species (author names, title, year, journal, DOI) | Several | Gagné, R.J. 1984. Five new species of Neotropical Cecidomyiidae (Diptera) associated with cacao flowers, killing the buds of Clusiaceae, or preying on mites. Brenesia 22: 123-138. |

**Table 3.** Reference information in the plant-galling insect data set. Description of the fields related to the host plant species information found in the file plant-galling\_insect\_host\_plants\_information.csv.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of**  **information** | **Field** | **Description** | **Levels** | **Examples** |
| **Reference information** | Ref\_number | Number for each reference | Ref\_01 - Ref\_32 | Ref\_01 |
| **Site information** | States | Brazilian states in which the plants were found | 5 | MS |
| Municipality | Brazilian municipalities in which the plants were found | Several | Aquidauana |
| Study\_location | Name of each study site | Several | Ecological Station of Jataí |
| Coordinates | Coordinates of study site | Several | 15°48’S, 48°52’W |
| Conservation\_unit | Whether the authors reported whether the study was carried out inside or outside a conservation unit | Yes, No and 'NA' | Yes |
| Status\_  conservation\_unit | Type of protected area reported in the study | Federal, State, RPPN and 'NA' | Federal |
| Phytophysiognomy\_type | Cerrado phytophysiognomy type reported by the authors | Several | Cerradão, cerrado |
| **Host plant information** | Plant\_species\_  original | taxonomic classification reported originally by the authors | Several | *Arrabidaea brachypoda* |
| Plant\_species\_  adjusted | Current and specific taxonomic classification | Several | *Fridericia platyphylla* (Cham.) L.G.  Lohmann |
| Plant\_family | Family taxonomic classification | Several | Bignoniaceae |
| Plant\_genus | Genus taxonomic classification | Several | *Fridericia* |
| Threat\_status | IUCN classification for threatened plants according to the red list of flora in Brazil | EN: Endangered VU: Vulnerable LC: Least concern DD: Data deficient NE: Not evaluated | VU |
| Life\_form | Type of life form *sensu* FLORA 2020 | Several |  |
| Vegetation\_type | Type of vegetation *sensu* FLORA 2020 | Several |  |
| Plant\_distribution | Brazilian states in which the plants have been reported in the FLORA 2020 | Several | GO|MG|MS|MT|SP |
| Biogeographical \_domain | Type of biogeographical regions *sensu* FLORA 2020 | Several | Cerrado|  Mata Atlântica |

**Table 4.** Reference information in the plant-galling insect data set.Description of the fields related to the reference information found in the file plant-galling\_insect\_host\_plant\_references.csv.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of**  **information** | **Field** | **Description** | **Levels** | **Examples** |
| **Reference information** | Ref\_number | Number for each reference | Ref\_01 - Ref\_32 | Ref\_01 |
| Publication\_years | Year of publication of the article | 1988 - 2018 | 1988 |
| Authors | Name of the authors | 22 | Fernandes et al. |
| References | Complete references (author names, title, year, journal, DOI) | 32 | Araújo, Walter Santos de, Santos, Benedito Baptista dos, & Gomes-Klein, Vera Lúcia. (2011). Insect galls from Serra dos Pireneus, GO, Brazil. Biota Neotropica, 11(2), 357-365. https://dx.doi.org/10.1590/S1676-06032011000200034 |

**CLASS V. SUPPLEMENTAL DESCRIPTORS**

**A. Data acquisition**

**1. Data request history:** None

**2. Data set updates history:** None

**3. Data entry/verification procedures:** The authors reviewed the data jointly, twice.

**G. History of data set usage:** None.

**Acknowledgments**

The authors thank CNPq (grant processes #140128/2019-0 for FCF Cintra, #140158/2018-9 for H Venâncio and #312752/2018-0 for JC Santos)

**Literature cited in metadata**

Araújo, W. S., B. B. Santos, and V. L. Gomes-Klein. 2011. Insect galls from Serra dos Pireneus, GO, Brazil. Biota Neotropica 11: 357-365.

Araújo, W. S., B. B. Santos, B. B., H. D. Ferreira, and D. C. Lousa. 2007. Ocorrência de galhas entomógenas na vegetação do campus da UFG em Goiânia, Goiás. Revista Brasileira de Biociências 5: 57-59.

Araújo, W. S., B. B. Santos., F. A. G. Guilherme, and C. Scareli-Santos. 2014. Galling insects in the Brazilian Cerrado: ecological patterns and perspectives. Pages 257-272 *in* G. W. Fernandes, and J. C. Santos, editors. Neotropical insect Galls. Springer, New York, USA.

Araújo, W. S., E. D. Porfírio-Júnior, B. A. Ribeiro, T. M. Silva, E. C. Silva, F. A. Guilherme, C. Scareli-Santos, and B. B. Santos. 2015. Checklist of host plants of insect galls in the state of Goiás in the Midwest Region of Brazil. Biodiversity Data Journal 13: e6835.

Araújo, W. S., F. L. Sobral, and L. Maracahipes. 2014. Insect galls of the Parque Nacional das Emas (Mineiros, GO, Brazil). Check List 10: 1445-1451.

Araújo, W. S., G. W. Fernandes, and J. C. Santos. 2019. An overview of inventories of gall-inducing insects in Brazil: looking for patterns and identifying knowledge gaps. Anais da Academia Brasileira de Ciências 91: e20180162.

Araújo, W. S., L. T. Moreira, L. A. D. Falcão, M. A. Z. Borges, M. Fagundes, M. L. D. Faria, and F. A. G. Guilherme. 2019. Superhost plants alter the structure of plant-galling insect networks in neotropical savannas. Plants 8: 369.

Araújo, W. S., V. L. Gomes-Klein, and B. B. Santos. 2007. Galhas entomógenas associadas à vegetação do Parque Estadual da Serra dos Pireneus, Pirenópolis, Goiás, Brasil. Revista Brasileira de Biociências 5: 45-47.

Bergamini, B. A. R., L. L. Bergamin, B. B. Santos, and W. S. Araújo. 2017. Occurrence and characterization of insect galls in the Floresta Nacional de Silvânia, Brazil. Papéis Avulsos de Zoologia 57: 413-431.

Carneiro, M. A. A., R. A. X. Borges, A. P. A. Araújo, and G. W. Fernandes. 2009. Insetos indutores de galhas da porção sul da Cadeia do Espinhaço, Minas Gerais, Brasil. Revista Brasileira de Entomologia 53: 570-592.

Carneiro, R. G. S., P. Pacheco, and R. M. S. Isaias. 2015. Could the extended phenotype extend to the cellular and subcellular levels in insect-induced galls? PLoS ONE 10: e0129331.

Cavalcanti, R., and C. Joly. 2002. Biodiversity and Conservation Priorities in the Cerrado Region. Pages 351-367 *in* P. S. Oliveira, and R. J. Marquis, editors. The Cerrados of Brazil: ecology and natural history of a Neotropical Savanna. Columbia University Press, Columbia. USA.

CNCFlora. 2020. Lista Vermelha da flora brasileira versão 2012.2 Centro Nacional de Conservação da Flora. Available in <http://cncflora.jbrj.gov.br/portal/. Access in 9 março 2020.

Coelho, M. S., E. D. Almada, G. W. Fernandes, M. A. A. Carneiro, R. M. Santos, A. V. Quintino, and A. Sanchez-Azofeifa. 2009. Gall inducing arthropods from a seasonally dry tropical forest in Serra do Cipó, Brazil. Revista Brasileira de Entomologia, 53: 404-414.

Coelho, M. S., M. A. A. Carneiro, C. A. Branco, and G. W. Fernandes. 2013a. Gall-inducing insects from Serra do Cabral, Minas Gerais, Brazil. Biota Neotropica 13: 102-109.

Coelho, M. S., M. A. A. Carneiro, C. Branco, R. A. X. Borges, and G. W. Fernandes. 2013b. Gall-inducing insects from Campos de Altitude, Brazil. Biota Neotropica 13: 139-151.

Costa, E. C., S. P. Carvalho-Fernandes, and J. Santos-Silva. 2014a. Galhas entomógenas associadas à Leguminosae do entorno do riacho Jatobá, Caetité, Bahia. Brazilian Journal of Biosciences 12: 115-120.

Costa, E. C., S. P. Carvalho-Fernandes, and J. Santos-Silva. 2014b. Galhas de insetos em uma área de transição caatinga-cerrado no Nordeste do Brasil. Sitientibus série Ciências Biológicas 14: 1-9.

Felt, E. P. 1907. Appendix: New species of Cecidomyiidae. 22d report of the State entomologist on injurious and other insects of the State of New York 1906. New York State Museum Bulletin 110: 39-186.

Fernandes, G. W. A., E. Tameirão-Neto, and R. P. Martins. 1988. Ocorrência e caracterização de galhas entomógenas na vegetação do campus pampulha da Universidade Federal de Minas Gerais. Revista Brasileira de Zoologia 5: 11-29.

Fernandes, G. W., and J. C. Santos. 2014. Neotropical insect galls. Springer, New York, USA.

Fernandes, G. W., and P. W. Price. 1992. The adaptive significance of insect gall distribution: Survivorship of species in xeric and mesic habitats. Oecologia 90: 14-20.

Fernandes, G. W., and S. J. Gonçalves-Alvim. 2006. Biodiversidade de insetos galhadores no Cerrado. Pages 284-293 *in* A. Scariot, J. M. Felfili, and J. C. Sousa-Silva, editors. Biodiversidade, Ecologia e Conservação do Cerrado. Embrapa, Brasília, BR.

Fernandes, G. W., M. A. A. Carneiro, A. C. F. Lara, L. R. Allain, G. I. Andrade, G. R. Julião, T. R. Reis, and I. M. Silva. 1996. Galling insects on neotropical species of *Baccharis* (Asteraceae). Tropical Zoology 9: 315-332.

Fernandes, G. W., R. C. Araújo, S. C. Araújo, J. A. Lombardi, A. S. Paula, R. Loyola-Júnior, and T. G. Cornelissen. 1997. Insect-galls from savanna and rocky fields of the Jequitinhonha valley, Minas Gerais, Brazil. Naturalia 22: 221-244.

Fernandes, W. G., M. A. A. Carneiro, and R. M. S, Isaias. 2011. Gall-inducing insects: from anatomy to biodiversity. Pages 369-395 in A. R. Panizzi, and J. R. P. Parra, editors. Insect bioecology and nutrition for integrated pest management. CRC Press, Boca Raton.

Flora do Brasil 2020 (Jardim Botânico do Rio de Janeiro). Available in http://[floradobrasil.jbrj.gov.br](http://floradobrasil.jbrj.gov.br/). Access in: 20 Jan. 2020.

Françoso, R. D., R. Brandão, C. C. Nogueira, Y. B. Salmona, R. B. Machado, and G. R. Colli. 2015. Habitat loss and the effectiveness of protected areas in the Cerrado Biodiversity Hotspot. Natureza & Conservação 13: 35-40.

Gagné, R. J. 1984. Five new species of Neotropical Cecidomyiidae (Diptera) associated with cacao flowers, killing the buds of Clusiaceae, or preying on mites. Brenesia 22: 123-138.

Gagné, R. J. 1994. The gall midges of the Neotropical region. Cornell University Press, Ithaca, USA.

Gagné, R. J., and M. Jaschhof. 2017. A Catalog of Cecidomyiidae (Diptera) of the World. Fourth Edition. Digital.

Garcia, C. A., and M. V. Urso-Guimarães. 2018. Three New Species of *Lopesia* Rübsaamen (Diptera: Cecidomyiidae) from Brazil. Florida Entomologist 101: 203-211.

Garcia, C. A., V. P. Lima, D. C. Calado, and M. V. Urso-Guimarães. 2017. New species of *Lopesia* Rübsaamen (Diptera: Cecidomyiidae) associated with *Andira humilis* Mart. ex Benth. (Fabaceae). Revista Brasileira de Entomologia 61: 239-242.

Giron, D., E. Huguet, G. N. Stone, and M. Body. 2016. Insect-induced effects on plants and possible effectors used by galling and leaf-mining insects to manipulate their host-plant. Journal of Insect Physiology 84: 70-89.

Gonçalves-Alvim, S. J., and G. W. Fernandes. 2001. Comunidades de insetos galhadores (Insecta) em diferentes fisionomias do cerrado em Minas Gerais, Brasil. Revista Brasileira de Zoologia 18: 289-305.

Grandez-Rios J. M., A. R. García-Vill, P. Cuevas-Reyes, and W. S. Araújo. 2015. Insectos inductores de agallas en América Latina: ecología, importancia y nuevas perspectivas. Revista de Biologia Neotropical 12: 92-103.

Hartley, S. E. 1998. The chemical composition of plant galls: are levels of nutrients and secondary compounds controlled by the gall-former? Oecologia 113:492-501.

Klink, C. A., and R. B. Machado. 2005. Conservation of the Brazilian Cerrado. Conservation Biology, 19: 707-713.

Lara, A. C. F. & G. W. Fernandes. 1996. The highest diversity of galling insects: Serra do Cipó, Brazil. Biodiversity Letters 3: 111-114

Lima, V. P., and D. Calado. 2018. Morphological characterization of insect galls and new records of associated invertebrates in a Cerrado area in Bahia State, Brazil. Brazilian Journal of Biology 78: 636-643.

Lutz, A., and A. M. C. Lima. 1918. Contribuição para o estudo das Tripaneidas (moscas de frutas) brasileiras. Memórias do Instituto Oswaldo Cruz, 10: 5-15.

Luz, G. R., G. W. Fernandes, J. O. Silva, F. S. Neves, and M. Fagundes. 2012. Insect galls in xeric and mesic habitats in a Cerrado-Caatinga transition in northern Minas Gerais, Brazil. Neotropical Biology and Conservation 7: 171-187.

Madeira, J. A., V. C. Maia, and R. F. Monteiro. 2003. Gall makers (Cecidomyiidae, Diptera) on *Calophyllum brasiliense* Camb. (Clusiaceae): descriptions and biology. Arquivos do Museu Nacional 61: 31-48.

Maia, V. C. 2001. The gall midges (Diptera, Cecidomyiidae) from three restingas of Rio de Janeiro State, Brazil. Revista Brasileira de Zoologia 18: 583-629

Maia, V. C. 2004. A new genus and six new species of gall midges (Diptera, Cecidomyiidae) from Serra de São José (Minas Gerais State), Brazil. Arquivos do Museu Nacional 62: 69-82.

Maia, V. C., A. R. Rodrigues, S. H. S. Ascendino, and M. Boggi. 2014. The insect gall collection of the Museu Nacional/Universidade Federal do Rio de Janeiro: biome cerrado, rupestrian fields. Brazilian Journal of Biology, 74: S207-S217.

Maia, V. C., and B. O. Santos. 2007. Um novo gênero e espécie de Schizomyiina (Diptera, Cecidomyiidae) associados com Piperaceae no Brasil. Iheringia, Série. Zoologica 97: 137-142.

Maia, V. C., and G. W. Fernandes. 2004. Insect galls from Serra de São José (Tiradentes, MG, Brazil). Brazilian Journal of Biology 64: 423-445.

Maia, V. C., and G. W. Fernandes. 2005a. A new genus and species of gall midge (Diptera: Cecidomyiidae) associated with *Waltheria indica* L. (Sterculiaceae). Zootaxa 1060: 27-36.

Maia, V. C., and G. W. Fernandes. 2005b. Two new species of Asphondyliini (Diptera: Cecidomyiidae) associated with *Bauhinia brevipes* (Fabaceae). Zootaxa 1091: 27-40.

Maia, V. C., and G. W. Fernandes. 2007. *Myrciariamyia admirabilis*, a new species of gall midge (Diptera, Cecidomyiidae) associated with *Erythroxylum* *suberosum* (Erythroxylaceae). Zootaxa 1554: 41-48.

Maia, V. C., and L. A. Oliveira. 2018. *Lopesia indaiensis* (Diptera, Cecidomyiidae), a new species of gall midge feeding on *Andira fraxinifolia* Benth (Fabaceae), an endemic plant in Brazil. Revista Brasileira de Entomologia 62: 125-130.

Maia, V. C., and L. Araújo. 2016. *Clinodiplosis agerati* (Diptera, Cecidomyiidae), a new galling species associated with *Ageratum conyzoides* (Asteraceae) from Brazil. Brazilian Journal of Biology 76: 782-786.

Maia, V. C., and M. A. A. Carneiro. 2012. A new species of *Baccharomyia* (Diptera, Cecidomyiidae) from *Baccharis pseudomiryocephala* (Asteraceae) in Brazil. Vestnik Zoologii 46: 23-28.

Maia, V. C., F. A. O. Silveira, L. A. Oliveira, and M. F. Xavier. 2008. *Asphondylia gochnatiae*, a new species of gall midge (Diptera, Cecidomyiidae) associated with *Gochnatia polymorpha* (Asteraceae). Zootaxa 1740: 53-58.

Maia, V. C., G. W. Fernandes, and D. Negreiros. 2009. A new genus and species of gall midge (Diptera, Cecidomyiidae) associated with *Myrcia retorta* (Myrtaceae) Revista Brasileira de Entomologia 53: 38–40.

Maia, V. C., G. W. Fernandes, and L. A. Oliveira. 2010. A new species of *Bruggmanniella* (Diptera, Cecidomyiidae, Asphondyliini) associated with *Doliocarpus dentatus* (Dillenicaceae). Revista Brasileira de Entomologia 54: 225-228.

Maia, V. C., I. C. Flor, and L. A. Oliveira. 2018. *Myrciamyia pterandrae* (Diptera, Cecidomyiidae, Lopesiini), a new species of gall midge associated with *Pterandra pyroidea* A. Juss. (Malpighiaceae), an endemic plant in Brazilian Cerrado. Revista Brasileira de Entomologia 62: 220-224.

Malves, K., and A. Frieiro-Costa. 2012. List of plants with galls induced by insects from the UNILAVRAS/Boqueirão Biological Reserve, Ingaí, state of Minas Gerais, Brazil. Check List 8: 426-431.

Martinelli, G., and M. A. Moraes. 2013. Livro vermelho da flora do Brasil (Jardim Botânico do Rio de Janeiro). Available from <http://cncflora.jbrj.gov.br> (accessed 11/05/2019).

Mendonça, R. C., J. M. Felfili, B. M. T. Walter, M. C. Silva-Júnior, A. V. Rezende, T. S. Filgueiras, P. E. Nogueira, and C. W. Fagg. 2008. Flora vascular do Bioma Cerrado: checklist com 12.356 espécies. Pages 421-1279 *in* S. M. Sano, S. P. Almeida, and J. F. Ribeiro, editors. Cerrado: ecologia e flora. Embrapa, Brasília, BR.

Moura, M. Z. D., G. L. G. Soares, and R. M. I. Santos. 2008. Species-specific changes in tissue morphogenesis induced by two arthropod leaf gallers in *Lantana camara* L. (Verbenaceae). Australian Journal of Botany 56: 153-160.

Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. Fonseca, and J. Kent. 2000. Biodiversity hotspots for conservation priorities. Nature 403: 853.

Nogueira, R. M., E. C. Costa, S. P. Carvalho-Fernandes, and J. Santos-Silva. 2016. Insect galls from Serra Geral, Caetité, BA, Brazil. Biota Neotropica 16: e20150035.

Oates C. N., K. J. Denby, A. A. Myburg, B. Slippers, and S. Naidoo. 2016. Insect gallers and their plant hosts: from omics data to systems biology. International Journal of Molecular Sciences 17: 1891.

Oliveira-Filho, A. T., and J. A. Ratter. 2002. Vegetation physiognomies and wood flora of the bioma Cerrado. Pages 91-120 *in* P. S. Oliveira, and R. J. Marquis, editors. The Cerrados of Brazil: ecology and natural history of a Neotropical Savanna. Columbia University Press, Columbia, USA.

Pereira-Colavite, A., and M. V. Urso-Guimarães. 2013. Nova espécie de *Dasineura* Rondani, 1840 (Diptera, Cecidomyiidae) em capítulos de *Hypochaeris chillensis* (Kunth) Britton (Asteraceae) para o Brasil. Papéis Avulsos de Zoologia 53: 59-66.

Price, P. W. 2005. Adaptive radiation of gall-inducing insects. Basic and Applied Ecology 6: 413-421.

Price, P. W., W. G. Abrahamson, M. D. Hunter, and G. Melika. 2004. Using gall wasps on oaks to test broad ecological concepts. Conservation Biology 18: 1406-1416.

Proença, B., and V. C. Maia. 2018. *Bruggmannia chapadensis* sp. nov. (Diptera: Cecidomyiidae), a new midge inducing galls on *Guapira pernambucensis* (Nyctaginaceae) from the Parque Nacional da Chapada dos Guimarães, Mato Grosso State, Brazil. Zoologia 35: 1-6.

Proença, B., and V. C. Maia. 2019. A new species of *Youngomyia* Felt from Brazil and new morphological data on *Youngomyia pouteriae* Maia (Insecta, Diptera, Cecidomyiidae). Revista Brasileira de Entomologia 63: 130-135.

Ratter, J. A., J. F. Ribeiro, and S. Bridgewater. 1997. The Brazilian cerrado vegetation and threats to its biodiversity. Annals of Botany 80: 223-230.

Ribeiro, A. N., M. I. P. A. Balbi, and M. V. Urso-Guimarães. 2019. Characterization of insect galls from natural vegetation area in Altinópolis, São Paulo State, Brazil. Papéis Avulsos de Zoologia 59: e20195904.

Ribeiro, J. F., and B. M. T. Walter. 2008. As principais fitofisionomias do Bioma Cerrado. Pages 151-212 *in* S. M. Sano, S. P. Almeida, and J. F. Ribeiro, editors. Cerrado: ecologia e flora. Embrapa, Brasília, BR.

Saito, V. S., and M. V. Urso-Guimarães. 2012. Characterization of galls, insect galls and associated fauna of Ecological Station of Jataí (Luiz Antônio, SP). Biota Neotropica 12: 99-107.

Santos, B. B., B. A. Ribeiro, T. M. Silva, and W. S. Araújo. 2012. Galhas de insetos em uma área de cerrado sentido restrito na região semi-urbana de Caldas Novas (Goiás, Brasil). Revista Brasileira de Biociências 10: 439-445.

Santos, I. M., V. P. Lima, E. K. S. Soares, M. Paula, and D. C. Calado. 2018. Insect galls in three species of *Copaifera* L. (Leguminosae, Caesalpinioideae) occurring sympatrically in a Cerrado area (Bahia, Brazil). Biota Neotropica 18: e20170356.

Savaris, M., F. Luz, L. M. Lorini, and S. Lampert. 2019. New distribution record, host plant and notes on natural history of *Tomoplagia rudolphi* (Lutz & Lima, 1918) (Diptera: Tephritidae). Papéis Avulsos de Zoologia 59: e20195943.

Stone, G. N. and K. Schönrogge. 2003. The adaptive significance of insect gall morphology. Trends in Ecology & Evolution 18: 512-522.

Shorthouse, J. D., D. Wool, and A. Raman. 2005. Gall-inducing insects - nature's most sophisticated herbivores. Basic and Applied Ecology 6:407-411.

Silva, A. R. F., R. M. Nogueira, E. C. Costa, S. P. Carvalho-Fernandes, and J. Santos-Silva. 2018b. Occurrence and characterization of entomogenic galls in an area of Cerrado *sensu stricto* and Gallery forest of the state of Bahia, Brazil. Anais da Academia Brasileira de Ciências 90: 2903-2919.

Silva, E. C., B. B. Santos, and W. S. Araújo. 2018a. Insect gall occurrence in savanna and forest remnant sites of Hidrolândia, GO, Brazil Central. Papéis Avulsos de Zoologia 58: e20185804.

Silva, J. M. C., and J. M. Bates. 2002. Biogeographic patterns and conservation in the South American Cerrado: a tropical savanna hotspot. BioScience 52: 225-234.

Silva, T. M., Araújo, W. S., and B. B. Santos. 2015. Ocorrência e caracterização de galhas de insetos em um fragmento de mata semicaducifólia do Câmpus Samambaia, Goiânia, GO, Brasil. Revista de Biologia Neotropical 12: 26-38.

Tavares, J. S. 1917. Cecídias brasileiras que se criam em plantas das famílias das Compositae, Rubiaceae, Tiliaceae, Lythraceae e Artocarpaceae. Brotéria, Série Zoológica 15: 113-181.

Tavares, J. S. 1918. Cecidomyias novas do Brazil, segunda série. Broteria, Série Zoológica 16: 68-84.

Tavares, J. S. 1920. O género *Bruggmanniella* Tav. com a descripção de uma espécie nova e a clave dichotómica des géneros das Asphondyliariae. Brotéria, Série Zoológica 18: 33-42.

Tooker, J. F., and A. M. Helms. 2014. Phytohormone dynamics associated with gall insects, and their potential role in the evolution of the gall-inducing habit. Journal of Chemical Ecology 40: 742-753.

Urso-Guimarães, M. V. 2018a. A new species of *Asphondylia* (Diptera: Cecidomyiidae) and a key to separate species of the genus associated with Asteraceae from Neotropical region. Papéis Avulsos de Zoologia 58: e20185853.

Urso-Guimarães, M. V. 2018b. New record of *Machaeriobia machaerii* (Kieffer, 1913) (Diptera, Cecidomyiidae) in Brazil and association with host-plant species. Revista Brasileira de Entomologia 62: 87-89.

Urso-Guimarães, M. V. 2018c. Two new species of the tribe Alycaulini (Diptera: Cecidomyiidae) from Brazil. Florida Entomologist 101: 603-611.

Urso-Guimarães, M. V. 2019a. Description of the larva of *Lopesia* spinosa Maia (Diptera, Cecidomyiidae) and new occurrences of the species. Revista Brasileira de Entomologia 63: 232-233.

Urso-Guimarães, M. V. 2019b. Description of the male and larva of *Schizomyia tuiuiu* Urso-Guimarães & Amorim (Diptera, Cecidomyiidae), new records and a key to Neotropical species of *Schizomyia* Kieffer. Iheringia. Série Zoologia 109: e2019017.

Urso-Guimarães, M. V., A. C. D. Castello, E. Y. Kataoka, and I. Koch. 2017. Characterization of entomogen galls from Mato Grosso do Sul, Brazil. Revista Brasileira de Entomologia 61: 25-42.

Urso-Guimarães, M. V., and A. M. Carmo-Neto. 2015. A new species of gall midge associated with *Diplopterys pubipetala* (A. Juss.) Anderson and Davis (Malpighiaceae) from Altinopolis, São Paulo, Brazil. Brazilian Journal of Biology 75: 173-179.

Urso-Guimarães, M. V., and C. Scareli-Santos. 2006. Galls and gall makers in plants from the Pé-de-Gigante Cerrado Reserve, Santa Rita do Passa Quatro, SP, Brazil. Brazilian Journal of Biology, 66: 357-369.

Urso-Guimarães, M. V., and D. S. Amorim. 2002. New Brazilian species of Asphondyliini (Diptera,Cecidomyiidae). Revista Brasileira de Entomologia 46: 561-570.

Urso-Guimarães, M. V., and D. S. Amorim. 2005. Two new species of *Bruggmanniella* Tavares, 1909 (Diptera: Cecidomyiidae) from Brazil. Studia Dipterologica 11: 429-436.

Urso-Guimarães, M. V., C. Scareli-Santos, and A. C. Bonifácio-Silva. 2003. Occurrence and characterization of entomogen galls in plants from natural vegetation areas in Delfinópolis, MG, Brazil. Brazilian Journal of Biology 63: 705-715.

Urso-Guimarães, M. V., M. Palaez-Rodriguez, and S. Trivinho-Strixino. 2014. New species of *Lopesia* (Diptera, Cecidomyiidae) associated with *Eichhornia azurea* (Pontederiaceae) from Brazil. Iheringia, Serie Zoologia 104: 478-483.

Urso-Guimarães, M.V., C. Scareli-Santos, and A. C. Bonifácio-Silva. 2003. Occurrence and characterization of entomogen galls in plants from natural vegetation areas in Delfinópolis, MG, Brazil. Brazilian Journal of Biology 63: 705-715.

Vieira, L. G., R. M. Nogueira, E. C. Costa, S. P. Carvalho-Fernandes, and J. S. Silva. 2018. Insect galls in Rupestrian field and Cerrado *stricto sensu* vegetation in Caetité, Bahia, Brazil. Biota Neotropica 18: e20170402.