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COLEOPTERA ASSOCIATED WITH GALLS FROM SOUTH AMERICA WITH NEW RECORDS [1]

(With 2 figures)

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ABSTRACT: Two new records of coleopterous galls, one on *Croton antisyphiliticus* Mart. (Euphorbiaceae) and the other on *Hippocratea volubilis* L. (Hippocrateaceae), and two new records of inquilinous weevils in galls are presented from Brazil. Besides, all available data on coleopterous galls from South America is compiled and the diversity of them is discussed.

Key words: South America, Coleoptera, galls, new records.

RESUMO: Coleoptera associados com galhas da América do Sul com novos registros.

Dois novos registros de galhas de Coleoptera, um em *Croton antisyphiliticus* Mart. (Euphorbiaceae) e o outro em *Hippocratea volubilis* L. (Hippocrateaceae), e dois novos registros de besouros inquilinos de galhas são apresentados do Brasil. Além disso, todos os dados disponíveis sobre galhas de Coleoptera da América do Sul são compilados e a sua diversidade é discutida.

Palavras-chaves: América do Sul, Coleoptera, galhas, novos registros.

INTRODUCTION

Galls are predictable and consistent plant deformations that occur in response to feeding or other stimulus by foreign organisms (Gagné, 1994). They can be induced by mites, insects, nematodes, fungi, bacteria and others. Among the insects, galling species are found in several orders, such as Diptera, Lepidoptera, Hemiptera, Coleoptera, Hymenoptera and Thysanoptera.

Little is known about the taxonomy, ecology and diversity of coleopterous galls in South America. Literature data are scattered in some papers on entomogenous galls, namely: COSTA-LIMA (1956); FERNANDES, TAMEIRÃO NETO & MARTINS (1988); FERNANDES *et al.* (1989, 1996); FIEDLER (1940); GONÇALVES-ALVIM & FERNANDES (2001); HOUARD (1933); KIEFFER & HERBST (1905); KIEFFER & JÖRGENSEN (1910); JÖRGENSEN (1916); MONTEIRO *et al.*(1993); TAVARES (1917); VANIN, MONTEIRO & FERRAZ (2000) and MAIA & FERNANDES (in press.).

In this paper, we add new data on Coleopterous galls from Brazil and gathers all record from South America in order to discuss the richness of the galling species, host plant preferences and patterns of distribution.

MATERIAL AND METHODS

This paper includes data extracted from the literature and data obtained by us. In spite of our studies focusing on gall midges (Diptera: Cecidomyiidae), some data on coleopterous galls have been obtained.

Photographies of these galls were taken in field. Galled plant organs were collected and transferred in plastic bags to the laboratory of Diptera, where part of the sample was dissected in order to observe the immatures in the gall chamber. Part was kept in plastic pots covered with a fine screen in order to obtain adults. The material obtained were preserved in alcohol 70%. Dried galls were deposited in the collection of the Museu Nacional - Rio de Janeiro (MNRJ).

RESULTS AND DISCUSSION

Twenty seven records of Coleopterous galls are listed, including the new ones presented herein. These galls occurred on 24 species of host plant and 14 families (Tab.1). Almost all galls have been recorded on angiosperms (monocotiledons: n=1 and dicotyledons: n=25), excepting one on gymnosperms (Gnetaceae: *Ephedra americana* Humbt. et Bonpl.).

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Table 1. Distribution and richness of coleopterous galls on host plants and localities in South America. References are also given.

HOST PLANT		# KIND OF GALLS	DISTRIBUTION	REFERENCES
FAMILY	SPECIES			
Alismaceae	*Sagittaria montevidensis* Cham. & Schlecht. f. *immaculata* Hicken	01	Argentina	HOUARD, 1933
Anacardiaceae	*Schinus dependens* Ortega	01	Chile	KIEFFER & HERBST, 1905; HOUARD, 1933
Annonaceae	*Portulaca oleracea* L.	01	Argentina	HOUARD, 1933
	Xilopia aromatica (Lam.) Mart.	01	Brazil	FERNANDES *et al.*, 1989
Apocynaceae	*Aspidosperma tomentosum* Mart.	01	Brazil	GONÇALVES-ALVIM & FERNANDES, 2001
Asteraceae	*Baccharis concinna* Barroso	02	Brazil	FERNANDES *et al.*, 1996
	Baccharis paucidentata DC.	01	South America	HOUARD, 1933
	Eupatorium sp.	01	Brazil	TAVARES, 1917B; HOUARD, 1933
	Parthenium hysterophorus L.	01	Argentina	FIEDLER, 1940
Bombacaceae	*Eriotheca gracilipes* (K. Schum) A. Robyns	01	Brazil	GONÇALVES-ALVIM & FERNANDES, 2001
Euphorbiaceae	*Croton antisyphiliticus* Mart.	01	Brazil	new record
Fagaceae	*Nothofagus obliqua* Blume	02	Chile	KIEFFER & HERBST, 1905; HOUARD, 1933
Gnetaceae	*Ephedra tweediana* C. A. Mey.	01	Argentina	HOUARD, 1933
Hippocrateaceae	*Hippocratea volubilis* L.	01	Brazil	new record
Leguminosae	*Andira* sp.	01	Brazil	FERNANDES & MAIA, 2004
	Dahlstedtia pinnata (Benth.) Malme	01	Brazil	COSTA-LIMA, 1956
	Eriosema sp.	01	Brazil	GONÇALVES-ALVIM & FERNANDES, 2001
	Prosopis alba Griseb.	01	Argentina	JÖRGENSEN, 1916; HOUARD, 1933
	Prosopis alpataco Phil.	01	Argentina	KIEFFER & JÖRGENSEN, 1910; HOUARD, 1933
	Prosopos campestris Griseb.	01	Argentina	HOUARD, 1933
Myrtaceae	*Gomidesia fenzliana* Berg	01	Brazil	MONTEIRO *et al.*, 1993; VANIN *et al.*, 2000
	Gomidesia martiana Berg	01	Brazil	MONTEIRO *et al.*, 1993; VANIN *et al.*, 2000
Solanaceae	*Solanum grandiflorum* Ruiz & Pav.	01	Brazil	COSTA-LIMA, 1956
	Solanum sp	01	Brazil	COSTA-LIMA, 1956
Tiliaceae	*Luehiea divaricata* Mart.	01	Brazil	FERNANDES *et al.*, 1988

Leguminosae and Asteraceae were the plant families with the greatest richness of galls, with six and five kinds of gall, respectively. The other families presented one or two kinds of gall. Most plant species supported only one kind of gall, excepting *Baccharis concinna* Barroso (n=3) and *Notophagous obliqua* Blume (n=2) (Tab.1).

Most galls (about 70%) were induced on stem or buds. The leaves were the second most attacked plant organ (about 15%), followed by roots (about 7%), flowers (3.7%) and tendril (3.7%). None galls occurred on fruits (Tab.2). Almost all gall inducers attacked a specific plant organ, excepting one which attacked simultaneously stem, petiole and midvein.

These data indicate a predominance of coleopterous galls on Leguminosae in South America and reveal the stem as the plant organ preferencially attacked by the coleopteran galling species. It is important to emphasize that the Leguminosae constitute a very diverse family of plant in the Neotropical region, being also commonly attacked by other gall maker insects, such as cecidomyiids (Diptera), coccoids (Hemiptera) and others. And the stem is also the most attacked organ by lepidopteran galling species, contrasting with the cecidomyiids, which induce galls mainly in leaves.

Concerning the taxonomy of the coleopteran gall makers, only six species have been identified (Tab.3). The other records have been presented at genera (n=3), family (n=4) or order level (n=12; about 44.5%). These data reveal how the taxonomy of the galling species is poorly known. The identified species belong to five genera distributed into three families according to ALONSO-ZARAZAGA & LYAL (1999): Apionidae - *Apion* Herbst, 1797 (2 spp.); Curculionidae - *Collabismus* Schoenherr, 1837 (1 sp.), *Conotrachelus* Dejean, 1835 (1 sp.), *Pacholenus* Schoenherr, 1826 (1 sp.) and Erirhinidae – *Hypselus* Schoenherr, 1843 (1 sp.), all of them are included in the same superfamily – Curculionoidae. The identified galling species are associated with only one host plant species or with two congeneric species, so these gall makers showed a high specificity of host.

Table 2. Distribution of coleopterous gall on plant parts in South America.

KINDS OF GALLS	NUMBER	PERCENTAGE
Stem or bud	19	70.37%
Leaf	4	14.82%
Root	2	7.41%
Flower	1	3.70%
Tendril	1	3.70%
Fruit	0	0%

Table 3. Distribution of coleopteran species on host plants, plant parts and localities in South America.

COLEOPTERAN GALLING SPECIES	HOST PLANT	PLANT PART	LOCALITY
Apionidae			
Apion angustatum Philippi	*Nothofagus obliqua* Blume	stem	Chile
Apion prosopides Kieff. & Jörg., 1910	*Prosopis alba* Griseb.	stem	Argentina
	Prosopis alpataco Phil.	leaf	Argentina
Apion sp.1	*Croton antisyphiliticus* Mart.	leaf	Brazil
Apion sp.2	*Portulaca oleracea* L.	flower	Argentina
Apion sp.3	*Dahlstedtia pinnata* (Benth.) Malme	stem	Brazil
Curculionidae			
Collabismus clitellae Boheman, 1837	*Solanum grandiflorum* Ruiz & Pav.	stem	Brazil
	Solanum sp.	stem	Brazil
Conotrachelus albocinereus Fiedler 1940	*Parthenium hysterophorus* L.	stem	Argentina
Pacholenus pelliceus Boheman, 1836	*Gomidesia fenzliana* Berg	stem	Brazil
	Gomidesia martiniana Berg	stem	Brazil
Erirhinidae			
Hypselus ater Boehman, 1843 (=*Anchonoides bonariensis* Brèthes, 1910)	*Sagittaria montevidensis* Cham. & Schlecht. f. *immaculata*	root	Argentina

Some species of Coleoptera are inquilines of galls. Two records of inquilinous species are presented for the first time in this paper (Tab.4) . These inquilinous weevils are associated with four different galls (3 induced by Diptera: Cecidomyiidae and the other induced by Lepidoptera: Momphidae) on four plant species.

The records of coleopterous galls from South America have been restricted to three countries: Brazil (with about 59% of the records), followed by Argentina (with about 26%) and Chile (with about 11%). None information is available for the other South American localities (Tab.5). Besides, data from Brazil have been restricted to four states, three of them situated in the Southern region: Minas Gerais, Rio de Janeiro and São Paulo, with approximately 59%, 23% and 12%, respectively, and one in the central plateau: Goiás with 6% (Tab.6). The published data also show the temporal (see references) and spatial discontinuity of the investigations in Brazil.

Table 5. Distribution of records of coleopterous galls in South America.

COUNTRY	KIND OF GALLS	
	NUMBER	PERCENTAGE
Brazil	16	55.3%
Argentina	7	25.9%
Chile	3	11.1%
South America	1	3.7%

Table 4. Distribution of coleopteran inquilines of galls on host plants and plant parts. Information about the galling species is given.

INQUILINOUS SPECIES	HOST PLANT	PLANT PART	GALL MAKER	LOCALITY
Anthonomus sp.	*Leandra aurea* (Cham.) Cogn. (Melastomataceae)	stem	Momphidae (Lepidoptera)	Brazil
Curculionidae sp.1	*Copaifera langsdorffii* Desf. (Leguminosae)	leaf	Cecidomyiidae (Diptera)	Brazil
*Curculionidae sp.2	*Neomitranthes obscura* (DC) N.J.E.Silveira	stem	*Neomitranthella robusta* Maia, 1995 (Cecidomyiidae)	Brazil
*Curculionidae sp.3	*Eugenia rotundifolia* Casar	stem	*Stephomyia rotundifoliorum* Maia, 1993 (Cecidomyiidae)	Brazil

(*) new record.

Table 6. Distribution of records of coleopterous galls in Brazil.

HOST PLANT	NO KIND OF GALLS	STATE
Andira sp.	01	MG
Aspidosperma tomentosum	01	MG
Baccharis concinna	02	MG
Croton antisyphiliticus	01	MG
Eriosema sp.	01	MG
Eriotheca gracilipes	01	MG
Luehea divaricata	01	MG
Solanum grandiflorum	01	MG
Xilopia aromatica	01	MG
Dahlstedtia pinnata	01	RJ
Gomidesia fenzliana	01	RJ
Gomidesia martiana	01	RJ
Hippocratea volubilis	01	RJ
Eupatorium sp.	01	SP
Solanum sp.	01	SP, GO

(GO) Goiás; (MG) Minas Gerais; (RJ) Rio de Janeiro; (SP) São Paulo.

Coleopterous galls on *Croton antisyphiliticus* Mart. (Euphorbiaceae) and on *Hippocratea volubilis* L. (Hippocrateaceae) are described following. Illustrations of these galls are given.

GALLS DESCRIPTIONS

Coleopterous gall on *Croton antisyphiliticus* Mart. (Euphorbiaceae)

Succulent stem, petiole or midvein gall, green, irregular in shape, with 1.5-2.0cm of length and multichambered (Fig.1). Gall maker: *Apion* sp. (Apionidae). Locality: Serra de São José (Tiradentes, Minas Gerais State, Brazil).

Coleopterous gall on *Hippocratea volubilis* L. (Hippocrateaceae)

Petiole swelling, brown, ovoid, unichambered, with 0.8-1.0cm of length and onechambered (Fig.2). Gall maker: Curculionidae (Coleoptera). Locality: Restinga of Grumari (Rio de Janeiro, State of Rio de Janeiro, Brazil).

Coleopterous galls on: fig.1- *Croton antisyphiliticus* Mart. (Euphorbiaceae); fig.2- *Hippocratea volubilis* L. (Hippocrateaceae).

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