

APHIDS (HEMIPTERA: APHIDIDAE) AND THEIR PARASITOIDS (HYMENOPTERA)  
ON *IXORA* SPP. (RUBIACEAE) IN THE STATES OF BAHIA AND SÃO  
PAULO, BRAZIL – FORMAL RECORDS OF INTERACTIONS

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ABSTRACT

This paper reports, for the first time, the incidence of the aphids *Aphis gossypii* Glover, 1877 and *Myzus persicae* (Sulzer, 1776) (Hemiptera: Aphididae) on *Ixora macrothyrsa* Teijsm. & Binn. (Rubiaceae) in Brazil. The formal records of interaction among *Aphis spiraecola* Patch, 1914 with *Ixora coccinea* L. and *Ixora coccinea* L. var. *compacta* Hort. in Brazil, and the presence of *Aphelinus gossypii* Timberlake, 1923 (Hymenoptera: Aphelinidae), parasitoid of *A. spiraecola* in the state of São Paulo, are made. Observations on other parasitoids (Hymenoptera) infesting these aphids were also made. The paper includes a short morphological characterization of the aphids, parasitoids, a survey of the ornamental plant hosts in Brazil and suggestions for control.

KEY WORDS: Aphididae, *Aphis*, control, *Myzus*, *Ixora*, Rubiaceae.

RESUMO

AFÍDEOS (HEMIPTERA: APHIDIDAE) E SEUS PARASITÓIDES (HYMENOPTERA) EM *IXORA* SPP. (RUBIACEAE) NOS ESTADOS DA BAHIA E SÃO PAULO, BRASIL – REGISTROS FORMAIS DE INTERAÇÃO. O trabalho relata o primeiro registro de incidência de *Aphis gossypii* Glover, 1877 e *Myzus persicae* (Sulzer, 1776) em plantas de *Ixora macrothyrsa* Teijsm. & Binn. (Rubiaceae) no Brasil. São efetuados os registros formais da interação de *Aphis spiraecola* Patch, 1914 com *Ixora coccinea* L. e *Ixora coccinea* L. var. *compacta* Hort. no Brasil e da presença de *Aphelinus gossypii* Timberlake, 1923, (Hymenoptera: Aphelinidae), parasitóide de *A. spiraecola*, no Estado de São Paulo. Observações sobre outros parasitóides (Hymenoptera) infestando os afídeos são efetuadas. O artigo inclui uma breve caracterização morfológica dos afídeos, dos parasitóides, lista das plantas ornamentais hospedeiras no Brasil e orientações sobre o controle.

PALAVRAS-CHAVE: Aphididae, *Aphis*, controle, *Myzus*, *Ixora*, Rubiaceae.

INTRODUCTION

The chain production of ornamental plants involves approximately R\$ 1 billion/year with an expected increasing of about 20% per year in the next years. The production is mainly devoted to the internal consumption and only a small part is exported. The major problems for exporting are due to the standardizing demands and sanitary aspects. The latter include pests, which constitute one of the most important barriers for growing of Brazilian ornamental exportations. Among the pests, aphids are a main limiting one for the cultivation and trading of ornamentals.

The genus *Ixora* L. is included in the family Rubiaceae that contains about 450 genera and 6,500 species being the vast majority tropical or subtropical. Genera such as *Cinchona* L., source of quinine and

*Coffea* L., chiefly *C. arabica* L., source of coffee belong to the family (CRONQUIST, 1982). Six species of *Ixora* are cultivated in Brazil, all of them with high ornamental and economic values. Their inflorescences are terminal, dense and globose, with orange, yellow, pink, red or white coloration. They are extensively used in the ornamentation of home gardens and public parks (LORENZI & SOUZA, 2001). By having beautiful, colorful and long-lasting inflorescences, the species of *Ixora* have a good potential for exporting.

The family Aphididae (Hemiptera, Sternorrhyncha, Aphidoidea) includes about 350 genera and 3,500 species worldwide in distribution. Many species cause damage to the cultivated plants, including ornamentals. They may suck plant sap or inject saliva that can cause stunting of the shoots, galls or deformation and discoloration of leaves and fruits. They may also serve as vectors of plant viruses or

excrete honeydew on which sooty mold grows, interfering in the photosynthesis of the plant (KOSZTARAB, 1982).

Among the aphids species, *Aphis gossypii* Glover, 1877, *A. spiraecola* Patch, 1914 and *Myzus persicae* (SULZER, 1776) are considered the main vectors of viruses to plants (HOLMAN, 1974; ILHARCO, 1993). They are polyphagous, feeding on growing parts and flowers of many plants of economic importance. According to LEAL & OLIVEIRA (1983) and PERONTI (1999), which surveyed aphids in ornamentals in Recife and São Carlos, respectively, *A. gossypii* and *A. spiraecola* were the species that infested the largest number of plants, being found in about 50% of them.

This paper reports, for the first time in Brazil, the incidence of *A. gossypii* and *M. persicae* on *Ixora macrothyrsa* Teijsm. & Binn., makes the formal record of occurrence of *A. spiraecola* on *I. coccinea* L. and *I. coccinea* L. var. *compacta* Hort. in Brazil, and the presence of *Aphelinus gossypii* Timberlake, 1923 (Hymenoptera: Aphelinidae), parasitoid of *A. spiraecola* in the state of São Paulo. Other parasitoids of the aphids are recorded. A short morphological characterization and illustrations of the main characters of the aphids, brief characterization of parasitoids and a survey of the ornamental plant hosts are presented. Recommendations for the control of the pests using soap solutions are made.

## MATERIAL AND METHODS

The aphids were collected in October/1999 in the county of São José do Rio Preto, State of São Paulo on *I. coccinea* var. *compacta*, in November of same year in Porto Seguro, south of state of Bahia on *I. coccinea* and in April/2000 in São Carlos, state of São Paulo, on *I. macrothyrsa*.

Plants of *Ixora* spp. were being cultivated on beds and jardinières of residential gardens under sunlight. The identification was made by the authors based on LORENZI & SOUZA (2001).

The aphids collected on the host plants were fixed and preserved in ethanol 95%. Part of the specimens were slide-mounted following, in part, the technique of ILHARCO & GOMES (1967). An incision were made on the dorsal region of the specimens, the body contents were expressed in 10% KOH water solution by gentle pressure, and after wards rinsed in detergent, washed several times in distilled water, dehydrated in ethanol series, cleared in eugenol and mounted in Canada balsam. The identifications were based on the key by HOLMAN (1974) and papers by EASTOP (1966) and REMAUDIÈRE (1994). The specimens of aphids were deposited in the collections of the Departamento de Ecologia e Biologia Evolutiva, Universidade Federal

de São Carlos, São Carlos (DCBU) and Coleção Entomológica Adolph Hempel, Instituto Biológico, São Paulo (IBSP) (collections codens according to ARNETT *et al.*, 1993).

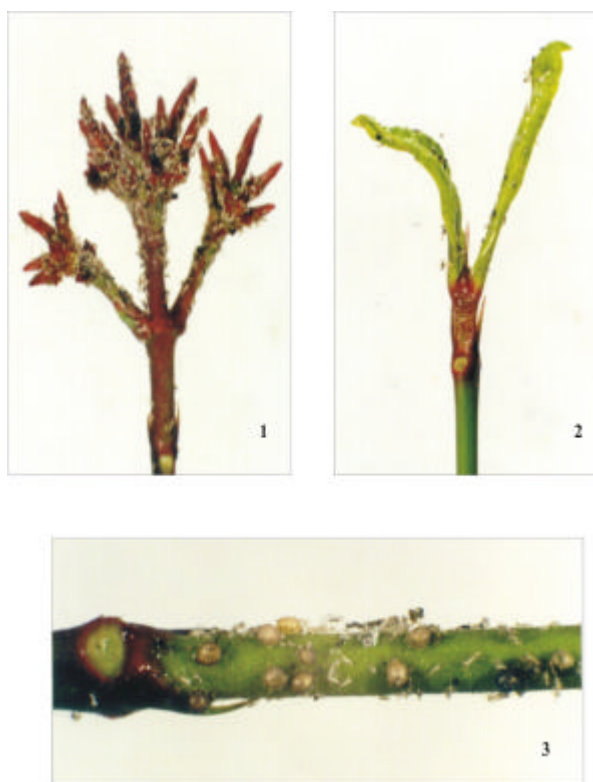
The parasited aphids were set apart in Petri dishes until the emergence of the adults of parasitoid or hyperparasitoid. They were fixed in ethanol 75% and sent for identification. They were not preserved.

## RESULTS AND DISCUSSION

### Formal records of interaction, description of damages and parasitism of the aphids

This paper records for the first time the occurrence of *Aphis gossypii* and *M. persicae* on *Ixora macrothyrsa* in Brazil. The first record of incidence of *A. spiraecola* on *I. coccinea* and *I. coccinea* var. *compacta* in Brazil was made shortly by IMENES *et al.* (2000) and in this paper more details are given.

*Aphis spiraecola* was found infesting *I. coccinea* var. *compacta* sprouts in the county of São José do Rio Preto, north of State of São Paulo in October/1999. In November/1999, inflorescences of *I. coccinea* were being attacked by the same species of aphid, in the



Figs 1-3. Infestation of *Aphis gossypii* Glover, 1877 (Hemiptera, Aphididae) on *Ixora macrothyrsa* Tijism. & Binn. (Rubiaceae). 1, inflorescence; 2, sprout; 3, mummies of *A. gossypii*.

county of Porto Seguro, south of the state of Bahia. In April/2000, high infestation of *A. gossypii* associated with few specimens of *M. persicae* was observed on inflorescences (Fig. 1) and sprouts (Fig. 2) of *I. macrothyrsa* in the county of São Carlos, north of State of São Paulo.

Evaluation of incidence indicated that 100% of sprouts and inflorescences were highly infested by the aphids in the three counties. As a direct result of the damage caused by the pests, the young leaves were wrinkled and the ornamental aspect of the plants was harmed.

Specimens of *Aphelinus gossypii* were found parasitizing *Aphis spiraeicola* in São José do Rio Preto. This is the first record of that aphelinid in the state of São Paulo. Before this, it was observed only once in Brazil, in the same host, in Recife, state of Pernambuco by FERNANDES et al. (in press) in cotton crop.

In São Carlos, *Aphis gossypii* was highly parasitized by *Lysiphlebus testaceipes* (Cresson, 1880) (Hymenoptera: Braconidae) or hyperparasitized by *Syrphophagus aphidivorus* (Mayr, 1876) (Hymenoptera: Encyrtidae); few specimens were attacked by *Aphidius colemani* Viereck, 1912 (Hymenoptera: Braconidae) or hyperparasitized by *Pachyneuron* sp. (Hymenoptera: Pteromalidae). *A. colemani* and *L. testaceipes* are frequently found parasitizing aphids in Brazil as well as the hyperparasitoids *S. aphidivorus* and *Pachyneuron* sp. In the São Carlos area, they were recorded by FERREIRA (1999), PERONTI (1999) and TAVARES (1991) parasitizing mainly species of genus *Aphis* Linnaeus, 1758 (Fig. 3).

**Short morphological characterization of *Aphis gossypii*, *A. spiraeicola* (Aphidini) and *Myzus persicae* (Macrosiphini) (Hemiptera: Aphididae: Aphidinae)**

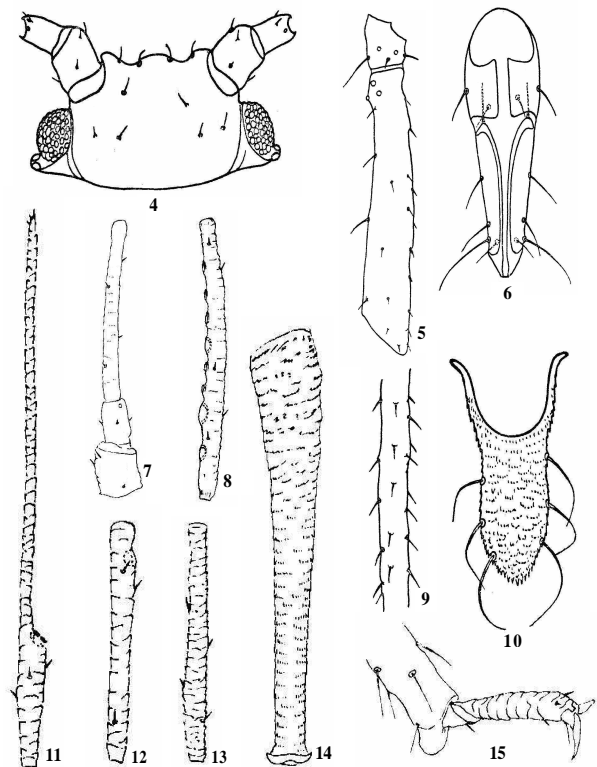
*Aphis gossypii* (Figs. 4-15). APTEROUS. Body length: 0.9-1.9 mm. Frons (Fig. 4) sinuous, with median tubercle, and setae with same diameter. Antennae (Figs. 7, 11, 12) with 5-6 segments, as long as 0.5-0.65x body length, *processus terminalis* 2 or 3 x longer than base of segment VI, primary rhinaria on segments V and VI, secondary rhinaria rounded or oval, setae 0.3-0.8x as large as basal diameter of segment III, tubercles few developed. Rostrum (Fig. 6) attaining the metacoxae, last segment 1-1.5x as long as metatarsomere II. Legs (Figs. 5, 9, 15) with short setae on dorsal side and 1-2 long and strong setae on ventral side of femora, tibiae with setae all of same kind, metatarsomere I with 3 setae. Abdomen with membranous dorsum; marginal tubercles on tergites I-VII, in the segment VII they are bellow and behind spiracles; transverse, narrow and sclerotized band on tergite VIII; distance between spiracles I and II larger than distance between spiracles II and III. Siphunculus (Fig. 14), tapering, imbricate, developed, 1.3-2.0x longer

than cauda, slightly longer than antennomere III. Cauda (Fig. 10) conical, slightly constricted at the middle, bearing 4-7 setae.

ALATE. Body length: 0.95-1.75 mm. Similar to apterous except by having antennae (Figs. 8, 13) as long as 0.60-0.75x of the body length; 3-9 flat secondary rhinaria on segment III, segment IV without rhinaria; marginal sclerites on abdominal tergites II and IV; postsiphuncular sclerites well developed.

Examined material: BRAZIL, SÃO PAULO, São Carlos, on *I. macrothyrsa*, IV.2000, A.L.B.G. Peronti leg., 5 apterous adults (slide mounted) (DCBU).

*Aphis spiraeicola* (Figs. 16-27). APTEROUS. Body length: 1.2-2.0 mm. Antennae 0.5-0.65x as long as body length, without secondary rhinaria on segment III (Fig. 18), *processus terminalis* 2 or 3x longer than basal part of segment VI, setae 0.7-0.8x as large as basal diameter of segment III, tubercles low or almost null. Abdomen with dorsum membranous and without sclerites, marginal tubercles on segments I and VIII, distance separating spiracles I and II larger than the one that between II and III. Genital plate with 2 long setae on anterior region and 2-7 pairs on



Figs 4-15. *Aphis gossypii* Glover, 1877 (Hemiptera, Aphididae). Apterous: 4, head; 5, 9, 15, legs (metatrochanter and metafemur, mesotibia, metatarsum); 6, rostrum; 7, 11, 12, antenna (segments I-III, VI and IV); 10, cauda; 14, siphunculus. Alate: 8, 13, antenna (segments III and IV). (Figs not in scale).

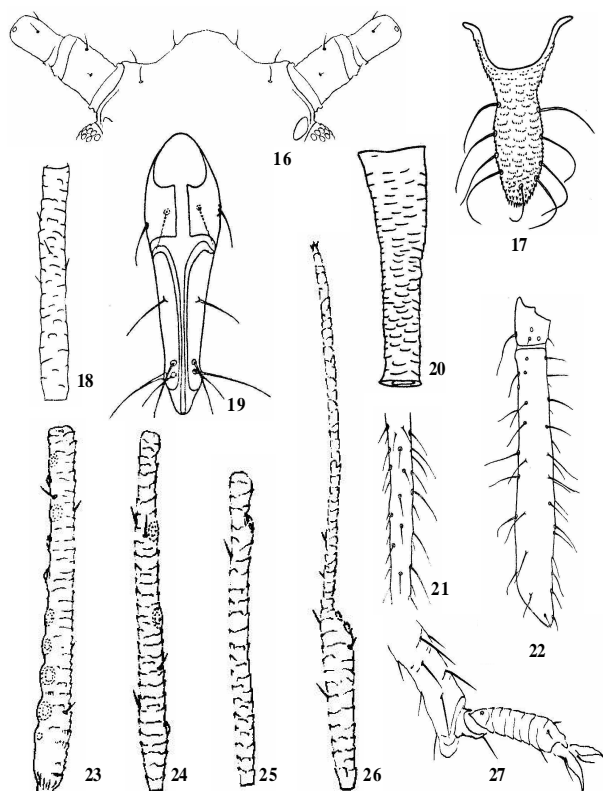
posterior margin.

**ALATE.** Body length: 1.4-1.8 mm. Frons (Fig. 16) slightly sinuous at sides, median tubercle low, setae variable in size. Antenna (Figs. 23-26) 6-segmented, 0.55-0.7x of body length, 4-10 aligned secondary rhinaria on segment III, 0-4 rhinaria on segment IV, segment V without rhinaria. Rostrum (Fig. 19) attaining the posterior coxae; last segment with 2 long and thin setae, 1.1-1.4x as long as metatarsomere II. Legs (Figs. 21, 22, 27) with long and thin setae on femur, all tibial setae of same kind, metatarsomere I bisetose. Abdomen with marginal sclerites on tergites II-IV, tergite VIII with narrow transverse fringe, postsiphuncular sclerites small. Siphunculus (Fig. 20) developed, cylindrical, with base slightly enlarged, 1.1-1.4x as long as cauda. Cauda (Fig. 17) finger-like, with conspicuous basal constriction, bearing 8-12 setae.

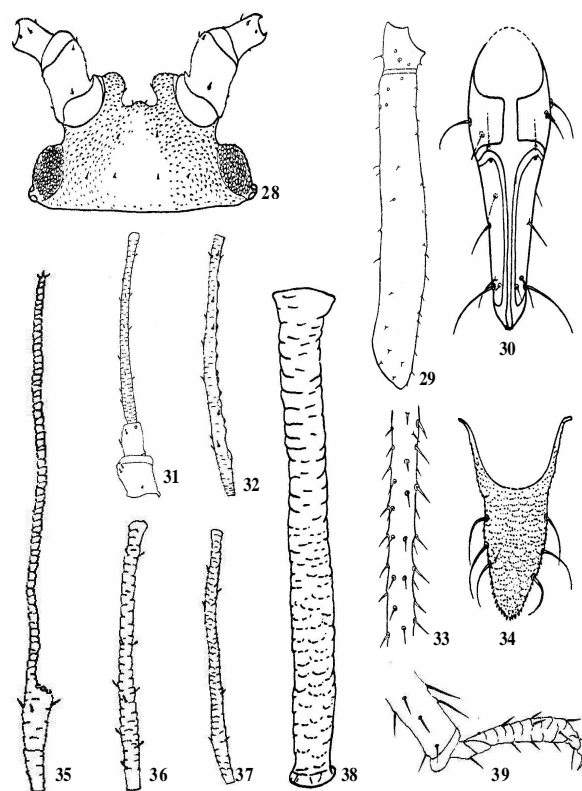
Examined material: BRAZIL, Bahia, Porto Seguro, on *I. coccinea*, XI.1999, A.L.B.G. Peronti, 2 apterous adults, 3 alates (slide mounted) (DCBU). São Paulo, São José do Rio Preto, on *I. coccinea* var. *compacta*, 25.X.1999, E.C. Bergmann leg., 49 apterous (47 in ethanol 70% IBSP, 2 slide mounted DCBU), 144 alates

(140 in ethanol 70% IBSP, 4 slide mounted DCBU).

**Myzus persicae** (Figs. 28-39). Apterous. Body length: 1.3-2.5 mm. Frons (Fig. 28) spiny, rugose or scaly, canaliculate, frontal setae obtuse. Antennae (Figs. 31, 35, 36) 6-segmented; as long as 0.65-0.8x of body length; *processus terminalis* 3-5x as large as base of segment IV; secondary rhinaria absent; setal diameter 0.16-0.33x as large as basal diameter of segment III; tubercles large, with rounded excrescencies at internal sides looking like tapered to apex. Rostrum (Fig. 30) extending to median coxae; last segment 0.95-1.15x as long as metatarsomere II, bearing 2-4 setae. Legs (Figs. 29, 33, 39) with femur and tibia bearing short setae, metatarsomere I bisetose. Abdomen with membranous dorsum, dorsal setae short and inconspicuous, tergite I and VII almost always without marginal tubercles, tergite VIII with 4 setae similar to ventral ones, ventral setae acute, distance between spiracles small. Siphunculus (Fig. 38) as long as 0.2-0.28x of body length, cylindrical, slightly clubbed and imbricate, apex swollen. Cauda (Fig. 34) 0.37-0.5x as long as the cornicles, triangular shaped, bearing 5-7 setae. Genital plate with 2 setae on anterior region and 12-



Figs 16-27. *Aphis spiraecola* Patch, 1914 (Hemiptera, Aphididae). Apterous: 18, antenna (segment III). Alate: 16, head; 17, cauda; 19, rostrum; 20, siphunculus; 21, 22, 27, legs (metatrochanter and metafemur, mesotibia and metatarsum); 23-26, antenna (segments III, IV, V and VI). (Figs not in scale).



Figs 28-39. *Myzus persicae* (Sulzer, 1776) (Hemiptera, Aphididae). Apterous: 28, head; 29, 33, 39, legs (metatrochanter and metafemur, mesotibia, metatarsum); 30, rostrum; 31, 35, 36, antenna (segments I-III, VI and IV); 34, cauda; 38, siphunculus. Alate: 32, 37, antenna (segments III and IV). (Figs not in scale).

17 short setae on posterior region.

Alate. Body length: 1.6-2.5 mm. Differs from the apterous by the following: antennae (Figs. 32, 37) almost as long as body length; 7-16 aligned, rounded or oval secondary rhinaria on segment III; abdominal dorsum sclerotized central plate extending from tergite II to V or VI, sometimes fused with some intersegmental plates and postsiphuncular sclerites; marginal sclerites large, presiphuncular sclerites small, large fringe on distal tergites.

Examined material: BRASIL, São Paulo, São Carlos, on *I. macrothyrsa*, IV.2000, A.L.B.G. Peronti leg., 2 apterous adults, 3 alates (slide mounted) (DCBU).

**Short morphological characterization of *Aphelinus gossypii* (Aphelinidae: Aphelininae: Aphelinini), *Aphidius colemani* and *Lysiphlebus testaceipes* (Braconidae: Aphidiinae: Aphidiini) (Hymenoptera)**

*Aphelinus gossypii* (ASHMEAD, 1904; EVANS & STANGE, 1997). Body length: 0.5-0.6 mm. Body dark; stout; relatively lightly sclerotized. Eyes not hairy. Antenna with 6-jointed flagellum in males; 5-jointed flagellum and clubbed in females. Wings hyaline or with a slightly fuscous patch; front wing with a hairless oblique line extending from the marginal vein towards the base; fore wing with marginal vein long and stigmal vein short. Propodeum transverse, with metasoma widely attached to mesosoma. Protibia with relatively long, curved apical spur; mesotibia dorsoapically without pegs, spur relatively long, often robust; tarsi 4-segmented, mesotarsi without peg ventrally. Cerci not conspicuously advanced anteriorly. Ovipositor not or only slightly exerted.

*Aphidius colemani* (EVANS & STANGE, 1997; VIIECK, 1912, 1916). Body length: 2-3 mm, slender. Mostly blackish; head uniformly blackish; clypeus, edge of malar space, and mouth stramineous; prothorax yellowish; mesonotum, scutellum, and propodeum black; male abdomen almost entirely black, segment I brownish; female abdomen with segment I partly brownish, segments II to IV largely blackish, apical

half mostly yellowish; sheaths pale. Antennae narrow, waist and long; with flagellum 16- or 17-segmented in male, last antennomere may be as long as or longer than the preceding joint; female with 14-jointed flagellum. Forewing with rm wanting; first submarginal cell confluent with discoidal cell, recurrent veins absent or present in number of one. Propodeum with a diamond shaped-areola and a petiolarea; the areola adjoining four other areas.

*Lysiphlebus testaceipes* (BROOKS, 2000; EVANS & STANGE, 1997; VIIECK, 1916). Similar to *A. colemani*. Body length: 2 mm. Body elongated; general colour shining black; thorax black; mid and hind legs blackish; petiole honey-yellow; abdomen brownish-black. Antennae long; in male 14- or 15-jointed; in female usually 13-segmented, sometimes 11- or 12-segmented. Thorax smooth. Forewing with rm in present, radial vein reaching 0.5 or less of disc length. Propodeum without carina.

**Survey of ornamental host of *Aphis gossypii*, *A. spiraeicola* and *Myzus persicae* in Brazil**

The results of the survey are summarized in the Table 1. The three aphid species are highly polyphagous the being recorded in at least, 80 species of ornamental plants belonging to 32 families. Among the former, *A. gossypii* has the largest number of records in ornamentals (54 species in 22 families) and *M. persicae* has the fewest number, being recorded in 17 species in nine families. Considering the extreme polypagy of the species, it is expected that many other ornamentals will be recorded as their hosts.

The information regarding the aphids ornamental hosts in Brazil was published in some papers that are not easily accessed by the users and it is expected that this survey will facilitate its availability.

Judging by the small number of papers, catalogues and books on the subject, the huge Brazilian flora, and growing importance of the chain production of the ornamentals in this country, much work still must be done before the aphids fauna and its relation with ornamentals are satisfactorily known.

Table 1 - List of ornamentals recorded as hosts of the aphids *Aphis gossypii* (Ag), *A. spiraeicola* (As) and *Myzus persicae* (Mp) in Brazil (" - ", information not available).

Hosts (Family/Species)	Aphid Species			Place	Source
	Ag	As	Mp		
<b>Amaranthaceae</b>					
<i>Iresine herbstii</i> Hook	•			São Carlos, SP	PERONTI (1999)
<b>Amaryllidaceae</b>					
<i>Eucharis grandiflora</i> Planch. & Linden	•			Recife, PE	LEAL & OLIVEIRA (1983)
<b>Anacardiaceae</b>					
<i>Schinus molle</i> L.	•			São Carlos, SP	PERONTI (1999)
<b>Apocynaceae</b>					
<i>Allamanda blanchetti</i> A. DC.	•			São Carlos, SP	PERONTI (1999)
<i>Catharanthus roseus</i> (L.) G. Don	•			São Carlos, SP	PERONTI (1999)

Cont. Table 1 - List of ornamentals recorded as hosts of the aphids *Aphis gossypii* (Ag), *A. spiraeicola* (As) and *Myzus persicae* (Mp) in Brazil (" - ", information not available).

Hosts (Family/Species)	Aphid Species			Place	Source
	Ag	As	Mp		
<i>Ervatamia coronaria</i> (Jacq.) Stapf	•			São Carlos, SP	PERONTI (1999)
<i>Vinca</i> sp.		•		São Carlos, SP	TAVARES (1996)
Araceae					
<i>Caladium bicolor</i> (Ait.) Venten.	•			-	SOUZA-SILVA & ILHARCO (1995)
<i>Caladium</i> spp.	•			Piracicaba, SP	BERGAMIN (1957)
				-	SILVA <i>et al.</i> (1968)
<i>Dieffenbachia amoena</i> Bull.	•			-	
				São Carlos, SP	SOUZA-SILVA & ILHARCO (1995)
				-	PERONTI (1999)
<i>Dieffenbachia</i> sp.	•			-	SOUZA-SILVA & ILHARCO (1995)
<i>Syngonium podophyllum</i> Scott	•			São Carlos, SP	PERONTI (1999)
Araliaceae					
<i>Polyscias fruticosa</i> (L.) Harms	•	•		Recife, PE	LEAL & OLIVEIRA (1983)
<i>Polyscias guilfoylei</i> (W. Bull.) L.H. Bailey		•		São Carlos, SP	PERONTI (1999)
<i>Schefflera arboricola</i> (Hayata) Merr.	•			São Carlos, SP	PERONTI (1999)
<i>Schefflera</i> sp.	•			São Roque, SP	TAVARES (1996)
Bignoniaceae					
<i>Jacaranda decurrens</i> Benth.	•			Brotas, SP	TAVARES (1996)
				São Paulo, SP	
<i>Podranea ricasoliana</i> (Tanfani) Sprague	•			-	BERGMANN <i>et al.</i> (1988)
				-	SOUZA-SILVA & ILHARCO (1995)
<i>Spathodea campanulata</i> Beauv.	•			São Carlos, SP	PERONTI (1999)
<i>Tabebuia roseo-alba</i> (Radl.) Sand.	•			São Carlos, SP	TAVARES (1996)
<i>Tabebuia</i> sp.	•			São Carlos, SP	PERONTI (1999)
<i>Tecoma stans</i> Hbk.	•	•		São Carlos, SP	TAVARES (1996)
Boraginaceae					
<i>Cordia</i> sp.	•			-	SOUZA-SILVA & ILHARCO (1995)
Caprifoliaceae					
<i>Viburnum</i> sp.	•			São Carlos, SP	PERONTI (1999)
Caryophyllaceae					
<i>Silene armeria</i> L.	•			Recife, PE	LEAL & OLIVEIRA (1983)
Compositae					
<i>Bellis perennis</i> L.	•			-	SOUZA-SILVA & ILHARCO (1995)
<i>Chrysanthemum morifolium</i> Ramat		•		Barbacena, MG	OLIVEIRA <i>et al.</i> (1988)
<i>Chrysanthemum</i> sp.	•	•		São Paulo, SP	BERGMANN <i>et al.</i> (1988)
<i>Gerbera jamesonii</i> Adlam		•		São Carlos, SP	PERONTI (1999)
<i>Zinnia elegans</i> Jacq.	•	•		Recife, PE	LEAL & OLIVEIRA (1983)
Crassulaceae					
<i>Kalanchoe blossfeldiana</i> Poelln.	•			São Carlos, SP	PERONTI (1999)
<i>Kalanchoe</i> sp.		•		-	SOUZA-SILVA & ILHARCO (1995)
Cruciferae					
<i>Brassica oleracea</i> L. var. <i>acephala</i> DC.		•		-	SOUZA-SILVA & ILHARCO (1995)
Euphorbiaceae					
<i>Acalypha wilkesiana</i> Müll. Arg.		•		São Paulo, SP	BERGMANN <i>et al.</i> (1988) (as <i>Acalyphas</i> .)
<i>Ricinus communis</i> L.		•		Recife, PE	LEAL & OLIVEIRA (1983)
Fabaceae					
<i>Bauhinia rufa</i> Steud.	•			São Paulo, SP	BERGMANN <i>et al.</i> (1988)
<i>Bauhinia variegata</i> L.	•			São Carlos, SP	PERONTI (1999)
<i>Bauhinia</i> sp.	•			-	SILVA <i>et al.</i> (1968)
				-	SOUZA-SILVA & ILHARCO (1995)
<i>Calliandra inaequilatera</i> Rusby	•			São Carlos, SP	PERONTI (1999)
Iridaceae					
<i>Gladiolus communis</i> L.	•			-	SOUZA-SILVA & ILHARCO (1995)
<i>Gladiolus hortulanus</i> L.H. Bailey		•		São Carlos, SP	PERONTI (1999)
<i>Gladiolus</i> sp.		•		-	SILVA <i>et al.</i> (1968)
<i>Neomarica gracilis</i> Sprague	•			São Paulo, SP	BERGMANN <i>et al.</i> (1988)

Cont. Table 1 - List of ornamentals recorded as hosts of the aphids *Aphis gossypii* (Ag), *A. spiraeicola* (As) and *Myzus persicae* (Mp) in Brazil (" - ", information not available).

Hosts (Family/Species)	Aphid Species			Place	Source
	Ag	As	Mp		
<b>Leguminosae</b>					
<i>Cassia leptocarpa</i> Benth.	•			São Carlos, SP	TAVARES (1996)
<i>Cassia leptophylla</i> Vog.	•			Piracicaba, SP	BERGAMIN (1957)
				-	SOUZA-SILVA & ILHARCO (1995)
<i>Cassia siamea</i> Lam.	•	•		Recife, PE	LEAL & OLIVEIRA (1983)
<b>Liliaceae</b>					
<i>Cordilyne terminalis</i> (L.) Kunth	•			São Paulo, SP	BERGMANN et al. (1988)
			•	São Carlos, SP	PERONTI (1999)
<b>Lythraceae</b>					
<i>Lagestroemia indica</i> L.	•			São Carlos, SP	PERONTI (1999)
<b>Malvaceae</b>					
				-	MOREIRA (1925)
				Piracicaba, SP	BERGAMIN (1957)
<i>Hibiscus rosa-sinensis</i> L.	•			-	SILVA et al. (1968)
				-	SOUZA-SILVA & ILHARCO (1995)
				São Carlos, SP	TAVARES (1996)
				São Carlos, SP	PERONTI (1999)
<i>Hibiscus sabdariffa</i> L.	•			-	SOUZA-SILVA & ILHARCO (1995)
<i>Hibiscus syriacus</i> L.		•		São Carlos, SP	PERONTI (1999)
<i>Hibiscus</i> sp.	•			Recife, PE	LEAL & OLIVEIRA (1983)
<i>Malvaviscus arboreus</i> Cav.	•	•		São Carlos, SP	PERONTI (1999)
				São Paulo, SP	IMENES et al. (1996)
<b>Melastomataceae</b>					
<i>Tibouchina granulosa</i> Cogn.		•		-	SOUZA-SILVA & ILHARCO (1995)
	•			São Carlos, SP	PERONTI (1999)
<b>Moraceae</b>					
<i>Ficus elastica</i> Roburgh	•			Recife, PE	LEAL & OLIVEIRA (1983)
<b>Nyctaginaceae</b>					
<i>Bougainvillea spectabilis</i> Willd.	•			Recife, PE	LEAL & OLIVEIRA (1983)
		•		São Carlos, SP	PERONTI (1999)
<b>Pittosporaceae</b>					
<i>Pittosporum tobira</i> (Thunb.) Aiton		•		-	SOUZA-SILVA & ILHARCO (1995)
				São Carlos, SP	PERONTI (1999)
<b>Portulacaceae</b>					
<i>Portulaca oleracea</i> L.	•			Piracicaba, SP	BERGAMIN (1957)
				-	SOUZA-SILVA & ILHARCO (1995)
<b>Rosaceae</b>					
				-	SOUZA-SILVA & ILHARCO (1995)
<i>Rosa</i> spp.	•			São Carlos, SP	TAVARES (1996)
				São Carlos, SP	PERONTI (1999)
<i>Spiraea</i> sp.	•			São Roque, SP	TAVARES (1996)
<b>Rubiaceae</b>					
<i>Gardenia jasminoides</i> J. Ellis	•			-	SOUZA-SILVA & ILHARCO (1995)
<i>Ixora coccinea</i> L.	•			Porto Seguro, BA	IMENES et al. (2000, this paper)
<b>Rubiaceae</b>					
<i>Ixora coccinea</i> L. var. <i>compacta</i> Hort.	•			S.J. do Rio Preto, SP	IMENES et al. (2000, this paper)
<i>Ixora macrothyrsa</i> Tijism. & Binn.	•	•		São Carlos, SP	IMENES et al. (this paper)
<b>Solanaceae</b>					
<i>Solanum asperum</i> R.C. Richard	•			Recife, PE	LEAL & OLIVEIRA (1983)
<b>Theaceae</b>					
				Pelotas, RS	BIEZANKO et al. (1949)
<i>Camellia japonica</i> L.	•			-	SILVA et al. (1968)
				-	SOUZA-SILVA & ILHARCO (1995)
<b>Tropaeolaceae</b>					
<i>Tropaeolum majus</i> L.		•		-	SILVA et al. (1968)
<b>Verbenaceae</b>					

Cont. Table 1 - List of ornamentals recorded as hosts of the aphids *Aphis gossypii* (Ag), *A. spiraecola* (As) and *Myzus persicae* (Mp) in Brazil (" - ", information not available).

Hosts (Family/Species)	Aphid Species			Place	Source
	Ag	As	Mp		
<i>Duranta repens</i> L. "Aurea"		•		São Carlos, SP	PERONTI (1999)
<i>Petrea subserrata</i> Cham.	•			-	SILVA <i>et al.</i> (1968)
<i>Petrea volubilis</i> L.	•			Piracicaba, SP	BERGAMIN (1957)
				-	SOUZA-SILVA & ILHARCO (1995)
<i>Verbena chamaedryfolia</i> Juss	•			Piracicaba, SP	BERGAMIN (1957)
<i>Verbena peruviana</i> (L.) Druce	•			-	SOUZA-SILVA & ILHARCO (1995)
<i>Verbena</i> sp.	•			-	SILVA <i>et al.</i> (1968)
<b>Zingiberaceae</b>					
<i>Alpina pupurata</i> (Viell.) K. Schum.	•			Recife, PE	LEAL & OLIVEIRA (1983)
<i>Costus mexicanus</i> Liebm.	•	•		Recife, PE	LEAL & OLIVEIRA (1983)

### Suggestions for Control of Aphids in Domestic Gardens

The control of aphids on ornamental plants in commercial production areas is made by spraying pyrethroids, carbamates or organophosphates (systemic or contact) insecticides. There is an extensive literature reporting the use and efficacy of those products in reducing or eliminating populations of *Aphis gossypii*, *A. spiraecola* and *Myzus persicae*.

In urban areas like domestic and public gardens, squares, parks, streets, offices, houses, etc., the chemical control is perhaps not the best alternative due the eventual risks to health of human beings and domestic animals. Besides, many chemical products indicated for control of these aphids in commercial crops do not exist in domissanitary formulation. Thus, their manipulation by untrained people, like housekeepers, gardeners and general consumers, and without adequate equipment is not recommended.

In the past few years, gardening and landscaping have experienced a strong increase, as has the search for environmentally adequate options for pest control. In this context, soap solutions can be a good alternative.

Soap solutions, although being minimally selective to natural enemies and quite unstable, have proved efficient in the control of aphids and are an excellent choice for places like urban areas where the use of chemicals is not the most adequate option. They were extensively employed in the decade before the appearing of organic insecticides (ARAÚJO, 1936a, 1936b; FONSECA, 1935a, 1935b, 1935c, 1936; GONÇALVES, 1935; HAMBLETON, 1935a, 1935b, 1935c, 1936). More recently, JONES *et al.* (1986), MOORE *et al.* (1979) and PINNOCK *et al.* (1974, 1978) indicated soap solutions to suppress aphid populations in ornamentals plants.

Aqueous solutions about 1-3% of coconut-oil soap or neutral detergent can reduce, by at least 70%, the populations of *A. gossypii*, *A. spiraecola* and *M. persicae*. The best time for spraying is at sunset, avoiding the sunny part of the day and preventing damages to the

leaves. Previous phytotoxicity tests should be performed for each plant species. Before the spraying, the most infested parts of the plants should be cut and destroyed in order to reduce the populational level of the pests.

On the other hand, proper management of the environment that includes the maintenance of vegetal diversity and an adequate level of organic matter in the soil should inhibit the growth of phytophagous insect populations, preventing them from attaining the economic injury level.

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