

Scale insects on succulent plants in Southern Italy

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Abstract: The authors report the results of surveys on scale insects occurring on succulent plants carried out during the last ten years. The insects have been collected in nurseries, public and private parks and in gardens in Sicily and in other regions of Southern Italy.

The greatest number of species has been recorded on Cactaceae and belong to Pseudococcidae (*Pseudococcus longispinus* (Targioni Tozzetti), *Ps. viburni* (Signoret), *Phenacoccus madeirensis* Green, *Planococcus citri* (Risso), *Spilococcus mamillariae* (Bouché), *Vryburgia rimariae* Tranfaglia, *Hypogeococcus pungens* Granara de Willink), Eriococcidae (*Eriococcus coccineus* Cockerell), Coccidae (*Coccus hesperidum* L.) and Diaspididae (*Abgrallaspis cyanophylli* (Signoret) and *Diaspis echinocacti* (Bouché)). On Aizoaceae, *Aspidiotus nerii* Bouché and *D. echinocacti* have been recorded besides the Pseudococcidae *Ps. viburni*, *V. rimariae*, the Coccidae *Saissetia coffeae* (Walker), *Pulvinariella mesembryanthemi* (Vallot) and the Diaspididae *Entaspidiotus lounsburyi* (Marlatt). The mealybugs *Ps. longispinus*, *Dysmicoccus brevipes* (Cockerell), *D. neobrevipes* Beardsley and the armoured scale *Acanthomytilus sacchari* (Hall) have been collected on Nolinaceae. Only Pseudococcidae have been found on Asclepiadaceae (*Ph. madeirensis*, *Pl. citri*, *V. rimariae*) and on Crassulaceae (*Pl. citri*, *V. rimariae*); the presence of *Ph. madeirensis* and *Ovaticoccus agavium* (Douglas) has been recorded on Agavaceae. *Rhizococcus cacticans* (Hambleton) and *Hemiberlesia lataniae* Signoret have been collected on Asteraceae and Euphorbiaceae respectively. Brief data about the distribution and economic importance of each species are given.

Key words: Coccoidea, succulents, surveys, Sicily.

Introduction

In Southern Italy, the cultivation of succulents has a relevant economic interest because it is possible to grow these plants in cold greenhouses or in shade houses with low production costs. Succulents are plants belonging to more than 50 families that have evolved different methods to prevent water loss and, therefore, have specialized fleshy tissues for water accumulation in the roots, stems, or leaves (Rowley, 1986). They often come from inhospitable environments and then have high rusticity that is appreciated by hobbyists and designers of urban gardens.

With the introduction of succulents through commerce and hobbyist exchange, several scale insect species have been spread from one country to another. The economic importance of these insects requires a continuous monitoring system in order to intercept any potential pest species which might be accidentally introduced and to avoid their establishment in new environments (Longo *et al.*, 1994). In this paper, we report the results of surveys on scale insects living on succulents, carried out in nurseries, public and private parks and in gardens in Eastern Sicily and Southern Italy during the last ten years.

Results and discussion

The list of species collected is shown in Table 1. The most frequently recorded pests belong to the family Pseudococcidae and represent about 47% of the total species.

Some of the mealybugs, such as *Planococcus citri* (Risso), *Pseudococcus longispinus* (Targioni Tozzetti), *Ps. viburni* (Signoret), *Phenacoccus madeirensis* Green, *Dysmicoccus brevipes* (Cockerell) and *D. neobrevipes* Beardsley, are worldwide and polyphagous pests and often seriously

damage the host plant. *Spilococcus mamillariae* (Bouché) has a worldwide distribution; is oligophagous and a common pest of ornamental succulent plants. *Vryburgia rimariae* Tranfaglia, distributed in Italy and France (Longo *et al.*, 1989; Matile-Ferrero *et al.*, 2004), feeds on a restricted range of succulents (Marotta & Garonna, 1991), infesting all parts and seriously damaging them. *Hypogeococcus pungens* Granara de Willink, distributed in Neotropical and Palearctic regions, is considered a pest of Cactaceae, occurring on the roots and aerial parts of the host plant (Süss & Trematerra, 1986). This last species has been successfully introduced from Argentina to Australia as a biological control agent to control Cactaceous plants (Williams & Granara de Willink, 1992). *Rhizoecus cacticans* (Hambleton), distributed in Central and Southern America, Australia and Mediterranean Basin (Longo *et al.*, 1994), feeds on numerous plants, sometimes causing extensive damage in greenhouses; in the surveys it was found on the roots of *Senecio* sp. in outdoor production.

Only three species of Coccidae, namely *Saissetia coffeae* (Walker), *Coccus hesperidum* L. and *Pulvinariella mesembryanthemi* (Vallot) and two Eriococcidae (*Ovaticoccus agavium* (Douglas) and *Eriococcus coccineus* Cockerell) have been collected on Aizoaceae, Cactaceae and Agavaceae (Table 1). *P. mesembryanthemi* (Vallot), a South African species typically associated with Aizoaceae, is considered a potential pest of these plants (Donaldson *et al.*, 1978; Gill, 1988). During our surveys, it has been collected on *Disphyma crassifolia* and on *Carpobrotus acinaciformis*, where it formed dense colonies.

With regard to Diaspididae (28.6% of the species recorded), the species more frequently found were the prickly pear scale *Diaspis echinocacti* (Bouché), and the oleander scale *Aspidiotus nerii* Bouché.

Entaspidiotus lounsburyi (Marlatt), previously recorded on Aizoaceae (Russo *et al.*, 1999), is at the moment present in very low population density. *Abgrallaspis cyanophilli* (Signoret), a cosmopolitan species, can be an injurious pest of Cactaceae (Balachowsky, 1948). *Acanthomytilus sacchari* (Hall), occasionally recorded on *Dasylyrion* sp., can damage the host plant by causing bleached areas on leaves. *Hemiberlesia lataniae* Signoret is a very common pest of ornamental plants (Longo *et al.*, 1994).

In general, the scale insects fauna of succulents consists mainly of oligophagous species, probably in relation to the peculiar anatomy and physiology of these interesting plants. In some cases fertilization, irrigation and absence of effective natural enemies has led to an increase in scale populations so that chemical control measures are required. This happened, for example, with *D. echinocacti* that was seriously damaging prickly pear in specialized cultivation in Sicily during the 90s (Russo & Siscaro, 1994).

Table 1. List of the scale insects collected on succulents arranged by host plant families.

HOST PLANT		SCALE INSECTS	
Family	Species	Family	Species
Aizoaceae	<i>Aptenia cordifolia</i>	Pseudococcidae	<i>Pseudococcus viburni</i>
		Coccidae	<i>Saissetia coffeae</i>
		Diaspididae	<i>Aspidiotus neri</i>
	<i>Carpobrotus acinaciformis</i>	Coccidae	<i>Pulvinariella mesembryanthemi</i>
	<i>Disphyma crassifolium</i>	Pseudococcidae	<i>Vryburgia rimariae</i>
		Coccidae	<i>Pulvinariella mesembryanthemi</i>
Diaspididae		<i>Entaspidiotus lounsburyi</i>	
<i>Lithops</i> sp.	Diaspididae	<i>Diaspis echinocacti</i>	
Agavaceae	<i>Agave americana</i>	Eriococcidae	<i>Ovaticoccus agavium</i>
	<i>A. Americana-marginata</i>	Eriococcidae	<i>Ovaticoccus agavium</i>
	<i>Agave</i> sp.	Pseudococcidae	<i>Phenacoccus madeirensis</i>
Asclepiadaceae	<i>Hoya carnosa</i>	Pseudococcidae	<i>Phenacoccus madeirensis</i>
			<i>Planococcus citri</i>
	<i>Stapelia variegata</i>	Pseudococcidae	<i>Vryburgia rimariae</i>
Asteraceae	<i>Senecio</i> sp.	Pseudococcidae	<i>Rhizoecus cacticans</i>
Cactaceae	<i>Cereus</i> spp.	Pseudococcidae	<i>Planococcus citri</i>
			<i>Vryburgia rimariae</i>
			<i>Hypogeococcus pungens</i>
		Diaspididae	<i>Abgrallaspis cyanophylli</i>
	<i>Cereus peruvianus</i> var. <i>monstruosus</i>	Pseudococcidae	<i>Hypogeococcus pungens</i>
	<i>Echinocactus</i> sp.	Coccidae	<i>Coccus hesperidum</i>
	<i>Eriocactus</i> sp.	Pseudococcidae	<i>Pseudococcus viburni</i>
	<i>Ferocactus latifoliae</i>	Pseudococcidae	<i>Spilococcus mamillariae</i>
	<i>Hylocereus undatus</i>	Pseudococcidae	<i>Phenacoccus madeirensis</i>
	<i>Lobivia</i> sp.	Pseudococcidae	<i>Spilococcus mamillariae</i>
	<i>Neobuxbaumia polilophus</i>	Eriococcidae	<i>Eriococcus coccineus</i>
<i>Opuntia ficus-indica</i>	Diaspididae	<i>Diaspis echinocacti</i>	
<i>Opuntia</i> sp.	Pseudococcidae	<i>Pseudococcus longispinus</i>	
Crassulaceae	<i>Crassula portulaca</i>	Pseudococcidae	<i>Planococcus citri</i>
	<i>Crassula</i> sp.	Pseudococcidae	<i>Vryburgia rimariae</i>
Euphorbiaceae	<i>Euphorbia caput-medusae</i>	Diaspididae	<i>Hemiberlesia lataniae</i>
Nalinaceae	<i>Beaucarnea recurvata</i>	Pseudococcidae	<i>Pseudococcus longispinus</i>
			<i>Dysmicoccus brevipes</i>
	<i>Dasyliirion</i> sp.	Diaspididae	<i>Acanthomytilus sacchari</i>

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