

THE GENUS *PULVINARIA* TARGIONI TOZZETTI,
1866 (HEMIPTERA: COCCOIDEA: COCCIDAE)
WITH SPECIAL REGARD TO *PULVINARIA*
HYDRANGEAE STEINWEDEN, 1946 AS A NEWLY
RECORDED SPECIES IN THE FAUNA OF CROATIA

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This paper deals with the scale insects *Pulvinaria floccifera* (Westwood, 1870), *Pulvinaria hydrangeae* Steinweden, 1946 and *Pulvinaria vitis* (Linnaeus, 1758) which were monitored during a four year faunistic investigation (2005–2008) of the genus *Pulvinaria* Targioni Tozzetti, 1866 in Croatia. *P. hydrangeae* is a newly recorded species in Croatia. Distribution (according to the UTM coordinate system) and host plants of these species in Croatia are reported. Some morphological characteristics useful to separate these three species are also given.

Key words: *Pulvinaria floccifera*, *Pulvinaria hydrangeae*, *Pulvinaria vitis*, distribution, morphology, Croatia

Masten Milek, T., Ivezić, M. & Šimala, M.: Rod *Pulvinaria* Targioni Tozzetti, 1866 (Hemiptera: Coccoidea: Coccidae) s posebnim osvrtom na vrstu *Pulvinaria hydrangeae* Steinweden, 1946 kao novozabilježenu u fauni Hrvatske. *Nat. Croat.*, Vol. 18, No. 2, 267–278, 2009, Zagreb.

Rad govori o vrstama štitastih uši *Pulvinaria floccifera* (Westwood, 1870), *Pulvinaria hydrangeae* Steinweden, 1946 i *Pulvinaria vitis* (Linnaeus, 1758) koje su utvrđene monitoringom roda *Pulvinaria* Targioni Tozzetti, 1866 tijekom četverogodišnjih faunističkih istraživanja u Hrvatskoj (od 2005. do 2008.). *P. hydrangeae* je novoregistrirana vrsta za Hrvatsku. Rasprostranjenost utvrđenih vrsta i njihovih domaćina u Hrvatskoj prikazana je prema UTM sustavu. Opisana su i neka morfološka obilježja potrebna za razlikovanje utvrđenih vrsta.

Ključne riječi: *Pulvinaria floccifera*, *Pulvinaria hydrangeae*, *Pulvinaria vitis*, rasprostranjenost, morfologija, Hrvatska

INTRODUCTION

The genus *Pulvinaria* Targioni-Tozzetti, 1866 comprises 141 species worldwide (BEN-DOV *et al.*, 2008a) including 67 of the Palaearctic region (BEN-DOV *et al.*, 2008b). According to literature data, *Pulvinaria floccifera* (Westwood, 1870), *Pulvinaria sericea* (Fourcroy, 1785) and *Pulvinaria vitis* (Linnaeus, 1758) were registered in Croatia in the past (LANGHOFFER, 1912; LINDINGER, 1912; NOVAK, 1928; SCHMIDT, 1956; KOVAČEVIĆ, 1961; ŽAK-OGAZA, 1967; KOZÁR, 1983). *Pulvinaria hydrangeae* Steinweden, 1946 is a newly recorded species in Croatia (MASTEN MILEK, 2007).

MATERIALS AND METHODS

Faunistic research on scale insects of the genus *Pulvinaria* was carried out over a 4 year period (2005–2008) in 21 counties of Croatia by visual inspections of potentially infested plants with the help of a 10x magnification lens. Host plant material infested with scale insects from leaves and stems was collected in plastic bags. Each sample was labelled with details about the host plant, damage symptoms, collector, sample number, date and the locality. The locality was marked using UTM coordinates (HORVAT *et al.*, 2003).

The collected specimens were slide mounted under the dissecting stereo microscope, according to methods of HODGSON & HENDERSON (2000). The microscopic morphological characters of adult female were studied using the keys of HAMON & WILLIAMS (1984), GILL (1988), KOSZTARAB & KOZÁR (1988), HODGSON & HENDERSON (2000) and JANSEN (2000).

RESULTS AND DISCUSSION

A survey of the genus *Pulvinaria* in Croatia (2005–2008) confirmed the presence of *P. floccifera*, *P. hydrangeae* and *P. vitis*. *P. hydrangeae* has not yet been recorded in Croatia. *Neopulvinaria innumerabilis* (Rathvon, 1854), *Pulvinariella mesembryanthemi* (Vallot, 1829) and *Protapulvinaria pyriformis* (Cockerell, 1894) were found as well during the survey. These species should be mentioned because they belong to the congener genera of *Pulvinaria* and they are new for the Croatian fauna as well. Information on *P. floccifera*, *P. hydrangeae* and *P. vitis* is reported below.

According to JANSEN (2000), the soft scale species of the genus *Pulvinaria* can be distinguished from other genera of the family Coccidae by the combination of the following characters. Teneral females are less than twice as long as wide and the tibia and tarsus usually are freely articulating. They produce a typical elongated, white cottony ovisac under the body. However, members of other genera may have a similar ovisac. Length and shape of the ovisac provide additional diagnostic field characteristics. Important microscopic characters are the three spiracular setae of which the median one is two or three times longer than the lateral two and the latter differ in shape from the marginal setae. Females of most *Pulvinaria* species are more or less oval shaped, rather flat, wrinkly and chestnut brown to more or less greyish.

Pulvinaria floccifera (Westwood, 1870)

P. floccifera (Fig. 1) is a common Mediterranean species with an almost world-wide distribution (KOSZTARAB & KOZAR, 1988). It is a polyphagous species associated with host plants from at least 34 plant families (BEN-DOV *et al.*, 2008c).

Adult females are 2–5 mm long, oval or elongate oval, fairly flat, somewhat transversely ridged and dark brown. Young adult females are brown, usually with a yellow stripe. The ovisac is white, fairly flat and 4–9 mm long (GILL, 1988) (Fig. 1a).

P. floccifera has one generation per year. Crawlers settle on leaves while later instars can return to the twigs where they mature (GILL, 1988). The species overwinters as second stage nymphs on twigs and leaves.

The first record of *P. floccifera* in Croatia dates from 1926 (NOVAK, 1928). It was recorded on *Euonymus* L. sp. in Dubrovnik. After that, this species was recorded on *Olea europea* L., *Euonymus japonicus* Thunb., *Magnolia* L. sp. (SCHMIDT, 1956) and *Pittosporum tobira* Ait. (KOZAR, 1983). During our research, *P. floccifera* was found on seven host plants *Ilex aquifolium* L., *Aralia japonica* Thunb., *Mahonia aquifolium* (Pursh) Nutt., *Euonymus japonicus* Thunb., *Aucuba japonica* Thunb., *Pittosporum tobira* Ait. and *Taxus baccata* L. which belong to seven plant families, on 17 localities (including Mediterranean and continental part of Croatia) (Tab. 1).

Pulvinaria hydrangeae Steinweden, 1946

P. hydrangeae (Fig. 2) is a polyphagous species distributed in Australia, New Zealand, USA, Belgium, France, Germany, Hungary, Italy, the Netherlands, Switzerland and Japan (BEN-DOV *et al.*, 2008e). Its origin is unknown as STEINWEDEN (1946) described the species from both North American specimens collected in 1935 and



Fig. 1. Adult females of *P. floccifera* on *Euonymus japonicus* L.f. (locality Zagreb) – a) postreproductive female with ovisac (photo: T. Masten Milek)

Tab. 1. Host plants, localities and finding dates of *Pulvinaria floccifera* (Westwood, 1870) in Croatia during 2005–2008.

Species	Plant family	Host plant	Locality	UTM	Date
<i>Pulvinaria floccifera</i> (Westwood, 1870)	Aquifoliaceae	<i>Ilex aquifolium</i> L.	Varaždin	33t xm0329	25.8.2006.
		<i>Ilex</i> L. sp.	Čakovec	33t xm1038	7.3.2007.
		<i>Ilex aquifolium</i> L.	Zagreb Vinogradska	33t w17474	31.3.2007.
		<i>Ilex aquifolium</i> L.	Lučko MBM*	33t w16868	16.5.2007.
		<i>Ilex aquifolium</i> L.	Kastav	33t v14924	9.6.2008.
	Araliaceae	<i>Aralia japonica</i> Thunb.	Vanga Brijuni	33t uk9875	16.5.2005.
		<i>Aralia japonica</i> Thunb.	Vanga Brijuni	33t uk9875	2.5.2006.
	Berberidaceae	<i>Mahonia aquifolium</i> (Pursh) Nutt.	Srdoči	33t v14924	9.6.2008.
	Celastraceae	<i>Euonymus japonicus</i> L.f.	Zagreb Bukovačka	33t w17975	7.3.2007.
		<i>Euonymus japonicus</i> L.f.	Zagreb Maksimirska	33t w17975	31.3.2007.
		<i>Euonymus japonicus</i> L.f.	Zagreb Maksimir park	33t w17975	19.4.2007.
	Cornaceae	<i>Aucuba japonica</i> Thunb.	Opatija	33t v14521	15.5.2005.
	Pittosporaceae	<i>Pittosporum tobira</i> Ait.	Dubrovnik	34t bn6126	5.4.2005.
		<i>Pittosporum tobira</i> Ait.	Vanga Brijuni	33t uk9875	12.5.2005.
		<i>Pittosporum tobira</i> Ait.	Vanga Brijuni	33t uk9875	16.5.2005.
		<i>Pittosporum tobira</i> Ait.	Vanga Brijuni	33t uk9875	5.5.2005.
		<i>Pittosporum tobira</i> Ait.	Opatija	33t v14521	15.5.2005.
		<i>Pittosporum tobira</i> Ait.	Kastav	33t v14924	3.6.2006.
		<i>Pittosporum tobira</i> Ait.	Vrgotini	33t ul9009	12.7.2006.
		<i>Pittosporum tobira</i> Ait.	Dubrovnik	34t bn6126	24.7.2006.
		<i>Pittosporum tobira</i> Ait.	Vanga Brijuni	33t uk9875	10.4.2007.
		<i>Pittosporum tobira</i> Ait.	Jadrija	33t wj6841	14.4.2007.
		<i>Pittosporum tobira</i> Ait.	Dubrovnik	34t bn6126	29.4.2007.
		<i>Pittosporum tobira</i> Ait.	Zadar	33t wj1884	25.7.2008.
		<i>Pittosporum tobira</i> Ait.	Solin	33t xj2022	29.7.2008.
		Taxaceae	<i>Taxus baccata</i> L.	Vanga Brijuni	33t uk9875
<i>Taxus baccata</i> L.	Daruvar		33t xl7352	19.5.2006.	
TOTAL	7 plant families	7 host plants	17 localities	–	–

* Greenhouse

specimens collected in Japan in 1895. In Slovenia it was registered in 1998 (SELJAK, 2001). It is known as a pest of many host plants belonging to the following plant families: Aceraceae, Cornaceae, Ebenaceae, Hydrangeaceae, Moraceae, Philadelphaceae, Platanaceae, Rosaceae, Taxaceae, Tiliaceae and Ulmaceae (BEN-DOV *et al.*, 2008f).

The female body is 3–5 mm long, ovoid to circular and fairly flat whereas the colour is yellow or brown, becoming darker with age. The ovisac is white, broadly



Fig. 2. Adult female of *P. hydrangeae* on *Tilia cordata* L. (locality Samobor) – a) postreproductive female with ovisac (photo: T. Masten Milek)

and shallowly grooved, convex, about 10 mm long (GILL, 1988) (Fig. 2a). According to HODGSON & HENDERSON (2000) adult females develop transverse ridges with age on dorsum.

P. hydrangeae has one generation per year (PELLIZZARI SCALTRITI, 1976). The species overwinters as third stage nymph on twigs where maturation and egg laying take place in spring. Crawlers return to the leaves for initial development (GILL, 1988). The fraction which survives is very small and was measured to be 0.08% (MERLIN, 1993) so nymphs might be already present on the twigs without the need to return.

In Croatia *P. hydrangeae* was detected for the first time in April 2006 on *Hydrangea macrophylla* (Thunb.) Ser. in Zagreb (MASTEN MILEK, 2007). During our research, this species was found on 15 localities on eight different host plants: *Acer campestre* L., *Acer monspessulanum* L., *Acer platanoides* L., *Acer pseudoplatanus* L., *Actinidia chinensis* Planch., *Cornus mas* L., *Photinia serrulata* Lindl., *H. macrophylla* and *Tilia cordata* L. (Tab. 2).

Pulvinaria vitis (Linnaeus, 1758)

P. vitis (Fig. 3) has a worldwide distribution, but it is now found throughout the Palaearctic and has been introduced to the Nearctic and Neotropical regions and New Zealand. It is known as the pest of many host plants belonging to the following families: Aceraceae, Betulaceae, Celastraceae, Compositae, Corylaceae, Hippocastanaceae, Juglandaceae, Oleaceae, Rosaceae, Salicaceae, Tamaricaceae, Tiliaceae and Vitaceae (BEN-DOV *et al.*, 2008d). Major host plant of *P. vitis* in Croatia is *Vitis vinifera* L. but it can be found on ornamentals as well (SCHMIDT, 1976).

Tab. 2. Host plants, localities and finding dates of *Pulvinaria hydrangeae* Steinweden, 1946 in Croatia during 2005–2008.

Species	Plant family	Host plant	Locality	UTM	Date
Pulvinaria hydrangeae Steinweden, 1946	Aceraceae	<i>Acer</i> L. sp.	Zagreb Nova bolnica	33t wl8276	7.5.2007.
		<i>Acer campestre</i> L.	Valpovo	34t br9859	31.7.2006.
		<i>Acer campestre</i> L.	Otok	34t cr3301	8.8.2006.
		<i>Acer campestre</i> L.	Samobor	33t wl5572	17.8.2006.
		<i>Acer campestre</i> L.	Vinkovci	34t cr2717	23.4.2007.
		<i>Acer campestre</i> L.	Vinkovci	34t cr2717	23.4.2007.
		<i>Acer campestre</i> L.	Zagreb	33t wl8276	1.5.2008.
		<i>Acer monspessulanum</i> L.	Senj	33t vk9282	13.8.2006.
		<i>Acer platanoides</i> L.	Samobor Anindol	33t wl5472	22.4.2007.
		<i>Acer pseudoplatanus</i> L.	Vinkovci	34t cr2717	8.8.2006.
	Actinidiceae	<i>Actinidia chinensis</i> Planch.	Kastav	33t vl4924	1.5.2008.
	Cornaceae	<i>Cornus mas</i> L.	Vinkovci	34t cr2717	10.8.2006.
			Daruvar	33t xl7352	6.9.2006.
			Vinkovci	34t cr2717	23.4.2007.
	Rosaceae	<i>Photinia serrulata</i> Lindl.	Opatija	33t vl4521	26.5.2006.
	Saxifragaceae	<i>Hydrangea macrophylla</i> (Thunb.) Ser.	Zagreb Stenjevac	33t wl6873	19.4.2006.
			Vanga Brijuni	33t uk9875	2.5.2006.
			Vanga Brijuni	33t uk9875	10.4.2007.
			Zagreb Stenjevac	33t wl6873	13.6.2007.
			Samobor	33t wl5472	21.4.2008.
	Tiliaceae	<i>Tilia</i> L. sp.	Daruvar	33t xl7352	26.4.2006.
Daruvarske toplice			33t xl7352	6.9.2006.	
Samobor Anindol			33t wl5472	22.4.2007.	
TOTAL	6 plant families	8 host plants	15 localities	–	–

Adult females are 3–7 mm long, ovoid to circular and flat. The colour of young adult females is yellow with variable brown mottle, becoming darker with age (GILL, 1988). The postreproductive female is oval, dark brown, the dorsum is wrinkled and strongly sclerotized and the ovisac is wide convex, cottony, white, and longer than the adult female (KOSZTARAB & KOZÁR, 1988).

P. vitis has one generation per year. Mated females overwinter in France on grape twigs and lay eggs in May. Eggs hatch in June, nymphs feed on leaves and adults mate in October (KOSZTARAB & KOZÁR, 1988). We noticed the same situation in Croatian vineyards during our research.



Fig. 3. *P. vitis* on *Vitis vinifera* L. (locality Daruvar) – postreproductive females with ovisac (left and right); young female in the middle (photo: T. Masten Milek)

The first record of *P. vitis* in Croatia dates from 1899 (LANGHOFFER, 1912). It was recorded on *V. vinifera* on the locality of Pakrac. After that, according to later literature data, this species was recorded on some other hosts such as *Euonymus europaea* L., *Euonymus latifolia* L., *Euonymus varrucosa* L. (LINDINGER, 1912), *Crataegus* L. sp.

Tab. 3. Host plants, localities and finding dates of *Pulvinaria vitis* (Linnaeus, 1758) in Croatia during 2005–2008.

Species	Plant family	Host plant	Locality	UTM	Date
<i>Pulvinaria vitis</i> (Linnaeus, 1758)	Vitaceae	<i>Vitis vinifera</i> L.	Imotski	33t xj7913	1.5.2005.
		<i>Vitis vinifera</i> L.	Daruvar	33t xl7352	19.5.2006.
		<i>Vitis vinifera</i> L.	Ilok	34t cr7308	23.5.2006.
		<i>Vitis vinifera</i> L.	Vivodina	33t wl3157	26.5.2006.
		<i>Vitis vinifera</i> L.	Vetovo	33t yl1833	5.6.2006.
		<i>Vitis vinifera</i> L.	Vrgorac	33t xh9286	6.6.2006.
		<i>Vitis vinifera</i> L.	Daruvar Lotada	33t xl7352	6.9.2006.
		<i>Vitis vinifera</i> L.	Bužin (kod Škudelina)	33t ul9632	4.4.2007.
		<i>Vitis vinifera</i> L.	Vukovar	34t cr4323	8.5.2007.
		<i>Vitis vinifera</i> L.	Vrgoračko polje	33t xh9286	26.5.2008.
		<i>Vitis vinifera</i> L.	Vrgoračko jezero	33t xh9286	26.5.2008.
		<i>Vitis vinifera</i> L.	Velika Gorica	33t wl8463	27.5.2008.
TOTAL	1 plant family	1 host plant	12 localities	–	–

(SCHMIDT, 1956), *Betula* L. sp., *Ulmus* L. sp. and *Prunus persica* L. (KOVAČEVIĆ, 1961). It was recorded to spread on *V. vinifera* all over Croatia (Card-file of Institute of plant protection, 1979–1987). During our research, *P. vitis* was found on 12 localities and always on *V. vinifera* (Tab. 3).

Notes on morphological and ecological characteristics of *P. floccifera*, *P. hydrangeae* and *P. vitis*

Some field characters noticed of *P. floccifera*, *P. hydrangeae* and *P. vitis* can be useful to separate these three species. *P. floccifera* is a polyphagous species which can be most frequently found on the leaves and branches of *Pittosporum* spp., *Euonymus* spp., *Ilex* spp., *Mahonia* spp. and *Taxus* spp. Also, *P. hydrangeae* is a polyphagous species which is not associated with *Ilex* spp. It is well known as a very common pest on the trees, branches, stems and leaves of *H. macrophylla*, *Acer* spp. and *Tilia* spp. *P. vitis* lives mainly on *V. vinifera* although it is a polyphagous species as well, and can be found on many different ornamentals.

A reliable identification is possible only on the basis of the study of microscopic morphological characters using relevant keys. Most important microscopic characters of *P. floccifera*, *P. hydrangeae* and *P. vitis* are given in Tab. 4.

Chilocorus bipustulatus L. and *Exochomus quadripustulatus* L. (fam. Coccinellidae) as predators and *Coccophagus lycimnia* (Walker) (fam. Aphelinidae) as parasitoid of *Pulvinaria* species were recorded during our survey.

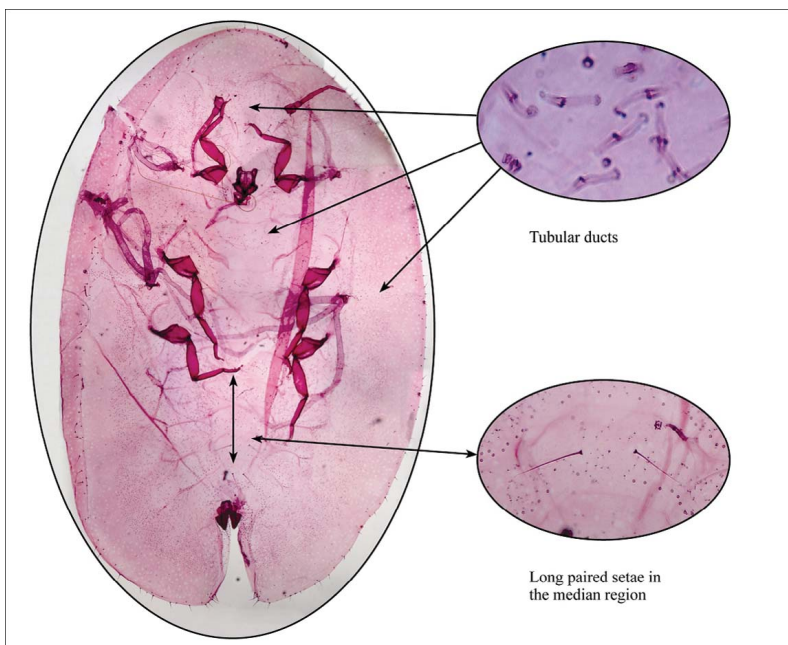


Fig. 4. Microscopic permanent slide of teneral female of *P. hydrangeae* with some details for identification (photo: T. Masten Milek)

Tab. 4. Some important distinctive microscopic characters of *P. floccifera*, *P. hydrangeae* and *P. vitis*

Validation characters	<i>P. floccifera</i>	<i>P. hydrangeae</i>	<i>P. vitis</i>
marginal setae	a few or all marginal setae with expanded fringed apices	a few or all marginal setae bifid or variously fringed	with pointed apices, never expanded or fringed
long paired setae in the median region (Fig. 4.)	ventrally present in median region of three posterior abdominal segments	ventrally present in all abdominal segments	ventrally present in median region of three posterior abdominal segments
ventral tubular ducts (Fig. 4.)	1. large ducts present medially on head, thorax, and first 1 or 2 abdominal segments, extending laterally to spiracles; 2. intermediate ducts present medially on posterior abdominal segments; 3. short ducts present in broad submarginal band, abundant posteriorly on abdomen, becoming rather thinly distributed between bands of spiracular disc-pore, very scarce anterior to prothorax and absent anterior to antennae	1. large ducts abundant medially and submedially on head and thorax; 2. intermediate ducts present medially and mediolaterally on abdomen and latered to large ducts on head and thorax; 3. short ducts present in a complete, broad, submarginal band	1. large ducts only present medially on head, thorax, and more anterior abdominal segments, extending laterally to band of intermediate ducts and short ducts, where they become infrequent or absent; 2. intermediate ducts frequent medially on posterior abdominal segments and laterally interspersed with large ducts and short ducts; 3. short ducts frequent in a broad submarginal band, extending from anal cleft to near antennae
dorsal submarginal duct tubercles	present (4–14)	absent	present (0–14)

CONCLUSIONS

In Croatia the genus *Pulvinaria* currently consists of three species: *P. floccifera*, *P. hydrangeae* and *P. vitis*. These are widely spread throughout the country. *P. sericea*, which was registered only once in the past, was not found in our survey. *P. floccifera* and *P. vitis* are present in Croatia for a long time. *P. floccifera* is the main pest of *Pit-tosporum* spp. in the Mediterranean part of Croatia which often leads to death of plants. *P. hydrangeae* is a new scale insect species for the fauna of Croatia. It is a typical pest of *H. macrophylla* in gardens, and *Acer* spp. and *Tilia* spp. in parks and woods. *P. vitis* can be characterized as a pest of *V. vinifera*.

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S A Ž E T A K

Vrste roda *Pulvinaria* Targioni-Tozzetti, 1866 (Hemiptera: Coccoidea: Coccidae) s naglaskom na vrstu *Pulvinaria hydrangeae* Steinweden, 1946 kao novozabilježenu u fauni Hrvatske

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Prema literaturnim podacima, do sada su u Hrvatskoj bile registrirane sljedeće vrste iz roda *Pulvinaria* Targioni Tozzetti: *Pulvinaria floccifera* (Westwood, 1870), *Pulvinaria sericea* (Fourcroy, 1785) i *Pulvinaria vitis* (Linnaeus, 1758). *P. floccifera* i *P. vitis* vrste su štítastih uši koje su dugo vremena prisutne u Hrvatskoj.

Četverogodišnja faunistička istraživanja (2005.–2008.) roda *Pulvinaria* u Republici Hrvatskoj provedena su na području 21 županije. U istraživanjima su korišteni materijali i metode rada kako slijedi: sakupljanje uzoraka biljnog materijala na temelju vizualnih pregleda, obrada uzoraka pod binokularom, pohranjivanje i čuvanje uzoraka, priprema mikroskopskih preparata, determinacija i označavanje lokaliteta faunističkih nalaza prema UTM sustavu.

Istraživanjem su utvrđene vrste *P. floccifera*, *P. hydrangeae* i *P. vitis*. *P. sericea* koja je u prošlosti registrirana samo jednom nije registrirana tijekom našeg istraživanja. *Neopulvinaria innumerabilis* (Rathvon, 1854), *Pulvinariella mesembryanthemi* (Vallot, 1829) i *Protopulvinaria pyriformis* (Cockerell, 1894) također su novoregistrirane vrste za Hrvatsku. Potrebno ih je spomenuti, iako nisu detaljno obrađene u ovom radu zato što pripadaju srodnim rodovima rodu *Pulvinaria* te su makroskopski vrlo slične

vrstama iz roda *Pulvinaria*. *P. floccifera* je registrirana na 7 domaćina: *Ilex aquifolium* L., *Aralia japonica* Thunb., *Mahonia aquifolium* (Pursh) Nutt., *Euonymus japonicus* L.f., *Aucuba japonica* Thunb., *Pittosporum tobira* Ait. i *Taxus baccata* L. koje pripadaju u 7 biljnih porodica, na 17 lokaliteta (uključujući mediteranski i kontinentalni dio Hrvatske). U Hrvatskoj je *P. hydrangeae* zabilježena prvi puta u travnju 2006. na *Hydrangea macrophylla* (Thunb.) Ser. u Zagrebu. Nakon toga je pronađena na 15 lokaliteta na 8 različitih domaćina: *Acer campestre* L., *Acer monspessulanum* L., *Acer platanoides* L., *Acer pseudoplatanus* L., *Actinidia chinensis* Planch., *Cornus mas* L., *Photinia serrulata* Lindl., *H. macrophylla* i *Tilia cordata* L. *P. vitis* je registrirana na 12 lokaliteta, uvijek na *V. vinifera*. Predatori *Chilocorus bipustulatus* L. i *Exochomus quadripustulatus* L. (porodica Coccinellidae) i parazitoid *Coccophagus lycimnia* (Walker) (porodica Aphelinidae) registrirani su kao prirodni neprijatelji vrsta iz roda *Pulvinaria* tijekom ovog istraživanja.

Iz četverogodišnjih istraživanja možemo zaključiti da u Hrvatskoj vrsta *P. floccifera* predstavlja jednog od najvažnijih štetnika biljaka *Pittosporum* spp. i vrlo često izaziva propadanje ovih biljaka, *P. hydrangeae* je značajan štetnik *H. macrophylla*, *Acer* spp. i *Tilia* spp., a *P. vitis* predstavlja štetnika na *V. vinifera*. Sve tri vrste široko su rasprostranjene u Hrvatskoj.