THE DISTRIBUTION, HOST PLANTS AND NATURAL ENEMIES OF WHITE PEACH SCALE, *PSEUDAULACASPIS PENTAGONA* (TARGIONI-TOZZETTI) (HEMIPTERA: DIASPIDIDAE), IN ANKARA PROVINCE

Ehab Mohammed Ahmed Mahmood Mohammed, Selma Ülgentürk*, Nedim Uygun, A. Pietro Garonna, Ferenc Szenkirály, Meral Fent and Mohammed Hayat

* Faculty of Agriculture, Department of Plant Protection, University of Ankara, Ankara, TURKEY. E-mail: ulgentur@ankara.edu.tr

[Mohammed, E. M. A. M., Ülgentürk, S., Uygun, N., Garonna, A. P., Szenkirály, F., Fent, M. & Hayat, M. 2016. The distribution, host plants and natural enemies of white peach scale, *Pseudaulacaspis pentagona* (Targioni-Tozzetti) (Hemiptera: Diaspididae), in Ankara province. Munis Entomology & Zoology, 11 (2): 650-656**]**

ABSTRACT: The distribution, host plants, and natural enemies of the white peach scale, *Pseudaulacaspis pentagona* (Targioni-Tozzetti) (Hemiptera: Diaspididae), were investigated in 25 districts of Ankara Province, Turkey, during 2013-2015. Thirteen districts were infested with harmful white peach scale; infestation was most common in parks, roadsides, private and institution gardens in centrum and old silkroad parts of Ankara. Twenty-two host plant species were found in these 13 districts, five of which (*Aesculus carnea*, *Hibiscus* sp., *Paulownia tomentosa, Rhus thyphina* and *Salix babylonica*) had not previously been recorded as host plants in Turkey. Some host plant species, including *Catalpa bignonioides, Cornus alba, Fraxinus americana*, *F. excelsior, Forsythia intermedia*, *Morus alba, M. nigra* and *Sophora japonica*, were found to be very highly infested. Five species of predators and three species of parasitoids were associated with white peach scale. *Orius minutus* L., *Chrysoperla pallida* (Henry et al.) are new record as predator of *P. pentagona* in World *and Epitetracnemus comis* Noyes &Ren Hui are first time record in Turkey.

KEY WORDS: *Rhus thyphina, Salix babylonica*, *Epitetracnemus comis*, *Chrysoperla pallida, Orius minutus*

The white peach scale (WPS), *Pseudaulacaspis pentagona* (Targioni-Tozzetti) (Hemiptera: Diaspididae) is covered by a waxy scale that is oval to circular in shape and a creamy-white to reddish-orange in color female. By contrast, adult males are tiny, yellow, two-winged insects. Immature males are also covered with a scale, but this is elongate and snowy white.

WPS is Oriental species and widely distributed all over the world (Garcia et al., 2016). In 1886, this species was seriously pest of mulberry trees and a menace to the silk industry and neighboring countries (Rosen, 1990). After years their spreading towards the north has been observed in central Europe and Mediterranean basin (Bodenheimer, 1953; Kozstarab & Kozár, 1988; Hanks & Denno, 1994; Şişman & Ülgentürk, 2010; Kaydan et al., 2013). It is polyphagous species that infests mulberry, beside of various kinds of deciduous fruit trees, ornamental and wild plants (Ben-Dov et al., 2015). It develops 2-5 generations per year up hanging climatic and geographic conditions (Kosztarab, 1990; Park & Kim, 1990; Branscome, 2012).

WPS is a pest of economic importance for mulberry, peach trees and woody ornamentals. In USA, crop losses from WPS, plus control costs were only $94000, but on the untreated peach trees the yield loss was valued at $480000 (Kosztarab, 1990). In Hawaii, it is only known as a crop pest in papaya (*Carica*

papaya); WPS poses a serious quarantine problem here, as they move into the papaya fruit in heavily infested trees (Neumann et al., 2010).

WPS is also attacked by several natural enemies (Collins & Whitcomb, 1975). Some parasites have since provided good control of WPS under most conditions (Collins & Whitcomb, 1975).

WPS is one of the most widely distributed insect species on fruit trees in Turkey (Kozár et al., 1979) and is considered the primary pest for peach trees in the Black Sea region (Kıroğlu, 1981) and the East Mediterranean region (Erkılıç & Uygun, 1997). In Turkey, it has two generations per year in mountainous areas, and three generations per year in coastal areas (Kıroğlu, 1981; Erkılıç & Uygun, 1997). WPS infests fruit plants such as almond, apricot, cherry, kiwi, medlar, mulberry, peach, plum, walnut and ornamental trees in Turkey (Zeki et al., 2004; Ülgentürk et al., 2009; Kaydan et al., 2013).

In recent years, WPS has also become a pest of great importance for mulberry trees (*Morus* spp.) in Ankara, due to the increased number of mulberry. This study aims to find out the size and spread of this insect and also determine the possibility of using biological control elements within integrated control program in Ankara province.

MATERIALS AND METHODS

Surveys were conducted to determine the distribution, host plants, and natural enemies of WPS in 17 districts and eight areas of Centrum of Ankara in the Spring–Autumn period of 2013-2015 (Fig. 1). Sampling areas were randomly selected, and infested twigs and/or branches were collected and placed in labelled plastic bags. The samples were then taken to the laboratory and examined under a stereomicroscope. Some WPS females were placed in 70% ethyl alcohol for identification, while others were put into plastic jars to rear their natural enemies. Adult predators of WPS that were found feeding with WPS on the same plant were collected directly by hand, while immature stages were reared on the WPS in climate room. The identification of host plants was made by the Landscape Department of Faculty of Agriculture, University of Ankara, Turkey.

RESULTS AND DISCUSSION

In total, 23 host plant species of WPS were found in 13 districts of Ankara province in 2013-2015. 7 of them were fruit trees (*Juglans regia*, *Morus alba*, *M. nigra*, *Prunus avium*, *P. persica*, *Vitis vinifera*, *Ficus carica*), while 16 were woody ornamental trees (*Aesculus carnea*, *Catalpa bignonioides*, *Cornus alba*, *Forsythia intermedia*, *Fraxinus americana*, *F. excelsior*, *Hibiscus syriacus*, *Koelreuteria paniculata*, *Paulownia tomentosa*, *Rhus thyphina* var. *laciniata*, *Ribes aureum*, *Robinia pseudoacacia*, *Salix babylonica*, *Sophora japonica*, *Syringa vulgaris*, and *Tilia tomentosa*) and one ornamental species *Pelargonium peltatum* (Table 1). WPS was determined to very high level infestation in centrum of Ankara and some districts, especially Ayaş, Beypazarı, Nallıhan on old silkroad with *C. bignonioides*, *Cornus* spp., *Forsythia intermedia*, *Fraxinus* spp., *M. alba*, *M. nigra*, and *S. japonica*, being most common. While *P. peltatum*, *R. thyphina* var. *laciniata*, *S. babylonica, Ficus carica* and *V. vinifera* were found rare host plant with high infestation. Interestingly, *Fraxinus americana, F. excelsior, Hibiscus* sp., *P. peltatum*, *V. vinifera, Paulownia tomentosa*, *A. carnea, R. thyphina* var. *laciniata* and *S. babylonica* are found for the first time as host

plants of WSP in Ankara and last four of them are recorded for the first time in Turkey.

In Ankara, *Crataegus* oxyacantha, *C. bignonioides*, *F. intermedia*, *K. paniculata*, *M. alba*, *M. nigra* var. *pendula*, *R. aureum*, S. *japonica, S. vulgaris* have been recorded by previous researchers as host of WSP (Çobanoğlu & Düzgüneş 1986; Ülgentürk & Toros, 1996; Ülgentürk & Toros, 2000; Zeki et al., 2004). In Aegean, Black Sea, Central Anatolia, Marmara and Mediterranean regions of Turkey, many fruit and ornamental plant species like *Actinia chinensis, A. deliciosa, Aesculus* sp., *Ailanthus altissima, Buxus sempervirens, Prunus avium, P. amygdalus, P. laurocerasus, Pelarganium* sp., *Ribes aureum, Robinia pseudoacacia, Tamarix* sp., *Sophora japonica, Syringia, vulgaris* and *V. vinifera* were found as host plants of WPS (Çanakçıoğlu, 1977; Kıroğlu, 1981; Erkılıç & Uygun, 1995; Ülgentürk & Çanakçıoğlu, 2004; Ülgentürk et al., 2009). *P. pentagona* is a cosmopolitan and polyphagous scale insect, and its wide range host spectrum points its adaptation and survival capacity.

In these study 5 species are found as predators of WPS; *Orius minutus* L. (Hemiptera: Anthocoridae), *Chilocorus bipustulatus* L., *Brumus quadripustulatus* L. (Coleoptera: Coccinellidae), *Cybocephalus* sp. (Coleoptera: Cybocephalidae) and *Chrysoperla pallida* (Henry et al.) (Neuroptera: Chrysopidae). The most common predator is *C. bipustulatus* followed by *Cybocephalus* sp. whereas the other predators are in few numbers. *C. bipustulatus* and *Cybocephalus* sp. are well known general predators on WPS and other scale insects in Turkey and all the world (Soylu & Ürel, 1977; Kıroğlu, 1981; Koztarab & Kozar 1988; Erkılıç & Uygun, 1995; Erler & Tunç, 2001; Ülgentürk & Toros, 2001). In spring, *C. bipustulatus* had controlled successfully of population of WSP but this success was not permanently in peach orchards of Black Sea region (Kıroğlu, 1981). The other general predators are *Chrysoperla pallidus* and *Orius minutus* are detected first time on WPS in Turkey and the world. Both predators prey mites, thrips, whiteflies, aphids, many other soft-bodied arthropods and their immature stages (Soylu & Ürel, 1977; Hagen et al., 1999; Efe et al., 2015). Graora & Spasić (2008) were recorded first time *Chrysopa carnea* Stephens and *Deraeocoris ruber* Linnaeus feeding *P. pentagona*. We think omnivorous characters of these predators are limited to control of WPS populations in Ankara.

As parasitoid of white peach scale, 3 species namely *Aphytis proclia* (Walker), *Encarsia berlesei* (Howard) (Hymenoptera: Aphelinidae) and *Epitetracnemus comis* Noyes & Ren Hui (Hymenoptera: Encyrtidae) were found in Ankara. *E. berlesei* and *A. proclia* are common respectively while *E. comis* is few number in Ankara. This parasitoid is recorded for the first time in Turkey. *E. berlesei* is thelytokous, endophagous parasitoids, reproducing young female and both immature stages of WPS (Bennassy, 1958; Habibian & Assadi, 1989; Pedata et al., 1995). *E. berlesei* was introduced to Italy from Japan and U.S.A. for the control of heavy infestation of WPS on mulberry trees that use silk production. Releasing of *E. berlesei* was complete success in Italy and parasitoid distributed all over the areas in Europe (Rosen, 1990). *E. berlesei* was the most abundant parasitoid of WPS in Italian orchards (Goranna & Viggiani, 1997). According Bodenheimer (1958), few number of *E. berlesei* from Florida was introduced to control WSP on mulberry trees that used silk production in Bursa by director of Silk research Institute in in year 1930. Releasing was limited success in the beginning. Although *E. berlesi* was most common parasitoid of WPS in Antalya (Erler & Tunç, 2001), surprisingly it was unsufficient to control WPS on peach in Black sea region (Kıroğlu, 1981) and in Mediteranean, Turkey (Erkılıç & Uygun, 1995).

Gürkan (1982) reported *E.* (*Praspaltella*) *berlesei* and *Aphytis diaspidis* Howard were parasited 57.4% of *P. pentagona* of population in Marmara region.

General ectoparasitoid, *A. proclia* was recorded in the previous work in Ankara (Ülgentürk & Toros, 2001). Benassy (1961) was conducted ectoparasitoids like *Aphytis* were highly dependent on climatic influences. Endoparasitod species like *Encarsia* more dependent their host than climatic conditions. Graora & Spasić (2008) were reported *E. berlesei* and *A. proclia* were found to be the most important regulators of *P. pentagona* population density with parasitism mounting to 60, even 64% in Serbia.

As a result of this study, among the 25 areas in Ankara, only 13 of them were infected with *P. pentagona*, 22 plant species has been found infected with armored insect. 4 of them are recorded for the first time in Turkey. In the affected areas with *P. pentagona*, 5 predators and 3 parasites were recorded. 2 predators and 1 parasite were not recorded in Turkey before. In a future study there is hope to see the relationship between *E. berlesei* and the WPS, and the extent of its ability to control this pest.

ACKNOWLEDGEMENTS

The authors are grateful Dr. M. Spodek, The Steinhardt Museum of Natural History Israel National Center for Biodiversity Studies , for kindly reading the manuscript and for his valuable suggestions.

LITERATURE CITED

Benassy, C. 1958. Etüde Bio-Ecologique De *Pseudaulacaspis pentagona* Targ. Et de son Parasite Specifigue *Prospaltella berlesei* Howard. En France, Annales des Epiphyties IV. 459.

Benassy, C. 1961. Contribution etüde de L'influence de quelques Facteurs Ecologiques sur la limitation des Pullulations de Cochenilles-Diaspines en France. Annales des Epiphyties, 12, 15.

Branscome, D. 2012. White Peach Scale, *Pseudaulacaspis pentagona* (Targioni) (Insecta: Hemiptera: Diaspididae). http://edis.ifas.ufl.edu/in 233.

Bodenheimer, F. S. 1953. The Coccoidea of Turkey III. İstanbul Univ. Facult. Sci. Rev., Ser. B., 18 (2): 91-164.

Bodenheimer, F. S. 1958. Türkiye'de ziraate ve ağaçlara zararlı olan böcekler ve bunlarla savaş hakkında bir etüt. Çeviren: Naci Kerter. Bayur Matbaası, Ankara, 320 pp.

Collins, F. A. & Whitcomb, W. H. 1975. Natural Enemies of the White Peach Scale, *Pseudaulacaspis Pentagona* (Homoptera: Coccidae), in Florida. Florida Entomologist, 15-21.

Çobanoğlu, S. & Düzgüneş, Z. 1986. Ankara İlinde Meyve Ağaçlarında Tespit Edilen Kabuklubitler (Homoptera: Diaspididae). Bit. Kor. Bült., 26 (3-4): 135-158.

Çanakçıoğlu, H. 1977. Türkiye'de Orman Ağaçları ve Ağaççıklarında Zarar Yapan Coccoidea (Hom.) Türleri Üzerinde Araştırmalar (Sistematik-Yayılış-KonukçuBiyoloji), İstanbul Üniversitesi, Orman Fakültesi Yayınları: 2322, Yayın No: 227, 122 pp.

Efe, D., Özgökçe, M. S. & Karaca, İ. 2015. Life table characteristics of *Orius minutus* (L.)(Hemiptera: Anthocoridae) feeding on *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae) at the laboratory conditions. by PSP Volume 24 – No 11c. Fresenius Environmental Bulletin, pages 4102-4107.

Erkılıç, L. & Uygun, N. 1995. Distribution, population fluctuations and natural enemies of the white peach scale, *Pseudaulacaspis pentagona* (Targioni-Tozzetti) (Homoptera: Diaspididae) in the East Mediterranean region of Turkey. Israel Journal of Entomology, 29: 191-198.

Erkılıç, L. B. & Uygun, N. 1997. Development time and fecundity of the white peach scale, Pseudaulacaspis pentagona, in Turkey. Phytoparasitica, 25 (1): 9-16.

Erler F. & Tunç, İ. 2001. A survey (1992–1996) of natural enemies of Diaspididae species in Antalya, Turkey. Phytoparasitica, 29 (4): 299-305.

García, M., Denno, B., Miller, D. R., Miller, G. L., Ben-Dov, Y. & Hardy, N. B. 2016. ScaleNet: A Literature-based model of scale insect biology and systematics. http://scalenet.info (Accessed: 2 Marc 2016).

Graora, D. & Spasić, R. 2008. Natural enemies of *Pseudaulacaspis pentagona* Targioni-Tozzetti in Serbia. Pesticidi i fitomedicina, 23 (1): 11-16.

Garonna, A. P. & Viggiani, G. 1997 Indagine sui parassitoidi di *Pseudaulacaspis pentagona* (Targioni-Tozzetti) (Homoptera: Diaspididae) presenti in Italia e loro distribuzione regionale. Bollettino Laboratorio di Entomologia Agraria "Filippo Silvestri", 53: 3-11.

Gurkan, S. 1982. The bio-ecology of *Pseudaulacaspis pentagona* Targ.-Toz. on peach in Marmara Region. Bitki Koruma Bul., 22: 179-197 (Turkish, with French abstract).

Habibian, A. & Assadi H. 1989. Some complementary studies of biological control with *Pseudaulacaspis pentagona* (Torg.-Tozz.) in Guilan province (Iran). Monograph. British-Crop-Protection-Council., 43, 249; In progress and prospects in insect control. Proceedings of an Inter. Conf. held at the Univ. of reading, Uk. 18-20 pp.

Hagen, K. S., Mills, G. G. & Mcmurtry, A. 1999. Terrestrial Arthropod predators of Insect and mite pests. In: Bellows, T. S. & Fisler (eds), Handbook of Biological Control,. T.W., Academic Press, USA. 383-549 p.

Hanks, L. M. & Denno, R. F. 1994. Local adaptation in the armored scale insect *Pseudaulacaspis pentagona* (Homoptera: Diaspididae). Ecology, 1994: 2301-2310.

Kaydan, M. B., Ülgentürk, S., & Erkılıç, L. 2013. Checklist of Turkish Coccoidea (Hemiptera: Sternorryncha) species. Turkish Bulletin of Entomology, 3 (4): 157-182.

Kıroğlu, H. 1981. Karadeniz bölgesi şeftali ağaçlarında zararlı kabuklubitlerden *Pseudaulacaspis pentagona* Targ.'ın morfolojisi, biyo-ekolojisi ve savaş metodları üzerinde araştırmalar. T.C. Tarım ve Orman Bakanlığı Zirai Mücadele ve Zirai Karantina Genel Müdürlüğü Araştırma Eserleri Serisi No: 2, Ankara, 54 s.

Kosztarab, M. & Kozár, F. 1988. Scale Insects of Central Europe. Akademiai Kiado, Budapest, Hungary. 456 pp.

Kosztarab, M. 1990. Economic Importance." In: Rosen D. (ed.) Armored Scale Insects, Their Biology, Natural Enemies and Control [Series title: World Crop Pests, Vol. 4B]., Elsevier, Amsterdam, the Netherlands, 307-311 pp.

Kosztarab, M., O'Brien, L. B., Stoetzel, M. B., Deitz, L. L. & Freytag, P. H. 1990. Problems and needs in the study of Homoptera in North America. Information Series-Virginia Polytechnic Institute and State University, College of Agriculture and Life Sciences, (90-1): 119-145.

Kozár F. 1998. Catalogue of Palaearctic Coccoidea. Budapest, Hungary: Plant Protection Institute, Hungarian Academy of Sciences.

Kozár, F., Konstantinova, G., Akman, M., Altay, K. & Kıroğlu, H. 1979. Distribution and density of scale insects (Hom.: Coccoidea) on fruit plants in Turkey in 1976. Survey of scale insect (Hom.: Coccoidea) infestations in European orchards No. II. Acta Phytopathologica Academiae Scientiarum Hungaricae, 14 (3-4): 535-542.

Neumann, G., Follett, P. A., Hollingsworth, R. G. & De Leon, J. H. 2010. High host specificity in *Encarsia diaspidicola* (Hymenoptera: Aphelinidae), a biological control candidate against the white peach scale in Hawaii. Biological Control, 54 (2): 107-113.

Park, J. D. & Kim, K. C. 1990. Host range, life cycle and natural enemies of mulberry scale (*Pseudaulacaspis pentagona*) on *Prunus mume* in southern Korea. Korean Journal of Applied Entomology, 29 (2): 104-112.

Pedata, P. A., Hunter, M. S. & Godfray, H. C. J. 1995. The population dynamics of the white peach scale and its parasitoids in a mulberry orchard in Campania, Italy. Bulletin of Entomological Research, (1995) 85: 531-539.

Rosen, D. 1990. Biological control: selected case histories. Armored scale insects. Their biology, natural enemies and control. Vol. 4B. Elsevier Asterdam, 497-505.

Soylu, O. Z. & Ürel, N. 1977. Studies on determination of parasitoids and predatory insects on citrus in South Anatolia region of Turkey. Plant Protection Bulletin, 17 (2-4): 77-104.

Şişman, S. & Ülgentürk, S. 2010. Scale insects species (Hemiptera: Coccoidea) in the Turkish Republic of Northern Cyprus. Turkish Journal of Zoology, 34 (2): 219-224.

Ülgentürk, S. & Toros, S. 1996 Ankara ili park bitkilerinde zararlı Diaspididae (Homoptera: Coccoidea) Türleri ve Konukçuları. 541-548 In: Turkiye III. Entomoloji Kongresi Bildirileri Ankara Üniversitesi Ziraat Fakültesi, Bitki Koruma Bölümü, Ankara.

Ügentürk, S. & Toros, S. 2000. Preliminary study on the parasitoids and predators of Diaspididae (Hemiptera: Coccoidea) on the park plants. Journal of Agricultural Sciences, 6 (4): 106-110.

Ülgentürk, S. & Toros, S. 2001. Parasitoids and predators of coccidae (Homoptera: Coccoidea) species on ornamental plants in Ankara, Turkey. Acta Phytopathologica et Entomologica Hungarica, 36 (3-4): 369-375.

Ülgentürk, S. & Çanakçioğlu, H. 2004. Scale insect pests on ornamental plants in urban habitats in Turkey. Journal of Pest Science, 77 (2): 79-84.

Ülgentürk, S., Ayhan, B. & Karakaya, A. 2009. Rize ili kivi bahçelerinde görülen kabuklubitler ve koşniller (Hemiptera: Coccoidea). Journal of Agricultural Faculty, 23 (1): 55-60.

Zeki, C., Ülgentürk S., Noyes, J. C. & Kaydan, M. B. 2004 Natural Enemies of Coccoidea (Hemiptera) on Orchard Trees and the Neighbouring Areas Plants in Afyon, Ankara, Burdur Isparta Provinces, Turkey. Report on ISSIS–X and related activities: 361-372.

Table 1. Host plants of white peach scale (*Pseudaulacaspis pentagona*) in Ankara Province.

District	Host plant	Location / date
Altındağ	*Cornus alba, C. alba, Fraxinus americana Forsythia intermedia, Juglans regia, Morus alba, M. nigra, Prunus avium, Sophora japonica, Syringa vulgaris*	Altın Park, 25.08.2013
	M. nigra var. *pendula*	Gençlik Park, 16.08.2014
	M. alba var. *pendula, Paulownia tomentosa*	Ankara Railway Station Garden, 16.08.2014
	M.nigra	Hasköy, 03.06.2015
	S. japonica	Aydınlık Evler, 03.06.2015
Ayaş	*M. alba*	Centrum, 12.04.2013
Beypazarı	*Ficus carica, M. alba, Salix babylonica, S. japonica*	Centrum, 21.09.2015
Cayırhan	*Paulownia tomentosa, M. alba*	Cumhuriyet Park, 21.9.2015
Çankaya	*Aesculus x carnea, Catalpa bignonioides, C. alba, F. excelsior, F. intermedia, J. regia, Koelreuteria paniculata, M. alba, M. nigra, Robinia pseudoacacia, S. japonica, Tilia tometosa*	Dikmen Park 1, 2 Etap, 27.09.2013
	M. alba	Birlik quarter, 28.09.2014
	M. alba	Oran quarter, 28.10.2014
	F. americana, S. japonica, Koelreuteria paniculata, M. nigra, Prunus persica	Kurtuluş Park, 25.09.2013
	M. alba, P. tomentosa	Tandoğan, 01.10.2013
	M. alba	Ahlâtlıbel, 28.09.2015
	M. alba	Ulus Kale, 03.08.2014
	M. alba, M. nigra	Botanik Park, 20.04.2013
	M. nigra	Seğmenler Park, 20.04.2015
	S. japonica	İncek, 20.4.2015
	M. alba, M. nigra	Hoşdere, 20.04.2015
Çubuk	*S. japonica*	Esenboğa Airport Road , 30.06.2015
Gölbaşı	*M. alba*	Centrum
	M. alba	Hacıhasan village, 17.04.2013
	F. excelsior	Eymir Forest, 13.03.2014
Keçiören	*J. regia , M. alba, M. nigra*	İncirli Basınevler Park, 12.06.2013
	C. bignonioides, C. alba, F. excelsior, F. intermedia, Hibiscus syriacus, M. alba, M. nigra	Faculty of Agriculture /Campus, 23.05.2015
	Fraxinus excelsior	Ankara University Campus
	M. alba	General Directorate of Meteorology /garden
	S. japonica	Keçiören Casino Park, 18.05.2015
	S. japonica	Sanatoryum Hastanesi Bahçesi, 06.06.2015
Mamak	*F. intermedia, M. nigra , S. japonica, S. vulgaris*	Ankara Üniversitesi Dikimevi-Campus, 25.09.2013
	R. pseudoacacia	Samsun Highway, 15.09.2014
Nallıhan	*C. bignonioides, F. intermedia, M. nigra, M. alba, Prunus persica, Vitis vinifera*	Centrum and road, 21.09.2015
Polatlı	*M. alba, R. pseudoacacia, S. japonica*	Centrum, 20.09.2014

Pursaklar	*C. bignonioides, M. alba*	Bağla quarter, 15.05.2013
Yenimahalle	*M. alba, S. japonica, S. vulgaris*	TAGEM / garden, 10.07.2013
	C. bignonioides, C. alba, F. intermedia, F. americana, M. alba, M. nigra, J. regia	Demetevler Cemre Park, 12.06.2013
	C. bignonioides, Ribes aureum	Ministry of Agriculture Logistics Facilities/ garden, 15.11.2013

Table 2. Predators of white peach scale (*Pseudaulacaspis pentagona*) in Ankara Province.

Predator	Host plant Date / location
Chilocorus bipustulatus L.	*Morus alba,* 26.08.2014, Altınpark; *M. alba* var. *pendula*, *M. alba, Morus alba,* 12.04.2013, Oran *Aesculus hippocastanum, Catalpa bignonioides, Cornus alba, Fraxinus americana, M. alba, M. alba* var. *pendula*, *Morus nigra, Robinia pseudoacacia, S. japonica,* 27.09.2015, Dikmen 1, 2 etap; *C. bignonioides, Fraxinus excelsior, M. alba, Morus nigra* var. *pendula*, 23.05.2015, Ankara University Campus, Tandoğan; *M. alba, C. bignonioides,* 17.05.2015, Faculty of Agriculture Campus; *S. japonica* 25.09.2014, Ankara University Dikimevi Campus; *C. bignonioides, F. americana, M. alba,* 10.08.2014, Cemre park; *C. bignonioides,* 15.11.2015, Campus of Agriculture, Yenimahalle
Brumus quadripustulatus L.	*M. alba,* 15.11.2015, Campus of Agriculture, Yenimahalle
Cybocephlus sp.	*M. alba,* 26.08.2014, Altınpark; *Morus alba,* 12.04.2013, Oran; *M. alba,* 12.07.2014, Seymenler park; *M. alba, S. japonica,* 23.05.2015, Ankara University Campus, Tandoğan; *Forsythia intermedia, F. excelsior,* 17.05.2015, Faculty of Agriculture Campus; *C. bignonioides, M. alba,* 21.09.2015, Centrum: *M. alba*, Cemrepark Demetevler, Ankara, 21.10.2015
Orius minutus L.	*F. excelsa,* 20.07.2015; *F. excels,* 22.09.2015; Altınpark, *M. alba, Salix babylonica,* 21.09.2015, Beypazarı
Chrysoperla pallida (Henry et al.)	*M. alba,* 21.09.2015, Botanik park

Table 3. Parazitoits of white peach scale (*Pseudaulacaspis pentagona*) in Ankara province.

Parazitoit	Host plant Location / Date
Aphytis proclia (Walker)	*M. alba*, Ayaş, 24.03.2013; *M. alba*, Ayaş, 13.05.2013; *M. alba*, Bağlar, 11.06.2013; *M.* alba, Cemrepark Demetevler, Ankara, 21.10.2015
Encarsia berlesei (Howard)	*M. alba*, Altınpark, 22.05.2013; *M. alba*, Bağlar, 20.05.2013; *M. alba*, Ayaş, 13.05.2013; *M. alba*, Botanik park, 10.05.2013; *M. alba*, Gölbaşı, 03.04.2013
Epitetracnemus comis Noyes& Ren Hui	*M. alba*, Beypazarı (centrum), 21.09.2015; *M. alba*, Cemrepark Demetevler, Ankara, 21.10.2015