

First record of the Oriental chestnut gall wasp, *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae) in Turkey

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ÖZET

Kestane gal arısının, *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae) Türkiye’de ilk kaydı

Dünyada, kestane çeşitlerinde en zararlı türlerinden biri olarak kabul edilen Kestane gal arısı, *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae), Türkiye’de ilk kez 2014 yılı nisan ayının son haftasında kaydedilmiştir. Zararlının Marmara Bölgesinde, Yalova ve Bursa illerindeki bazı kestane bahçeleri ile yaklaşık 2000 ha ormanlık alanda bulunduğu belirlenmiştir. Avrupa karantina listesinde bulunan zararlı aynı zamanda Türkiye’nin zirai karantina listesinde de yer almaktadır.

Anahtar kelimeler: Kestane gal arısı; *Dryocosmus kuriphilus*; *Castanea sativa*; Türkiye

ABSTRACT

Oriental chestnut gall wasp, *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae) considered to be one of the most harmful pests of sweet chestnut varieties in the world has been recorded at the end of week of April 2014 for the first time in Turkey. It was observed in a few chestnut groves and in some forest areas, about 2000 ha in Yalova and Bursa province of the Marmara Region, Turkey. It is on quarantine species lists in Europe as well as in Turkey.

Keywords: Oriental chestnut gall wasp, *Dryocosmus kuriphilus*, *Castanea sativa*, Turkey

INTRODUCTION

Chestnut cultivar grown in Turkey located in the Mediterranean basin is European chestnut; *Castanea sativa* Miller, as in other countries located the Mediterranean basin (Subaşı 2004). Chestnut is an important income source for forest villagers in Turkey. Annual chestnut production of Turkey is 60.000 tons in 40.000 ha area (Anonymous 2010). Turkey ranks as the third highest country after China and Republic of Korea in terms of chestnut production in the world (Anonymous

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Yazının Yayın Kuruluna Geliş Tarihi (Received):.09.07.2014

2012). Annual chestnut production of Bursa and Yalova provinces is 3.000 tons in 6.509 ha forest area (Anonymous 2012)

Chestnut tortrix, *Cydia splendana* (Hübner) (Lepidoptera: Tortricidae) and Chestnut weevil *Curculio elephas* (Gyllenhal) (Coleoptera: Curculionidae) are known as the most important pests of chestnut in Turkey up to present (Coskuncu and Mert 2011). *Dryocosmuskuriphilus* is considered to be one of the most important pests of the genus *Castanea* in the countries which were grown chestnut in the world and is classified by the European and Mediterranean Plant Protection Organization as a quarantine organism (Anonymous 2005). Its main hosts are Japanese chestnut, *Castanea crenata*, European chestnut, *Castanea sativum*, Chinese chestnut, *Castaneacollisima* and American chestnut, *Castanea detata* (Anonymous 2005). It is a pest of Chinese origin and introduced in Japan, Korea and the United States accidentally. It has been widespread at short time within those countries (Rieske 2007). More recently this pest was detected in Europe: firstly in Italy in 2002 (Brussino et al. 2002) and three years later in Slovenia (Seljak 2006) and France (Anonymous 2007). Chestnut gall wasp is also known as a threat in chestnut grown in Turkey and as a quarantine pest. In fact, papers related to it have been published by Coşkuncu (2010) and Anagnostakis et al. (2014). They are reported that *D.kuriphilus* has not presented in Turkey yet.

MATERIAL AND METHOD

A regional survey was carried out to determine the distribution of *D.kuriphilus*, in chestnut groves and in some forest areas of Yalova province of the Marmara Region from 28 April 2014 to 16 May 2014. Chestnut production areas of the Gacık village were considered as base because *D.kuriphilus* was determined for first time there. The study was started in four different directions of the Gacık village and it was continued until the free-areas from *D.kuriphilus*. Pictures in studies were taken with Olympus trademark the stereoscopic binocular microscope in laboratory and with Samsung GT- S7562 photo machine in chestnut production areas

In survey conducted for determination of areas infested by this pest, a total of 100 trees from different sites of every village were examined randomly. Coordinates and altitudes of chestnut production areas belong to villages were obtained with handheld GPS (Magellan SporTrak).

When the presence of this pest was detected in Gacık village of Çiftlikköy District of Yalova province, plant leaves and buds were brought to the laboratory. Larvae and pupae were taken out by dissecting galls, and adults were reared from galls having pupae and larvae found in the buds and leaves under laboratory conditions. For the identification of *D.kuriphilus* was referred to Anonymous (2005) which includes detailed descriptions of larvae, pupae, adult stages, and the characteristic galls induced by the feeding larvae on chestnut leaves. Identification studies were

with Olympus trademark the stereoscopic binocular microscope. This identification was confirmed by Prof. Dr. Juli Pujade-Villar, specialist on Cynipidae, (Universitat de Barcelona, Facultat de Biologia Departament de Biologia Animal, Barcelona, Spain).

RESULTS AND DISCUSSION

In study, surveys were conducted all 20 villages. All villages except 4 villages where were localized on the outermost part of survey area were determined with infested by this pest. Survey results related to *D.kuriphilus*, the most dangerous pest on European chestnut, *Castanea sativum* in provinces of Yalova and Bursa in Turkey were given in Figure 1 and Table 1.

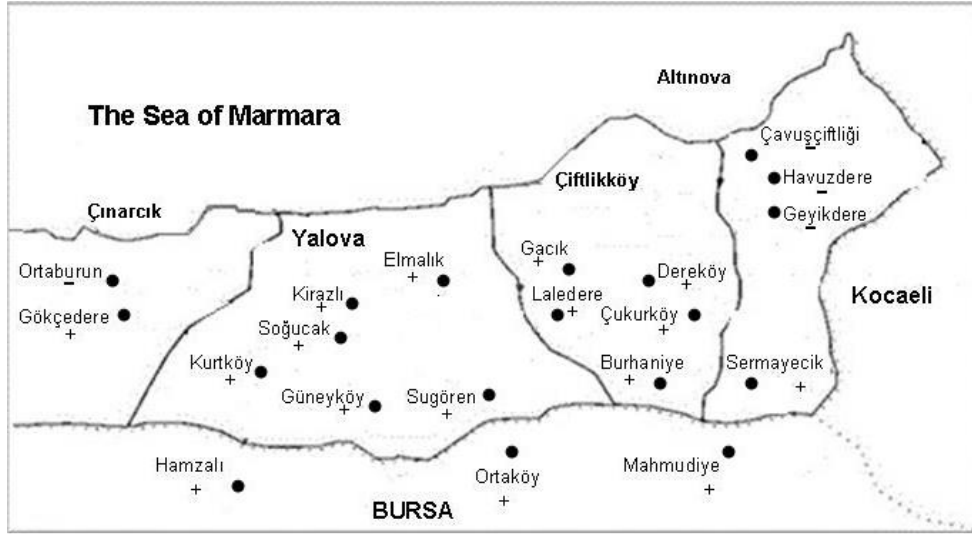


Figure 1. Villages infested (+) and not infested (-) with *Dryocosmus kuriphilus* in Yalova and Bursa provinces of Turkey

According to survey results in Table 1 and Figure 1, all of the examined chestnut trees in the chestnut production areas in Gacık, Laledere, Elmalık villages and forest areas around them were infested as 100% with *D.kuriphilus*, also the ratio of infested chestnut trees within the examined chestnut trees in the chestnut production areas in other 13 villages were varied between 30 and 80%.

Table 1. Survey results related to *Dryocosmuskuriphilus* in Yalova and Bursa provinces of Turkey in 2014

Date	Village/ District/ Province	Coordinates	Altitudes (m)	Infestation for 100 trees (%)
28.04.2014	Gacık/Çiftlikköy/Yalova	40°36'35.83"N 29°20'28.78"E	150	100
29.04.2014	Laledere/Çiftlikköy/Yalova	40°36'16.58"N 29°22'01.75"E	220	100
30.04.2014	Çukurköy/Çiftlikköy/Yalova	40°36'9.37"N 29°24'59.94"E	100	80
01.05.2014	Sugören/Çiftlikköy/Yalova	40°33'36.64"N 29°19'35.36"E	428	70
02.05.2014	Dereköy/Çiftlikköy/Yalova	40°36'26.72"N 29°23'24.46"E	129	70
03.05.2014	Burhaniye/Çiftlikköy/Yalova	40°34'10.98"N 29°24'06.82"E	336	60
04.05.2014	Kirazlı/Central/Yalova 7	40°36'53.84"N, 29°17'19.74"E	125	30
05.05.2014	Elmalık/Central/Yalova	40°36'42.60"N 29°18'33.49"E	105	100
06.05.2014	Kurtköy/Central/Yalova	40°34'38.24"N 29°13'31.35"E	165	70
07.05.2014	Soğucak/Central/Yalova 10	40°35'47.26"N 29°16'25.28"E	175	60
08.05.2014	Güneyköy/Central/Yalova	40°33'17.22"N 29°16'47.18"E	270	60
09.05.2014	Sermayecik/Altınova/Yalova	40°33'43.35"N 29°26'35.55"E	470	80
10.05.2014	Havuzdere/Altınova/Yalova	40°37'07.61"N 29°8'57.94"E	100	0
11.05.2014	Çavuşçiftliği/Altınova/Yalova	40°41'15.45"N 29°28'28.40"E	135	0
11.05.2014	Geyikdere/Altınova/Yalova	40°40'28.00"N 29°26'49.02"E	253	0
12.05.2014	Gökçedere/Termal/Yalova 16	40°36'28.16"N 29°10'10.21"E	453	30
13.05.2014	Ortaburun/Termal/Yalova	40°37'07.61"N 29°08'57.94"E	150	0
14.05.2014	Hamzalı/Orhangazi/Bursa	40°31'27.17"N 29°15'46.07"E	348	60
15.05.2014	Mahmudiye/Orhangazi/Bursa	40°33'05.64"N 29°27'56.59"E	600	70
16.05.2014	Ortaköy/Orhangazi/Bursa	40°33'9.39"N 29°20'16.85"E	359	70

The chestnut production areas of Geyikdere and Havuzdere Çavuşçiftliği villages in Easternmost and Ortaburun village in the westernmost of Yalova province were not infested. The Northernmost of Yalova province and Southernmost of Bursa province were not suitable geographically for the cultivation of chestnuts. Total

infested area was about 2000 ha. It is about equal to half of the chestnut production area in Yalova. Meanwhile, introduction to Turkey of *D.kuriphilus* was investigated by researching team in this study but they have not been reached any definite evidence. So, they have been considering with infested plant material used for propagating purposes, transporting by men accidentally. Also, in surveys, galls induced by this pest that were 10-20 mm in diameter, red and green in colors on all buds and branches of chestnut trees examined in these villages and forest areas were found intensively (Figure 2). Galls were in rose color generally but some galls on the tip and medium of the leaf veins were in green color (Figure 3).



Figure 2. Galls in rose color induced by *Dryocosmuskuriphilus*.



Figure 3. Galls in green color induced by *Dryocosmuskuriphilus*.

Every gall had 3-4 larvae, about 2 mm in length, milky white in color (Figure 4). Adults reared under laboratory conditions were about 2-3 mm in length, the black colored body and color of their legs, antennae, mandibles and scapus, pedicel portions were yellowish brown (Figure 5). Adults' emergency under laboratory conditions were started on 28 May 2014 and then continued until 23 June 2014 gradually.



Figure 4. Larvae of *Dryocosmuskuriphilus*.



Figure 5. Female adult of *Dryocosmus kuriphilus*

Oriental chestnut gall wasp is univoltine and thelytokous (Moriya et al. 2003). The females appear in early summer and they lay eggs inside buds. Early instar larvae overwinter inside chestnut buds until the following season. It is difficult to detect early instar larvae inside buds by simple external plant inspection (Anonymous

2005). This biological evidences demonstrates that *D.kuriphilus* has presented in the detected area earlier than 28 April 2014 when pest was found for first time. Besides; this hypothesis has been supported that the older galls observed on chestnut tree during surveys (Figure 6).



Figure 6. The older galls on a chestnut tree in Yalova.

CONCLUSION

For restricting the dispersal of *D.kuriphilus*, it has been started to its controlling in accordance with Regulation Oriental chestnut gall wasp prepared in parallel to Commission Decision the numbered 2006/464/EC and on 27 June 2006 of the European Union. Turkey quarantine procedures could play an important role in preventing the spread of it from infested areas to non-infested areas through human activities. Also, control measuring should be conducted to keep at a low level the gall wasp populations in infested areas in province of Yalova. Additionally, biological control studies were reported the most effective method in the control of it (Moriya et al. 2003, Quaccia et al. 2008). Local parasitoid and predatory insects should be investigated and the introduction and utilization of biological control agents that were known as successful as a possible strategy to control should be conducted.

ACKNOWLEDGMENTS

I am grateful to Prof. Dr. Juli Pujade-Villar (Universitat de Barcelona, Facultat de Biologia Departament de Biologia Animal, Barcelona, Spain) for his valuable help in identifying.

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