Mustafa Kemal Üniversitesi Tarım Bilimleri Dergisi 25 (2):237-242, 2020
(*Mustafa Kemal University Journal of Agricultural Sciences* 25 (2):237-242, 2020)
e-ISSN: 2667-7733
http://dergipark.org.tr/mkutbd

ARAŞTIRMA MAKALESİ **RESEARCH ARTICLE**

Determination of population density and infestation rates of peach twig borer, *Anarsia lineatella* Zeller (Lepidoptera: Gelechiidae) on early apricot orchards in Mersin province

Mersin ili erkenci kayısı bahçelerinde Şeftali güvesi, *Anarsia lineatella* Zeller (Lepidoptera: Gelechiidae)'nin popülasyon yoğunluğu ve bulaşıklık oranının belirlenmesi

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MAKALE BİLGİSİ / ARTICLE INFO

Makale tarihçesi / Article history:
DOI: 10.37908/mkutbd.729967
Geliş tarihi /Received:04.05.2020
Kabul tarihi/Accepted:11.06.2020

Keywords:
Peach twig borer, *Anarsia lineatella*, pheromone traps, infestation rates, Mersin province.

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Ö Z E T / A B S T R A C T

Aims: Peach twig borer (PTB), *Anarsia lineatella* Zeller (Lepidoptera: Gelechiidae), is one of the important pests of apricot in Turkey. The study was conducted in 2013-2014 to determine the population density and infestation rates of PTB on early apricot orchards in Anamur district of Mersin province in Turkey.

Methods and Results: The study was conducted in five early apricot orchards of the villages Kalınören (Trintina), Ören (Trintina), Cerenler I (Nimfa), Cerenler II (Trintina) and İskele (Trintina) of Anamur district. The peach twig borer of pheromone (E-5 Decenyl acetate 5,0 mg/capsul E5 Decenol 1,0 mg/capsul) was used in Econex polillero trap + DDVP impregnated tablet. Each of sampled orchard contained one pheromone trap. The traps were hanged at South-East direction of the trees about 1.5-2 m above ground, checked weekly and the caught adults were counted and cleaned.. Randomly chosen 20 trees' twigs (20/tree) and fruits (50/tree) were checked, apart from the trap hanging trees, in order to determine the infestation rates. After two years of the study, the population density of pest varied between each sampling year. In the first year, a total of 46 PTB adults were caught by five pheromone traps at five early apricot orchards. The first adults were caught on 14 April, and the highest number of catches was on 12 May. The highest number of PTB adults was in May with 67.4%, followed by April with 32.6%. In the second year, a total of 66 PTB adults were caught by five pheromone traps at five early apricot orchards. The first adults were caught on 13 April, and the highest number of catches was on 11 May. The highest number of PTB adults was in May with 68.2%, followed by in April with 31.8%. It was observed that PTB had one generation and the pest did not cause any significant infestation on early apricot varieties.

Conclusions: The highest number of the PTB adults were caught by pheromone traps in May, following in April in both years. The pest had one genaration and not cause any significant infestation on early apricot varieties.

Significance and Impact of the Study: The pests were recoved by pheromone traps at all early apricot orchards and the highest number of adults caught in May, following in April. The pest had one genaration and not cause any significant infestation on early apricot varieties.

Atıf / Citation: Seferoğlu İA, Demirel N (2020) Mersin ili erkenci kayısı bahçelerinde Şeftali güvesi, *Anarsia lineatella* Zeller (Lepidoptera: Gelechiidae)'nin popülasyon yoğunluğu ve bulaşıklık oranının belirlenmesi. *MKU. Tar. Bil. Derg.* 25(2) : 237-242. DOI: 10.37908/mkutbd.729967

INTRODUCTION

Apricot, *Prunus armeniaca* L. (Rosales: Rosaceae: Prunoideae), is one of the most important stone fruits, a total produce of 4,257,241 tons of fruit per annum in the world, about 985,000 tons of this amount is produced by Turkey (FAO, 2018). Apricot has many economically important pests that cause significant yield reduction. The peach twig borer [PTB], *Anarsia lineatella* Zell. (Lepidoptera: Gelechiidae), is important pests of apricot, peach, almond, plum and nectarine worldwide (Balachowsky, 1966; Carter, 1984), causes serious problems in more than 44 countries (EPPO, 2019). The pest is one of the important pests of apricot in Turkey (Kovancı and Kılınçer, 1984; Hazır and Ulusoy, 2009; Oztürk et al., 2010; Mamay et al., 2014; Can Cengiz and Subchev, 2015; Seferoğlu, 2016). Larvae of the overwintering generations of the pest first attack flowers and buds (Bailey 1948; Carter, 1984). Subsequent generations of larvae feed on shoots and developing fruits, rendering fruit unmarketable and shoots incapable of bearing future fruit (Bailey 1948; Carter, 1984; Kovancı and Kilincer, 1984; Ponomarenko 1990; Cravedi, 2000; Tomse et al., 2004). Many studies have been conducted to study peach twig borer host range, damage and management (Damos and Savopoulou-Soultani, 2007; Iacob, 1970; Zalom et al., 1992). In Turkey, faunistics, population dynamics and management of peach twig borer have been studied by many researchers (Gençsoylu et al., 2006; Hazır and Ulusoy, 2009; Oztürk et al., 2010). The female sex pheromones could provide a reliable tool for detecting and monitoring of peach twig borer moth adult. The female sex pheromone components of *A. lineatella* was identified by Roelofs et al. (1975) as (*E*)-5-decen-1-yl acetate (*E*5-10:OAc; 87%) and (*E*)-5-decen-1-ol (*E*5-10:OH; 13%) and it has since been used widely as a monitoring tool. Subsequently, the sex pheromone of this pest is widely used to provide a detecting and monitoring tool for adult males (Rice and Jones, 1975; Hathaway, 1981; Millar and Rice, 1992; Kehat et al., 1994; Kocourek and Berankova, 1996; Schlamp et al., 2005; Ivanova et al., 2010; Knight et al., 2011), for mating disruption (Kyparissoudas, 1989; Oztürk et al., 2010; Reuveny et al., 2010; Kutinkova et al., 2012). The current study was to determine the population density and infestation rates of peach twig borer, *Anarsia lineatella* Zeller (Lepidoptera: Gelechiidae) on early apricot orchards in Mersin province of Turkey.

MATERIALS and METHODS

The study was conducted in 2013-2014 to determine the population density and infestation rates of PTB in Anamur district of Mersin province in Turkey. The study was conducted in five early apricot orchards of the villages Kalınören (Trintina), Ören (Trintina), Cerenler I (Nimfa), Cerenler II (Trintina) and İskele (Trintina) of Anamur district. The peach twig borer of pheromone (E-5 Decenyl acetate 5,0 mg/capsul E5 Decenol 1,0 mg/capsul) was used in Econex polillero trap + DDVP impregnated tablet. Each of sampled orchard contained one pheromone trap. The traps were hanged at South-East direction of the trees about 1.5-2 m above ground, checked weekly and the caught adults were counted and cleaned. Pheromones in the traps replaced in every 40 days with the new ones. Randomly chosen 20 trees' twigs (20/tree) and fruits (50/tree) were checked, apart from the trap hanging trees, in order to determine the infestation rates.

RESULTS and DISCUSSION

The peach twig borer [PTB] were caught by pheromone traps in all sampled orchards. A total of 46 PTB adults were caught by five pheromone traps in 2013. The first adults were caught on 14 April, and the highest number of catches was on 12 May (Figure 1). There was not any PTB adult after 26 May in any of the sampled orchards. The highest number of PTB adults was in May with 67.4%, followed by in April with 32.6%.

The pests were caught by five pheromone traps in all sampled orchards. A total of 66 PTB adults were caught by five pheromone traps in 2014. The first adults were caught on 13 April, and the highest number of catches was on 11 May (Figure 2). There was not any PTB adult after 25 May in any of the sampled orchards. The highest number of PTB adults was in May with 68.2%, followed by in April with 31.8%.

Ivanova et al. (2010) reported that the first adult of PTB appeared in May and the first peak of PTB flight was noted in 3rd ten days of May in all three years of study. Therefore, the PTB had three generations per year in Bulgaria.

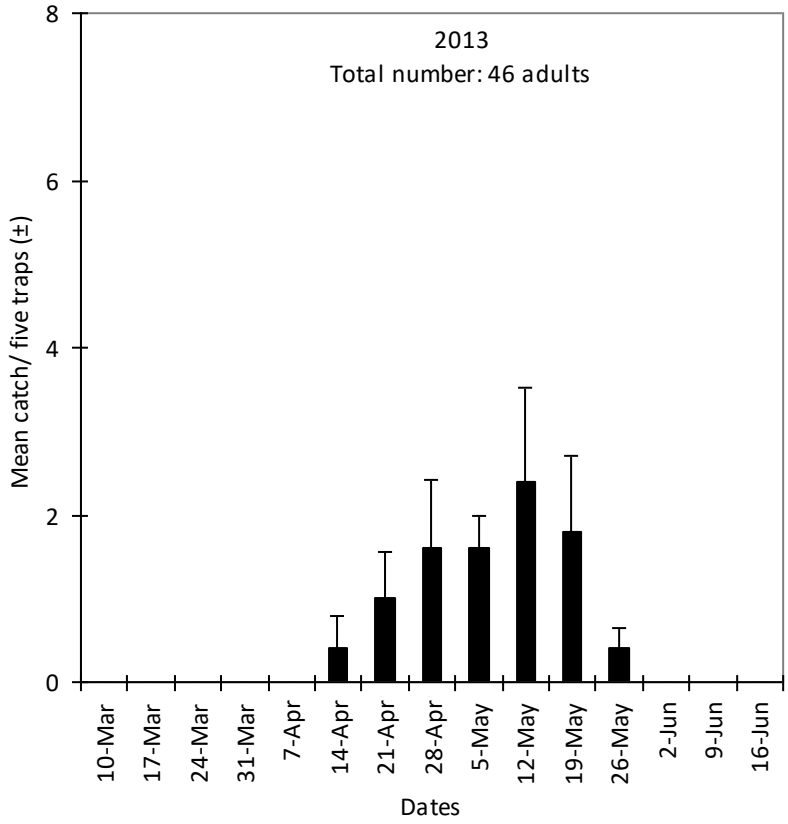

Figure 1. A population density of peach twig borer on early apricot orchards in Anamur district of Mersin province

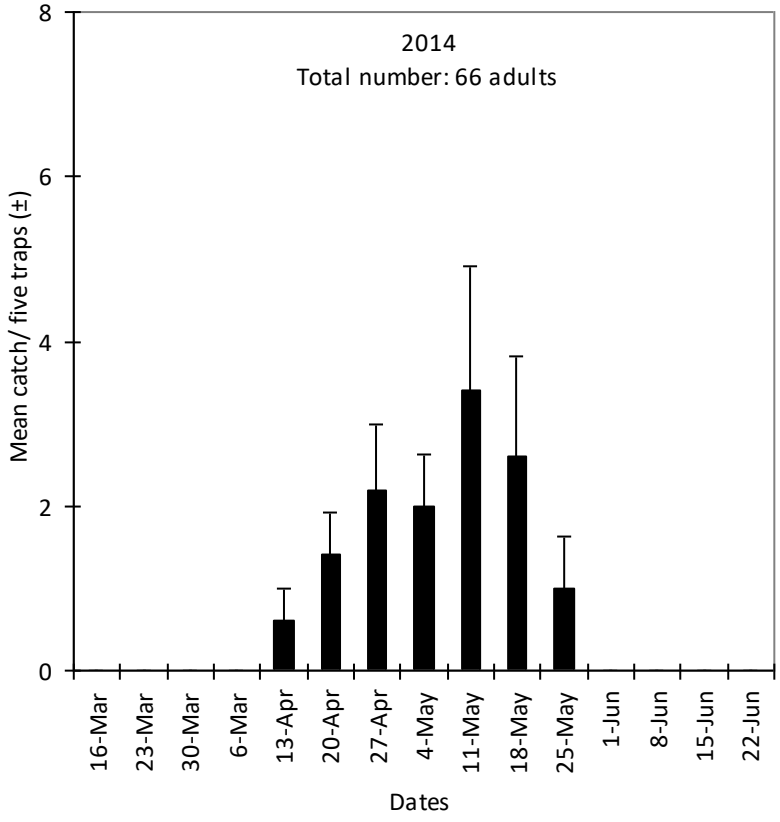

Figure 2. A population density of peach twig borer on early apricot orchards in Anamur district of Mersin province

Mamay et al. (2014) reported that the first adult of PTB were captured by pheromone trap in early May and the highest numbers of adults caught by them in peach, apricot and nectarine orchards were 115,86 and 70 adults/trap.

The current study indicated that the PTB had one generation on early apricot orchards in Anamur district of Mersin province. Mamay et al. (2014) reported that the PTB had four generations per year on peach, apricot and nectarine orchards. In addition, Can Cengiz and Subchev (2015) reported that the PTB had three generations per year in Hatay province.

The present study indicated that the PTB did not cause any significant infestation on early apricot orchards in Anamur district of Mersin province. However, previous studies were conducted by Ozturk et al. (2010) an average infestation rates with mating disruption techniques were 6.17- 4.60 % in 2006, 5.51-1.92 % in 2007 and 4.26-1.66 % in 2008. Moreover, Mamay et al. (2014) reported that the PTB infestation rates on twigs were 38, 18 and 16% in 2010 and 30, 22 and 14% in 2011, while infestation rates on fruits were 29, 6 and 6% in 2010 and 14, 8 and 5% in 2011 on peach, nectarine and apricot.

CONCLUSIONS

The present study was conducted to determine population density and infestation rates of peach twig borer, *Anarsia lineatella* Zeller (Lepidoptera: Gelechiidae) on early apricot orchards in Mersin province of Turkey. After two years of the study, the population density of pest varied between each sampling year. In the first year, a total of 46 PTB adults were caught by five pheromone traps at five sampled ochards. The first adults were caught on 14 April, and the highest number of catches was on 12 May. The highest number of PTB adults was in May with 67.4%, followed by in April with 32.6%. In the second year, a total of 66 PTB adults were caught by five pheromone traps at five sampled orchards. The first adults were caught on 13 April, and the highest number of catches was on 11 May. The highest number of PTB adults was in May with 68.2%, followed by in April with 31.8%. The PTB had one generation and the pest did not cause any significant infestation on early apricot varieties in Mersin province.

ÖZET

Amaç: Şeftali güvesi, *Anarsia lineatella* (Lepidoptera: Gelechiidae), ülkemizde kayısının en önemli zararlılarından birisidir. Çalışma 2013-2014 yıllarında Mersin ilinin Anamur ilçesinde bulunan erkenci kayısı bahçelerinde şeftali güvesi'nin popülasyon yoğunluğu ve bulaşıklık oranlarının belirlenmesi amacıyla yapılmıştır.

Yöntem ve Bulgular: Çalışma Anamur'un Kalınören (Trintina), Ören (Trintina), Cerenler I (Nimfa), Cerenler II (Trintina) ve İskele (Trintina) köylerinde bulunan beş erkenci kayısı bahçelerinde yürütülmüştür. Çalışmada şeftali güvesi feromonu (E-5 Decenyl acetate 5,0 mg/kapsül E5 Decenol 1,0 mg/kapsül) ve Econex polillero tuzak + DDVP emdirilmiş tablet kullanılmıştır. Örnekleme yapılan her bahçede bir adet tuzak mevcuttur. Tuzaklar kayısı ağacının güney doğu tarafına yerden yaklaşık 1.5-2m yüksekliğe asılmış, haftalık olarak kontrol edilmiş, yakalanan şeftali güvesi erginleri sayılıp temizlenmiştir. Tuzaklardaki feromonlar her 40 günde bir yenileri ile değiştirilmiştir. Şeftali güvesinin bulaşıklık oranı feromon tuzaklarının kurulduğu kayısı ağacı hariç, rastgele seçilen 20 adet kayısı ağacının sürgün (20/ağaç) ve meyveleri (50/ağaç) kontrol edilerek yapılmıştır. İki yıllık çalışmanın sonrasında, zararlının popülasyon yoğunluğunda farklılıklar gözlenmiştir. Birinci yılda, beş erkenci kayısı bahçesinde yapılan örneklemede beş feromon tuzakları tarafından toplam 46 adet şeftali güvesi ergini yakalanmıştır. Feromon tuzakları tarafından ilk erginler 14 Nisan'da yakalanmış ve en fazla ergin 12 Mayıs tarihinde yakalanmıştır. Ancak örneklenen bahçelerde 26 Mayıs'dan sonraki tarihlerde şeftali güvesi ergini yakalanmamıştır. Feromon tuzakları tarafından en fazla şeftali güvesi ergini %67,4 ile mayıs ayında yakalanmış olup, bunu %32,6 ile nisan ayı takip etmiştir. İkinci yılda, beş erkenci kayısı bahçesinde yapılan örneklemede beş feromon tuzakları tarafından 66 adet şeftali güvesi ergini yakalanmıştır. Feromon tuzakları tarafından ilk erginler 13 Nisan'da ve en fazla ergin 11 Mayıs tarihinde yakalanmıştır. Örneklenen bahçelerde 25 Mayıs'dan itibaren şeftali güvesi erginine rastlanmamıştır. Çalışma süresince feromon tuzakları tarafından en fazla şeftali güvesi ergini %68,2 ile mayıs ayında yakalanmış olup, bunu %31,8 ile nisan ayı takip etmiştir. Çalışmada şeftali güvesi erkenci kayısı bahçelerinde 1 döl verdiği ve zararlının erkenci kayısı çeşitlerinde her hangi bir zarar oluşturmadığı gözlenmiştir.

Genel Yorum: Şeftali güvesi feromon tuzakları tarafından bütün erkenci kayısı bahçelerinde tespit edilmiştir. Iki yıl boyunca feromon tuzakları tarafından en fazla sayıda şeftali güvesi ergini Mayıs ve Nisan aylarında yakalanmıştır. Zararlı tek döl vermiş ve erkenci kayısı bahçelerinde herhangi bir zarar oluşturmamıştır.

Çalışmanın Önemi ve Etkisi: Şeftali güvesi feromon tuzakları tarafından bütün erkenci kayısı bahçelerinde tespit edilmiştir. Feromon tuzakları tarafından en fazla

sayıda şeftali güvesi ergini Mayıs ayında yakalanmış, bunu Nisan ayı takip etmiştir. Zararlı tek döl vermiş ve erkenci kayısı bahçelerinde herhangi bir zarar oluşturmamıştır.

Anahtar Kelimeler: Şeftali güvesi, *Anarsia lineatella*, Feromon tuzakları, Bulaşıklık oranı, Mersin.

ACKNOWLEDGEMENTS

This project was supported by University of Hatay Mustafa Kemal of Scientific Research Projects (BAP) (Project number: 12181).

CONFLICT OF INTEREST

The authors declare no conflict of interest for this study.

AUTHOR'S CONTRIBUTIONS

The contribution of the authors is equal.

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