Türk. entomol. derg., 1994, **18** (2) : 71-76
ISSN 1010-6960

Some observations on dominant structure and population changes of *Asymmetrasca decedens* (Paoli) and *Empoasca decipiens* Paoli (Hom.,Cicadellidae) on different crops in Adana

Hüseyin BAŞPINAR*

Summary

The dominant structure and population changes of ***Asymmetrasca decedens*** (Paoli) and ***Empoasca decipiens*** Paoli on different crop plants in Adana in 1988 to 1991.

E. decipiens was dominant on eggplant, sesame, and tomato. Of the overall average, 76 % was ***E. decipiens*** while only 24 % ***A. decedens***. ***A. decedens*** was the common species on citrus, cotton, and maize averaging about 83 % of the population.

The population of ***A. decedens /E. decipiens*** on maize (both early and second crop) and cotton increased to peak in July 1989. Similar results occured in 1990, however the maximum population density on spring maize was observed early in May.

The population of ***A. decedens /E. decipiens*** on citrus started to increase in September 1988 to 1989, respectively. Within a short period the leafhoppers built up their populations very rapidly till November.

It was observed that ***A. decedens /E. decipiens*** population peaked on weeds at the same time as on citrus during autumn and winter not only in orchards, but also in non-cultivated areas, indicating that the citrus was not the main target plant. To overcome this important pest problem on citrus, the hibernation behavior, especially the dispersal and the movement between weeds and trees have to be studied.

---

* Çukurova Üniversitesi, Ziraat Fakültesi, Bitki Koruma Bölümü, 01330 Adana, Türkiye
Alınış (Received) : 9.4.1993

Introduction

One of the most abundant and widespread leafhopper subfamilies (Homoptera: Cicadellidae) is Thyphlocybinae, of which ***Asymmetrasca decedens*** (Paoli) and ***Empoasca decipiens*** Paoli are by far the most common species, causing substantiable damage in several crop plants in Turkey (Bozkurt, 1970; Lodos, 1986). The damage consists directly by sucking, leading in decline of vigor and vitality of infested plants. In recent years, a serious damage caused by ***A. decedens*** was observed on citrus in the Çukurova region. Adults fed on the maturing citrus fruits by puncturing the rind cells, causing yellowish to brown, rounding scars, and reducing the marketability of fruits (Başpınar and Uygun, 1992). A similar damage, caused by ***E. fabae*** (Harris) was already observed in California, and was reported to be of minor economic relevance (Anonymous, 1984).

A. decedens and ***E. decipiens*** are morphologically indistinguishable from each other, unless male genitalia are prepared. Because of this difficulty, both leafhoppers are repeatedly handled as a complex and are often referred as ***Empoasca*** spp. in literature. But, it is most likely that both species, belonging even to different genera, show significant differences in habitat and host plant preferences as well as in biology and pest status. To develop control measures against these pests, the knowledge of field ecology and dominance structure on different host plants is evident.

The purpose of this research was to study the dominant structure and population changes of ***A. decedens*** and ***E.decipiens*** on different crop plants in Adana in 1988 to 1991.

Material and Method

The population changes of ***A. decedens*** and ***E. decipiens*** were monitored on citrus in 1988 to 1990, and in maize and cotton fields in 1989 to 1990, and on eggplant, sesame, and tomato in 1991. The samplings were done twice a month by a vacuum sampler (D-Vac), and standardized by sucking a single plant for 3 seconds, replicated 100 times for all field crops. In citrus, the collections were done for a total of 100 s changing collection site every 3 s, and on at least 10 trees. The number of each samples were averaged monthly. All field collected materials were killed by mean of freeze shock at -25°C for several hours. After separating ***A. decedens*** and ***E. decipiens*** from all other leafhoppers by sight determination, the number of males were counted for each species. For the reason that ***A. decedens*** and ***E. decipiens*** are indistinguishable with regard to external characters, up to 100 male genitalia were prepared per date for species identification according to Oman (1949). Corresponding to these results the proportion of both species of each sample was estimated.

Results and Discussion

A. decedens and ***E. decipiens*** preferred different crops as food and/or host plants. As shown in Table 1, ***E. decipiens*** was dominant on eggplant, sesame, and

tomato. Of the overall average, 76 % was ***E.decipiens*** while only 24 % was ***A.decedens***. The abundance of both species never exceeded 150 individuals in a standardized D-vac collection.

A.decedens was the common species on citrus, cotton, and maize averaging about 83 % of the population. ***E.decipiens*** was of minor importance (Table 1).

Table 1. Dominant sturucture of ***Asymmetrasca decedens*** and ***Empoasca decipiens*** on six different crop plants in Adana in 1988 to 1991

Plants	Dominance structure (%) on different hosts	
	A. decedens	***E. decipiens***
Eggplant	25	75
Sesame	14	86
Tomato	33	67
Average	**24**	**76**
Citrus	89	11
Cotton	93	17
Maize	67	33
Average	**83**	**17**

For the reason that citrus and cotton are by far the most valuable export products of the Çukurova and maize revealed increasing importance during the last few years, the population dynamic of ***A.decedens*** together with ***E.decipiens*** is presented in detail (Fig. 1 & 2).

On maize (both early and second crop) and cotton, the leafhopper population increased to peak in July with an average of 39 individuals on maize and as much as 1010 individuals on cotton in a standardized D-Vac collection in 1989. Similar results occurred in 1990, however the maximum population density on spring maize was observed early in May. On cotton a maximum number of 1500 individuals were sampled by D-vac in July. Following these peaks, the ***A.decedens /E.decipiens*** population decreased dramatically to very low levels within one or two months on both crops and in both years (Fig. 1).

The population of ***A.decedens /E.decipiens*** on citrus started to increase in September 1988 and October 1989, respectively. Within a short period the leafhoppers built up their populations very rapidly till November, averaging 550 and 200 individuals in 1988 and 1989, respectively. Populations remained on higher level till January in both years. Later the number of ***A.decedens /E.decipiens*** dropped to almost zero level for the rest of the year. During the samplings only very few ***A.decedens /E.decipiens*** nymphs were noticed, either in the D-vac samples or by visual observations on citrus trees. This strongly indicated that the high leafhopper population was not a result of multiplication on citrus, but most likely attributable to migration from the summer hosts into the citrus orchards.

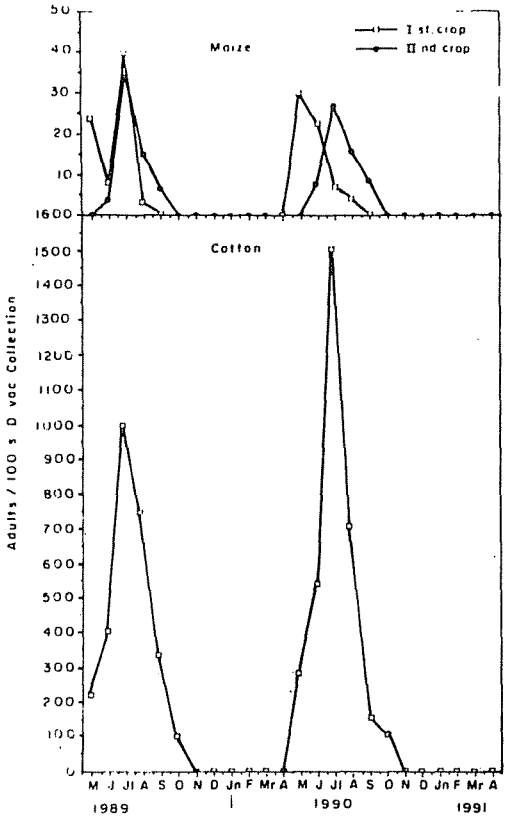

Fig 1. Population changes of ***Asymmetrasca decedens Empoasca decipiens*** on maize (early and second crop) and cotton in Adana in 1989 to 1990.

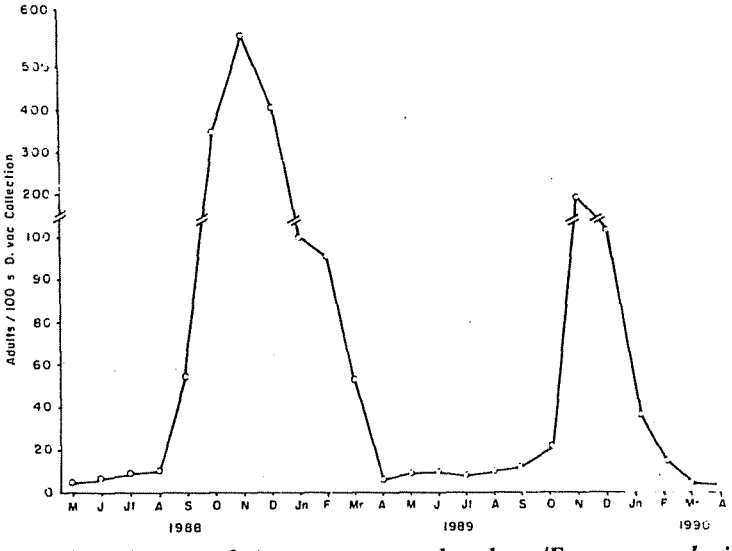

Fig 2. Population changes of ***Asymmetrasca decedens /Empoasca decipiens*** on citrus in Adana in 1988 to 1990.

On the other hand the abundance of *A. decedens /E. decipiens* on its summer crops was not strongly related to the abundance on citrus during fall/winter, since the population peak of leafhoppers on citrus occured four months later following the peak on the summer crops, and no numerical relationship between the abundance on cotton or maize and citrus was detected. However, the citrus population will be aided by the summer crop population. *A. decedens* is produced on good hosts like cotton or maize, which provide a large amount of biomass for oviposition and feeding. Assisted by the excessive use of pesticides destroying natural enemy complexes, the leafhopper populations frequently build up to monumental proportions during summer. When these crops are terminated, large number of leafhoppers will migrate to other hosts, especially to winter weeds and ever-green crops.

It was observed that *A. decedens /E. decipiens* population peaked on weeds at the same time as on citrus during autumn and winter, not only in orchards but also in non-cultivated areas (Kersting 1990; Başpınar and Uygun, 1992). Thus it is most likely that the leafhopper did not migrate only to citrus particularly, but to weeds also. From these weeds *A. decedens* might move to citrus and vice versa. According to studies in California, *E. fabae* migrated from cotton and tomato to citrus orchards in autumn to hibernate in the shelter of the trees, while feeding may also occur on weed plants within the orchard (Anonymous, 1984).

To overcome this important pest problem on citrus, the hibernation behavior, especially the dispersal and the movement between weeds and trees have to be studied in detail. Furthermore, it is essential to learn whether citrus is a preferred tree-host for hibernating of *A. decedens /E. decipiens* or whether the leafhopper is just a "tourist" on this crop. More extensive studies on the relationship of *A.decedens /E.decipiens* and its winter hosts should be conducted to develop adequate control measures.

Acknowledgements

The author wish to thank Prof. Dr. Erdal Şekeroğlu and Dr. Ulrich Kersting for going through the manuscript and offering constructive critisizm.

Özet

Adana' da farklı kültür bitkilerinde *Asymmetrasca decedens* (Paoli) ve *Empoasca decipiens* Paoli (Hom., Cicadellidae) populasyonlarının birbirlerine oranı ve populasyon dalgalanmaları üzerinde bazı çalışmalar

Bu çalışmada *Asymmetrasca decedens* (Paoli) ve *Empoasca decipiens* Paoli' in Adana' da farklı kültür bitkileri üzerindeki populasyon dalgalanmaları ve bu iki türden hangisinin daha yoğun olarak bulunduğu 1988-1991 yılları arasında incelenmiştir.

E. decipiens patlıcan, susam ve domates üzerinde daha yoğun olarak bulunmuştur. Toplam populasyonların ortalaması hesaplandığında söz konusu bu bitkiler

üzerinde *E. decipiens* oranı % 76 olurken *A. decedens* % 24 olmuştur. Buna karşın *A. decedens* turunçgil, pamuk ve mısırda *E. decipiens*'e göre daha yaygın olarak bulunmuş ve ortalama % 83 oranında saptanmıştır.

A. decedens /E. decipiens populasyonları mısır (birinci ve ikinci ürün) ve pamukda Temmuz 1989' da tepe noktası oluşturmuştur. Benzer sonuçlar 1990 yılında da elde edilmiş, ancak sadece birinci ürün mısırda populasyon mayıs ayında en yüksek düzeye ulaşarak bir önceki yıla göre farklılık oluşturmuştur.

Turunçgillerde *A. decedens /E. decipiens* populasyonu hem 1988 ve hem de 1989 yıllarında eylül ayında artmaya başlamış, kısa bir süre içerisinde de hızla yükselerek kasım ayında tepe noktası oluşturmuştur.

A. decedens /E. decipiens populasyonunun sonbahar ve kış aylarında sadece turunçgil ve bahçe içerisindeki yabancı otlarda değil, aynı zamanda tarım dışı alanlardaki otlarda da yükseldiği bilinmektedir. Özellikle turunçgillerde zararlı olan bu cicadellid'lere karşı etkili savaşım yöntemlerinin geliştirilebilmesi için bunların kışlama davranışları, ayrıca yayılışları ve yabancı otlar ile turunçgil bahçeleri arasındaki populasyon hareketleri ayrıntılı bir şekilde incelenmelidir.

References

Anonymous, 1984. Integrated pest management for citrus. University of california, Statewide integrated pest management project, Division of Agriculture and Natural Resources, publication no:3303, 144 p.

Başpınar, H. and N. Uygun, 1992. Doğu Akdeniz Bölgesi turunçgil bahçelerinde *Asymmetrasca decedens* (Paoli) ve *Empoasca decipiens* Paoli (Homoptera, Cicadellidae) ' in populasyon dalgalanmaları ve zararı üzerinde çalışmalar. Türkiye II. Entomoloji Kongresi Bildirileri, 28-31 Ocak 1992, Ç.Ü. Ziraat Fakültesi, Bitki Koruma Bölümü, Adana.

Bozkurt, E., 1970. Ege Bölgesi pamuklarında zarar yapan *Empoasca* (Fam. Cicadellidae) türleri, yayılış, zarar şekli ve dereceleri üzerinde araştırmalar. E. Ü. Ziraat Fakültesi Yayınları, No: 146, Bornova, İzmir, 71 s.

Kersting, U., 1990. Untersuchungen über Wirtspflanzenspektrum und Insektenvektoren sowie Nachweismethoden des Erregers der Zitrusstauche, *Spiroplasma citri* Saglio et al., im Zitrusanbaugebiet der Südtürkei. Dissertation der Univesitaet Bonn, FRG, 97 pp.

Lodos, N., 1986. Türkiye Entomolojisi II., Genel, uygulamalı ve faunistik. E. Ü. Ziraat Fakültesi Yayınları, No:429, Bornova, İzmir, 580 s.

Oman, P. W., 1949. The Nearctic Leafhoppers (Homoptera: Cicadellidae), A Generic Check List. **Ann. Soc. of Amer., Memoris of the Entomological Society of Washington,** Number 3, 253 pp.