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The Studies on the Determination of Species of Thysanoptera in Processing Tomato Production Areas in İzmir (Bergama, Kınık) Province of Turkey[1]

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Summary

Surveys, conducted in different parts of the Bergama and Kınık Districts, in the İzmir Province of Turkey, between 2003 and 2005 have shown that the most common species was ***Thrips tabaci*** (Lindeman). Other species were Thrips species of the Phlaeothripidae family of unidentified species and ***Haplothrips*** sp., ***Chirothrips*** sp., ***Drepanothrips reuteri*** Uzel, ***Frankliniella intonsa*** (Trybom), ***Frankliniella teniucornis*** **(**Uzel), ***Tenothrips discolor*** (Karny), ***Thrips angusticeps*** Uzel of the Thripidae family; none of the latter have been identified to genus and were found to have limited expansion areas. In the study ***Aelothrips collaris*** Prisner, a beneficial species of the Aelothripidae family and another variety of unidentified species of the genus ***Aelothrips*** were observed.

Key words: Thysanoptera, processing tomato, İzmir, Bergama, Kınık, fauna

Introduction

In Turkey, processing tomatoes are planted for tomato paste production, drying and different ways of fresh consumption. The term

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"processing tomato" usually refers to tomato sorts planted for tomato paste production. Turkey is the world's third biggest tomato producer after the United States and Italy. Processing tomato plantation in Turkey is concentrated in some districts of the provinces Balıkesir, Bursa, Çanakkale and İzmir and in the Manisa Province. According to records of 2004, Torbalı with 2952 ha has the largest plantation area in the İzmir Province, followed by Bergama with 2150 ha and Kınık with 1400 ha. The total tomato plantation area in the İzmir Province lies between 11.000 -12.000 ha (Anonymous, 2005).

There are previously conducted studies in our country on pests affecting processing tomatos (Durmuşoğlu and Öncüer, 1991; Öncüer and Karsavuran, 1992; Öncüer et al., 1992). These studies, however, do not contain sufficient information on thrips species and their population densities in processing tomatoes. Studies on processing tomato pests are concentrated on the Bursa and Manisa Provinces; no studies were encountered on processing tomato pests in the Bakırçay basin and the districts Bergama and Kınık, both located in this basin. This study aims to determine existing thrips species of this region which holds an important place in processing tomato plantation in the İzmir Province.

Material and Method

The study was conducted during 2003-2005 in plantation areas of processing tomatoes in the Districts Bergama and Kınık of the İzmir Province. Surveys were carried out in tomato plantation areas of these districts for the purpose of species identification of the order Thysanoptera.

The main material of this study is made up of processing tomato plants and thrips encountered on these plants of various regions of the Bergama and Kınık Districts in the İzmir Province.

Field Studies

Various processing tomato plantation areas in the Bergama and Kınık Districts, representing the region (Ayazköy, Bölcek, Göçbeyli, Kadıköy, Poyracık), were visited three times a year for studies on the identification of species of the Thysanoptera order. Leaves and flowers of 50 randomly choosen plants, were collected from fields representing the region. Leaf samples were collected from the 3rd from top compound leaves of sprouts of plant parts facing south, flowers from newly bloomed ones. The flowers were wrapped in paper, labelled and put into plastic containers with sealed lids; each leave group was paper-

wrapped individually, put into plastic bags, sealed and then delivered to the laboratory in an ice box.

Laboratory Studies

Leaf samples which were brought to the laboratory, some were spread on white paper on a table and some were put into big white bowls. Next, each single thrips on the leaves and all thrips which have fallen into the bowl were collected by a size 0 sable brush and were countedThrips on the flowers were first shaken off the flowers into the white bowl and then collected by a size 0 sable brush.

Thrips specimens, collected by means of a brush, were placed in plastic tubes containing thrips preservation liquid AGA (1 unit glycial acetic acid + 1 unit glycerine + 10 units 60% ethyl alkol) and the tubes were then labelled with the respective information about the samples. After one month the thrips were transferred from this solution into 30% ethyl alcohol with 1-2 drops glycerine added and were conserved in this way until the making of the preparation.

Production of preparations of thrips samples

Thrips species to be identified were taken out the 30% ethyl alcohol before their preperations were produced. For such purpose the thrips were first kept 30 mins in a petri dish containing Lactophenol, then placed dorsivental on a slide dripped with drops of Hoyer's medium and then covered with straight aligned wings, antenna and legs; the thrips were then kept in an incubator at 55 ºC for 1 hour. Finally the labels were filled out and the thrips were ready for identification.

Thrips samples identifications were made by Prof. Dr. Joe E. FUNDERBURK and Prof. Dr. İrfan TUNÇ.

Study Results and Discussion

In surveys conducted in growing periods of 2003-2005 in different processing tomato plantation areas of the Bergama and Kınık Districts of the İzmir Province have shown that ***Thrips tabaci*** (Lindeman) of the Thysanoptera order is the most common species on leaves and flowers of processing tomatoes. Besides this species, ***Aelothrips collaris*** Prisner and ***Aelothrips*** sp., from the Aelothripidae family and Thysanoptera order, species unidentified to species of the Phlaeothripidae family, ***Chirothrips*** sp., ***Drepanothrips reuteri*** Uzel, ***Frankliniella intonsa*** (Trybom) ***Frankliniella teniucornis*** (Uzel),

Tenothrips discolor (Karny) and ***Thrips angusticeps*** Uzel from the Thripidae family, have been found in the survey area. The numbers of Thysanoptera species found in processing tomato plantations of Bergama and Kınık is depicted in Table 1.

Table 1. Species and numbers of Thysanoptera found on leaves and flowers, according to surveys in processing tomato plantations between 2003-2005 in İzmir (Bergama, Kınık)

Taxonomy	Family	Total number in specimen	Ratio (%)
Chirothrips sp.	Thripidae	2	0.4
Drepanothrips reuteri Uzel	"	1	0.2
Frankliniella intonsa (Trybom)	"	2	0.4
Frankliniella teniucornis (Uzel)	"	15	2.9
Tenothrips discolor (Karny)	"	9	1.7
Thrips angusticeps Uzel	"	2	0.4
Thrips tabaci (Lindeman)	"	457	88.6
Aelothrips collaris Prisner	Aelothripidae	14	2.7
Aelothrips sp.	"	4	0.8
Haplothrips sp.	Phlaeothripidae	10	1.9

As can be seen in Table 1, 10 species of thrips were identified on leaves and flowers of processing tomatoes, three of them at genus level. 2 species of the Phlaeothripidae family whose species identification is still in progress were also observed. The diversity of hosts of these species comes from the fact that a variety of crops are cultivated arround processing tomato fields. The ***T. tabaci*** is found at a rate of 88.6% whereas other species were observed not to exist in great numbers.

94.6% of the species which are in the fields of processing tomatoes take place in the family of Thripidae, but 3.5% of them and 1.9% of them take place in Aelothripidae and Phlaeothripidae families.

T. tabaci that made up 88.6% of the thrips species collected from leaves and flowers of processing tomatoes during the survey, harm leaves and flowers of tomatoes growing under field and greenhouse condition. This species is also a vector of the TSWV (= The tomato spotted wilt virus) desease, and an effective transmitting thrips of the virus in open-field and greenhouse conditions (Cho et al., 1988; Chatzivassiliou, 2001; Clift and Tesoriero, 2001; Gabor et al., 2001; Clift, 2004; Alan, 2005).

F. intonsa and ***F. tenuicornis*** a leaf-feeder, have a wide range of hosts. They feed from flowers of their hosts. They are also vectors of the TSWV disease (Inoue et al., 1994; Atakan and Uygur, 1999; Atakan and Özgür, 2001; Atakan and Tunç, 2004; Atakan and Uygur, 2004 a; Atakan and Uygur, 2004 b).

T. anusticeps and ***T. discolor*** a leaf-feeder, feed with leaves and flowers. Their main hosts are Gramineae and plants of the Cruciferae family (Lodos, 1984; Atakan and Tunç, 2004 b).

The hosts of ***D. reuteri*** are mostly grapes. They also reside in various other fruit trees. (Lodos, 1984; Tunç, 1992).

Some species of the Phlaeothripidae family feed in leaves only, whereas some species feed only in flowers. Their main hosts are plants of the Compositae and Graminae families (Lodos, 1984).

Aelothrips spp. a predator that feeds with plant lice, mite and other tiny insects (Lodos, 1984).

The species of Thysanoptera order which have been found according to the researches are followed according to their families. The species of each kind is told according to their own places and dates. The number of the species are shown in parentheses.

Family: Aelothripidae

Aelothrips collaris Prisner
These specimens were collected from the leaves: Bergama (Göçbeyli), 21.VI.2003, (1); 02.VII.2005, (2); 09.VII.2005, (4); 16.VII.2005, (2). Totally 10 specimens.
These specimens were collected from the flowers: Bergama (Göçbeyli), 22.V.2004, (4). Totally 4 specimens.

***Aelothrips* sp.**
These specimens of this species were collected only from the leaves.
Bergama (Göçbeyli), 26.VI.2004, (4). Totally 4 specimens.

Family: Phleothripidae

***Haplothrips* sp.**
These specimens were collected from the leaves: Bergama (Kadıköy), 22.V.2004, (1); Kınık (Poyracık), 28.VI.2003, (1). Totally 2 specimens.
These specimens were collected from the flowers: Kınık (Poyracık), 14.VI.2003, (3); 28.VI.2003, (5). Totally 8 specimens.

Family: Thripidae

***Chirothrips* sp.**
These specimens were collected from the leaves: Kınık (Poyracık), 28.VI.2003, (1). Totally 1 specimen.
These specimens were collected from the flowers: Kınık (Poyracık), 14.VI.2003, (1). Totally 1 specimen.

Drepanothrips reuteri Uzel
This species of specimen was collected from the flowers.
Kınık (Poyracık), 12.V.2004, (1). Totally 1 specimen.

Frankliniella intonsa (Trybom)
These specimens were collected from the leaves: Kınık (Poyracık), 12.V.2004, (1). Totally 1 specimen.
These specimens were collected from the flowers: Kınık (Poyracık), 19.VI.2004, (1).
Totally 1 specimen.

Frankliniella tenuicornis (Uzel)
These specimens of this species were collected only from the leaves.
Bergama (Göçbeyli), 21.VI. 2003, (5); 19.VI. 2004, (8); Kınık (Poyracık), 12.V.2004, (2). Totally 15 specimens.

Tenothrips discolor (Karny)
These specimens were collected from the leaves: Bergama (Göçbeyli) 12.VI.2004, (2); Kınık (Poyracık), 12.V.2004, (3). Totally 5 specimens.
These specimens were collected from the flowers: Bergama (Göçbeyli), 29.V.2004, (2); Kınık (Poyracık), 12.V.2004, (1); 05.VI.2004, (1). Totally 4 specimens.

Thrips angusticeps Uzel
These specimens of this species were collected only from the leaves.
Bergama (Göçbeyli), 29.V.2004, (2). Totally 2 specimens.

Thrips tabaci (Lindeman)
These specimens were collected from the leaves: Bergama (Ayazköy), 12.V.2004, (2); 12.VI.2004, (8); 19.VI.2004, (14); Bergama (Bölcek), 07.VI.2003, (10); 14.VI.2003, (5); 09.VII.2003, (4); 16.VIII.2003, (2); 19.VI.2004 (5); Bergama (Göçbeyli), 07.VI.2003, (11); 12.VII.2003,

(4); 12.V.2004, (4); 29.V.2004, (10); 12.VI.2004, (18); 19.VI.2004, (6); 26.VI.2004, (3); 10.VII.2004, (5); 21.V.2005, (12); 28.V.2005, (10); 02.VII.2005, (6); 20.VIII.2005, (5); Bergama (Kadıköy), 14.VI.2003, (6); 22.V.2004, (3); Kınık (Poyracık), 07.VI.2003, (42); 14.VI.2003, (37); 28.VI.2003, (14); 12.VII.2003, (6); 26.VII.2003, (6); 09.VIII.2003, (3); 16.VIII.2003, (2); 12.V.2004, (3); 22.V.2004, (8); 05.VI.2004, (17); 19.VI.2004, (21); 03.VII.2004, (5); 10.VII.2004, (3); 17.VII.2004, (2); 21.V.2005, (18); 09.VII.2005, (2); 28.V.2005, (9); 11.VI.2005, (6); 25.VI.2005, (3). Totally 360 specimens.
These specimens were collected from the flowers: Bergama (Bölcek), 07.VI.2003, (2); Bergama (Göçbeyli), 07.VI.2003, (9); 05.VII.2003, (7); 12.VII.2003, (1); 02.VIII.2003, (1); 12.VI.2004, (5); 19.VI.2004, (5); 21.V.2005, (3); 28.V.2005, (2); Kınık (Poyracık), 07.VI.2003, (2); 14.VI.2003, (10); 28.VI.2003 (12); 05.VII.2003, (12); 12.VII.2003, (5); 26.VII.2003, (5); 02.VIII.2003, (4); 12.V.2004, (5); 22.V.2004, (2); 19.VI.2004, (1); 03.VII.2004, (1); 28.V.2005, (3); 04.VI.2005, (3); 11.VI.2005, (1); 18.VI.2005, (1). Totally 97 specimens.

The species of ***A. collaris***, ***Chirothrips*** sp.*,* ***F. intonsa***, ***Haplothrips*** sp.*,* ***T. discolor*** and ***T. tabaci*** was collected from both the leaves and the flowers of tomato. The species of ***Aelothrips*** sp., ***F. teniucornis*** and ***T. angusticeps*** has been found only on the leaves of tomato. But the species of ***D. reuteri*** was collected from the tomato flowers. It can be said that the fauna of Thysanoptera order is very rich on the growth of processing tomato in the towns of Bergama and Kınık in İzmir Province.

The most common species in processing tomato plantation areas in the Bergama and Kınık Districts of the İzmir Province is ***T. tabaci.*** The crop diversity of this region, especially neighbouring cotton and tomato fields may increase the harm caused by different species of thrips. Today, local farmers don't regard thrips species as a threat. There is no pest control effort against thrips in processing tomatoes**.** Like with many other plants, no evidence of ***Frankliniella occidentalis*** (Pergande) (Thysanoptera: Thripidae), a species feeding with leaves and flowers of processing tomatoes, has been found in the region. In the following years however, infection monitoring should be established in the region.

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Özet

İzmir (Bergama, Kınık) İlinde Sanayi Domatesi Alanlarında Thysanoptera Türlerinin Belirlenmesi Üzerine Araştırmalar

İzmir İlinde sanayi domatesi yetiştiriciliği yapılan Bergama ve Kınık İlçelerinin değişik yörelerinde 2003-2005 yılları arasında yapılan sürvey sonucunda yaprak ve çiçeklerde en yaygın tür ***Thrips tabaci*** (Lindeman) olmuştur. Bu türün dışında bulunan trips türleri Phlaeothripidae familyasından tür teşhisi tam olarak yapılamamış türler ile cins düzeyinde teşhisi yapılmış ***Haplothrips*** sp., Thripidae familyasından ***Chirothrips*** sp., ***Drepanothrips reuteri*** Uzel ***Frankliniella intonsa*** (Trybom), ***Frankliniella teniucornis*** (Uzel), ***Tenothrips discolor*** (Karny), ***Thrips angusticeps*** Uzel olup, bu türlerin bulunuş ve yayılış oranları çok düşük olarak saptanmıştır. Çalışmada yararlı trips türlerinden Aelothripidae familyasından ***Aelothrips collaris*** Prisner ve tür teşhisi tam yapılamamış olan başka bir ***Aelothrips*** cinsine bağlı tür saptanmıştır.

Anahtar sözcükler: Thysanoptera, sanayi domatesi, İzmir, Bergama, Kınık, fauna

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