

## THYSANOPTERA IN A COASTAL MEDITERRANEAN WINTER\*

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### SUMMARY

The Thysanoptera species present actively during the winter months in Antalya province which has a coast of about 600 km on western Mediterranean of Turkey were studied.

The total number of the species recorded in winter was 17. Five species, *Thrips tabaci*, *Th. major*, *Taeniothrips meridionalis*, *Ta. annulatus* and *Melanthrips fuscus* were found to appear throughout all winter months (December, January and February). Ten species showed up only either in December or February. Two of the species namely *Rhipidothrips brunneus* and *Anaphothrips alternans* are recorded for the first time in Turkey. The ecological status of the species has been discussed so far the findings permitted.

### INTRODUCTION

The studies on the status of any species of animal or plant in a season which has marginal climatic conditions may yield some evidence about its ecology. The present investigation aimed to get such information about the Thysanoptera species existed in Antalya by studying their situation in a relatively cool season that is a coastal Mediterranean winter.

The study focused on winter months which are December, January and February so far meteorological data indicated. But the situation of each species in pre-winter (November) and post-winter (March) months was also included in order to give a better picture of the problem.

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## THE AREA

Antalya is located in the West Mediterranean part of Turkey having a coast of about 600 km on Mediterranean and lays between  $36^{\circ}$ - $38^{\circ}$  N latitudes and between  $29^{\circ}$ - $33^{\circ}$  E longitudes approximately. All sampling sites are on the coastal area, the most extrem point of collection is not far more than 25 km from the coast and altitudes are close to sea level.

## THE CLIMATE

The climate of the area studied is typical of North Mediterranean. Meteorological data in table 1 belongs to Antalya (provincial center) and there were no any significant differences for parameters indicated between various meteorological stations located in different parts of the area. Temperatures ranged from  $-1.5$  (min.) to  $23.7^{\circ}\text{C}$  (max.) and average monthly temperatures were between  $7.0$  and  $10.7^{\circ}\text{C}$  for winter period. Normally most of the annual precipitation occur in November-March that is a characteristic of Mediterranean climate. It should be noted that in the period of study precipitation was lower than average amount that occurred in the previous years. Relative humidity is extremely high when northern winds do not exist, but not so as monthly averages.

Table 1. Meteorological data of Antalya for November, December (1988); January, February and March (1989).

	Temperature $^{\circ}\text{C}$			RH %			Precipitation mm	No of sunny days	Average daylength		Average sunny period per day	
	mean	min.	max.	mean	min.	max			h	m	h	m
November	11.8	0.8	20.8	64	15	98	86.1	8	10	12	4	54
December	10.7	1.2	19.1	70	20	98	267.3	8	9	36	4	30
January	7.0	-1.5	18.4	53	12	99	48.2	22	9	54	7	48
February	8.9	-1.2	21.2	61	13	95	108.8	14	10	48	6	42
March	12.7	3.9	23.7	70	8	98	102.4	11	11	54	6	42

Monthly average daylengths are between 9 h 36 m and 10 h 48 m. The number of sunny days per month were between 8 and 22 and actual average sunny hours per day ranged from 4 h 30 m to 7 h 48 m for the period studied.

## THE CROPS AND WILD FLORA

Antalya is mainly an undercover vegetable and cutflower, citrus and cotton growing area. In winter, vegetables like tomato, eggplant, cucumber, squash, pepper and bean, and cut flowers like carnations, *Gerbera* are grown undercover. Outdoor (open field) grown vegetables are mainly onion, garlic, leek, broadbean, lettuce, cabbage, celery, cauliflower, spinach, dill, parsley, peppermint etc. Broadbean occupies the largest area.

The woody plants which flower in winter time are *Eriobotrya japonica* (November, December, January); *Clematis* sp. (December, January); *Calycotoma villosa*, *Prunus amygdalus*, *Prunus persica*, *Pinus brutia* (February). *Euphorbia* sp. (December, January, February and on); *Raphanus* spp (January, February and on) and *Asphodelus* sp. (February and on) are the main herbaceous wild plants encountered frequently in winter.

## THYSANOPTERA

Samples were taken fortnightly by shaking plants on a white tray. Investigation included all the districts of Antalya having coast on Mediterranean Sea.

Only five species of Thysanoptera thrived throughout the winter (Table 2) and some information relating to their occurrence is given below.

### *Thrips major* Uzel

It is the most frequent and abundant species. *Thrips major* existed mainly in flowers of fruit trees *Eriobotrya japonica*, *Prunus amygdalus*, *Prunus persica* and shrubs *Calycotoma villosa* and *Clematis* sp. Wild herbaceous plants like *Euphorbia* sp. and *Asphodelus* sp. were also found to support this species (Table 3).

*E.japonica* is the most widespread host of *Th.major* in the area and had a flowering stage started in early November and ended in the beginning of February. It has been the main host for about three months. *Clematis* sp. though not encountered often has given support through December and January. Other fruit trees, shrubs,

Table 2. Thysanoptera species found in Antalya in winter time (December 1988, January and February 1989) and their relative frequency, diversity, abundance, persistence, and distribution.

THYSANOPTERA	Frequency	Diversity	Abundance	Persistence	Distribution**
<b>AELOTHRIPIDAE</b>					
<i>Rhipidothrips brunneus</i>	1	1	4	F	Holarctic
<i>Melanthrips fuscus</i>	9	9	32	DJF*	West Palaearctic
<i>Aeolothrips ericas</i>	1	1	1	F	W. Pal
<i>Aeolothrips gloriosus</i>	1	1	1	F	Mediterranean
<b>THRIPIDAE</b>					
<i>Anaphothrips alternans</i>	1	1	1	J	Africa, East Med. (data incomplete)
<i>Ceratothrips anatolicus</i>	2	2	2	F	Turkey, Greece (data incomplete)
<i>Frankliniella intonsa</i>	2	2	3	D F	Euro-Siberian
<i>Frankliniella tenuicornis</i>	1	1	1	D	Hol.
<i>Oxythrips ajugae</i>	2	2	3	F	W. Pal.
<i>Taeniothrips annulatus</i>	4	1	8	DJF	Med.
<i>Taeniothrips inconspuens</i>	2	2	2	F	Semi-Cosmopolitan (Pal.)
<i>Taeniothrips meridionalis</i>	17	11	34	DJF	Turano-Med. (data incomplete)
<i>Thrips angusticeps</i>	3	3	6	D	W. Pal.
<i>Thrips major</i>	30	12	261	DJF	Hol. (Pal.)
<i>Thrips minutissimus</i>	1	1	1	F	Euro-Asian
<i>Thrips tabaci</i>	26	20	87	DJF	Cosmopolitan
<b>PHLAEOTHRIPIDAE</b>					
<i>Neohegeria</i> sp.	2	2	2	F	
Total	17 species	55 samples	29 plant species	449 individuals	

\* D= December, J= January, F= February

\*\* According to zur Strassen (1986 and others) and Priesner (1960).

and wild plants mostly started to support in February and continued afterwards. The position of *Vicia faba* is not solid since it harbored *Th.major* mainly in the fields neighbour to *E.japonica* orchards.

Table 3. The plant species supporting *Th.major*, the number of samples taken from them, the number of *Th.major* individuals in these samples and the flowering periods of plants.

	No of samples	Total No of <i>Th.major</i>	Flowering period
<i>Eriobotrya japonica</i>	7	86	NDJF <sup>*</sup>
<i>Clematis</i> sp.	2	26	DJ
<i>Calycotome villosa</i>	3	56	F → <sup>**</sup>
<i>Prunus amygdalus</i>	4	12	F →
<i>Prunus persica</i>	2	10	F →
<i>Vicia faba</i>	4	26	JF
<i>Euphorbia</i> sp.	3	19	JF →
<i>Asphodelus</i> sp.	1	16	F →
Others	4	10	
Total	30	261	

\* As in table 2.

\*\* and on.

#### *Thrips tabaci* Lindeman

This species did not show a clumping pattern of distribution. In general it scattered in small numbers on rather diversified plant species as a result of its polyphagous habit. But leek, onion and garlic were heavily infested by *Th.tabaci* and immature stages were found throughout the season. It is a serious pest on these crops. Greenhouse grown cucumber and squash were also among the crops vulnerable to attacks of this species wherever and whenever pesticidal pressure ceased. Carnations *Gerbera* and other greenhouse grown cutflowers also attract *Th.tabaci*, but hardly establish in such habitats due to the heavy pressure of pesticides applied.

### **Taeniothrips meridionalis Priesner**

It is a rather diversified species but not represented with large numbers. This species was found mostly on flowers of trees and shrubs. It was very rare until early February, but has abruptly become more frequent and abundant in the second half of February and afterwards.

### **Taeniothrips annulatus Karny**

This is a non-diversified species. It has been found only on *Euphorbia* sp. and only in small numbers during the period of study, but reached large numbers in March.

### **Melanthrips fuscus Sulzer**

This species is known to inhabit mainly on cruciferous plants and the same also applies to our findings. Its occurrence (never more than one individual) in non-cruciferous plants should be incidental.

## DISCUSSION

The total number of Thysanoptera species found was 17 in Antalya in winter time. The most frequent species were *Th.major*, *Th.tabaci* and *T.meridionalis*. Most of the other species existed only in 1-2 samples.

The most diversified species was *Th.tabaci* and followed by *Th.major* and *Ta.meridionalis*. *M.fuscus* also seemed as a relatively diversified species, however its position is discussed above. The position of the other species is not disputable since they were extremely rare.

The most abundant species was *Th.major*. It was followed by *Th.tabaci*, *Ta.meridionalis* and *M.fuscus* which were found in rather smaller numbers compared with *Th.major*. The species represented with very small numbers were those found only either in December or February, except *Ta.annulatus*.

The species persisted throughout the season or in other words in December, January and February were indicated above. The position of *Frankliniella intonsa* (Trybom) is not certain since has not been encountered in an interval that is January and in which the most severe winter conditions of the year prevail. *Frankliniella tenuicornis*

(Uzel) and *Thrips angusticeps* Uzel appeared only in December and *Anaphothrips alternans* Bagnall<sup>\*</sup> only in January so far our material showed.

The number of species has increased in the last half of February. The species that have shown up only in the second half of February were *Rhipidothrips brunneus* Williams<sup>\*\*</sup>, *Aeolothrips ericae* Bagnall, *A. gloriosus* Bagnall, *Ceratothrips anatolicus* (Priesner), *Oxythrips ajugae* Uzel, *Taeniothrips inconsequens* (Uzel), *Thrips minutissimus* Linnaeus and *Neohegeria* sp.

The winter conditions obviously favoured *Th. major* and *M. fuscus*. Both species did not tend to change their abundance and frequency from on the second half of the February which favoured all the rest species. Pre-winter period has also favoured *Th. major*, but not earlier than November. However *M. fuscus* has started to show up in December and afterwards, no trace in November and its population has burst in January with the appearance of its cruciferous hosts, *Raphanus* spp.

Our investigations showed that *Th. tabaci* appear all year around in conditions of Antalya that indicates its adaptability to a wide range of climatic conditions. The disappearance of *M. fuscus* in late spring, throughout summer and early fall may show its preference for relatively cool seasons. However the appearance of this species and *Ta. annulatus* which are dependent on certain species of plants must also be considered from point of presence of their specific hosts in any season given. The status of *Th. major* which disappear similarly must also be considered from both angles since very small number of woody plants exist to flower in the area in the period indicated above. However our further studies are expected to bring more evidence over the questions discussed above.

The species that appeared only either in December or February may be considered at least as intolerant of cold.

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\* First record for Turkey. Güzeloba, 1♀, celery. 5.1.1989.

\*\* First record for Turkey. Çakırlar, 4♀, cereal. 23.2.1989.

It is interesting to note that no any tubuliferous species was traced from December to the second half of February.

Nevertheless the species of winter time are not only as many presented here. More species may be expected to exist which our investigations might fail to detect due to sampling dates, climatic conditions before and on sampling days, failure to reach proper living quarters etc.

The number of Thysanoptera species found in each month was as in the following:

November	12
December	8
January	6
February	14 (first half 4)
March	22

It is certain that besides the failures in detection, changes in the climatic conditions and crop pattern from year to year may also effect the appearance of any species in any winter or month given. However it can be speculated that the hard winter time roughly took place between December and the second half of February when the number of Thysanoptera species so far we were able to detect was considered.

Meteorological parameters which support this sort of judgement are monthly average temperatures and daylengths which normally are expected to be more decisive than the rest.

## ÖZET

### AKDENİZ SAHİL KIŞ ŞARTLARINDA GÖRÜLEN THYSANOPTERA

Bu çalışma Akdeniz sahil kışı gibi marjinal iklim şartlarındaki durumlarını incelemek suretiyle karşılaşılan Thysanoptera türlerinin ekolojisi hakkında bilgi toplamayı amaçlamaktadır. Antalya ilinin sahil kesimleri iki haftada bir taranmak suretiyle Kasım, Aralık 1988; Ocak, Şubat, Mart 1989 aylarını kapsayacak şekilde yürütülen çalışmalar sonucunda kış aylarında (Aralık, Ocak ve Şubat) 17 Thysanoptera türü tespit edilmiştir (Çizelge 2). Bunlardan beşi kış aylarının tamamında varlığını sürdüren türler olup sırasıyla *Thrips major*, *Th. tabaci*, *Taeniothrips meridionalis*, *Ta. annulatus* ve *Melanthrips fuscus*'tur.

Bunlardan *Th. major* en sık ve en kalabalık tür olup başta yenidoğya (*Eriobotrya japonica*) olmak üzere, badem (*Prunus amygdalus*) ve *P. persica* gibi meyve ağaçlarının ve *Clematis* sp. ve *Calycotoma villosa* gibi çallıların çiçeklerinde görülmüştür (Çizelge 3).



*Th.tabaci* çok deęişik bitki türlerinde, fakat genellikle az sayılarda görölmekle birlikte bazı hıyar ve kabak seralarında oldukça, hemen bütün soęan, sarmısak ve pırasa yetiştirilen alanlarda ise çok yoğun olarak tespit edilmiştir. Son üç kültür bitkisinde ciddi zararlı durumundadır.

*Ta.meridionalis* Şubatın ikinci yarısına kadar 1-2'lik sayılar halinde çeşitli bitki türleri üzerinde tespit edilmiş, bu tarihten itibaren sıklık ve sayı bakımından artış göstermiştir.

*Ta.annulatus*, *Euphorbia* spp'e *M.fuscus* ise *Raphanus* spp'e özelleşmiş türler olarak konukçularıyla birlikte ortaya çıkmış ve varlıklarını sürdürmüşlerdir.

Şubatın ikinci yarısından sonra sıklık ve sayı bakımından eğilimi deęişmeyen iki tür *Th.major* ve *M.fuscus*'un nispeten serin şartları tercih ettikleri, *Th.tabaci*'nin yıl boyunca varlığını sürdürmek suretiyle geniş bir iklim şartları yelpazesine hoşgörölü olduęu yukarıda konukçularla ilgili açıklamaları da gözardı etmemek şartıyla söylenebilir. Tespit edilen türlerden *Rhipidothrips brunneus*, *Aeolothrips ericae*, *A.gloriosus*, *Ceratothrips anatolicus*, *Oxythrips ajugae*, *Ta.inconsequens*, *Th.minutissimus*, *Neohegeria* sp. yalnız Şubatta, *Frankliniella tenuicornis* ve *Th.angusticeps* yalnız Aralıkta, *Anaphothrips alternans* yalnız Ocakta görölmüştür. Bunlar ve Aralık ve Şubatta görölüp de Ocakta görölmeyen *F.intonsa*'nın durumu çok az sayılarda temsil edilmiş olmaları dolayısıyla belirgin deęildir. Ancak son iki tür hariç dięerlerinin zorlu kış dönemlerinde ortaya çıkmadıklarını söylemek mümkündür.

*Rhipidothrips brunneus* ve *Anaphothrips alternans* Türkiye'de ilk defa kaydedilmektedir.

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