

Thrips Species Found in West Azarbaijan (Orumieh) Vineyards, and Seasonal Abundance of the Predominant Species (*Rubiothrips vitis*)

G. Akbarzadeh Shoukat^{1*} and N. Shayesteh²

ABSTRACT

Thrips species injurious to grapes are known as pests in vineyards all over the world and belong to the main pests of grapes in West Azarbaijan, Iran. In this study, thrips species occurring in West Azarbaijan vineyards were identified and the predominant species documented according to their relative abundance at different growth stages. The seasonal abundance of predominant species was investigated by means of yellow sticky trap catches and weekly sampling from vegetative and reproductive organs of vines. Five species including: *Rubiothrips vitis* (Priesner), *Thrips tabaci* Lindeman, *Tenothrips discolor* (Karny), *Tenothrips reichardtii* (Priesner), and *Limothrips angulicornis* Jablonowski, were collected and identified. *R. vitis*, constituting 92 and 66 percent of the thrips population on vegetative and reproductive organs, respectively, was found to be predominant. *T. tabaci* was not found on vegetative organs, but it was found to constitute 32 percent of the thrips found on reproductive organs (flowers). The two species *R. vitis* and *T. reichardtii* are new records for the Iranian fauna. The number of adult thrips caught by sticky traps was positively correlated with the density of the adults on vegetative (buds and leaves) and reproductive (flower) organs in the first and second generations, respectively.

Keywords: Grapevine, *Limothrips angulicornis*, *Rubiothrips vitis*, *Tenothrips discolor*, *Tenothrips reichardtii*.

INTRODUCTION

Thrips are major pests in vineyards of West Azarbaijan, a region with extensive grape production (about 20,000 ha under cultivation) in the Northwest of Iran. Limited information is available in Iran on thrips species injurious to grapevines. Although *Retithrips sp.* has been recorded as injurious thrips in vineyards in the south (Hemmati, 1990) and *D. reuteri* in the central part of Iran (Esmaili, 1993), there has been no study so far in the Northwest of the country, in spite of the application of annually chemical control measures against thrips pests, especially in early growth season. Various species of thrips are known as grapevine pests in different geographical

regions. The Western flower thrips *Frankliniella occidentalis* (Perg.), the grape thrips *Drepanothrips reuteri* Uzel., the citrus thrips *Scirtothrips citri* (Moulton), the bean thrips *Caliothrips fasciatus* (Perg.) and the grass thrips *Frankliniella minuta* Moulton (Jentray *et al.*, 1975) are of main importance. Considerable damage to Turkey's is grapevines is caused by thrips feeding early in the growth season, resulting in bud drying, growth stunting and curling, puncturing and drying of the leaves, as well as oviposition in soft tissues (Kaskalouglu *et al.*, 1965).

F. occidentalis (Perg.), an American species, is considered a grapevine pest in the U.S.A. (Jensen, 1981; McNalley, 1985), Italy (Ciampolini *et al.*, 1991) and Mexico (Guerra, 1989).

1. Agricultural Research Center of West Azarbaijan, P. O. Box: 365, Orumieh, Islamic Republic of Iran.

2. Faculty of Agriculture, Ormia University, Ormia, Islamic Republic of Iran.

* Corresponding author.



D. reuteri Uzel, a European species, causes damage in vineyards in the U.S.A. (Jensen *et al.*, 1981), Italy (Ciamoplino, 1991), France (Bournier, 1983), Sweden (Remund *et al.*, 1989) and Turkey (Cengiz, 1973). In order to evaluate the economic importance of this species, its occurrence and damage was monitored in the vineyards of Northeast Italy, using different types of sticky traps (Strapazzon *et al.*, 1988). *Rubiothrips vitis* Priesner is abundant in vineyards of some East Mediterranean countries such as Turkey, Greece, Palestine and Romania (Priesner, 1933). *R. vitis* is the predominant species in Turkey and constitutes 73.6 and 61.3 percent of the thrips population in the Izmir and Manisa regions, respectively (Cengiz, 1973). *R. vitis* (Priesner) was described as *Anaphothrips vitis* Priesner by Priesner in 1933, but was later transferred to the genus *Rubiothrips*, (Bhatti, 1978).

Rhipiphorothrips cruentatus Hood is the main species found in vineyards in Pakistan and Afghanistan (Gentry, 1962) as well as India (Ananthakrishnan, 1980) and is considered as the key pest in Afghan vineyards (Gentry, 1962). *Scirtothrips dorsalis* Hood is known as a grapevine pest in Japan, and its seasonal changes and infestation sites on grapes have been investigated by Shibao (1990). It was the objective of the present study to identify the thrips species in vineyards of West Azarbaijan (Orumieh), to determine the predominant species, and to study the seasonal population dynamics of the vine thrips in two categories- predominant and other species.

MATERIALS AND METHODS

In order to determine the thrips species in Orumieh vineyards, twenty vineyards in four main vine growing districts were sampled at two different vine growth stages. The first sampling occurred in late April from vegetative organs at bud burst until the stage of two to three unfolded leaves (bud and leaf) by collecting 25 buds and 25 young leaves randomly from each vineyard. In the

laboratory the samples were shaken out on to a sheet of paper, and the adult thrips picked up with a moistened camel-hair brush. The thrips specimens were killed and preserved in A.G.A. solution (60% ethanol, glycerol and acetic acid, in the ratio of 10:1:1). The second sampling was made on reproductive organs (flowers) at full flowering stage, by collecting five randomly selected clusters from each vineyard in early June. Different thrips specimens were initially separated based on morphological differences, and their identification was carried out by Dr. R. zur Strassen at the Forschungsinstitut Senckenberg in Frankfurt (Germany) and Professor. Bournier at Montpellier (France).

Determination of the predominant species was carried out in two ways : 1) by studying the relative abundance of each species in a group of 100 randomly selected individuals out of the mass of specimens collected from all over the vineyards of Orumieh, at two growth stages, and 2) by counting the number of each thrips species occurring on 60 leaves or fallen individuals by shaking 10 clusters moderately three times.

The seasonal population dynamics of the predominant species were studied by using two yellow sticky traps and weekly random sampling from vegetative and reproductive organs in an experimental vineyard at Bakeshiouchay, Orumieh. Each trap was a strip of cardboard sized 2.5× 22cm, painted with yellow color and coated with Tanglefoot glue. The traps were fixed at a height of 50 cm from surface at a distance of 100 m from each other in central part of the vineyard in mid April. The thrips were caught by the traps and were counted weekly in the laboratory and classified according to the two categories, predominant and other species. The used traps were picked up and replaced by new ones weekly. In sampling from vegetative organs, both surfaces of 60 leaves from 2 newly grown shoots from each of 10 vines taken separately from three categories: Apical, middle and basal leaves were examined for adults and larvae of thrips using a binocular every week (Stiner, 1990). Sampling from reproductive organs was done by counting the number of

Table 1. The relative abundance of *R. vitis* in relation to other thrips species and their relative abundance for twenty vineyards from four regions of Orumieh in 1995.

Growth stage	Bud burst – Flat leaf			Full flowering		
	Relative abundance %	Sex ratio		Relative abundance %	Sex ratio	
		F	M		F	M
Thrips species						
<i>Rubiothrips vitis</i>	92	78.3	21.7(6.5 ^a - 15.2 ^b)	66	69.7	30.3 (9.1 ^a - 21.2 ^b)
<i>Thrips tabaci</i>	00	-----		32	91	18
Other thrips species	8	100		2	100	
	100			100		

^a Brachypterous male^b Macropterous male

thrips fallen by shaking 10 clusters from 5 vines moderately three times for the whole of the growth season.

RESULTS AND DISCUSSION

Thrips Species

Five thrips species including:

- *Rubiothrips vitis* (Priesner)
 - *Thrips tabaci* Lindeman
 - *Tenothrips reichardti* (Priesner)
 - *Tenothrips discolor* (Karny)
 - *Limothrips angulicornis* Jablonowski
- were all identified from thrips collection in Orumieh vineyards during 1995. Tables 1 and 2 indicates the relative proportion of *R.vitis* in comparison with other species in samples from the twenty vineyards in the four wine growing regions of Orumieh and in the experimental vineyard, respectively.

R.vitis was found to be the predominant

species in Orumieh vineyards, constituting 92 and 66 percent of the thrips population at the two sampling stages, respectively (Table 1). it also made up 93.3, 87 and 87.4 percent of the thrips population in the experimental vineyard on vegetative organs, reproductive organs and yellow sticky traps, respectively (Table 2).

T. tabaci was not observed on buds and leaves at the first sampling stage, but it constituted 32 percent of the thrips population on flowers. *T. reichardti* and *T. discolor* were found at rates of 8 and 2 percent of the thrips population at both growth stages respectively. *L. angulicornis* is known as a gramineous species and was probably accidentally captured on the vine. The three last species were named “other thrips species” in this paper.

Two species, *R. vitis* and *T. reichardti*, are new among Iranian fauna and were recorded for the first time from Orumieh vineyards. Although *T. tabaci* is known to be a polyphagous pest, the grapevine is considered

Table 2. The relative abundance of *R. vitis* in relation to other thrips species in an experimental vineyard Bakeshlouchay, Orumieh in 1995.

Sampling type	Vegetative organs	Reproductive organ	Yellow sticky traps
Thrips species			
<i>Rubiothrips vitis</i>	93.3%	87%	87.4%
Other thrips species	6.7%	13%	12.6%

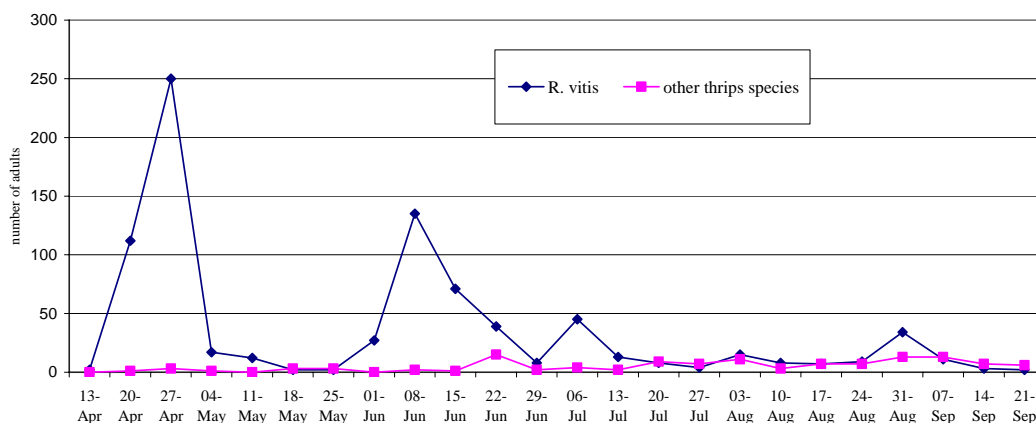


Figure 1. Number of adult thrips caught on yellow sticky boards in an experimental vineyard Bakeshlouchay, Orumieh, April to September 1995.

a new host for this thrips species in Iran.

Description of *R. vitis*

Adult females are 1.0 to 1.4 mm long with an average of 1.2 mm, their body color orange-yellow with a whitish head. Their compound eyes are brownish-dark red and their simple eyes orange. The antenna are eight-segmented with fork-like sense cones near the base of the third and fourth segments. The abdomen is eleven segmented which generally appears to

be 10 segments. Segments 1-7 are rectangular and the remaining four segments are cone like. The ovipositor is saw-like, turned down and is attached to the eighth and ninth abdominal segments. Adult males are 0.80 – 0.90 mm long with an average of 0.88 mm and, except for the longevity and shape of the reproduction organs, the other characters are similar to the adult female. As mentioned previously, adult males in this species occur in two forms:

- 1) males, with well-developed wings or “Macropterous”; and
- 2) males, with pad like wings or

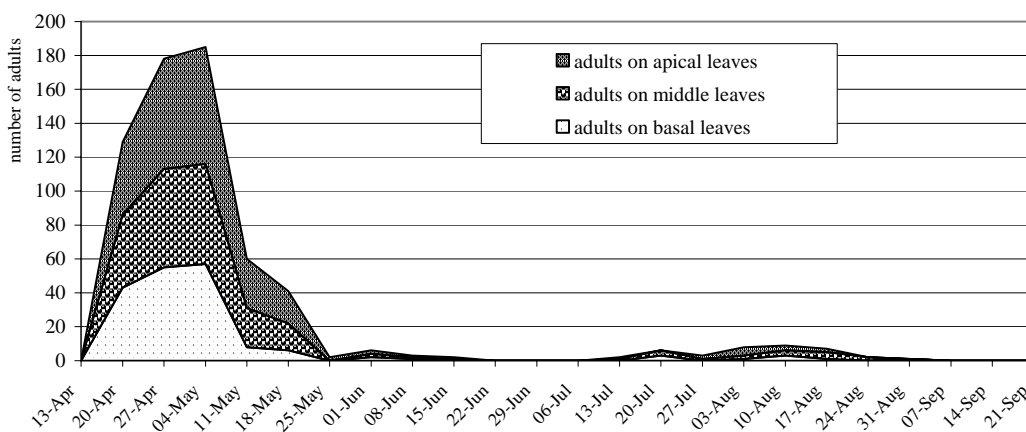


Figure 2. Number of *R. vitis* thrips sampled leaves boared in an experimental vineyard in Bakeshiouchay, Orumieh, April to September 1995.

“Brachypterous”.

Seasonal Population Dynamics

The number of adult thrips caught in yellow sticky traps during the growth season in the experimental vineyard is shown in Figure 1. *R.vitis* the predominant species (Table 2, Figure1).

The catches of thrips by traps occurred from 13 April until 21 September. There are two main peaks on 27 April and 8 June as well as two minor ones on 6 July and 31 August.

larvae on apical leaves (Figure 3), indicating their clear preference for the tender, sappy apical leaves. Regarding the coincidence of catches by yellow sticky traps with samplings from vegetative and reproductive organs shown in Figure 4, it can be seen that the two main peaks indicating the number of adult *R. vitis* caught by the traps are correlated with the highest density of the pest on vegetative (bud and leaf) and reproductive (flowers) organs, respectively. Thus the disappearance of thrips individuals from vegetative organs from early June until mid-July (occurrence of new, minor

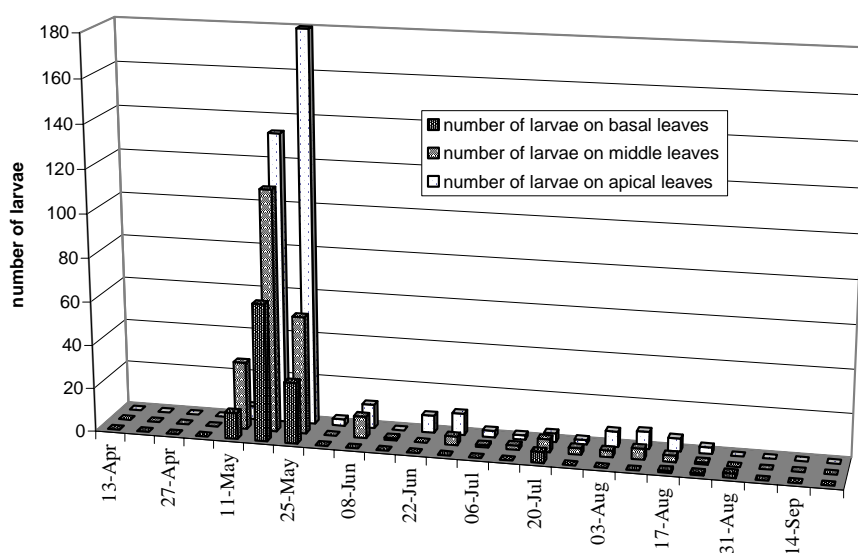


Figure 3. Densities of the larvae of the *R.vitis* on basal,middle and apical leaves.

According to Figure 2 there was no obvious difference in number of adult thrips on apical, middle and basal leaves at bud burst stage when the new green shoots first became visible and began to develop because the preformed leaves were still folded and very close to each other. As the new shoots enlarged and the leaves unfolded, an increasing number of the insects were found on the apical leaves. Nevertheless, there was a considerable difference between the number of

vegetative growth) can be attributed to the activity of the second generation of *R. vitis* onto main flower clusters.

ACKNOWLEDGEMENTS

The author sincerely thanks Dr. R. zur Strassen and Prof. A. Bournier for their identification of the specimens.

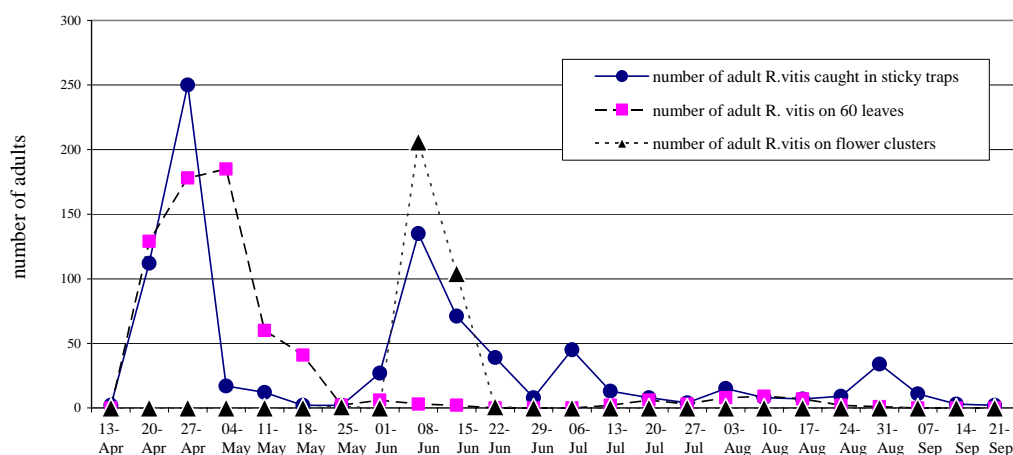


Figure 4. Relationship between the yellow sticky trap catches with the density of *R. vitis* adults on leaves and flowers.

REFERENCES

1. Ananthkrishnan, T. N. 1980. Thrips. In: "Vectors of Plant Pathogens" (Ed.) Harris, K. F. and Maramorosch, K. Academic Press, PP. 149-164.
2. Bhatti, G. S. 1978. Systematics of *Anaphothrips* Uzel. 1985, *Sensu Lato* and some Related Genera (Insecta, Thysanoptera: Thripidae). *Senckenbergiana biologica*, **59**: 85-114.
3. Bournier, A. 1983. *Les thrips, Biologie, Importance Agronomique*. Paris, 128 pp.
4. Cengiz, F. 1974. Izmir ve manisa dolaylarinda baglara ariz olan Thysanoptera Turleri, taninmalari, konukculari, zararlar ve tabii dusmanlari uzerinde arastirmalar. *Teknik Bulten No. 22* Izmir. PP. 86
5. Ciampolini, M., Perrini, S. and Tumino, S. 1991. Forti danni da tripidi and uva da tavola nei vigneti meridionali. *Informator Agrario Verona* **47(7)** : 127-131
6. Esmaili, M. 1993. *Main Pests of Iranian Fruit Crop*. Hamoon Publications. 781 pp.
7. Gentry, J. W. 1962. Crop Insects of North East Africa - South West Asia. *Agriculture Handbook 273*, U.S. Department of Agriculture. 475 pp.
8. Guerra, S. L. 1989. Effectiveness of Aldicarb in the Control of the Western Flower Thrips, *Frankliniella occidentalis* (Pergande), in Table Grapes in Northwestern Mexico. *Crop Prot.*, **8**: 277-279.
9. Hemmati, F. 1990. Collecting and Surveying of Insect Fauna on Grapevine in Khuzestan Province. *Scientific Journal of Agriculture*, Department of Plant Protection, Seed and Plant Improvement Institute, Karaj, Iran.
10. Jensen, F. L., Flaherty, D. L. and Lurisi, D. A. 1981. Thrips. In: "Grape Pest Management." Division Agriculture Science, University of California PP. 98-110 and 176-186.
11. Kaskaloglu N. and Turkmanoglu, H. 1965. Bag Hastalik ve Zararlilari. Ticaret matbacilik. T. A. S., Izmir, Turkey.
12. McNally, P. S., Foggy, C., Flynn, J. and Horenstein, J. 1985. Effectiveness of Thrips (Thysanoptera: Thripidae) on Shoot Growth and Berry Maturity of Chenin Blank Grapes. *J. Econ. Entomol.*, **78**: 69-72.
13. Priesner, H. 1933. Two New Thysanoptera from Palestine. *Bulletin Societe Royale Entomologique Egypte*, **17**: 79-82.
14. Remund, V. and Boller, E. 1989. Thrips im ostschweizer Rebbau: 1. Problemstellung Artenspektrum und Lebensweise. *Schweiz. Z. Obst -Weinbau*, **125**: 183-188.
15. Shiba, M., Tanaka, F. and Nakasuji, F. 1990. Seasonal Changes and Infestation Sites of the Chile Thrips, *Scirtothrips dorsalis* (Thysanoptera : Thripidae) on Grapes. *Japan J. Appl. Entomology-Zoology*, **34**: 145-152.
16. Stiner, Y. M. 1990. Determining Population Characteristics and Sampling Procedures for the Western Flower Thrips (Thysanoptera: Thripidae) and the Predatory Mite *Amblyseius*

- cucumeris* (Acari: Phytoseiidae) on Greenhouse Cucumber. *Environ. Entomol.*, **19(5)**: 1605-1613.
17. Strapazon, A., Pavan, F. and Cristoferi, K. 1990. Monitoring Plant Suckers in Vineyards using Chromotropic Traps: Influence of Yellow Colour and Trap Size on *Drepanothrips reuteri* Uzel Captured Frustula. *Entomologica Nuova Serie*, **11(24)**: 9-18.

گونه‌های تریپس تاکستان‌های استان آذربایجان غربی و فراوانی فصلی گونه غالب (*Rubiothrips vitis*)

غ. اکبرزاده شوکت و ن. شایسته

چکیده

گونه‌های مختلف تریپس آفت خسارت‌زای تاکستان‌های سراسر دنیا بوده و جزو آفات مهم باغات انگور استان آذربایجان غربی است. در این بررسی گونه‌های تریپس تاکستان‌های آذربایجان غربی شناسایی شد و بر اساس فراوانی نسبی آن‌ها در مراحل مختلف رشدی گونه غالب تریپس تاکستان‌ها تعیین گردید. فراوانی فصلی گونه غالب با استفاده از شکار تریپس در تله‌های زرد چسبنده و نمونه‌برداری هفتگی از اندام‌های رویشی و زایشی گیاه مو بررسی شد. پنج گونه تریپس شامل گونه‌های: *Rubiothrips vitis* (Priesner)، *Tenothrips reichardti*، *Tenothrips discolor* (Karny)، *Thrips tabaci* Lideman، *R. vitis* (Priesner) و *Limothrips angulicornis* Jablonowski جمع‌آوری و شناسایی شدند. با تشکیل دادن به ترتیب ۹۲ و ۶۶ درصد جمعیت تریپس در روی اندام‌های رویشی و زایشی به عنوان گونه غالب شناخته شد. *T. tabaci* Lideman در روی اندام‌های رویشی مشاهده نشد ولی ۳۲ درصد از کل جمعیت تریپس را در روی اندام‌های زایشی (گل) به خود اختصاص داد. دو گونه *R. vitis* (Priesner) و *T. reichardti* (Priesner) برای فون حشرات ایران جدید می‌باشد. تعداد حشرات کامل تریپس مو شکار شده در تله‌های زرد چسبنده کاملاً "منطبق با تراکم حشرات کامل این آفت در روی اندام‌های رویشی و زایشی بود که به ترتیب مربوط به نسل‌های اول و دوم آفت می‌باشد.