

LABORATORY TRIALS TO STUDY THE SUSCEPTIBILITY OF SOME GRAPEVINE VARIETIES IN RELATION TO BIOLOGICAL ASPECTS OF THE TWO SPOTTED SPIDER MITE, *Tetranychus urticae* KOCH

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ABSTRACT

The cultivars of some grapevines (*Vitis vinifera* L.) varieties, King Robi, Black Rose, Flame Seedless, Thompson Seedless and Bez El-Anza were cultivated at Noubaria Province, El-Baheira Governorate, during the season 2005. These varieties were tested under laboratory conditions to study their relative susceptibility to the infestation of *Tetranychus urticae* Koch infestation at 25 ± 2 °C and 70 ± 5 % R.H. . King Robi Variety was the most susceptible Variety while Bez El-Anza variety was the less susceptible one. On the other hand, Black Rose, Flame Seedless and Thompson Seedless have moderate susceptibility. The highest number of eggs was noticed on King Robe variety young leaves (18.35 eggs).

INTRODUCTION

In Egypt, grapevine (*Vitis vinifera* L.) is one of the important horticultural crops for local consumption and exportation. Summer and Nile Crops (2004) showed that the total cultivated grape area was 159929 feddans with production 1275288 tons. Some trials were made to study the biological aspects of the phytophagous mites on grape vine by Yousef (1970), Zaher and Yousef (1972) Abd El-Hafez (1974), Yousef *et al.*, (1980), Wahba *et al.*, (1982) Atwa *et al.*, (1987), Kondo *et al.*, (1987) Bonato *et al.* , (1990) and Ashihara (1996). The present work aimed to study the susceptibility of five grapevines varieties in relation to some biological aspects of *T. urticae*.

MATERIALS AND METHODS

1-Cultivated grapevine

An area of about one feddan cultivated with five grape varieties namely, King Robe, Black Rose, Flam Seedless, Thompson Seedless and Bez ElAnza at Noubaria province , El-Beheira Governorate in April 2005. The experiment area had not exposed to any treatment with any acaricides. Samples of young and old leaves for each variety were taken in paper bags and directly transferred to laboratory in the same day of collection for investigation. Obtained data were subjected to one-way analysis of variance (ANOVA) and means were separated by Duncan' s multiple range tests (Duncan, 1955).

2- Biological study:-

To study the susceptibility of grape vine varieties aforementioned on the biological aspects of *T. urticae*, young and old leaves of five grape varieties were used for rearing the mite under constant temperature at 25 ± 2 °C and relative humidity of 70 ± 5 % R.H.. Leaves were placed on cotton wool in Petri-dishes of 12.5 cm in diameter. Suitable moisture was

maintained by adding few drops of water . Pure culture of *T. urticae* was maintained at the laboratory. Newly hatched larvae were transferred singly to a leaf discs (1 cm in diameter) of each Variety to complete their life span. Newly emerged females were copulated and left to deposited their eggs until dead. Examination took place twice a daily. The duration of stages, number of deposited eggs and other biological aspects were recorded .

RESULTS AND DISCUSSION

Duration of the different stages of *T. urticae* Koch on young leaves of five grapes. Incubation period:-

A-) Young grape leaves

As shown in Table (1) and Fig. (1) obtained data showed that no significant differences between the incubation period of the individuals mites which fed on the different tested varieties for both females and males. This period took 4.79, 4.79, 4.77 , 4.86 and 4.77 days when the female reared on King Robi, Black Rose, Flam Seedless, Thompson and Bez ElAnza varieties, respectively, while it was 4.85, 4.78, 4.77, 4.78 and 4.81 days for males fed on the aforementioned varieties, respectively.

B-) Old grape leaves

The incubation period of *T. urticae* fed on different grape varieties lasted 4.75, 4.8, 4.7, 4.6 and 4.87 days for female while it was 5.53 , 4.5, 4.5, 4.4 , and 4.8 days for the male individuals fed on the same aforementioned varieties , respectively, Table (2).

Table (1) : Duration of developmental period of of *Tetranychus urticae* Koch when reared on young leaves at 25 ± 2 °C and 70 % R.H.

Stage	Sex	Varieties of grapes				
		King Robi	Black Rose	Flam Seedless	Thompson	Bez ElAnza
Incubation period	Female	4.79 + 0.09	4.79 + 0.12	4.77 + 0.14	4.86 + 0.17	4.77 + 0.13
	Male	4.85 + 0.27	4.78 + 0.09	4.77 + 0.11	4.78 + 0.06	4.81 + 0.07
Developmental time	Female	12.18 +0.21	12.14 +0.08	12.1 + 0.05	12.77 +0.08	3.81 + 0.13
	Male	11.75 + 0.08	11.76 ± 0.07	11.08 ± 0.08	10.5 ± 0.07	11.01 ± 0.10
Longevity	Female	18.13+ 0.98	15.44 + 0.08	11.90 + 0.05	10.64 + 0.05	9.09 + 0.08
	Male	16.25 + 0.42	14 + 0.09	10.02 + 0.01	9.06 + 0.2	7.87 + 0.21

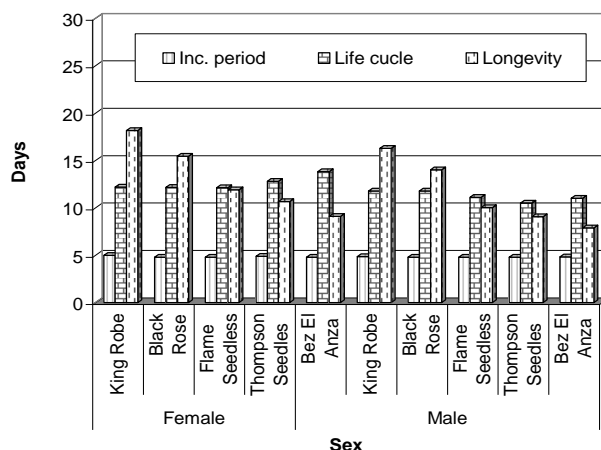
± S.D.

Table (2):Duration of developmental periods of *Tetranychus urticae* Koch when reared on old leaves at 25± 2 °C and 70 % R.H.

Stage	Sex	Varieties of grapes				
		King Robi	Black Rose	Flam Seedles	Thompson	Bez ElAnza
Incubation period	Female	4.75 ± 0.08	4.8 ± 0.1	4.7 ± 0.7	4.60 ± 0.07	4.87 ± 0.13
	Male	5.53 ± 0.04	4.5 ± 0.04	4.5 ± 0.14	4.4 ± 0.09	4.8 ± 0.05
Developmental time	Female	14.43 + 0.08	14.79 + 0.07	13.61 + 0.09	12.35 + 0.19	12.1 + 0.09
	Male	12.85 ± 0.08	13.01 ± 0.23	12.03 ± 0.18	11.73 ± 0.09	12.01 ± 0.09
Longevity	Female	6.07 ± 0.13	4.97 ± 0.13	11.44 ± 0.28	13.58 ± 0.06	14.15 + 0.31
	Male	4.64 ± 0.15	3.89 ± 0.16	10.33 ± 0.33	12.06 ± 0.22	12.49 + 0.07

± S.D.

Fig. (1) : Duration of developmental period of *Tetranychus urticae* Koch when fed on grape vine young leaves at 25 C and 70 % R.H.



Immature stages

A-) Young grape leaves

The tabulated data in Table (1) denoted that there were slightly differences between the periods of the developmental stages of *T.urticae* when fed on different varieties of grape for females and males. The longest period was noticed for the females when the mite fed on Bez ElAnza Varity (13.81 days) but the lowest one was noticed for the female on Flam seedless Varity (12.10 days).On the other hand this period affected significantly where it lasted 11.75, 11.76, 11.08, 10.5 and 11.01 days when the mite fed on King Robi, Black Rose, Flam Seedless, Thompson and Bez ElAnza varieties, respectively on young leaves of grape at 25 °C for male individuals.

B-) Old grape leaves

Data in Table (2) denoted that there were slightly differences between the periods of the developmental stages of *T.urticae* when fed on different varieties of grape for females and males. The longest period was noticed for the females when the mite fed on Black Rose Varity (14.79 days) but the lowest one was noticed for the female on Bez ElAnza Varity (12.10 days). On the other hand this period affected significantly where it lasted 12.85, 13.01, 12.03, 11.73 and 12.01 days when males fed on old leaves of King Robi, Black Rose, Flam Seedless, Thompson and Bez ElAnza varieties, respectively under the same conditions.

Longevity:-

Obtained data in tables (1&2) cleared that there were significantly differences between adult stage periods of female and male when they fed on young or old leaves of different grape varieties.However, the adult female individuals of *T. urticae* lasted for 18.13 days (the longest period) and 9.09 days (the lowest period) when the female fed on the young leaves of King

Robi and Bez El-Anza, respectively. On the other hand male adulthood lasted 16.25 days (the longest period) and 7.87 days (the lowest period) when the mite fed on the young leaves of King Robe and Bez ElAnza varieties respectively. While, on the old leaves of grape the adult female of *T. urticae* staged 14.15 days (the longest period) (Bez ElAnza variety) and 4.97 days (the lowest period) on Black Rose variety at 25 °C. Also, adult male lasted the longest period when it fed on Bez ElAnza Variety (12.49 days), while it was 3.89 days) (the lowest period) when the mite fed on Black Rose Variety.

Female longevity:

a-) Preovipositon period

As shown in Table (3), it was noticed that, there is very highly significant differences between female individuals fed on the different grape varieties (young leaves).The adult female lasted 1.64 days (the longest period) when the mite fed on King Rope Variety while it was 0.50 days (the lowest period) when the mite fed on Bez ElAnza Variety. On the other hand, the preoviposition period lasted 3.0 days on the old leaves (the longest period) on Black Rose variety of grape , while it was 1.04 days when the adult female fed on Bez El-Anza variety (The lowest period).

Table (3) : Effect of different varieties on the longevity and fecundity of *Tetranychus urticae* Koch on young leaves at 25 ± 2 °C and 70 ± 5 % R.H.

Variety	Preovipositi on period	Oviposition period	Postovipositio n period	Fecundity
King Robi	1.64 ± 0.10	15.8 + 0.06	1.03 ± 0.02	18.35 + 0.66
Black Rose	1.3 ± 0.04	13.24 + 0.16	0.8 ± 0.06	15.39 + 0.80
Flam Seedless	0.94 ± 0.12	10.25 + 0.08	0.8 ± 0.08	11.87 + 0.12
Thompson Seedless	0.98 ± 0.06	8.79 + 0.09	0.72 ± 0.04	10.56 +0.08
Bez El Anza	0.50 ± 0.06	7.5 + 0.05	1.05 ± 0.32	8.98 + 0.12

± S.D.

b.) Oviposition period

Data in Tables (3 & 4), revealed that there is highly significant difference between female oviposition period when fed on (young and old leaves) different grape varieties The oviposition period lasted 15.8 days (the longest period) on young King Robi variety decreased to 7.5 days (the shortest period) on young Bez ElAnza variety. On the other hand, the longest oviposition period was obtained when the female fed on old leaves of Bez ElAnza (12.28 days), while the lowest one lasted 1.04 days for the females fed on Black Rose variety.

c-) Postovipositon period

Obtained data in Tables (3 & 4) cleared that, there is no highly significant differences between female postoviposition period fed on (young and old leaves) different varieties of grape. Female postoviposition period lasted 1.03, 0.8, 0.8, 0.72 and 1.05 days on young leaves, while it was 0.69, 0.99, 0.79, 0.83 and 0.74 days on old grape leaves when females fed on King Rope, Black Rose, Flam Seedless, Thompson Seedless and Bez ElAnza varieties, respectively.

Table (4) : Effect of different varieties on the longevity and fecundity of *Tetranychus urticae* Koch on old leaves at 25 ± 2 °C and 70 ± 5 % R.H.

Variety	Preoviposition period	Oviposition period	Postoviposition period	Fecundity
King Robi	1.99 ± 0.15	3.31 ± 0.13	0.69 ± 0.05	5.96 ± 0.24
Black Rose	3.0 ± 0.09	1.04 ± 0.06	0.99 ± 0.11	5.01 ± 0.15
Flam Seedless	1.99 ± 0.12	8.74 ± 0.09	0.79 ± 0.06	11.98 ± 0.13
Thompson Seedless	1.2 ± 0.06	11.53 ± 0.20	0.83 ± 0.07	13.6 ± 0.08
Bez El Anza	1.04 ± 0.09	12.28 ± 0.13	0.74 ± 0.05	14.09 ± 0.11

± S.D.

Fecundity

Female fecundity was highly affected when fed on both young and old leaves of different grape varieties at 25 °C. The highest number of eggs laid by the female was observed on young King Robi Variety (18.35 eggs), but the lowest number of deposited eggs was noticed when the female fed on old Black Rose, (5.01 eggs), Table (3).

Similar results were obtained by Kondo *et al.*, (1987) when reared *T. kanazawai* Kishida on grape vine . There was higher survival rate of immature stages, development more quickly and showed a higher oviposition rate than on bean leaves.

Fig. (2) : Duration of the developmental stages of *T. urticae* when fed on grape vine old leaves at 25 C and 70 % R.H.

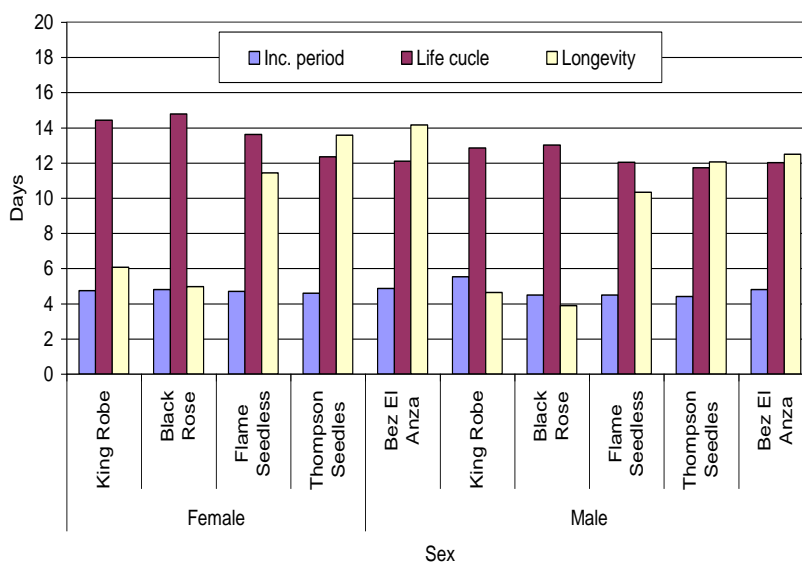


Fig. (3) : Effect of different grape vine varieties on the longevity of *T. urticae* Koch on young leaves at 25 C and 70 % R.H.

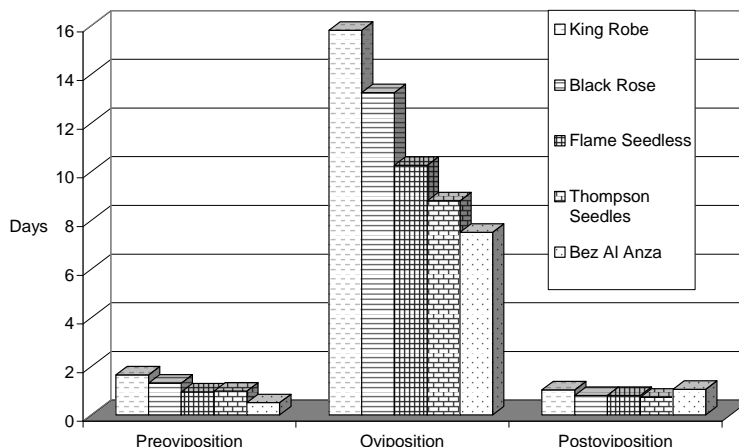
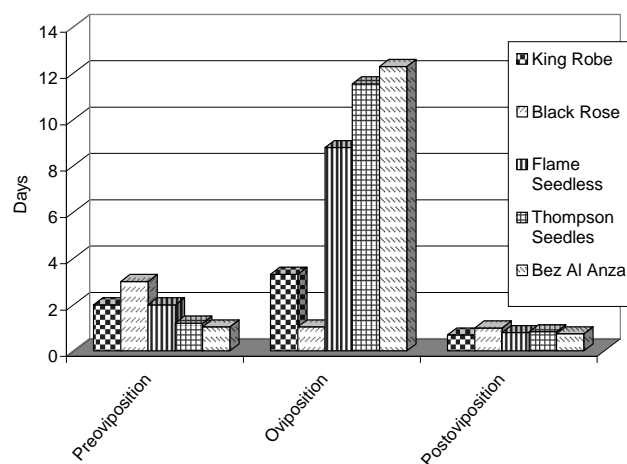


Fig. (4) : Effect of different grape varieties on longevity of *T. urticae* Koch on old leaves at 25 C and 70 % R.H..



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تأثير حساسية بعض اصناف العنب على النواحي البيولوجية للعنكبوت الاحمر *Tetranychus urticae* Koch العادى

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تم دراسة تأثير حساسية بعض اصناف العنب المنزرعة فى منطقة النوبارية بمحافظة البحيرة على بيولوجية العنكبوت الاحمر العادى *T. urticae* فى المعمل عند ٢٥° م ورطوبة نسبية ٧٥ % حيث اتضح ان العنب صنف King Robe كان اعلى الاصناف حساسية بينما الصنف Bez EIANza اقلهم حساسية اما الاصناف Black Rose و Flame Seedless و Thompson Seedless فكانت متوسطة الحساسية ولوحظ ايضا ان اعلى معدل لوضع البيض كان على الصنف King Robe على الاوراق الصغيرة (١٨,٥٣ بيضة).

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