

## Susceptibility of Three Muskmelon *Cucumis melo* L. Cultivars to Infestation with *Tetranychus urticae* Koch

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### ABSTRACT

Experiments were conducted to evaluate the susceptibility of three muskmelon cultivars (Ananas France, Galia2 and Shahd2) to infestation with *Tetranychus urticae* Koch and its population fluctuation during two successive seasons (2012 and 2013) at Behira governorate. Galia2 cultivar was the most highly susceptible recording average of 97.16 and 100.3 mite moving stages and 86.38 and 74.20 eggs/leaf during the two successive seasons, respectively followed by Shahd2 cultivar recording 86.16 and 86.43 mite individuals during the two seasons, respectively. The lowest infestation was recorded on ananas france registering 41 and 39.40' during the two successive seasons respectively. Susceptibility of muskmelon cultivars to infestation with *T. urticae* may be affected by its chemical contents. Negative relationship occurring between motile mite infestation levels and total Alkloids; while no correlation for eggs with all components. Mite population reached its peak during April in the two successive seasons.

**Key Words:** *Tetranychus urticae*, Muskmelon cultivars.

### INTRODUCTION

Musk melon *Cucumis melo* L. (Family Cucurbitaceae) is considered one of the most important vegetable crops in Egypt. It is a species of melons that has been developed into many cultivated varieties. It is also a variety more closely resemble of watermelon which usually infested with *Tetranychus urticae* Koch (Farrag *et al.*, 1984) and the tarsonemid mite *Polyphagotarsonemus latus* Banks (Kousik *et al.*, 2007). Evaluation the susceptibility of some musk melon cultivars to infestation with *T. urticae* is considered important to select the more resistant ones and to avoid using pesticides.

Chemical contents which normally vary from variety to another, may affect the population level of herbivores. Abdallah *et al.* (2009) studied the host plant resistant to *T. urticae*. Thus, the present work was conducted to evaluate the susceptibility of three muskmelon cultivars with *Tetranychus urticae* infestation and its correlation with certain leaf chemical contents. The population dynamics of the mite was also studied throughout the two successive seasons 2012 and 2013.

### MATERIALS AND METHODS

This investigation was carried out in Behara governorate at Nobaria distrect. Three muskmelon cultivars Ananas France, Galia 2 and Shahd2 were cultivated in open field during the two successive seasons (summer season 2012 and early summer

season 2013 in an area about twenty faddan. The population dynamics of *T. urticae* Koch infesting the three previous cultivars. The first season began from 15<sup>th</sup> Jan 2012 up to 23<sup>rd</sup> Feb.2012; while second season began from 14<sup>th</sup> Jan 2013 up to 24<sup>th</sup> Feb.2013. Samples each of 20 leaves were weekly collected from every muskmelon cultivar and examined for movable stages and the eggs of *T. urticae* occurrence. Total amino acids and free amino acids were determined according to Etsushiro *et al.* (1981) method; total phenols content according to Folin-Ciocalteu, described by Meda *et al.* (2005); total Alkoloids titermetrically according to Sabri *et al.* (1973). Total carotenes were determined colormetrically according to Holden (1965), Tannins by using Vanillin hydrochloric acid method according to Burn (1971). Chemical analysis was carried out in the growing season of the three previous cultivars during the two periods peak of infestation. Muskmelon leaves were collected, transferred to laboratory and dried at room temperature and relative humidity then transferred to the laboratory of the Faculty of Agriculture Research Park, Cairo Univ. for chemical analysis.

### RESULTS AND DISCUSSION

Data in table (1) demonstrate that the susceptibility of three previous muskmelon cultivars to the movable stages of *T. urticae* infestation during season 2012 could be arranged descendingly as follows: Galia 2 and Shahd2 (42% and 36%) followed by Ananas France which was moderately infested

Table (1): Susceptibility of three cultivars to *Tetranychus urticae* infestation during 2012 and 2013 seasons

Muskmelon cultivar	Mean number of <i>T. urticae</i> movable stages/leaf			
	summer season 2012		Early summer season 2013	
	Mean number	%infestation	Mean number	%infestation
Galia 2	48.2±29.5 <sup>a</sup>	42%	53.4±31 <sup>a</sup>	44.5%
Shahd 2	42.3±27.8 <sup>a</sup>	36%	41.4±24 <sup>b</sup>	20.7%
Ananas France	24.2±11.3 <sup>b</sup>	21.1%	24.8±10.9 <sup>c</sup>	34.8%
LSD value at 0.05	8.4		8.5	

Means with same letter are not significantly different

Table(2): Susceptibility of three cultivars to eggs of *Tetranychus urticae* infestation during 2012 and 2013 seasons

Muskmelon cultivar	Mean number of <i>T. urticae</i> eggs/leaf			
	summer season 2012		Early summer season 2013	
	Mean number	%infestation	Mean number	%infestation
Galia 2	46.7 <sup>a</sup> ±24.5	43.4%	50 <sup>a</sup> ±24.4	42.9%
Shahd 2	36.5 <sup>b</sup> ±21.4	33.9%	41.4 <sup>b</sup> ±22.9	35.4%
Ananas France	24.4 <sup>c</sup> ±12.4	22.7%	25.4 <sup>c</sup> ±12.3	21.7%
LSD value at 0.05	6.8		6.6	

Mean with the same letter are not significantly different

Table (3): Relationship between phytochemical components of three watermelon cultivars leaves and population of *Tetranychus urticae*

cultivars	infestation	Phytochemical compounds							
		Mean of <i>T. urticae</i> eggs	Mean of <i>T. urticae</i> movable stage	Total amino acids g/100g	Total free amino acids g/100g	Total phenolic compounds g/100g	Total Alkaloids g/100g	Total carotines g/100g	Tannines g/100g
Shahd 2	peak	74.20	86.16	29.26	6.34	2.70	0.22	10.22	1.71
	Late season	55.10	84.13	19.00	5.51	2.45	0.23	8.27	1.54
	mean	64.65	58.2						
Galia 2	peak	86.38	97.16	29.63	6.13	2.67	0.24	12.65	1.87
	Late season	68.17	91.30	20.14	4.28	2.30	0.23	9.12	1.66
	mean	77.3	94.3						
Ananas france	peak	48.14	38.10	28.95	6.00	3.14	0.20	13.92	2.11
	Late season	23.10	31.15	18.23	5.65	3.56	2.16	11.54	1.92
	mean	35.6	34.6						

21.1% and for the second season (2013) it was Galia 2, Ananas France and Shahd2 44.5, 34.8 and 20.7%, respectively.

The mean numbers of *T. urticae* and infestation eggs percentages followed similar trend (table 2) during the same successive seasons. It could be arranged descendingly as follows: Galia2 (43.4 and 50%), Shahd2 (33.9 and 35.4%) and Ananas france (22.7 and 25.4%) during the two seasons.

#### Population dynamic of *Tetranychus urticae* on three muskmelon cultivars:

Population dynamic of the two spotted spider mites *T. urticae* motile stages and eggs were recorded during winter seasons 2012 and 2013 from mid January up to the last week of April. During season 2012, the infestation of muskmelon cultivars Shahd2, Galia2 with motile stages *T. urticae* started from mid

January then gradually increased to reach its peak in the beginning of third week of April and in beginning of second week for Ananas france. The number of motile stages of *T. urticae* /leaf for Ananas France Galia 2 and shahd2 cultivars averaged 5.23, 9.2 and 7.35 in the beginning of infestation, respectively then increased to 41, 97.16 and 86.16 in the peak of infestation, respectively (Fig.1), and in the beginning of infestation of the previous muskmelon cultivars with motile stages of *T. urticae* during season 2013 averaged 6.25, 10.35 and 8 for Ananas france, Galia 2 and Shahd2, respectively, and increased to 39.7 in the third week of march for Ananas france and reached 100.3 and 68.43 in the second week of April, respectively (Fig2). The numbers of eggs/leaf was 7.13, 11.18 and 8.3 in the beginning of season 2012 for Ananas france, Galia2 and shahd2, respectively, and increased to reach its peak to 48.14 and 86.38 in the beginning of April for Ananas france, Galia2,

respectively and 74.20 for shahd2 (Fig3). In season 2013 the numbers of eggs/leaf was 6.98, 13.50 and 9.15 in the beginning of season, and reached its peak 49.34 78.25 in the third week of March for Ananas france and Galia2, respectively and 75.25 in the beginning of April (Fig4).

One of the most important factors which play a role in the susceptibility of muskmelon cultivars to *T. urticae* infestation is leaf phytochemical components. Obtained data in table 3 indicated negative relationship occurring between motile mite infestation levels and total Alkloids; while no correlation for eggs with all components as shown in table 3. These results are in disagreement with those obtained by EL-Saiedy et al., 2011 but in agreement with Edelstain et al. (2000), Cactagnoli et al. (2003), Maklad (2004) and Abdallah et al (2009).

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