

**Population Dynamic of *Tetranychus urticae* and *Euseius scutalis*
on some Plants in Organic Farming in Egypt**

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ABSTRACT

This study was conducted for one year from September 2014 to determine the population dynamics of *Tetranychus urticae* and *Euseius scutalis* (A.-H.) on ornamental, medicinal and aromatic plants (*Hibiscus sabdarriffa* L., *Mentha vridis* L., *Mentha piperita* L. and *Syngonium podophyllum* Schott) at Giza and Qalyubia governorates. A positive correlation occurred between population densities of both mites and weather factors. *T. urticae* population on *Mentha vridis* L., *Hibiscus sabdarriffa* L., *Mentha piperita* L. and *Syngonium podophyllum* Schott increased to reach population on Nov. 1st with an average of eggs and moving stages, respectively (23.50 and 30), Dec. 1st (26.00, and 9), Jun. 1st (37.00, and 24.25), Sept. 1st (37.00 and 24.25) and *Euseius scutalis* on May 1st (15.25 and 24.75), Dec. 1st (25 and 22.25), Dec. 15th (26.00 and 42.25). Then the lowest level of population on Sept. 15th (3.25 and 12.5), Apr. 1st (9.50 and 6), Sept. 1st (2015), (11.50 and 18.5), Mar. 1st (8.50 and 12.75) and *Euseius scutalis* Sept. 15th (3.25 and 3.75), Sept. 1st (9.50 and 14.75), Jan. 1st (9.50 and 15.55), Mar. 1st (9.25 and 13.25) in this data showed that population of *T. urticae* and *E. scutalis* increased to high value in Nov. and Dec. and decreased in numbers on Mar. and Apr. cause of this require to removing weeds in time after this menthes and plants condition.

Key words: Ornamental; Aromatic; Medicinal plants; *Hibiscus sabdarriffa* L.; *Mentha vridis* L.; *Mentha piperita* L. ; *Syngonium podophyllum* Schott; *Tetranychus urticae* Koch; *Euseius scutalis* (A.-H.).

INTRODUCTION

Aromatic and medicinal plants are important sources of herbs and spices which are a good natural source for the synthesis of more complicated flavors, fragrances, pharmaceuticals, vitamins and other important chemicals. Different types of insect and mites are infesting it.

Previous studies have shown that *E. scutalis* is one of the predators of the spider mite *T. urticae*, and immatures of whiteflies (Swirski *et al.*, 1967).

The present study was conducted to determine the population dynamics of *Tetranychus urticae* and associated *E. scutalis* on leaves of the ornamental, medicinal and aromatic plants (*Hibiscus sabdarriffa*, *M. vridis*, *M. piperita* and *Syngonium podophyllum* Schott) at Giza and Qalyubia governorates for one year. This may throw lights to reduce using pesticides in organic farming.

MATERIALS AND METHODS

This study was conducted for one year from September 2014. Samples were collected from two locations (Research of Prerogative of Medicinal and Aromatic Plants center at Gezerat El-Shieer, El-Qanatar El-Khiriya, Qalyubia governorate and the Faculty of Agriculture Cairo university farm in Giza).

Random samples each of 27 leaves from the three

ornamental and aromatic plants (*Hibiscus sabdarriffa* L., *Mentha vridis* L., *M. piperita* L. and *Syngonium podophyllum* Schott) and debris of associated ground were taken throughout the growing season. Mites were extracted by modified Tullgren funnel and identified to species level. Weather records were taken from Meteorological Station of agricultural Res. Cent. Dokki, Giza.

RESULTS AND DISCUSSION

Population dynamics of *E. scutalis* and associated *T. urticae* on leaves of the ornamental, medicinal and aromatic plants *Hibiscus sabdarriffa*, *Mentha vridis*, *M. piperita* and *Syngonium podophyllum*, for one year, were given in Tables 1 & 2.

Data determined that *T. urticae* population increased gradually to reach its peak on Nov. 1st with averages 23.50 and 30 per nine leaves, respectively; then it gradually decreased to reach the lowest level at mid September for moving stages and eggs with averages of 3.25 and 12.5 per nine leaves, respectively. The intercourse between the population of adults, moving stages and eggs of *E. scutalis* and daily mean temperature was significantly positive for all stages, the amounts of L.S.D values were in Jan. 15 13.00 and 6.75 then population gradually increased to reach the peak on May 1st 15.25 and 14.75 per nine leaves, respectively. The population then gradually decreased to reach the lowest level at September for moving stages and eggs with averages of 3.25 and 3.75 per nine leaves, respectively.

Table 1: Population dynamic of *T. urticae* on *H. sabdarriffa*, *M. vridis*, *M. piperita* and *S. podophyllum* for one year from September 2014 at Qalyubia and Giza governorates

Sampling date	<i>M. vridis</i>		<i>H. sabdarriffa</i>		<i>S. podophyllum</i>		<i>M. piperita</i>		Tmp.	R.H.%
	eggs	moving stages	eggs	moving stages	eggs	moving stages	eggs	moving stages		
Sept.	13.1	20.5	23.3	41.9	65	44.6	26	44.5	45	57
Oct.	35.5	38.3	24.8	18.9	38.1	52.8	33.8	43	27	58.5
Nov.	48	71.5	26.8	11.1	39	49.8	39.5	31	25	62
Dec.	36.5	46.5	44.5	21.2	35	37	50.5	41	19	48.5
Jan.	20.3	22.8	31	12.6	43.3	62.1	61	38.6	15.5	55.5
Feb.	21.3	16.5	23.6	11.5	44	37.3	44	30.5	18	48
Mar.	34.3	13.3	30.1	17.1	21	49.8	32.6	33.5	26.5	48
Apr.	46.3	37.5	28	18.1	34.3	37.5	34.6	36.3	28	61.5
May	65	62.8	33.6	24.1	46.3	62.8	46.3	62.8	36.5	48
Jun.	38.5	44.6	36.8	24.9	65	44.6	65	44.6	42.5	36
Jul.	54.5	27.3	29.8	29.6	38.5	27.3	38.5	27.3	39	52
Aug.	23	29.3	19	35.4	52.8	35	54.5	29.3	36.5	54.5
Sept.	23.5	11.5	19	45.3	36.3	25.5	23.5	11.5	36.5	51
LSD _{5%}	7.4	7.4	7	14.5	8.9	13.7	9.5	11.3		

Table 2: Population dynamic of *E. scutalis* on *H. sabdarriffa*, *M. vridis*, *M. piperita* and *S. podophyllum* for one year from September 2014 at Qalyubia and Giza governorates

Sampling date	<i>M. vridis</i>		<i>H. sabdarriffa</i>		<i>S. podophyllum</i>		<i>M. piperita</i>		Tmp.	R.H.%
	eggs	moving stages	eggs	moving stages	eggs	moving stages	eggs	moving stages		
Sept.	6.6	6.6	22.5	49.3	24.8	43.9	43.5	65.8	45	57
Oct.	24	24	23	39.1	27.8	42.5	30.8	54.3	27	58.5
Nov.	30.8	30.8	23.6	35.5	26.3	45.8	41	69.8	25	62
Dec.	22.6	22.6	37.5	33.1	31.5	54.5	38.8	62.6	19	48.5
Jan.	29.5	29.5	30.5	46.3	26.5	42.5	25.5	32.9	15.5	55.5
Feb.	25.3	25.3	21.8	32.5	27	49.8	27.3	49	18	48
Mar.	25.1	25.1	26.3	35.8	25.1	36.3	22.3	28	26.5	48
Apr.	28.3	28.3	29.8	40.8	28.3	54.6	24.6	48.4	28	61.5
May	29.3	29.3	24.3	29.1	29.3	46.3	26.3	42.2	36.5	48
Jun.	28.8	28.8	24.1	39.3	28.8	44.8	22.8	41.5	42.5	36
Jul.	26	26	31.8	29.1	26	46	23.6	45.5	39	52
Aug.	29.8	29.8	31.8	42.9	30	52.8	25.6	56.1	36.5	54.5
Sept.	13	13	9.5	14.5	15.5	16	10.3	19.5	36.5	51
LSD _{5%}	3.7	3.7	5.2	12.2	4.3	7.6	5.8	12		

Population dynamics of *T. urticae* and *E. scutalis* on *H. sabdarriffa*.

Obtained results are parallel with that of Shereef *et al.* (1981) who studied the population densities of the phytophagous mites *T. urticae* and its predatory mites on peppermint in Giza, Egypt, during (1978).

Data showed that the first appearance of *T. urticae* occurred on Sept. 1st for moving stages and eggs, respectively. Population then gradually increased to reach its peak on Dec. 1st with averages (26.00 and 9) per nine leaves, respectively. The population then gradually decreased to reach the lowest level on Apr 1st for both moving stages and eggs with averages 12.5 and 3.00 per nine leaves, respectively.

The intercourse between the population of moving stages and eggs of *E. scutalis* and daily mean temperature was significantly positive for all stages; amounts of L.S.D values were in Jan. 13.00 and 6.75, population gradually increased to reach the peak on

Dec. with averages 25 and 11.75 per nine leaves, respectively; then the population gradually decreased to reach the lowest level on Sept. 1th for moving stages and eggs with averages of 9.50 and 14.45 per nine leaves, respectively.

Population dynamic of *T. urticae* and *E. scutalis* on *M. piperita*.

Data determined that the population gradually increased to reach the peak for *T. urticae* on Jun. with averages 37.00 and 24.25 per nine leaves, respectively; then the population gradually decreased to reach the lowest level at Sept. 2015 for moving stages and eggs with averages of 11.50 and 18.5 per nine leaves, respectively. The intercourse between the population of adults, moving stages and eggs of *E. scutalis* and daily mean temperature was significantly positive for all stages, the amounts of L.S.D values were in Jan. 13.00 and 6.75. Population gradually increased to reach the peak of *E. scutalis* on Dec. with

26.00 and 42.25 moving stages per nine leaves, respectively; then the population gradually decreased to reach the lowest level in Jan. for both moving stages and eggs with averages of 9.50 and 15.5 per nine leaves, respectively.

Population densities of *T. urticae* and *E. scutalis* on *S. podophyllum*.

The populations gradually increased to reach the peak for *T. urticae* in Sept. with an average 37.00 eggs and 24.25 moving stages per nine leaves, respectively; then the population gradually decreased to reach the lowest level on Mar.^{1st} for moving stages with averages of 8.50 and 12.75 per nine leaves, respectively. The intercourse between the population of adults, moving stages of *E. scutalis* and daily mean temperature was significantly positive for all stages; the amounts of L.S.D values were on mid Aug. 16.00 and 19.25, then population gradually increased to reach the peak of *E. scutalis* on Dec. 26.00 eggs and 42.25 moving stages per nine leaves then population gradually decreased to reach the lowest level in Mar. 9.25 eggs and 13.25 moving stages.

The Data showed that two factors had a strong effect on the abundance of mite on Spearmint plants. The statical analysis proved that the daily mean temperature positively affected the population of the arthropods associated with spearmint plants; while on the contrary; relative humidity had a negative effect. This agrees with Sheref *et al.* (1981) who reported

that weather temperature significantly affected phytophagous mite population. Abo Shnaf (2009) also reported that *T. urticae* density increased rapidly in July and remained at a high level until September: population then gradually decreased until February.

Finely, this study showed that in organic farming, the predator *Euseius scutalis* had a great effect in reducing *T. urticae* prey as negative correlations occurred. The increase of the predator under conditions of organic farming decreased associated pests specially *T. urticae*.

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