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BIO-ECOLOGICAL STUDIES ON THE TWO-SPOTTED RED SPIDER MITE, *Tetranychus urticae* KOCH ON SOME LEGUMINOUS CROPS AT SHARKIA GOVERNORATE, EGYPT

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ABSTRACT

Frequency occurrence and some biological aspects of the two-spotted red spider mite, *Tetranychus urticae* Koch were studied on seven important leguminous crops commonly grown in Sharkia Governorate, Egypt (common bean, cowpea, faba bean, lupine, pea, peanut, soybean). The highest frequency of occurrence of *T. urticae* was recorded on soybean (87.96%) followed descendengly by common bean (84.26%), cowpea (71.29%), lupine (70.45%), faba bean (57.82%), pea (50.88%) and peanut (46.00%). Duration of developmental stages, generation time, longevity and fecundity of *T. urticae* female were investigated when reared on leaf discs of the aforementioned crops under laboratory conditions. Prolonged development of all stages was observed as well the total and daily egg production rates were fewer at low temperature (20±2°C) on the tested winter legume crops. These rates were 19.80, 2.28, 31.10, 3.01 and 46.90, 3.10 eggs when the mite female fed on lupine, faba bean and pea plants, respectively. Rising temperature to 25±2°C caused shortening of the developmental stages, when rearing on leaf discs of summer legume crops. The highest total number of deposited eggs was recorded on common bean (69.83 eggs) and soybean (58.66 eggs) with the highest daily mean of 6.02 and 5.98 eggs per day, successively. Moderate numbers of deposited eggs were observed on cowpea (48.33 eggs) and peanut (44.67 eggs), with nearly subequal daily mean of 5.33 and 5.05 eggs, respectively. Results suggested that, the two- spotted red spider mite *T. urticae* may be considered a serious pest of the leguminous crops in Egypt. Temperature and host plant species are of the factors affecting populations of this pest on these crops.

Key words: *Tetranychus urticae*, biology, ecology, frequency occurrence, host plants, leguminous crops.

INTRODUCTION

Family Leguminacae contains a large number of crops, several of them are of economic importance. Soybean *Glycine max* is one of the most important legume crops in different parts of the world. Great attention has been paid to improve total production and quality by increasing the area under soybean cultivation. Several authors cleared that one of the factors contributing to low yields is injury caused by many arthropod pests, particularly phytophagous mites that are widely spread during the growing season (Simpson and Connell, 1973; Hildebrand *et al.*, 1986; Rajkovic, 1988; Brown *et al.*, 1991). Moreover, Johnson *et al.* (1982) as well Smith and Mozingo (1983) reported that *T. urticae* is an important pest of cultivated peanut *Arachis hypogaea* causing losses in most years. Feeding injury caused by the tetranychid mite *T. urticae* on common bean *Phaseolus vulgaris* was discussed by Kasem (1984), Kropczynska and Tomczyk (1986), Fustaino (1987) and Lee *et al.* (1988). In India, Singh and Singh (1987) and Singh (1995) mentioned that the red spider mite *Tetranychus ludeni* appeared to be a serious pest of cowpea *Vigna sinensis*. Banpot *et al.* (1986) stated that the red spider mite *Tetranychus* sp. is one of the arthropod pests attacking pigeon pea

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Cajanus cajan. Flechtmann *et al.* (1999) collected the tetranychid mite *Schizotetranychus kreiten* from pigeon pea in Guadeloupe. Sharaf (1986) reported that faba bean *Vicia faba* is the most suitable host for rearing *T. urticae* in greenhouses.

In Egypt, summer legume crops (common bean, cowpea, peanut, soybean) as well as winter legume crops (faba bean, lupine, pea) are commonly grown and considered as important legumes especially in Sharkia Governorate. A number of studies have been carried out on spider mites infesting these crops (Hoda *et al.*, 1986; Farrag *et al.*, 1998; Taha *et al.*, 2002; El-Duweini *et al.*, 2003; Ahmed, 2005; Mohamed and Omar, 2007; Hashem *et al.*, 2009; Romeih *et al.*, 2013) and some others yet are not studied (lupine, pea, cowpea). Several studies indicated that, the two-spotted spider mite does not accept all plants to the same degree, because of differences in nutritive and toxic constituents (Boom *et al.*, 2003; Gotoh *et al.*, 2004). Other factors such as morphology of leaf surface also play an important role in plant acceptance (Hanna *et al.*, 1981; Warabieda and Solomon, 2003; Skorupska, 2004). Generally, the objective of this study was to compare the occurrence of *T. urticae* on some leguminous crops at different localities of Sharkia Governorate and some biological aspects of this species were determined under laboratory conditions.

MATERIALS AND METHODS

Frequency Occurrence of the Two-Spotted Red Spider Mite, *Tetranychus urticae* on Some Legume Crops at Sharkia Governorate

Fifty samples (50 leaves each) of seven legume crops, *i.e.*, common bean, *Phaseolus vulgaris*; cowpea, *Vigna sinensis*; faba bean, *Vicia faba*; lupine, *Lupinus termis*; pea, *Pisum sativum*; peanut, *Arachis hypogea* and soybean, *Glycine max* were randomly collected from five districts, Abou-Kapeer, El-Hussania, El-Salhia, Fakous and Hehia throughout the growing season of each crop. Leaf samples were collected and placed separately in tightly closed plastic bags marked by a label denoting host plant species, date of collection and sampling place, then transferred to the laboratory for inspection by the aid of a stereomicroscope. The frequency occurrence of the mite in the examined samples was classified as constant "C", accessory "A" or accidental "AC" if it occurred in > 50, 25- 50 or < 25 % of the total number of samples, respectively (Palyvos *et al.*, 2008).

Biological Studies

Durations of developmental stages, longevity and fecundity of *T. urticae* females on leaves of seven legume crops

The stock cultures of *T. urticae* were started from female and male individuals collected from leaves of seven legume crops, *i.e.*, common bean, cowpea, faba bean, lupine, pea, peanut and soybean. The mite was reared according to the methods described by Gotoh (1986) and Pontier *et al.* (2000). Under laboratory conditions healthy leaves of the aforementioned legume crops were placed singly with upper surface down on cotton pad soaked with water in Petri dishes. Each leaf was surrounded by a cotton strip saturated with water to serve as a barrier to prevent escape of mites. Suitable moisture was maintained by adding few drops of water as needed. Leaves were changed when needed. The culture units were kept under laboratory conditions. Sexed females were placed singly on each of the previous mentioned units using leaf discs (4 cm in diameter) of the abovementioned legume crops and left to deposit their eggs. After 12 hr., the females were transferred to another Petri dish and left to deposite another eggs. The deposited eggs, were twice daily examined during the incubation period. Hatched larvae were reared singly on the previous host plants during their life span. The durations of egg, larval, protonymphal and deutonymphal stages were calculated, in addition to the durations of total immatures, life cycle, generation and life span. Moreover, the preoviposition, oviposition, postoviposition and longevity periods were measured. Experiments were carried out under laboratory conditions at approximately 20±2°C and 80±4% R.H. for the winter legume crops, while these values were 25±2°C and 60±5% R.H. for the summer legume crops. The obtained data were subjected to statistical analysis of variance according to Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

Frequency Occurrence of *T. urticae* on Some Legume Crops at Sharkia Governorate

Frequency occurrence of the two-spotted red spider mite, *T. urticae* on common bean, cowpea, faba bean, lupine, pea, peanut and soybean in five districts, Sharkia Governorate, *i.e.,* Abou-Kapeer, El-Hussania, El-Salhia, Fakous and Hehia counties is shown in Table 1. The mite was classified as constant of soybean, common bean and cowpea in all investigated localities where, it recorded the highest mean values of frequency occurrence in total collected samples reaching 87.96, 84.26 and 71.29%, respectively. On the other hand, the least values of frequency occurrence were recorded on peanut plants. These values were 50.00, 50.00, 44.00, 44.00 and 42.00% in Abou-Kapeer, El-Hussania, El-Salhia, Fakous and Hehia, consecutively. Lupine and faba bean occupied the fourth and fifth ranks of *T. urticae* frequency occurrence among the investigated plants, where the mite was rated as constant in all of the investigated localities except in Hehia since it was considered as accessory, with frequency occurrence of 50.00 and 42.14% for lupine and faba bean, successively. The mite was constant on pea plants in El-Hussania, El-Salhia and Fakous localities, but in Abou-Kapeer and Hehia the mite was accessory, with frequency occurrence of 45.00 and 33.00% respectively. Generally, the highest mean values of frequency occurrence (87.96%) was recorded on soybean, followed by common bean (84.26%); cowpea (71.29%); lupine (70.45%); faba bean (57.82%); pea (50.8%) and peanut (46.00%). These results indicated that, the two-spotted spider mite *T. urticae* has a broad range of host plants and has the potential to become a serious pest on these investigated crops.

Some Biological Aspects of *T. urticae*

Obtained data in Tables 2 and 3 demonstrated that, the egg incubation periods of the tetranychid mite *T. urticae* on the investigated legume plant leaves were nearly similar at the same temperature. This period was usually longer at lower temperature (20 ± 2°C), where it ranged from 6.2 to 6.5 days. At higher temperature (25 ± 2°C) the duration of egg stage was markedly shorter and lasted from 3.95 to 4.01 days. The egg stage occupied from 38.12-40.13% and from 30.36 to 32.70% of the entire developmental period on the tested crop leaves at 20 ± 2°C and 25 ± 2°C, respectively. These results nearly agree with those of some authors such as Gotoh (1986) who reported that the egg stage of *T. viennensis* female occupied 44% of the entire developmental period on deciduous oak leaf discs at 25°C. Carey and Bradley (1982) mentioned that, the egg stage of *T. urticae* lasted 6.00 and 4.42 days at 21.1°C and 23.8°C, respectively on cotton cotyledons.

The average durations of larval, protonymphal and deutonymphal stages of *T.urticae* fed on leaf discs of the investigated legume plants at 20 ± 2°C are completed in about of 3.4, 2.95, 3.65; 3.6, 3.15, 3.9 and 3.2, 2.8, 3.4 days when mite reared on faba bean, lupine and pea leaf discs, respectively (Table 2). These values at 25±2°C averaged 2.75, 2.59, 2.91; 2.88, 2.77, 3.11; 2.96, 2.88, 3.22 and 2.76, 2.69, 3.03 days for larva, protonymph and deutonymph when fed on common bean, cowpea, peanut and soybean leaf discs, successively.

The tested plant leaves significantly affected the duration of development for *T. urticae* immature stages. When rearing on tested winter crops (at 20 ± 2°C), the shortest period of immature stages (9.4 days) was recorded on pea leaves. Significantly longer period for development of immature stages (10.55 days) was recorded on lupine leaves. On faba bean this period averaged 10 days. On the tested summer legume crops at 25 ± 2°C, durations of development for *T. urticae* immature stages were markedly shorter, averaging 8.25, 8.48, 8.76 and 9.06 days on common bean, soybean, cowpea and peanut, respectively (Table 3). Van de Vrie *et al.* (1972) mentioned that the rate of development of *T. urticae* immature stages is influenced by temperature, humidity and quality of food.

Regarding total developmental time from egg to adult, data in Table 2 showed that when the mite fed on faba bean, lupine and pea leaf discs at 20 ± 2°C, the total developmental time from egg to adult was longer and durated 16.2, 17.05 and15.7 days for the aforementioned host plants, respectively. Insignificant variations ($P<05$) were not detected between host plants. At the higher temperature (25±2°C) *T. urticae* required

Table 1. Percent frequency occurrence of the two-spotted red spider mite, *Tetranychus urticae* on some leguminous crops at different localities of Sharkia Governorate

Localities / Crop	Abou-Kapeer	El-Hussania	El-Salhia	Fakous	Hehia	Mean of collected samples
Common bean	87.50^{C}	80.95^{C}	60.00^{C}	92.85^{C}	100.00^{C}	84.26^{C}
Cowpea	77.77^{C}	68.42^{C}	73.00^{C}	70.58^{C}	66.66^{C}	71.29^{C}
Faba bean	66.66^{C}	56.52^{C}	66.66^{C}	57.14^{C}	42.14^{A}	57.82^{C}
Lupine	75.00^{C}	73.33^{C}	75.00^{C}	78.94^{C}	50.00^{A}	70.45^{C}
Pea	45.00^{A}	60.00^{C}	60.00^{c}	56.00^{C}	33.00^{A}	50.80^{C}
Peanut	50.00^{A}	50.00^{A}	44.00^{A}	44.00^{A}	42.00^{A}	46.00^{A}
Soybean	90.00^{C}	80.00^{C}	80.90^{C}	88.88^{C}	100.00^{C}	87.96^{C}
Mean	70.28^{C}	67.03^{C}	65.65^{C}	69.77^{C}	61.97^{C}	67.37^{C}

The mite was classified as constant (C), accessory (A) or accidental (AC) if it occurred in > 50, 25-50 or < 25% of the total number of samples, respectively (Palyvos *et al.*, 2008).

Table 2. Developmental periods (in days) of *Tetranychus urticae* female when reared on leaves of some winter legume crops at 20±2°C and 80±4% R.H.

Mite stage	Host plant			
	Faba bean	Lupine	Pea	LSD $_{0.05\%}$
Egg	6.20 ± 0.2	6.50 ± 0.22	6.30 ± 0.20	0.641
Larva	3.40 ± 0.19	3.60 ± 0.10	3.20 ± 0.24	0.573
Protonymph	2.95 ± 0.31	3.15 ± 0.23	2.80 ± 0.20	0.775
Deutonymph	3.65 ± 0.22	3.90 ± 0.19	3.40 ± 0.19	0.609
Total immatures	10.0 ± 0.34	10.55 ± 0.24	9.40 ± 0.42	1.052
Life cycle	16.2 ± 0.50	17.05 ± 0.40	15.70 ± 0.50	1.440
Generation	18.35 ± 0.65	19.55 ± 0.44	17.58 ± 0.66	1.830
Life span	30.95 ± 1.04	30.6 ± 0.55	34.88 ± 0.63	2.379

± (SE) =Standard error.

Table 3. Developmental periods (in days) of *Tetranychus urticae* female when reared on leaves of some summer legume crops at 25±2°C and 60±5% R.H.

Mite stage	Host plant				
	Common bean	Cowpea	Peanut	Soybean	LSD $_{0.05\%}$
Egg	4.01±0.17	3.96±0.08	3.95±0.19	3.98±0.11	0.423
Larva	2.75±0.06	2.88±0.21	2.96±0.11	2.76±0.07	0.373
Protonymph	2.59±0.05	2.77±0.09	2.88±0.16	2.69±0.04	0.292
Deutonymph	2.91±0.16	3.11±0.17	3.22±0.14	3.03±0.15	0.455
Total immatures	8.25±0.19	8.76±0.07	9.06±0.26	8.48±0.14	0.530
Life cycle	12.26±0.31	12.72±0.13	13.01±0.32	12.46±0.17	0.731
Generation	13.34±0.31	13.93±0.12	14.29±0.39	13.64±0.21	0.849
Life span	27.06±0.24	25.45±0.30	25.6±0.51	25.69±0.37	1.133

± (SE) = Standard error.

markedly less time to complete its life cycle, with significant differences between the tested plants. The shortest period of life cycle (12.26 days) was recorded on common bean leaves, whereas this period lasted 12.46 and 12.72 days when mite reared on soybean and cowpea leaves, respectively. The longest period of life cycle (13.01 days) was observed on peanut leaves (Table 3). Carey and Bradley (1982) reported that, the life cycle of *T. urticae* lasted for an average of 10.5 days when the mite fed on cotton cotyledons at 23.8°C. On the other hand, the spider mite, *T. pacificus* maturated in an average of 10.5 days at 24°C on the same host plant. Similar results were obtained by Awad (2013) who showed that, life cycle of *T. urticae* was completed in 11.92 and 12.98 days when fed on persimmon and pecan leaves, respectively at 27 ± 2°C and 70 ± 4% R.H.

Generation period of *T. urticae* was significantly influenced by host plant. On winter legume crops tested at 20 ± 2°C the mite completed a full egg to egg cycle in a markedly longer time ranged from 17.58 to 19.55 days when mite female fed on pea and lupine leaves, respectively (Table 2). On faba bean leaves, generation time was 18.35 days. On the contrary, generation period durated a considerably shorter time ranged from 13.34 to 14.29 days when mite female fed on common bean and peanut leaves, successively. These values averaged 13.64 and 13.93 days when mite feeding was done on soybean and cowpea leaves, alternatively (Table 3). Hanna *et al.* (1981) reported that generation time of *T. urticae* durated 11.38 and 11.43 days at 27±2°C when mite fed on the two soybean varieties, Hampton and Gacson, respectively. Similarly, Rao *et al.* (1996) stated that with rising temperatures (20, 25 and 30°C) the generation time of *T. urticae* as well as doubling time of the population decreased. Moreover, Awad (2013) showed that, the generation period of *T. urticae* averaged 13.58 and 14.25 days when mite female reared on persimmon and pecan leaf discs, successively under laboratory conditions of 27±2°C and 70±4% R.H.

The investigated host plants were significantly differed in their effect on life span of the tetranychid mite *T. urticae*. Female mite lived a considerably longer time when fed on winter legume crops tested at 20±2°C, female life span averaged 30.6 and 30.95 days on lupine and faba bean leaves, consecutively. Significantly longer life span (34.88 days) was recorded on pea leaves. On the contrary, lower values of *T. urticae* life span were recorded at higher temperature 25±2°C. These periods were nearly subequal on cowpea (25.45), peanut (25.6) and soybean (25.69). The longest period of *T. urticae* life span (27.06) was recorded when mite reared on common bean leaves (Tables 2 and 3). Rao *et al.* (1996) showed that, in all rearing methods used, rising temperature (20, 25 and 30°C) caused a shortening of adult life span of the two-spotted spider mite *T. urticae*. Shehata (2010) reported that, the life span durated 34.53 days for *T. urticae* female when fed on soybean leaves at 27±2°C and 65 ± 5% R.H. Life span of *T. urticae* averaged 27.58 and 26.08 days on pecan and persimmon leaves (Awad, 2013).

Data tabulated in Table 4 indicat that, the time from maturation to the first egg (preoviposition period) ranged from 1.88 days on pea and 2.15 days on faba bean to 2.43 days on lupine leaves at 20 ± 2°C. At 25 ± 2°C the preoviposition periods were 1.08, 1.18, 1.21 and 1.28 days on common bean, soybean, cowpea and peanut leaves, respectively (Table 5). Female of *T. urticae* continued to deposit eggs for a period averaging 10.4 and 15.15 days when they fed on faba bean and pea leaf discs, respectively, considerably longer than that reared on lupine leaf discs (8.85 days). On the other hand, oviposition period averaged 9.83, 9.08 and 8.88 days on soybean, cowpea and peanut leaf discs, successively, markedly shorter than that reared on common bean leaf discs (11.63 days).

Before the adult female of *T. urticae* death at 20 ± 2°C, it stopped egg laying for a period averaging 2.15, 2.2 and 2.28 days on pea, faba bean and lupine leaf discs, respectively (Table 4). At 25±2°C female of *T. urticae* reared on common bean, soybean, cowpea and peanut leaf discs died within 2.09, 2.21, 2.43 and 2.43 days after the end of oviposition, alternatively. Gotoh (1986) reported that, most females of *T. viennensis* died within one or two days after the end of oviposition.

Adult female longevity of *T. urticae* significantly affected by kind of host plant at 20±2°C when reared on faba bean, pea and lupine

Table 4. Longevity (in days) and fecundity of *Tetranychus urticae* when reared on leaves of some winter legume crops at 20 ± 2°C and 80 ± 4% R.H.

Crop	Preoviposition period	Oviposition period	Postoviposition period	Longevity	Deposited eggs	
					Total average	Daily mean
Faba bean	2.15 [ab]	10.40 [b]	2.2 [a]	14.75 [b]	31.10 [b]	3.01 [a]
	±0.24	±0.46	±0.21	±0.42	±0.91	±0.06
Lupine	2.43 [a]	8.85 [c]	2.28 [a]	13.55 [c]	19.80 [c]	2.28 [b]
	±0.09	±0.51	±0.10	±0.51	±0.73	±0.10
Pea	1.88 [b]	15.15 [a]	2.15 [a]	19.18 [a]	46.90 [a]	3.10 [a]
	±0.18	±0.22	±0.11	±0.25	±0.80	±0.07
LSD $_{0.05\%}$	0.52	1.20	0.43	1.18	2.36	0.22

± (SE) =Standard error.

Means followed by the same letter in columns are not significantly different at P<05 according to Duncan's multiple range test.

Table 5. Longevity (in days) and fecundity of *Tetranychus urticae* when reared on leaves of some summer legume crops at 25 ± 2°C and 60±5% R.H.

Crop	Preoviposition period	Oviposition period	Postoviposition period	Longevity	Deposited eggs	
					Total average	Daily mean
Common bean	1.08 [a]	11.63 [a]	2.09 [a]	14.80 [a]	69.83 [a]	6.02 [a]
	±0.05	±0.24	±0.14	±0.22	±1.89	±0.18
Cowpea	1.21 [a]	9.08 [c]	2.43 [a]	12.73 [b]	48.33 [c]	5.33 [b]
	±0.10	±0.15	±0.18	±0.34	±1.17	±0.13
Peanut	1.28 [a]	8.88 [c]	2.43 [a]	12.59 [b]	44.67 [c]	5.05 [b]
	±0.08	±0.15	±0.12	±0.24	±1.74	±0.24
Soybean	1.18 [a]	9.83 [b]	2.21 [a]	13.23 [b]	58.66 [b]	5.98 [a]
	±0.08	±0.22	±0.15	±0.31	±2.03	±0.17
LSD $_{0.05\%}$	0.22	0.606	0.438	0.823	5.143	0.53

± (SE) = Standard error.

Means followed by the same letter in columns are not significantly different at P<05 according to Duncan's multiple range test.

leaves. The prolongest longevity period was recorded on pea leaves (19.18 days) followed by faba bean leaves (14.75 days). Contrarily, the shortest longevity was recorded on lupine leaves (13.55 days). At 25 ± 2°C adult female of *T. urticae* lived slightly shorter time depending on host plant. The longest longevity was recorded on common bean leaves (14.80 days). On soybean, cowpea and peanut leaves these values averaged 13.23, 12.73 and 12.59 days, respectively (Tables 4 and 5). The total adult longevity of *T. viennensis* was 17.58 days at 25°C (Gotoh 1986), Chahine *et al.* (1994) showed that, adult female of *T. urticae* lived 11 days when fed on *Phaseolus vulgaris* leaves in the laboratory at 22°C.

The total average and daily mean of deposited eggs per *T. urticae* female were significantly influenced by kind of host plant. Feeding on leaves of pea resulted in significantly greater number of deposited eggs (46.90 eggs) with the highest daily rate of 3.10 eggs/day. The least number of deposited eggs (19.80 eggs) was recorded on lupine leaves with the least value of daily rate (2.28 eggs/day). Moderate values of the total average (31.10 eggs) and daily mean (3.01 eggs/day) of deposited eggs per *T. urticae* female were recorded on faba bean leaves (Table 4). Greater values of the total average and daily mean of deposited eggs per adult female of *T.urticae* were recorded when mite fed on the tested summer legume crop leaves under laboratory conditions of 25 ± 2°C. The greatest number of deposited eggs (69.83 eggs) and the highest daily rate (6.02 eggs/day) was recorded on common bean leaves. Significantly greater numbers of deposited eggs (58.66 eggs) and daily rate (5.98 eggs/day) were resulted when the mite female fed on soybean leaves. The lowest numbers of deposited eggs were recorded on cowpea leaves (48.33 eggs) and peanut leaves (44.67 eggs), with daily means of 5.33 and 5.05 eggs/day for the former and later host plants, respectively (Table 5). These results nearly agree with data obtained by Chahine *et al.* (1994) who reported that the adult female of *T. urticae* laid 55.2 eggs as a total number when fed on common bean *P. vulgaris* in the laboratory at 22°C. The total number of eggs laid per female of *T. urticae* on soybean, Clark cultivar was 86.95 in the laboratory at 27±2°C (Hanna *et al.*, 1981). The daily ovipositional rate on peanut agreed with Shehata (2010) who reported that the daily mean of deposited eggs laid by *T. urticae* on peanut leaves was 4.95 eggs/ day at 27±2°C. Generally, the findings of this study are in agreement with similar studies on tetranychid species. Van de Vrie *et al.* (1972) showed that, the rate of development of the immature stages of tetranychids is influenced by temperature, humidity and quality of the food. Carey and Bradley (1982) indicated that, the developmental times are only slightly affected by the host plant and the temperature is the overriding environmental influence in the life history parameters. Temperature play a key role in the time needed for development and average fecundity of the spider mite *T. urticae* (Halloum *et al.*, 2009). The divers host plant species may have been the different effects on the spider mite *T. urticae* (Boom *et al.*, 2003; Gotoh *et al.*, 2004; Razmjou *et al.*, 2009). Singh (1995) indicated that, temperature appeared to be regulatory factor for population build-up of *T. urticae* on cowpea. Both temperature and rearing methods were found to be key elements influencing the life history of *T. urticae* (Rao *et al.*, 1996).

From the previous results, it can be concluded that, the two-spotted red spider mite *T.urticae* is very polyphagous and considered a serious pest on legume crops. The choice of host plant species will affect populations of this pest to reach damaging level in culture. The mite appears more serious on legumes during summer season because of shorter developmental time and higher fecundity.

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دراسات بيوإيكولوجية على حلم العنكبوت الأحمر ذوالبقعتين *Tetranychus urticae* Koch على بعض المحاصيل البقولية فى محافظة الشرقية بمصر

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تم دراسة تكرار التواجد وبعض النواحى البيولوجية لحلم العنكبوت الأحمر ذو البقعتين *Tetranychus urticae* على سبعة محاصيل بقوليه هامة والتى تزرع بكثرة فى محافظة الشرقية بمصر، ثلاثة منها شتوية وهى الفول البلدى والترمس والبسلة والأربعة الأخريات صيفية وهى الفاصوليا واللوبيا والفول السودانى وفول الصويا، تم تسجيل أعلى تكرار للتواجد على فول الصويا بنسبة ٨٧,٩٦% متبوعاً بالفاصوليا ٨٤,٢٦% واللوبيا ٧١,٢٩% والترمس ٧٠,٤٥% والفول البلدى ٥٧,٨٢% والبسلة ٥٠,٨% والفول السودانى ٤٦%، قدرت فترات تحول الأطوار، مدة الجيل، وطول العمر، وخصوبة إناث الحلم عند تربيته على أقراص ورقيه من النباتات المذكورة سالفا تحت ظروف المعمل، تم ملاحظة طول فترات تحول كل الأطوار على درجة الحرارة (٢٠±٢م) وذلك عند التربية على المحاصيل البقولية الشتوية، كما قل معدل وضع البيض الكلى واليومى للحلم على النباتات البقولية الشتوية، حيث بلغت هذه القيم ١٩,٨٠، ٢,٢٨ و ٣١,١٠، ٣,٠١ و ٤٦,٩٠، ٣,١٠ بيضه عند تربية الحلم على النباتات سابقة الذكر على التوالى، وعند ارتفاع درجة الحرارة إلى (٢٥ ± ٢°م) أدى ذلك إلى قصر فترات التطور وذلك عند تربية الحلم على النباتات البقولية الصيفية، كما تم تسجيل المعدل الكلى الأكبر لوضع البيض على الفاصوليا (٦٩,٨٣ بيضة) وفول الصويا (٥٨,٦٦ بيضة) بمتوسط يومى بلغت قيمته ٦,٠٢، ٥,٩٨ بيضة على التوالى، وسجلت أعداد متوسطة للبيض على اللوبيا (٤٨,٣٣ بيضه) والفول السودانى (٤٤,٦٧ بيضة) بمتوسط يومى متقارب لحد ما ٥,٣٣ ، ٥,٠٥ بيضة على التوالى، وعموما توضح هذه النتائج أن حلم العنكبوت الأحمر ذو البقعتين يعتبر آفة خطيرة على المحاصيل محل الدراسة فى مصر، كما أن درجة الحرارة والعائل النباتى من العوامل المؤثرة على تعدادات هذه الآفة.

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