Occurrence of phytophagous and predacious mites in two fig cultivars with population dynamics of the most abundant species in relation to weather factors and plant phenology at Sohag governorate, Egypt

Abd El-Aleem S. Desoky[1], Azza A. Mohamed[2*], Hany A. Fouad[1] & Nourhan A. Amin[1]

[1]*Plant Protection Department, Faculty of Agriculture, Sohag University, Sohag, Egypt. E-mail, abdelalem2011@yahoo.com; haafouad@yahoo.com; norhanabdalghany226@gmail.com*
[2]*Plant Protection Research Institute, Agricultural Research Center, Giza, Egypt, E-mail,azza.abdelgawad@yahoo.com; ORCID https://orcid.org/0000–0002 -7907-5018*
**Corresponding author, E-mail, azza.abdelgawad@yahoo.com*

ABSTRACT

A survey and ecological studies were carried out on mite species inhabiting fig, *Ficus carica* L. (Moraceae), an important fruit crop in Egypt, at Sohag governorate during 2020–2021. The occurrence of species inhabiting leaves, debris and soil of "Sultani" and "Condria" fig cultivars were considered. Results revealed the occurrence of 51 mite species. Nine phytophagous mite species presented nine genera and five families (i.e., Diptilomiopidae, Eriophyidae, Tarsonemidae, Tenuipalpidae and Tetranychidae). Thirty-one species of predaceous mites (25 genera, 13 families) and 11 species (10 genera and 8 families) miscellaneous-feeding habits were recorded. Population dynamics of *Tetranychus urticae* Koch, *Euseius scutalis* (Athias-Henriot), *Tydeus oregonensis* Baker, *Agistemus exsertus* Gonzalez and *Aceria ficus* (Cotté) were found to be affected by both weather factors and plant phenology. *Tetranychus urticae* had two peaks in mid-Jul. and early Oct. on "Sultani" and "Condria" cultivars during the two successive years. The fig bud mite, *A. ficus* was recorded with a high numbers in Jun. on both cultivars. Predacious mites were found to be in relation to occurring phytophagous ones. The population dynamics of phytophagous mites with the relation of temperature, relative humidity and plant age (i.e., plant phenology to emulating plant nutritional value dynamic) were fitted to a polynomial model including weather factors and plant age as third degree of polynomial over two intervals presenting two phonological intervals of plant growth pattern. Results indicated that the change in the nutritional value of the host plant was more effective on mite population dynamics than weather factors.

Keywords: Survey, *Ficus carica*, ecology, plant-feeding mites, predators, miscellaneous.

INTRODUCTION

Fig, *Ficus carica* L. (Moraceae) is one of the most economic fruit crops in Egypt (Abo-El-Saad and Salem 2011). Figs have great nutrition value due to being important sources of carbohydrates, essential amino acids and are rich in vitamins A, B1, B2, C and minerals. Fig orchards are more susceptible to injury of several phytophagous mites causing economic yield loss (El-Halawany et al. 1986; Mannaa 1988 and Ali 2006). Phytophagous mites found on fig orchards feed on the plant sap causing great damage by piercing leaf cells and sucking out the contents, causing cell damage and death (Farrag et al. 1998). Eriophyoid bud and leaf mites injure fig orchards in Egypt, their infestations have been increased in the last few years to significant rates. The most familiar symptoms caused by these mites are rusting or surface browning, bud blasting, impedance of new growth, bud distortion, and leaf chlorosis. Severe infestation may result in defoliation of branches or of whole orchards (Abdel-Khalek 1993). The two-spotted spider mite, *Tetranychus urticae* Koch (Acari: Tetranychidae) is one of the most important pests in many cropping systems worldwide. Its host plants (nearly 1150 plant species) comprise vegetables, fruits, crops, and a wide range of ornamentals (Migeon and Dorkeld 2021). The predaceous mites, *Phytoseius finitimus* Canestrini & Fanzago and *Agistemus exsertus* Gonzalez were reported on apple trees in Egypt. These mites feed on tenuipalpid, tetranychid, and eriophyid mites (El-Laithy and Fouly 1992).

This study was conducted to list different mite species on different cultivars of fig orchards and the population dynamics of the dominant mite species on "Sultani" and "Condria" fig cultivars at Sohag governorate, Egypt.

MATERIALS AND METHODS

Occurrence of mites inhabiting fig orchards

The present investigation was conducted at different locations at Sohag governorate during the 2020–2021. Thirty leaves of fig orchards were randomly collected. About 250 g of debris and soil to a depth of 20 cm underneath fig orchards was sampled. Samples were kept

immediately in paper bags and tightly closed then transferred to the laboratory for examination. Leaves were directly examined with the aid of a stereo-microscope. While the mites in debris and soil were extracted using modified Tullgren funnels for about 24 hours (Lasebikan 1974). The extracted mites were received in Petri dishes filled with water, then examined under a stereo-microscope and cleared in lactic acid and mounted in Hoyer's medium on glass microscopic slides for further identification (El-Moghazy and Shawer 2013). The eriophyid mites were mounted in modified Berlese medium (Jeppson et al. 1975). The necessary information (host plant, location, and collecting date) was registered on labels which were stuck on slides of one side, then gently heated to stretch the individuals to get off the air for further microscopically examination using (Optika-Vision Lite_ENG-rev 01, Italy) to identify the specimens to mite species level to be written on the other side of the slide. Mounted slides were kept for 24 hr. in an electric oven at 40–50ºC. Mite identification was conducted according to the world references keys (Hughes 1976; Evans and Till 1979; Zaher 1984, 1986; Ueckermann and Meyer, 1987; Krantz and Walter 2009; Abo-Shnaf and Moraes 2014; Mašán 2017).

Population dynamics

For mite sampling, 15 pesticide-free orchards of two fig cultivars "Sultani" and "Condria" were selected. Samples were biked up twice monthly during 2020–2021. A random 30 leaves and five of terminal and lateral buds from each cultivar was collected. The leaves and buds were sorted in individual paper bags and transferred to the laboratory for mite examination. Mites on leaves and buds were counted using a stereo-microscope. The maximum, minimum temperatures and relative humidity were obtained from the online database Underground® (The Weather Company, GA, USA) throughout the investigation period and determined the peaks of most common phytophagous and predacious mites in relation to weather factors and plant phenology.

Statistical analysis

For elucidating the effect of weather factors and plant age (i.e., plant phenology to emulating plant nutritional value dynamic), simple correlations and partial regression were used to obtain the amount of variability in the pest activity which could be attributed to the percentages of explained variance (EV%) as the combined effect of the climatic factors. According to Abou-Setta (2020), the dynamics of mites on perennials have to be discussed according to plant physiological growth changes (stages) over the year. So, the period from flowering to crop harvest (March to August) was discussed separately from post-harvest to leaves fall at the end the year. The effect of weather factors (i.e., maximum and minimum temperatures and RH%) were evaluated as simple correlations and partial regressions. Plant age was considered as multiple polynomial regressions. The hole model was presented as $Y=a \pm b1Temp\_max \pm b2 Temp\_min \pm b3 RH \pm b4 Age \pm b5 Age2 \pm b6 Age^3$. Obtained data were analyzed using Procs Corr, Reg, and ANOVA in SAS (Anonymous 2003).

RESULTS AND DISCUSSION

1. Mites occurrence

In this study, 51 mite species in genera and 26 families of three mite groups (Prostigmata, Mesostigmata and Oribatida) were collected. These mite species were classified according to their feeding behaviour into three groups as follow:

A) Phytophagous mites

The phytophagous mites found on fig orchards listed nine species belonging to nine genera, representing and five families of suborder Prostigmata. These families were Diptilomiopidae, Eriophyidae, Tarsonemidae, Tenuipalpidae and Tetranychidae (Table 1). These results agree with what reported by Elhalawany (2001); Abou El-Saad and Salem (2011); Elhalawany (2012); Daneshnia and Akrami (2013) and Hussian et al. (2018).

B) Miscellaneous mites

The miscellaneous mites had the highest numbers found in the soil. This group of mites is unknown feeding behaviour. They need further studies to estimate their role. Mites of uncertain food collected from leaves of "Sultani" fig cultivar were 11 species in ten genera and eight families belonging to two suborders Prostigmata and Oribatida (Elhalawany 2001). The differences in mite species and mite numbers were good indicators of soil fertility and soil quality in this area. Previous studies in a similar environment

also showed the distribution of soil mites. Zaher and Mohamed (1980) reported seven genera of five families of soil mites in fields of potato, vine and sunflower at Rass Cedr, Sinai Peninsula. Kandeel (1993) reported the mite fauna at three districts in North Sinai.

The current survey revealed the presence of 51 species belonging to 44 genera in 26 families, of which eight genera in seven families from Suborder Orbatida (Table 2).

Predacious mites

Predaceous mites play an important role in suppressing pest populations occupying different habitats and are used in biological control programs. Predacious mites on fig leaves, soil, and debris are presented in Table (3). A total of 31 mite species belonging to 25 genera and 13 families in two mite groups (suborder Prostigmta and order Mesostigmat) were recorded. Suborder Prostigmata was presented by ten families, 15 genera, and 18 species. Order Mesostigmata was presented by three families, ten genera, and 13 species. This data is in harmony with that of Elmoghazy and Shawer (2013).

Population dynamics of mites

In this study, five mite species (*Tetranychus urticae* Koch*; Aceria Ficus* (Cotté)*; Euseius scutalis* (Athias-Henriot)*; Agistemus exsertus* Gonzalez and *Tydeus oregonensis* Baker) belonging to five families were found in considerable numbers associated with leaves of two figs cultivars "Sultani" and "Condria".

Population dynamics of *T. urticae* on "Sultani" fig cultivar during 2020–2021.

Obtained results are illustrated in Figures (1 and 2). It is clearly showed that the population of the two-spotted spider mite, *T. urticae* was recorded with few numbers in mid-Mar. after that the population gradually increased from late Mar. till the end of Jun. during two seasons on "Sultani" fig orchards. *Tetranychus urticae* has two peaks in mid-Jul. and early Oct. with total numbers of 1745 and 800 individuals/30 leaves at maximum and minimum temperatures of 38.7 & 23.7 and 37.3 & 23.1°C, and 33.7 & 41.7% RH during the first season 2020, respectively. During the second season, relevant results were 2727 and 1000 individuals/30 leaves at maximum and minimum temperatures of 38.7 & 24.4 and 32.2 & 19.5°C, and 30.9 & 45.0% RH, respectively. The spider mite disappeared in winter months from mid-Dec. till early Mar. because of falling leaves during two seasons.

Tetranychus urticae on "Condria" fig cultivar had two peaks in late May and Oct. with total numbers of 1000 and 300 individuals/30 leaves at maximum and minimum temperatures of 36.64 & 22.0 and 33.6 & 19.8, and 37.0 & 48.3% RH, respectively in the first season. Relative values were 1245 and 340 individuals/ 30 leaves at maximum and minimum temperatures of 37.3 & 22.5 and 32.2 & 18.7, and 28.6 & 48.3% RH, respectively (Figures 1 and 2).

The fig bud mite, *A. ficus*

On "Condria" fig cultivar, the eriophyid bud mite, *A. ficus* was recorded in mid-Mar. with few numbers, then gradually increased from mid-Apr. till late Jun. After that, the population reaches its highest population in late-June with a total number of 290 individuals/10 buds at maximum and minimum temperatures of 37.7 & 23.4°C, and 36.3% RH in the first season with 200 individuals/10 buds at maximum and minimum temperatures of 36.2 & 21.6°C and 31.4% RH in the first week of June. The second peak was recorded in late October at 90 individuals/10 buds and in the second week of Oct. (55 individuals/10 buds) in the second season. The populations gradually decrease from early Nov. to early Dec. during two seasons (Figures 1 and 2). The obtained data are in agreement with that reported by Abou-Awad et al. (2000) and Ashihara et al. (2004).

The phytoseiid mite, *E. scutalis*

Individuals of *E. scutalis* were found with few numbers in late-Apr. then, began to increase in May and reached its peak in late-Oct. (330 and 360 individuals/30 leaves) in the first and second season, respectively on "Sultani" fig cultivar. After that, the population gradually decreased from early Nov. to early Dec. for the two seasons, respectively (Figures 1 and 2).

Euseius scutalis had two peaks on "Condria" fig cultivar in late Jun. and the second week of Nov. in the first season. The monthly total numbers were 140 and 190 individuals at maximum temperatures (36.1 and 27.9°C) to minimum temperature (23.4 and 17.6°C) and relative humidity varied from 36.3 to 57.6%, respectively. During the second season, the predatory mite has two peaks in mid-Jul. (150 individuals/30 leaves) and in second week of November (160 individuals/30 leaves) (Figures 1

and 2). These results agree with the findings of Ata et al. (2016).

The stigmaid mite, *A. exsertus*

Agistemus exsertus has two peaks of seasonal abundance in late Jun. and second week of Nov. (83 and 60 individuals) when the maximum temperatures were (37.7 and 27.9°C) and the minimum temperatures were (23.4 and 17.6°C), the relative humidity was (36.3 and 57.6%) in the first season, respectively in "Condria" fig cultivar. While in the second season, it has two peaks in mid-July and late Oct. (70 and 55 individuals/30 leaves), respectively (Figures 1 and 2).

The obtained results indicated that the phytophagous mite, *T. urticae* was found in a great numbers in two fig cultivars, but more in "Sultani", while *E. scutalis* was found in moderate numbers on the two fig cultivars. *Tydeus oregonensis* was found in moderate numbers on "Sultani" fig cultivar. Few numbers of *A. exsertus* and *A. ficus* individuals were found on "Condria" cultivar.

Effect of temperature, relative humidity, and plant age on the population fluctuation of *T. urticae* on "Sultani" and "Condria" fig cultivars

The effect of weather factors and plant age on the population density of *T. urticae* infesting fig orchards during the two seasons is presented in Tables (4 and 5). Positive correlation values for maximum temperature ranged from 0.50 to 0.69 with P-values between 0.0912 and 0.0576; whereas significant positive correlation for minimum temperature ranged from 0.66 to 0.71 in the first season, and insignificant positive correlation ranged from 0.49 to 0.61 in the second season; while insignificant negative correlation between *T. urticae* and relative humidity ranged from -0.45 to -0.33 with P-values between 0.2608 and 0.2876, during the two seasons on "Sultani" cultivar. Similar results were found for "Condria" fig cultivar, which has positive correlation values for maximum and minimal temperatures ranged from 0.37 to 0.71; and insignificant negative correlation between *T. urticae* and relative humidity ranged from -0.36 to -0.63 with P-values between 0.4236 and 0.0267 for the two seasons.

The explained variance (EV%) was ranged from 46.67 to 75.23 on "Sultani" cultivar and ranged from 26.64 and 73.46 on "Condria" cultivar during the two seasons. The single effect of applying the third-degree polynomial model using plant age revealed explained variance was ranged from 62.92 to 78.82 with P-value ranged from 0.0390 to 0.0076 on "Sultani" cultivar. The explained variance ranged from 57.70 to 73.36 with P-value ranged from 0.0585 to 0.0110 on "Conadria" cultivar.

The combined effect of weather factors and plant age were more significant than plant age as it ranged from 76.53 to 100.0 on "Sultani" cultivar and from 80.24 to 100.0 on "Condria" cultivar (Tables 4 and 5).

Insignificant positive correlation values for maximum and minimum temperatures and *A. ficus* ranged from 0.33 to 0.62 with P-values between 0.4100 and 0.1306; while insignificant negative correlation between *A. ficus* and relative humidity ranged from -0.56 to 0.02 in the first season and from -0.63 to -0.50 in the second season on "Condria" cultivar. The explained variance ranged from 53.92 to 69.33% on "Condria" cultivar in the first and second seasons, respectively. The single effect of plant age revealed explained variance ranged from 66.38 to 86.85 with P-value ranged from 0.0269 to 0.0777. The combined effect of weather factors and plant age were more significant than plant age, as it ranged from 75.57 to 100.0 on "Condria" cultivar (Table 6). Finally, results indicated that the change in the nutritional value of the host plant was more effective on mite population dynamics than weather factors.

The effect of tested cultivars on the relation between the phytophagous mites and the predatory mites

Statistical analysis indicated that in-significant positive correlations were recorded between the *T. urticae* population and the predatory mite, *E. scutalis* (0.13 & 0.12 and 0.17 & 0.41) during the first and second seasons on "Sultani" and "Condria" cultivars, respectively. Highly significant positive correlation was recorded between *A. ficus* and *E. scutalis* (0.69) on "Condria" cultivar in the first season and significant positive correlation (0.66) in the second season.

Highly significant positive correlation between the predatory mite, *A. esxertus* and *T. urticae* (0.82) in the first season and significant positive correlation (0.67) in the second season on "Condria" cultivar was occurred.

Table 1. Occurrence of phytophagous mites collected from leaves and buds in fig orchards at Sohag governorate

Mite group	Families	Species	Location	Habitat	Abundance
Prostigmata	Diptilomiopidae keifer	*Diptilomiopus ficus* Attiah	Almaraghuh	Leaves	+
		Rhyncaphytoptus ficifoliae Keifer	Akhimim	Leaves	+++
	Eriophyidae Nalepa	*Aceria ficus* (Cotté)	Almaraghuh	Buds, leaves	++
		Neserella capreifoliae Meyer &Ueckermann	Almaraghuh	leaves	++
		Tegonotus caricus Elhalwany, Mohammed & Ueckermann	Almaraghuh	leaves	+
	Tarsonemidae Kramer	*Tarsonemus meyerus* Soliman & Kandeel	Alblina, Almaraghuh,- Akhimim	Leaves soil	+++
	Tenuipalpidae Berlese	*Brevipalpus obovatus* Donnadieu	daralsalam	leaves	+
		Cenopalpus pulcher (Canestrini & Fanzago)	Tima	leaves	+
	Tetranychidae Donnadieu	*Tetranycus urticae* Koch	Almaraghuh, Akhimim, Alblina, daralsalam, Tima	Leaves, buds	+++

+ Low population (1–3) ++ Moderate population (4–9) +++ High population > 9

Table 2. Occurrence of miscellaneous-feeding mites collected in fig orchards at Sohag governorate

Mite group	Families	Species	Location	Habitat	Abundance
Prostigmata	Tydeidae Kramer	*Paralorryia bakeri* Zaher& El Bagoury	Almaraghuh Akhimim	leaves	+
		Tydeus californicus (Banks)	Jahinah	leaves	+++
		Tydeus oregonensis Baker	Almaraghuh	leaves	+++
Oribatida	Epilohmanniidae Oudemans	*Epilohmannia* spp.	Akhimim	soil	+
	Galumnidae Jacot	*Pilogalumna* spp .	Akhimim	soil	+++
	Lohmanniidae Berlese	*Lohmannia* spp.	Akhimim	soil	++
	Oppiidae Sellnick	*Oppia* spp.	Akhimim	soil	+
		Oppiella spp.	Akhimim	soil	+++
	Oribatulidae Thor	*Zygoribatula* spp.	Akhimim	soil	+++
	Palaeacaridae Grandjean	*Palaeacarus* spp.	Akhimim	soil	+
	Pediculochelidae Lavoipierre	*Pediculochelus* spp.	Almaraghuh	soil	++

+ Low population (1–3) ++ Moderate population (4–9) +++ High population > 9

Table 3. Occurrence of predacious mites collected from leaves and soil in fig orchards at Sohag governorate

Mite group	Families	Species	Location	Habitat	Abundance
Prostigmata	Bdellidae Dugès	*Neomolgus aegyptiacus* Soliman	Akhimim	soil	+++
		Spinibdella bifurcate Atyeo	Akhimim	soil	++
	Cheylitidae Leach	*Acaropsella kulagini* (Rohdendorf)	Almaraghuh	soil	+
		Cheletomimus bakeri (Ehara)	Almaraghuh Akhimim	soil	+++
		Cheletogenes ornatus (Canestrini & Fanzago)	Alblina	leaves	++
	Cunaxidae Thor	*Coleoscirus tuberculatus* DenHeyer	Almaraghuh	soil	+
		Cunaxa capreolus (Barlese)	Akhimim Almaraghuh	soil	+++
		Cunaxa setirostris (Hermann)	Almaraghuh	soil	+
		Neocunaxoides spp.	Almaraghuh	soil	+
	Hemisarcoptidae Oudemans	*Hemisarcoptes malus* (Shimer)	Alblina	leaves	+
	Microdispidae Cross	*Brennandania* spp.	Almaraghuh	soil	+
	Family Eupalpsellidae Willman	*Saniosulus nudus Summars*	Akhimim	Leaves	+
	Pygmephoridae Cross	*Bakerdania centriger* Coorreman)	Almaraghuh	soil	+
	Scutacaridae Oudemans	*Scutacarus aegypticus* Yousef & Metwally	Akhimim	soil	++
		Scutacarus tackei Willmann	Akhimim	soil	+
	Stigmaeidae Oudemans	*Agistemus exsertus* Gonzalez	Almaraghuh	leaves	++
		Agistemus vulgaris Soliman and Gomaa	Almaraghuh	soil	++
	Trombidiidae Leach	*Trombidium* spp.	Almaraghuh	soil	+
Mesostigmata	Ameroseiidae Evans	*Kleemannia kosi* El-Badry, Nasr & Hafez	Akhimim		+++
		Kleemannia wahabi Ibrahim & Abdel-Samed	Akhimim Almaraghuh	soil	++
		Sertitympanum zaheri (El-Badry, Nasr & Hafez)	Almaraghuh	soil	+
	Laelapidae Berlese	*Androlaelaps casalis* (Berlese)	Almaraghuh	soil	+++
		Ololaelaps bregetovae Shereef & Soliman	Akhimim	soil	++
	Phytoseiidae Berlese	*Amblyseius ficus* El- Halawany & Abdel Samad	*Almaraghuh-Akhimim*	*leaves*	++
		Euseius hutu (Pritchard & Baker)	Almaraghuh	Leaves, soil	++
		Euseius scutalis (Athias-Henriot)	Akhimim, Jahinah, Almaraghuh	leaves	+++
		Kuzinellus niloticus (El-Badry)	Akhimim	leaves	++
		Neoseiulus barkeri Hughes	Akhimim Almaraghuh	soil	+++
		Proprioseiopsis badryi (Yousef & El-Borolossy)	Akhimim	soil	++
		Typhlodromus (*Anthoseius*) *egypticus* El-Badry	Akhimim	leaves	+
		Typhlodromus (*Typhlodromus*) *pyri* Scheuten	Almaraghuh	leaves	+

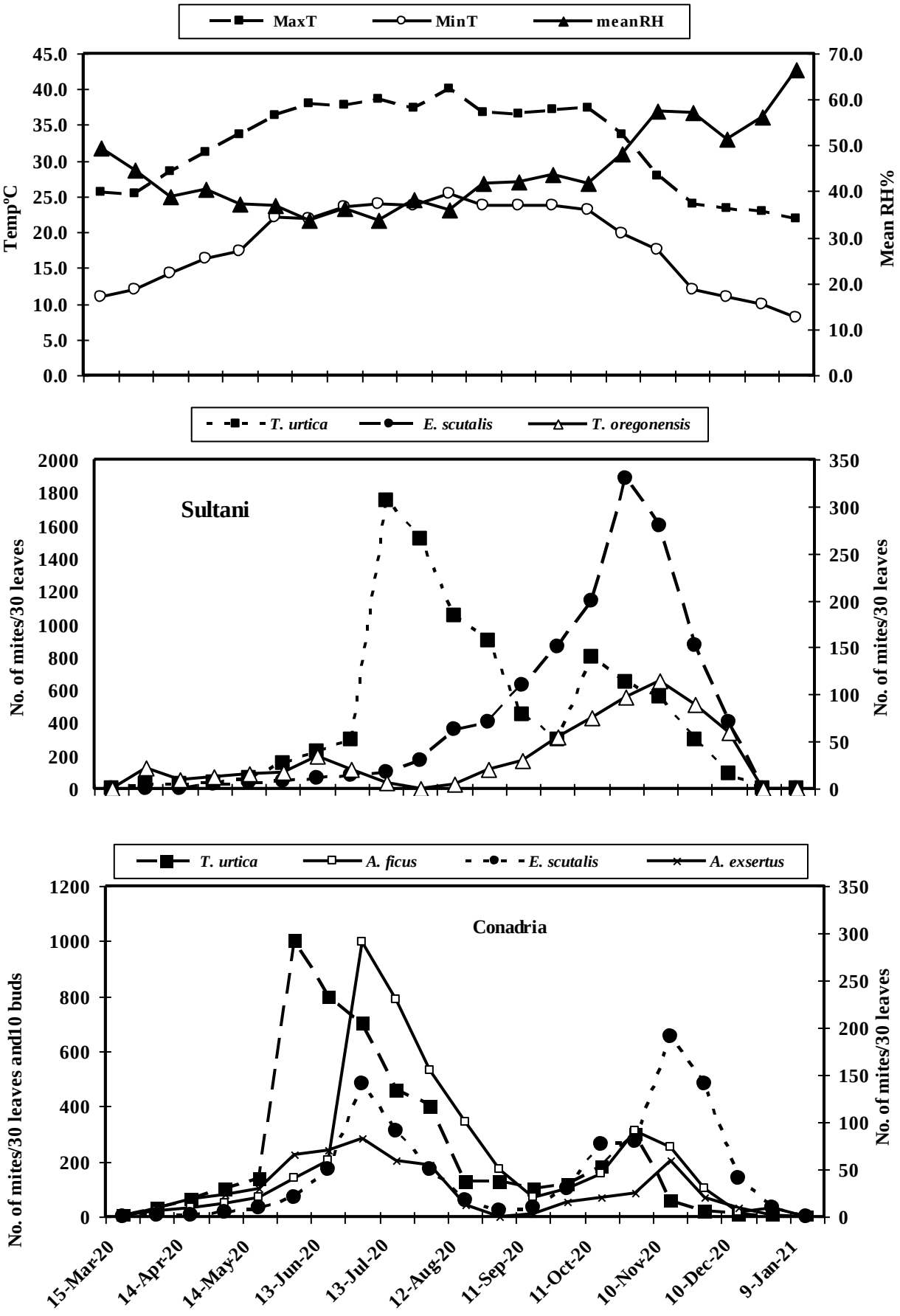

Figure 1. Population dynamics of phytophagous and predacious mites on "Sultani" and "Condria" fig cultivars at Shandaweel, Shohag governorate during 2020 season.

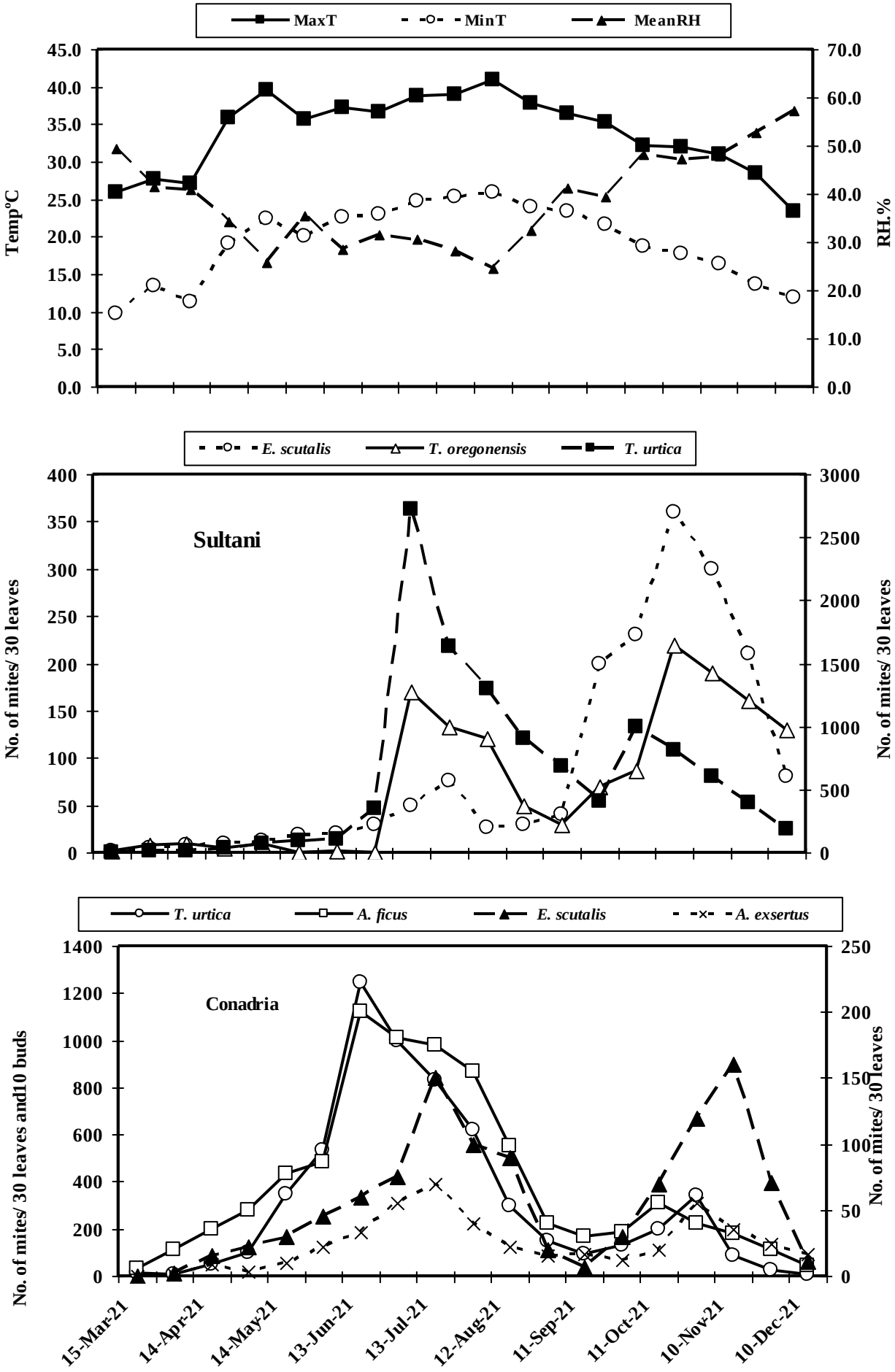

Figure 2. Population dynamics of phytophagous and predacious mites on "Sultani" and "Condria" fig cultivars in Shandaweel, Shohag governorate during 2021 season.

Table 4. Simple correlation coefficients and multiple regression values for the effect of weather factors and plant age on *T. urticae* populations on "Sultani" fig cultivar in Shandawel region during the growing season 2020–2021.

Season	Factor	Level	Simple correlation		Multiple regression				
			R	P	b	P	F	P	EV %
2020 (Mar. to Sept.)	Weather	Temp max	0.61	0.0332	-312.5	0.2761	2.99	0.0955	52.89
		Temp min	0.66	0.0172	36.4	0.1602			
		RH	-0.33	0.2876	-99.4	0.3459			
	Plant age	Age-Age^3	-	-	-	-	8.36	0.0076	75.82
	Combined		-	-	-	-	3.97	0.0761	82.64
2020 (Sept. to Dec.)	Weather	Temp max	0.69	0.0576	68.89	0.5919	2.09	0.2447	61.02
		Temp min	0.71	0.0454	-8.55	0.9387			
		RH	-0.45	0.2608	34.12	0.3912			
	Plant age	Age-Age^3	-	-	-	-	4.75	0.0832	78.09
	Combined		-	-	-	-	1.57	0.5441	90.43
2021 (Mar. to Sept.)	Weather	Temp max	0.50	0.0912	-252.6	0.3217	2.33	0.1503	46.67
		Temp min	0.61	0.0336	318.4	0.1226			
		RH	-0.37	0.2336	-24.8	0.7439			
	Plant age	Age-Age^3	-	-	-	-	4.53	0.0390	62.92
	Combined		-	-	-	-	2.72	0.1461	76.53
2021 (Sept. to Dec.)	Weather	Temp max	0.55	0.1961	196.4	0.1229	3.04	0.1930	75.23
		Temp min	0.49	0.2601	11.3	0.9040			
		RH	-0.37	0.4110	124.0	0.1123			
	Plant age	Age-Age^3	-	-	-	-	1.76	0.3275	63.73
	Combined		-	-	-	-	0	0	100.0

Table 5. Simple correlation and multiple regression values for the effect of weather factors and plant age on *T. urticae* populations on "Condria" fig cultivar in Shandawel region during the growing season 2020-2021.

Season	Factor	Level	Simple correlation		Multiple regression				
			R	P	b	P	F	P	EV %
2020 (Mar. to Sept.)	Weather	Temp max	0.49	0.1009	-48.18	0.7711	1.95	0.1995	42.30
		Temp min	0.41	0.1761	51.52	0.7212			
		RH	-0.63	0.0267	-71.90	0.2606			
	Plant age	Age-Age^3	-	-	-	-	3.79	0.0585	58.70
	Combined		-	-	-	-	3.38	0.1011	80.24
2020 (Sept. to Dec.)	Weather	Temp max	0.71	0.0461	76.24	0.1022	3.69	0.1198	73.46
		Temp min	0.66	0.0739	-54.54	0.1622			
		RH	-0.56	0.1480	17.11	0.1892			
	Plant age	Age-Age^3	-	-	-	-	2.62	0.1878	66.25
	Combined		-	-	-	-	6.14	0.2996	97.36
2021 (Mar. to Sept.)	Weather	Temp max	0.42	0.1646	-147.9	0.2569	1.81	0.2228	40.46
		Temp min	0.46	0.1260	119.7	0.2357			
		RH	-0.53	0.0759	-58.26	0.1565			
	Plant age	Age-Age^3	-	-	-	-	7.34	0.0110	73.36
	Combined		-	-	-	-	11.35	0.0087	93.16
2021 (Sept. to Dec.)	Weather	Temp max	0.43	0.3271	46.62	0.5255	0.36	0.7863	26.64
		Temp min	0.37	0.4069	-16.07	0.8096			
		RH	-0.36	0.4236	14.69	0.7334			
	Plant age	Age-Age^3	-	-	-	-	1.86	0.3126	64.95
	Combined		-	-	-	-	0	0	100.0

Table 6. Simple correlation and multiple regression values for the effect of weather factors and plant age on *Aceria ficus* populations on "Condria" fig cultivar in Shandawel region during the growing season 2020-2021.

Season	Factor	Level	Simple correlation		Multiple regression				
			R	P	b	P	F	P	EV %
2020 (Mar. to Sept.)	Weather	Temp max	0.57	0.0514	-57.31	0.1952	3.12	0.0880	53.92
		Temp min	0.56	0.0550	-57.26	0.1434			
		RH	-0.56	0.0579	-28.66	0.0933			
	Plant age	Age-Age^3	-	-	-	-	5.27	0.0269	66.38
	Combined		-	-	-	-	2.58	0.1590	75.57
2020 (Sept. to Dec.)	Weather	Temp max	0.33	0.4100	16.66	0.2265	3.01	0.1572	69.33
		Temp min	0.38	0.3434	-7.54	0.5046			
		RH	0.02	0.9464	8.84	0.0649			
	Plant age	Age-Age^3	-	-	-	-	2.95	0.1617	68.86
	Combined		-	-	-	-	12.70	0.2115	98.70
2021 (Mar. to Sept.)	Weather	Temp max	0.50	0.0943	-27.31	0.1402	3.38	0.0749	55.88
		Temp min	0.54	0.0665	21.92	0.1267			
		RH	-0.63	0.0281	-11.06	0.0632			
	Plant age	Age-Age^3	-	-	-	-	12.99	0.0019	82.97
	Combined		-	-	-	-	12.21	0.0074	93.61
2021 (Sept. to Dec.)	Weather	Temp max	0.62	0.1306	8.50	0.2688	1.42	0.3890	58.76
		Temp min	0.56	0.1889	-0.91	0.8867			
		RH	-0.50	0.2523	4.00	0.3692			
	Plant age	Age-Age^3	-	-	-	-	6.61	0.0777	86.85
	Combined		-	-	-	-	0	0	100.0

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