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5. SUMMARY

I- Field and laboratory studies on cotton crop (*Gossypium barbadnes* L.):-

The future of cotton industry in Egypt depends on the competitiveness in the world market and its profitability to the producer. These demands emphasize the need for more effective integrated cotton management system. It is well known the use of pesticides on cotton plants has its harmful effects on natural enemies, which are one of the main elements of natural balance between pests and predators. Spider mites are considered among the economic pests of cotton plants at recent years. Arthropod predator insects, mites and the spiders are considered the main elements for minimizing the population of different pests during the growing season, therefore, different points of on spider mite *Tetranychus urticae* Koch on cotton crop and the natural enemies of predatory mites were carried out during two seasons 2002 and 2003 seasons as follows:-

1- Evaluation four cotton varieties to their relative susceptibility to spider mites infestation:

Spider mites can undoubtedly cause a great damage and severe cotton losses. Obtained results and statistical analysis revealed that there were highly significant differences between cotton varieties; Giza 80, Giza 83, Giza 90 and Giza 81.83 in their relative susceptibility to spider mites whereas population fluctuation of eggs, motile stages were recorded during the two seasons. Results showed that Giza 80 was the most susceptible

to spider mites infestation, which receiving 395.3 eggs and 351.0 mites during the first season while during the second season 2003, Giza 80 variety hardboard 269 eggs and 219 mites. On the other hand, Giza 83 variety was high resistant to spider mite infestation than other varieties were it received 256.2 eggs and 195.3 mites at the first season 2002, while at the second season aggregated 179 eggs and 128.5 mites. Giza 90 and Giza 81.83 were intermediate in their relative susceptibility to spider mite infestation. Population fluctuation during the two season was in definite trend whereas number of eggs and mites differ from seedling stage to other periods. On the other hand, the level infestation of spider mites on different growth stages of cotton varieties were high during the first season 2002 than the second season 2003, whereby these results depend on other factors such as environmental which effect on both cotton plants and pests.

2- Population fluctuation of tarsonemid mite *Tarsonemus confusus* Ewing.

Phytophagous mite *T. confusus* cause a great damage on cotton plant at recent years whereas the number of mite was recorded during the two seasons. The tarsonemid mites appear at the late of two seasons in few numbers on four cotton varieties. Giza 80, Giza 83, Giza 40 and Giza 81.83 were harbored (25.4 & 15.8), (22.1 & 11.1), (27.3 & 14.6) and (28.6 & 16.9) mite individuals.

3- Seasonal abundance of predatory mites population during the two seasons 2002 & 2003.

A. *Esueius scutalis* Athiaz-Henriot.

Mite predator appear in a few numbers at late of season, then increase in population through the two seasons until reached their peak during the first week of September at the first season 2002 and at mid of August at the second season 2002 and at mid of August at the second season 2003. Giza 80, Giza 83, Giza 40 and Giza 81.83 were received (18.6 & 17.5), (14.9 & 10.0), (20.3 & 17.1) and (17.1 & 12.6) mite individuals.

B. *Typhlodromus swirskii* Althias-Henriot.

Also obtained results showed that this predatory mites were found at late of season of cotton in few numbers associated with spider mites and other sucking pests infesting cotton.

C. *Agistemus exertus* Conzalez.

This mite predator appeared at mid of July during the two seasons. The predator started in a few number, then increased during August and the first week of September in 2002 & 2003.

D. *Pronematus ubiquitous* (McGregor).

This predator belonging to family Typhlodromidae, which found associated with pests infesting cotton. This mite predator recorded in few numbers at first of July and increased in number until reached its peak during mid of August at first season and the first week of September at the second season.

E. *Tydeus californicus* Banks.

This mite was in few number during the two season 2002 & 2003.

B) Biological Studies

Biological studies on red spider mite *Tetranychus urticae* Koch when fed on four cotton varieties at 25 & 30°C and 70±5% R.H.

Influence of cotton varieties and degrees of temperature were investigator on spider mites. Obtained data showed that there are different stages and fecundity were affected by different hosts and temperature, whereas total immature stage lasted (9.1, 11.3, 9.9 & 11.1) days at 25°C when mite fed on Giza 80, Giza 83, Giza 90 and Giza 81.83, respectively. At 30°C these periods stayed (5.2; 7.1, 5.7 & 6.6) days at the same trend of hosts.

Females oviposition periods and fecundity were affected greatly by hosts and temperature whereas oviposition period required (9.9 & 8.4); (5.4 & 5.0), (8.2 & 7.3) and (6.1 & 5.3) days at 25 & 30°C when mite fed on the above mentioned hosts.

Females deposited an average eggs of (30.5 & 47.3), (18.0 & 30.5), (34.8 & 60.0) and (21.0 & 31.5) eggs at 25 & 30°C, when they fed on the above mentioned cotton varieties, respectively.

C) Relationship between spider mite *T. urticae* and nutritional favorability of cotton varieties:

Biological aspects and fecundity of spider mites were affected by nutritive composition of cotton varieties. Obtained

data stated that increase of N was associated with increase of fecundity, growth stages and reproduction where as leaves contents of macronutrients and micronutrients were analysis, therefore Giza 80 was highest variety in its content of N. (1.35% & 1.63%) during the two seasons therefore it was high susceptible variety to mite infestation. On the other hand, Giza 83 variety was high resistant because of leaves contents include the lowest of N (1.03% & 1.30%) and high percentage of potassium and sodium. While cotton varieties, Giza 90 and Giza 81.83 were intermediate in their relative susceptibility to spider mite infestation because of their leaves include a moderate values of N, K and P.

D) Effect of leaves cotton varieties constituents on biological aspects of spider mite *T. urticae*:

Obtained results revealed that there are a greatly between leaves contents and developmental stages of spider mites, whereas significant negative and positive correlations were obtained in different stages and fecundity of mites.

E) Histological studies on leaves of cotton varieties:

Histological studies cleared that cotton varieties, Giza 83 and Giza 81.83 have the higher thickness of cuticled epidermis of the upper leaves surfaces compared with Giza 90 and Giza 80 cotton varieties. The more thickness of the cuticled epidermis especially that of the lower surface could be considered as a physical resistance factor.

II- Field and laboratory studies on single, three-way crosses of maize (corn) *Zea mays* (L.) crop:-

A- Field Studies:

1- Evaluation ten single crosses of maize for their relative susceptibility to spider mites:-

Ten single crosses of maize were investigated to their relative susceptibility to spider mite *T. urticae* Koch during two seasons the average numbers of eggs and motile stages were recorded. The statistical analysis showed that there were highly significant between mite infestation and single crosses of maize crop. Results revealed that single crosses 10, 122 and Watani 4 were resistance, while single crosses 123, 124, 126, 155 and Bachair 13 were moderate. On the other hand, the single cross Pioneer 3080 was susceptible to spider mite infestation.

2- Evaluation ten three-way crosses of maize crop for their relative susceptibility to spider mites:-

The three-way crosses, 310, 320, 321, 321, 322, 323, 324, 325, Nefertity, Watania 1 and Pioneer 3057 were investigated to their relative susceptibility to spider mite *T. urticae* infestation.

Obtained data showed that the three-way crosses 310 and 320 were resistant, but the three-way crosses 321 and 352 were susceptible. On the other hand, the three-way crosses Nefertity and Pioneer 3057 were highly susceptible, while the rest of three-way crosses were intermediate in their relative susceptibility to spider mite infestation.

3- Population fluctuation of tarsonemid mite *Stenotarsonemus sayedi* Zaher & Kandeel on single cross and three-way crosses of maize crop:-

The population fluctuation of Tarsonemid mite *S. sayedi* were recorded during the two season 2002 and 2003, obtained results and statistical analysis showed that there aren't differences between tarsonemid mite infestation and single & three-way crosses of maize crop.

4- Population fluctuation of predatory mite *Euseius scutalis* Athias-Henriot on different single and three-way crosses of maize crop:

The phytoseudae mite *E. scutalis* play an important role in biological control, therefore population fluctuation of the predatory were recorded on different single, three-way crosses of maize crop during the two seasons.

Obtained data cleared that there is significant between different hybrids of maize and the predator, this results due to the difference between maize hybrids and spider mites population.

5- Population fluctuation of predatory mite *Pronematus ubiquitous* McGregor on different maize hybrids:-

The population fluctuation of the predatory mite *P. ubiquitous* were recorded on single, three-way crosses of maize crop during the two seasons. Obtained data and statistical analysis cleared that there is significant between predatory mite *P. ubiquitous* population and single, three-way cross of maize.

B- Laboratory studies:

Biological studies on spider mite *T. urticae* Koch were carried out under laboratory conditions where it fed on single crosses and three-way cross 310 at 25, 30°C and 70±5% R.H.

Obtained results and statistical analysis showed that there are significant between biological developmental stages and fecundity of spiders mite *T. urticae* when fed on two maize hybrids at 25 & 30°C whereas female longevity lasted short time when mite fed on single cross than three-way cross, while this period prolonged with three-way cross. The number of deposited eggs by female, when fed on single cross 10 were (14.5 & 26.3 eggs) at 25°C and 30°C, respectively, while at the same degrees of temperature female fecundity was (23.0 & 44.3) eggs when she fed on three-way cross 310. Also, high temperature was effected on developmental stages and fecundity of the spider mites.

III- Field and laboratory studies on faba bean (*Vicia faba* L.) crop:**A. Field studies on faba bean crop:**

Population fluctuation of spider mite *T. urticae* Koch and *T. cucurbitacearum* (Sayed) were recorded during two seasons 2001-2002 and 2002-2003 at Beni-Suef Governorate. Obtained results showed that spider mites cause a great damage on faba bean crop. Mite individuals of *T. urticae*. increased till reached it peak during the first week of April during the two seasons.

Regarding the second spider mite *T. cucurbitacearum* whereas the infestation started in few numbers at early of February and still in low numbers until the end of the two season at Beni-Suef area.

B. Laboratory studies on spider mite *T. urticae* where it fed on Faba bean at 25 & 30°C and 70±5% R.H.

Effect of temperature degrees on biological developmental stages of spider mites when fed on leaves of faba bean crop were investigated. Obtained data and statistical analysis revealed that temperature tare was effected on duration and Fecundity of spider mite *T. urticae*.

Female oviposition period lasted (9.6 & 7.8) days at 25°C and 30°C while female longevity required 12.1 and 9.5 days at the same trend female deposited an average of eggs 38.0 and 63 at 25°C and 30°C, respectively.

IV- Biological studies on phytoseudae mite *Neoseiulus neoreticulatus* Yousef & El-Brollosy.

Biological studies on the predatory mite *N. neoreticulatus* were carried out to study the effect of five degrees of temperature on developmental stages and fecundity, when he fed on immature stages of spider mite *T. urticae* Koch.

Results and statistical analysis showed that there is significant between predator developmental stages & fecundity and different degrees of temperature.

Female oviposition periods lasted (40.0; 25.6, 14.6, 10.0 and 7.8) days at 15, 20, 25, 30 and 35°C. Female deposited an average eggs of (10.4, 18.5, 28.4, 41.6 and 29.0) eggs, with a daily rate of (0.26, 0.72, 1.94, 4.16 and 3.71) eggs at the same trend of temperature degrees.

During the oviposition periods female consumed (50.4, 69.3, 120.0, 167.0 and 106.0) individuals at 15, 20, 25, 30 and 35°C, respectively.

Female and male during longevity consumed (58.3 & 33.5), (78.5 & 41.4); (131.7 & 74.1), (184.0 & 85.0) and (117.0 & 50.0) individuals at 15, 20, 25, 30 and 35°C, respectively.

Life table parameters of the predatory mite *N. neoreticulatus* when reared at five degrees of temperature when it fed on immature stages of spider mite *T. urticae*.

Obtained data revealed that net reproductive rate (R_0) differed according to degree of temperature whereas it (3.93; 7.89, 13.94; 25.8 and 16.30 at 15, 20, 25, 30 and 35°C respectively. The intrinsic rate of natural increase (r_m) was 0.027, 0.10, 0.17, 0.27 and 0.21 at the same trend of temperature. Therefore, 30°C considered the best degree of temperature for the predatory mite *N. neoreticulatus*.