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POPULATION DYNAMICS OF *Tetranychus urticae* KOCH AND ASSOCIATED PREDATORY SPECIES ON PERSIMMON *Diospyros kaki* AT QALUBYIA GOVERNORATE .

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ABSTRACT

The present work aimed to throw more light on one phytophagous mite; *Tetranychus urticae*_koch (Family Tetranychidae) was observed in persimmon *Diospyros kaki* (Family :Ebenaceae) from mid of febeuary till the first week of November .Predaceous mites included 5 species belonging to 5 genera and 2 families as following : *Neoseiulus californicus* , *Amplyseius badryi* , *Phytoseius plumif*er and *Typhlodromus pyri* (Family : Phytoseiidae) and only one species for family Stigmidae ; *Agistemus* sp . Family Phytoseiidae recorded high numbers of predaceous mits than family Stigmidae . Spider , *Linyphia phrygiana* (Family : Linyphiidae) was observed from may to September , Ants was observed on persimmon branches and fruits by different numbers from April to October .

INTRUDUCTION

Persimmon (*Diospyros kaki*) is an important fruit in Japan , China , Europe and Italy (Nizakat et al 2007) . It is also gaining popularity in the Mediterranean countries , In the last few years , the persimmon cultivation has increased in main horticultural area in Egypt and newly reclaimed lands. The area under cultivation with persimmon trees in Egypt about 1750 feddans producing about 800 tons. The consumers for this fruit in of great interest due to its contains different types of (carotinoids , vitamin C , tannins and fiber) are active in the preventation of chronic – degenerative disease and they have antibacterial activity (Nizakat 2007 , Ping and Hing , 2006 and Testoni , 2002) . The phytophagous mite *Tetranychus urticae*_koch is a major pest of wide range of crops all over the world. This species is the most common spider mite that is widely spread in Egypt on different crops (Zaher , 1984). Various researches have evaluated the spatial distribution of *Tetranychus* species and their associated predators in different crops (Wilson ,1982 , Wilson et al 1983 and Flaherty et al 1992) .

Predaceous mites belonging to the family phytoseiidae have gained to attention of scientists being the potential predators of other harmful mites , small insects and their eggs (Evans , 1992 , Nomikou et al , 2001). The mites of the genus phytosieus were found feeding on spider mites (Smith and Summers , 1961).The family stigmidae contain species that are predaceous on phytosieus mites and insects. These mites have been recognized as a very important biological control agent (Walter 1992, Furtado et al 2005 and Ehara 2005). Mealybugs and scale in association with ants can sometimes cause problems .

In Egypt , ecological studies on the phytophagous mites infesting cultivation of persimmon and predaceous associating was out data , so the

present work amied to studying the population dynamics of certain phytophagous mites and its predaceous mites and spider in habiting of persimmon at Qalubyia Governorate .

MATERIALS AND METHODS

Periodic random sampling of leaves was conducted from each tree every 15 days intervals . Each sample was generally composed of 100 leaves (20 leaves x 5 replicates) . The upper and lower surface of whole leaves was inspected. Samples leaves were placed in paper bags and transferred to the laboratory . Examination was made by the use of a stereomicroscope binocular . Different stages of the phytophagous and predaceous mites were counted . The removing of mites occurred by fine camel hairs , cleared in Nesbitt's solution , for 24 h. and then mite individuals were put in Hoyer's solution on glass slide for identification . Sample for ants and spider represented 15 infested twigs (3 replicates x 5 branches) . The select branches must be affroximately having 10 leaves yielded enough insect and enough predator to ensure are prentative sample (Devilliers 1973). Daily records of maximum temperature and relative humidity were obtained at Qalubyia Governorate .

RESULTS AND DISCUSSION

1- Phytophagous (Family : Tetranychidae)

The phytophagous mites cause severe harmful effects on leaves and buds. In the present study , they represented by only one family (Tetranychidae) Table 1 . The number of this family is found throughout those parts of the world. They occur on virtually every major food crop, often causing serious injury or death of the host (Ehara 2005) . The first appearance of phytophagous (immature and adult) occurred during the second half of February (1.1 individual / 20 leaves), the registrated mean temperature 18.8 C . And R.H 60.4% and then the mean numbers increased gradually with the increasing of temperature till reach its maximum abundance in the first week of September (94.0 individual / 20 leaves) with mean temperature 36.1 C. and R.H 60.8%. Then , the population declined till the end of the season .

2- Predaceous Mites

These mites were represented by two families; phytoseiidae and stigmaeidae.

A: Family: phytoseiidae

Predatory mites of the family phytoseiidae are of special interest because many species prey on phytophagous mites, and very few species had been described. However some early studies indicated that phytoseiids prey on spider mites and mites are important predators (Cutright, 1994 and Smith & summers 1949). In this study, four mite species were collected from different samples in orchard of persimmon (Table 1).

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1- *Neoseiulus californicus* Megregor:

The first appearance in early March , and the population increased during the same month till reach to 2.4 individuals / 20 leaves at moderate temperature and relative humidity (24.8 C . and 49.5 % R.H .) , but with advent of higher temperature (35.6 C .) and relative humidity (60.2 %) during the first week of August the population increased reach a peak (11.2 individuals / 20 leaves) then declined at the end of October . The total number of *N. californicus* of 83.0 individuals / 20 leaves during the year.

2- *Amplyseius badryi* yousef & El Borllosy:

This predaceous mite is found in persimmon leaves with high population density during the year (144.8 individual / 20 leaves). The first recorded of predaceous mites during the mid – February and first of March in a small number about 1 and 2.0 individual / 20 leaves , then a rapid steady increase in the population till reach a peak of 15.1 individual / 20 leaves during first August . This peak was attributed to rise of temperature and relative humidity which favored the mite reproduction (35.6 C. & 60.2 % R.H.). From the second half of August, the population decreased till reach the minimum in November (2.5 individual / 20 leaves).

3-*Phytoseius plumifer* Conestrini & Fonzago:

This species was collected associated with T. urticae on persimmon leaves in low population during the year (56.0 individual / 20 leaves). The first appearance of *P. plumifer* occurred during the first week of March by only one individual and after that , the population fluctuated till reach the maximum in first week of July (7.3 individual at 32.9 C . and 49.1 % R.H. then declined at the first half of September .

4- *Typhlodromus pyri* Scheuten:

This predaceous mite existed by moderate numbers during the year (83.0 individuals) . This species began to appear during mid – March at 24.8 C. and 49.5 % R.H., and their population increased gradually till a peak of mid – Jun . (6.7 individuals) at 32.5 C . and 47.5 % R.H. This peak followed

by a decline during July . Another peak occurred for predaceous mite during first week of September (14.1 individuals) at 36.2 C. & 60.8% R.H. then , the population decreased till the end of November.

B. Family : Stigmaeidae

This family has been recognized as natural enemies of phytophagous mites. Our survey is revealed the presence of only one Genus of this family (Table 1).

***Agistemus* sp:**

The predaceous mite which appeared in low numbers (49.2 individual / 20 leaves) during the year, it began to appear in first week of April by very low number (0.5 individual) at 22.1 C and 54.3 % R.H. and their population increased gradually till a peak of 15th August (7.1 individuals) at 36.1 C. and 63.6 % R.H. then the population decreased till the 15th of October.

1- Dwarf spider:

Spider are considered an important natural control agents to wide range economically injurious pests . In this study only one spider; *Linyphia phrygiana* (Family : Linyphiidae) was observed on persimmon from first week of May by 2 individuals / branch , then , the numbers fluctuated till a peak of mid – Jun .(2.1 individuals / branch) at 32.5 C and 47.5 % R.H. The population decreased from July to the first week of September . This spider occurred during the year by few number 9.5 individuals (Table 1) .

2- Ants:

This ants is observed in the persimmon branches and fruits from April to the mid – October by different numbers , it began to appear by few numbers during April and 1st May . The numbers increased till reach to moderate numbers during Mid – May and 1st Jun . then the ants increased from mid – June till mid – August , when the temperature and relative humidity ranged between 32.5 – 36.1 C and 47.5 – 63.6 % R.H. and from September the number of ants decreased till reach a few – numbers in mid – October .

From over resul, it can ts be concluded that total population of *T. urticae* had high abundance throughout summer season (Jun., July & August) averaged were 389.8 individuals making about 47.9 % of the whole year . Also , during this period , the predaceous mite associated with *T. urticae* occupied the high numbers 198.2 individuals making about 54% of whole year , in addition , the spider reach to the high numbers during summer (5.8 individual) making 61.1 % of the whole year . Average this high percentage may be due to the favorability of climatic conditions during this period. However, in winter (Dec., Jan.& Feb.) , the population recorded the lowest percentage of phytophagous (0.2 %) , predacious mites (0.3%) of the whole year , this may be lowering of temperatures and relative humidity . During spring and autumn season , the population of both phytophagous and its predaceous mite associated recorded moderated percentage ranged (18.9 – 33%) and (21.1 – 24.6) , respectively.

Generally, the above mentioned data in the present study demonstrated that , the complex of different predaceous mites together play an important role in reducing the population density of phytophagous mites (Holtzer *et al* 1988) .

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تعداد اكاروس العنكبوت الأحمر ذو البقعتين و أنواع المفترسات المصاحبة لـه على أشجار الكاكى في محافظه القليوبية .

وفاء عثمان جمعه ، فوزي محمد حسن عيد و رضا عبد السميع هندي
مركز البحوث الزراعية – معهد بحوث وقاية النباتات .

تعتبر أشجار الكاكى *Diospyros kaki* من محاصيل الفاكهة ذات الاهميه الإقتصاديه العالمية وقد بدأت تنتشر زراعته في كثير من الاراضى المستصلحة حديثا في بعض محافظات مصر .

أجريت الدراسة على أشجار الكاكى المنتشرة في محافظه القليوبية . و الدراسة تمت على ٢٥ شجره تتعرض للاصا به بالعنكبوت الأحمر ذو البقعتين. أجريت الدراسة خلال عام ٢٠٠٦ و قد أتضح من الدراسة ما يلي:

1. وجد اكاروس العنكبوت الأحمر على أوراق أشجار الكاكى في الفترة من منتصف شهر فبراير و حتى الأسبوع الأول من نوفمبر وكان العدد الكلى الذي سجله خلال العام ٨١٣,٦ فرد .
2. وصل أعلى تعداد لاكا روس العنكبوت الأحمر في الأسبوع الأول من سبتمبر (٩٤ فرد /٢٠ ورقه) عندما وصلت درجه الحرارة إلى ٣٦,١ °م و رطوبة نسبيه ٦٠,٨ %.
3. أظهرت الدراسة وجود عائلتين من المفترسات الاكاروسيه , عائله phytoseiidae و عائله stigmaeidae وقد تضمنت العائله الأولى تواجد ٤ أنواع هي

Neoseiulus californicus , *Amplyseius badryi* , *Phytoseius plumifer* and *Typhlodromus pyri*

وقد تواجدت هذه الأنواع خلال العام بمعدل ٨٣ , ١٤٤,٨, ٥٦, ٨٣ فرد على الترتيب, حيث كان المفترس الثاني هو أكثر الأنواع تواجدا و المفترس الثالث اقل تواجدا. أما العائله الثانية فقد اشتملت على تواجد جنس واحد فقط ظهر خلال عام الدراسة بتعداد قليل وكان أكثر تواجدا خلال الموسم الصيفي

4. أوضحت الدراسة تواجد العنكبوت القزمى *Linyphia phrygiana* في الفترة من بداية مايو و حتى بداية سبتمبر وقد تواجد خلال العام بأعداد قليلة جدا وصلت إلى ٩,٥ فرد .
5. ظهر النمل على الأفرع و الثمار بأعداد كبيرة خلال شهر يوليه – أغسطس و سبتمبر .
6. تعتبر الفترة الصيفية (يونيه – يوليه – أغسطس) هي أكثر الفترات نشاط لكل من اكاروس العنكبوت الأحمر ذو البقعتين و المفترسات المصاحبة له و كان ذلك أيضا بالنسبة للعنكبوت القزمى و النمل وخلال هذه الفترة تواجدت جميع أطوار العنكبوت الأحمر , كما انخفضت الكثافة العددية لأطوار العنكبوت الأحمر ذو البقعتين خلال الشتاء و الربيع .