

## THE IMPACT OF DIPEL 2X NUCLEAR POLYHEDROSIS VIRUS (NPV) AND INSECTICIDES ON COTTON NATURAL ENEMIES AT ISMAILIA GOVERNORATE

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### ABSTRACT

The present field study was carried out at Ismailia Governorate during the two successive cotton growing seasons of 2003 & 2004. Weekly samples of the predatory fauna were collected from four selected fields at Ismailia Governorate cotton fields treated by Dipel 2x and Nuclear Polyhedrosis Virus (NPV) throughout and compared with the corresponding fauna collected from insecticide treated cotton fields .

Samples were undertaken from cotton fields before treated of either Bio and insecticides. Data revealed that the reliable occurrence of Dipel 2x and Nuclear Polyhedrosis Virus (NPV), Six predators species were recorded. These were *Scymnus* spp. order coleoptera, *Coccinella undecimpunctata*, (Family : Coccinellide), *Paederus alferii*, (Family : Starphynidae), one from order Hemiptora *Orius* spp., (Family : Anthocooideae) one from order Neuroptera *Chrysopa carnea* (Family : Chrysopidae) and one from order Diaptera *Syrphus* spp (Family : Syrphidae ). in cotton fields during the two tested seasons .The obtained results confirmed that predator densities were 2.75 times and accordingly more numerous in the Dipel 2x and Nuclear Polyhedrosis Virus (NPV) treated fields than the corresponding cotton fields treated with recommended insecticides.

### INTRODUCTION

Cotton is commonly attacked by cotton leafworm *Spodoptera littoralis* (Boisd.) and bollworm, *Pectinophora gossypiella* (Saunders) and *Earias insulana* (Boisd.). Several authors have determined that the population densities of related predators in cotton fields and studied their role in regulating the population of cotton pests in Egypt , Ali *et al.* (1975), Awadalla *et al.* (1976), Fayad and Ibrahim (1980), Pickett *et al.* (1984), El-Adl and Ghanem (1986), El-Heneidy *et al.* (1987) and Moawad *et al.* (1993). The recent widespread application of pesticides for controlling the cotton pests has in many cases serious effects on the population densities of natural enemies in this country leading effects to considerable agricultural problems in the situation of cotton pests. During the last few years, attempts towards establishing an integrated pest Management against of cotton pests were conducted with the aim of keeping the natural level and attaining better pest control measurement with less need for pesticide control.

The present work was conducted to study the triangle relationship between biological agents Dipel 2x and Nuclear Polyhedrosis Virus (NPV) as well as the effect of chemical insecticides) and host plant.

## MATERIALS AND METHODS

During the two successive cotton growing seasons 2003 & 2004 changes in the population densities of predators fauna were studied depending on the weekly sampled counts in cotton the from fields treated with Dipel 2x and Nuclear Polyhedrosis Virus (NPV) and as well as in the field treated with recommended insecticides .

During June 2003 and 2004 until the end of cotton growing season, samples were taken weekly from four-selected field at Ismailia Governorate in the field treated with the Dipel 2x and Nuclear Polyhedrosis Virus (NPV) treated area, versus one treated with the recommended insecticide. During 2003 cotton growing season Dipel 2x and Nuclear Polyhedrosis Virus (NPV) was fixed to cotton plants on early June. Weekly numbers of captured beneficial insects were recorded and data were kept during the cotton growing season, for comparable with the corresponding fields treated with insecticides. In 2004 season Dipel 2x and Nuclear Polyhedrosis Virus (NPV) were applied in cotton plants on 10<sup>th</sup> of June. Cotton fields in Ismailia were treated with the recommended insecticides started from 20<sup>th</sup> of July until the 4<sup>th</sup>, 19<sup>th</sup> of August 2003 while it was on 23<sup>rd</sup> of July and 5<sup>th</sup>, 20<sup>th</sup> of August 2004.

Sampling procedure was carried out from late May up to the second half of September during the two seasons 2003 and 2004. The changes in the population density of predators were studied depending on the weekly samples from the 2<sup>nd</sup> half of June until the end of cotton growing season from the fields treated with Dipel 2x and Nuclear Polyhedrosis Virus (NPV) also insecticides area.

Samples were taken from Dipel 2x and Nuclear Polyhedrosis Virus (NPV) from the treated area at Ismailia Governorate versus and the insecticide treated area. The sampler walked slowly two 50 meters (the first cross with the second) holding the mouth of the sweeping the net rhythmically applied across the field in alternate directions, so that it "scraped" along the top of cotton canopy. Samples were collected into cotton or nulin bags, be identified, counted and recorded in the same day.

## RESULTS AND DISCUSSION

Fig. (1) indicate that the occurrence of predators expressed as number of individuals was as follows: *Scymnus* spp. (5.45), *Orius* spp. (29), *Paederus alferii* (10.33), *Coccinella undecimpunctata* (19.25), *Chrysopa carnea* (3.33) and *Syrphus* spp. (3.99 /100 meters) from the 2<sup>nd</sup> half of May and increased drastically reaching a peak during the 1<sup>st</sup> half of June in the same season 2003. From this time onward predators activity declined gradually until mid June on which the first application of Dipel 2x and Nuclear Polyhedrosis Virus (NPV) was carried out on 17-20<sup>th</sup> of June i.e just before the second peak could manifest itself on 30<sup>th</sup> June

During July to the first half of August 2003 a remarkable and gradual decline in the population densities of these predators occurred and continued up to 10<sup>th</sup> of September. Samples were collected from at Ismailia

Governorate demonstrated the same trend of occurrence Fig (2). It is obvious, that the population density of *Scymnus* spp. and *Syrphus* spp. demonstrated very low occurrence during the whole experimental period in cotton fields. A remarkable decrease in predators density was detected as indicated by weekly samples following the insecticides treated from mid July till mid August 2003. However, during the second half of August, the predators disappeared completely. One week later, sampling revealed a slight increase in predator population.

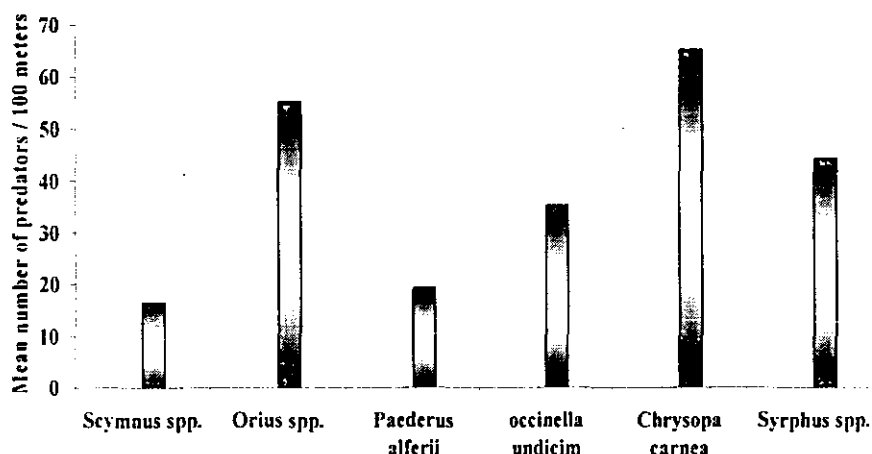


Fig. (1) : Mean number of predators / 100 square meters in cotton field treated with NPV + Diple 2x at Ismalia during 2003 cotton growing season .

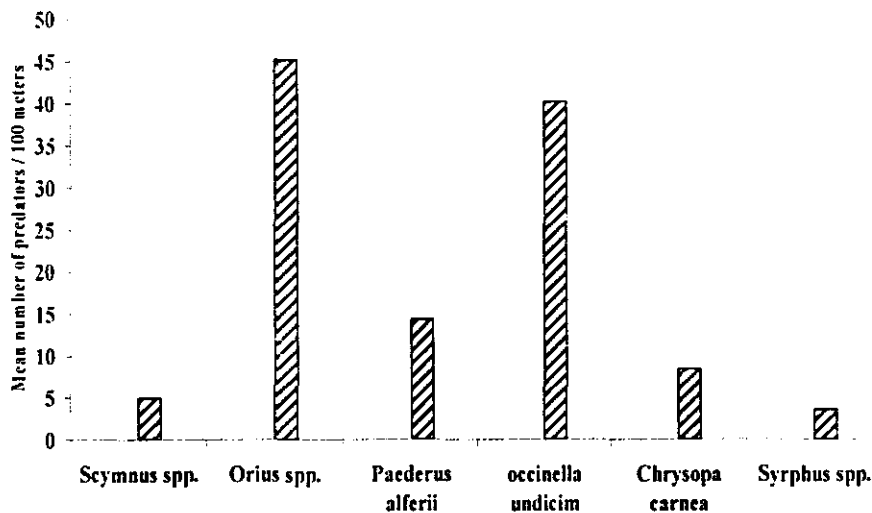


Fig (2) : Mean number of predators / 100 square meters in cotton field treated with Flufenoxuron at Ismalia during 2003 cotton growing season .

The changes in the population density of the tested predators in the four localities at Ismalia Governorate during 2004 cotton growing season showed Fig. (3). The population abundance of prevailed predators occurred in scarcely numbers within the 2<sup>nd</sup> half of May, 2004 after which population density increased gradually thus forming a peak during the 2<sup>nd</sup> half of May and early of June. However, gradual decrease was achieved during the two following weeks. Low numbers were recorded during the 1<sup>st</sup> half of June, and decrease continued hence the late June. Samples collected during July and mid of August revealed that the population density tended to decline almost sharply, with the exception of Orius spp., where a third small peak manifested itself during the first half of August. A relatively slight increase occurred during late of September.

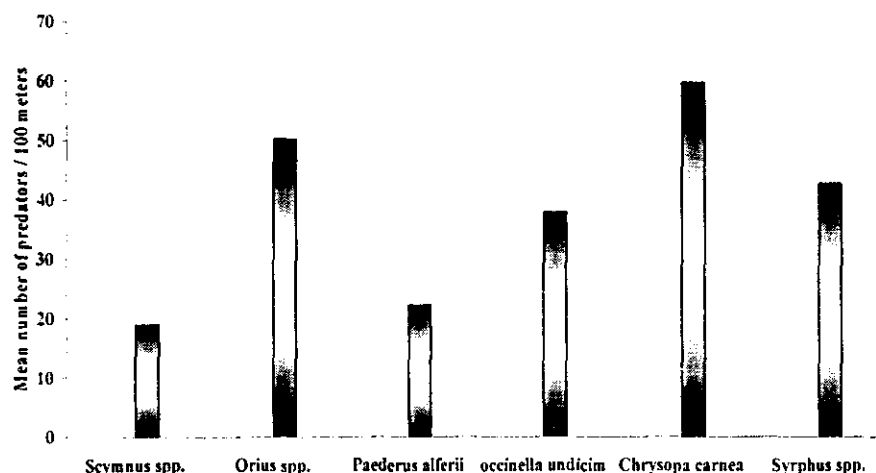


Fig. (3) : Mean number of predators / 100 square meters in cotton field treated with *Trichogramma evanescens* at Ismalali during 2004 cotton growing season .

Fig. (4) indicate that the initial occurrence of related predators in cotton fields was comparatively in low numbers during the 2<sup>nd</sup> week of May, except for Orius spp.

Cotton fields treated with insecticides counted numbers of predators increased gradually thus forming the first peak at the end of May, following by a remarkable decline during the first half of June .A second peak for only Orius spp. and Paederus spp. occurred on 23 June just before the first of insecticides application . The population density of tested six predators decreased remarkably during late June, just after the applied of first spray of insecticides. Fig. (4) it showed that the prevailed predators underwent remarkable suppression in numbers during the period from late June up to the last application of the spray of insecticides on 5<sup>th</sup> of September . However, on the beginning of the last week of September a slight increase in predator numbers, particularly for Orius spp. was occurred, it was obvious that Syrphus spp. disappeared completely untill the end of season. In general conclusion the data in Fig. (1-4) indicated that the changes in the population

densities of the considered predators varied greatly due to season effect. In general, predators started to increase during June because of the remarkable migration from clover fields to the neighborhood cotton plants suitable for feeding and egg laying. it is in agreement with that found by El Heneidy et al (1978-79). However, most predatory arthropods during June - July in the untreated cotton fields give evidence to the occurrence of strong relationship between predatory arthropods and *Spodoptera littoralis* egg masses.

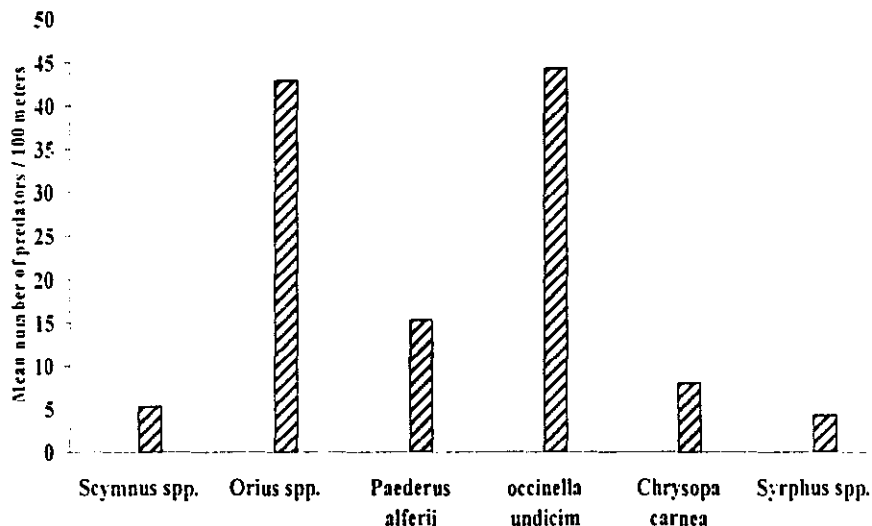


Fig. (4) : Mean number of predators / 100 square meters in cotton field treated with Flufenoxuron at Ismalia during 2004 cotton growing season .

These results are in harmony with the findings of Ibrahim (1962), Ismail (1974), Ali *et al* (1975), Awadalla *et al* (1976), El-Heneidy, *et al.* (1979), Naguib(1979) (Fayad and Ibrahim(1980), Abdel-Kawi (1983), El-Adl and Ghanem (1986), El-Heneidy *et al* (1987), and Moawad *et al.*(1993) .

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**تقيم الكثافة العددية للأعداء الحيوية في حقول القطن المعاملة ببعض المركبات الحيوية والكيميائية المتخصصة في محافظة الإسماعيلية**  
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معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى .

أجريت هذه الدراسة بمحافظة الإسماعيلية خلال موسمي (٢٠٠٣ و ٢٠٠٤). جمعت عينات أسبوعية من المفترسات المنتشرة في حقول القطن اعتباراً من شهر مايو وحتى نهاية موسم النمو من القطعة المعاملة بالفيرس النورى (NPV) و البكتريا دايل 2X المستخدمة في مكافحة دودة ورق القطن مقارنة مع التي جمعت من الحقول المعاملة بالمبيدات المتخصصة و الموصى بها مثل منظم النمو الفلوفينوكسيورون. و قد جمعت هذه العينات قبل وبعد المعاملة بالمبيدات وطرق مكافحة الحيوية. وقد أوضحت الدراسات انتشار ستة أنواع هامة خلال موسمي الفحص من المفترسات هي حشرة الاسكيينس والاوريس و ابرة العجوز وأبو العيد ١١ نقطة واسد المن وذبابة السرفس. وقد أوضحت الدراسة أن نسبة الكثافة العددية لهذه المفترسات في حقول القطن المعاملة بالمركبات الحيوية والتي استخدمت فيها النقاوة البيولوجية الى تلك المعاملة بالمبيدات المتخصصة كنسبة ١ : ١,٩٩ و خاصة في حقول القطن المنزرعة بعد البرسيم في منطقة القنطرة غرب في محافظة الإسماعيلية.