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The Population Trend of *Nysius inconspicuus* Distant (Hemiptera; Lygaeidae) and its Control on Sunflower (*Helianthus annuus* L.)

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Abstract: Weekly data for population trend of *Nysius inconspicuus* Distant. showed that its attack was initiated in May at late seed development stage and remained until sunflower harvesting. The average number of bugs was 0.15 per head in the second week of May. A sharp increase was observed in its population and a maximum number (216.5 bugs/plant) was recorded in the 2nd week of June at the time of harvest during spring, 1994. Dimecron 100 SCW at 300 ml/acre, Paramat 50 EC at 450 ml/acre, Thiodan 35 EC at 700 ml/acre and Tamaron SL 100 at 450 ml/acre were tested for the control of dusky bug, *N. inconspicuus* Distant. on sunflower during spring 1994. They effectively controlled the bug population and saved the yield significantly. There was no significant difference for dusky bug mortality among the tested insecticides. The bug control increased crop yield and percent oil content significantly compared to check. Dimecron 100 SCW gave the best result regarding the yield (2205 kg ha⁻¹) and oil content (45.33%) followed by Paramat 50 EC (1867 kg ha⁻¹ and 44.71%), Thiodan 35 EC (1781 kg ha⁻¹ and 45.17%) and Tamaron SL 100 (1727 kg ha⁻¹ and 43.30%), respectively. The effective control is achieved when the crop was sprayed at 10-day interval.

Key words: *Nysius inconspicuus* Distant population, Control, *Helianthus annuus* L.

Introduction

Sunflower (*Helianthus annuus*- L.) is an important oilseed crop and stands third to soybean and palm for global production of vegetable oil. It was introduced in Pakistan during early 1960s. Its kernels contains 40-50 percent oil and 17-20 percent protein. It is also an excellent source of linoleic acid and alpha tocopherol (Vit:E). It is grown twice a year i.e. during spring and autumn seasons mostly in irrigated conditions. The crop is becoming popular and has been planted on 192 thousand hectare with a production of 109.40 thousand tons of edible oil. However, its average yield (1456 kg ha⁻¹) is lower compared to advanced sunflower growing countries. The reason for low yield can be attributed to many factors. Among these, various insect pests attacking sunflower are of great importance. According to Lohar (1987) only sucking pests such as whitefly and jassid cause 44 percent yield losses in Sindh.

As sunflower is a new crop, it is vulnerable to new pests. A breeding population of Dusky bug, *Nysius inconspicuus* Distant. (Hemiptera; Lygaeidae) was recorded in sunflower, *H. annuus* L. for the first time in Pakistan during Spring 1992. It usually appears during spring season and sucks the sap from the sunflower seeds. The bug is observed in May and its population continuously increases until the crop harvest. It causes serious damage to sunflower crop (Broadle *et al.*, 1986; Kakakhel and Amjad, 1997).

The *Nysius* genus is known to suck the cell sap by piercing the epidermis of plants. It belongs to the group of seed bug. It is a polyphagous pest and recorded worldwide (Broadle, 1978; Birtles *et al.*, 1992; Dillard *et al.*, 1993; Ferguson, 1994). As it is a new pest in Pakistan, the present study is to generate preliminary information on the population trend of *N. inconspicuus* Distant. and to select the effective insecticides for its control.

Materials and Methods

Population studies: Sunflower hybrid Hysun-33, was planted on one acre field at National Agricultural Research Centre (NARC), Islamabad during spring, 1994. The population of *N. inconspicuus* Distant. was recorded weekly. Each time 40 plants were selected randomly. To collect the insect, the sunflower heads were shaken vigorously after covering them with muslin cloth bags. When all

bugs were fallen into the bags, they were removed from the sunflower heads, their opening ends were knotted properly and were put in freezer at 0-5°C for 24 hours before counting the nymphs and adults and converted into total bugs per plant.

Chemical control: Four insecticides, viz., Dimecron 100 SCW at 300 ml/acre, Paramat 50 EC at 450 ml/acre, Thiodan 35 EC at 700 ml/acre and Tamaron SL 100 at 450 ml/acre were used for the control of dusky bug, *N. inconspicuus* Distant. The sunflower field was thoroughly examined for the bug population. When the population reached about 25 individuals per head, the insecticides were sprayed using the knapsack sprayer. After 15 days of the first spray, the bug population was again increased and the same insecticides were sprayed for the second time.

The data for bug population per plant, yield in kg per hectare and percent oil content were recorded at crop maturity for further analysis by MSTAT-C. The means were separated using LSD.

Result and Discussions

Population studies: The results showed that *N. inconspicuus* Distant. appeared after flower initiation during the spring season. Earlier, Frazmann *et al.* (1992) also reported that *N. vinitor* and *N. clevelandensis* were found during budding and flowering stages of the spring planted sunflower in Australia. It is also evident that during spring, 1994, its population was initiated in May at late seed development stage and remained until harvesting of the crop. The average number of bugs was 0.15 per head in the second week of May. A sharp increase was observed in its population and a maximum number was recorded in the last week of June, 1994 at the time of harvest (Fig. 1). Broadle *et al.* (1986) reported that *Nysius* spp. population can go upto 221 bugs per head in Australia. As usually the harvesting of sunflower crop is done manually, dusky bug because of its population disturbs the labours and hence adversely affects their efficiency. Some time it becomes necessary to control the dusky bug, *N. inconspicuus* Distant. population before the crop harvest.

Chemical control: The dusky bug, *N. inconspicuus* Distant. was very carefully monitored and whenever the bug population reached 25 per sunflower head, the spray was done. As its population

Table 1: Chemical control of dusky bug on sunflower during spring, 1994

Insecticides	Dusky bug population per plant			
	First Spray		Second Spray	
	31/05/94	13/06/94	16/06/94	27/06/94
Check	24.87 A	118.60 A	152.30 A	216.50 A
Dimecron 100 SCW	19.47 B	62.33 A	13.93 B	25.07 B
Paramat 50 EC	11.93 B	112.06 A	13.67 B	15.40 B
Thiodan 35 EC	8.27 B	87.00 A	9.07 B	18.93 B
Tamaron SL 100	9.87 B	65.93 A	7.47 B	13.33 B

Means followed by the same letter in the same column are not significantly different at $p = 0.05$

Table 2: The effect of dusky bug control on yield and oil content of sunflower

Insecticides	Yield (kg/ha)	Oil content (%)
Check	1635 B	44.21 AB
Dimecron 100 SCW	2205 A	45.33 A
Paramat 50 EC	1867 At	44.71 AB
Thiodan 35 EC	1781 B	45.17 A
Tamaron SL 100	1727 B	43.30 B

Means followed by the same letter in the same column are not significantly different at $p = 0.05$

increased rapidly, the insecticides (Dimecron 100 SCW at 300 ml/acre, Paramat 50 EC at 450 ml/acre, Thiodan 35 EC at 700 ml/acre and Tamaron SL 100 at 450 ml/acre) were sprayed twice for its control.

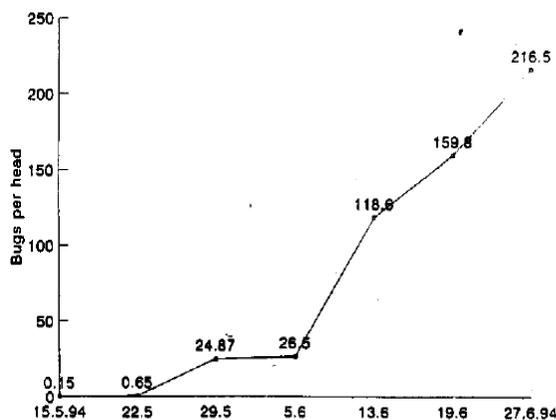


Fig. 1: Population trend of dusky bug during spring, 1994 at NAR9

The tested insecticides significantly controlled the dusky bug population for 15 days after spray (Table 1) compared to check. However, there was no significance difference in Insect mortality among the insecticides. As the adult dusky bug population is very mobile, the prominent number ranging from 10 to 20 per head were still present on the treated plants. This population has great reproduction potential (Swincer, 1977). Ten days after spray, there were nonsignificant differences in dusky bug population among treated and check plots. The average population on treated plots was more than 100 bugs per plant. Therefore, these insecticides were applied for the second time. Kim *et al.* (1994) also recommended to spray *N. plebejus* at 10 day interval but Swincer (1977) argued that more than one spray may be uneconomical and recommend Maldison 118 percent ULV at

450 ml and Maldison 50 percent at 1.1 litre a hectare. Result of second spray showed that the insecticides significantly controlled the bug population. It is also evident from these results that the tested insecticides did not have any significant effect on the dusky bug mortality among each other: however Tamaron SL 100 gave better control compared to Paramat 50 EC, Thiodan 35 EC and Dimecron 100 WSC. The population record after 10 days showed that the population reached above 200 on the check plots where insecticides were not sprayed. Broadle *et al.* (1986) reported that *Nysius* spp. population can go upto 221 bugs per head in Australia. But these insecticides showed the residual toxicity and population was significantly lower ranging from 13 to 25 per head on the treated plots at the crop maturity compared to check (Table 1).

The dusky bug control by Dimecron 100 SCW significantly saved the crop yield followed Paramat 50 EC, Thiodan 35 EC, Tamaron SL 100 compared to check (Table 2). The result also revealed that percent oil content was significantly different and the insecticides can be arranged in descending order as Dimecron 100 SCW > Thiodan 35 EC > Paramat 50 EC > Tamaron SL 100. Dimecron 100 SCW gave the best result regarding the yield (2205 Kg ha⁻¹) and oil content (45.33%). It might be the reason that Dimecron suppressed insects feeding on the sunflower head other than the dusky bug. Paramat 50 EC conferred 1867 kg ha⁻¹ and 44.71 percent oil content. Whereas, Thiodan 35 EC yielded 1781 Kg ha⁻¹ with 45.17 percent oil content. However, Tamaron SL 100 produced 1727 Kg ha⁻¹ and 43.30 percent oil content compared to check (1635 kg ha⁻¹ and 44.21% oil content). These studies conclude that dusky bug, *N. inconspicuus* Distant. revealed a very high number per sunflower plant which may cause economic losses to the crop. It might be a serious pest and might be very dangerous for sunflower seed production in Pakistan. It may also be concluded that the tested insecticides can control dusky bug very effectively for 10 to 15 days. The *N. inconspicuus* Distant. is an active insect and its population may migrate from check to the treated plots very rapidly, therefore, continuous monitoring for the bug population is needed after 10 days of spray for its economic control on sunflower.

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