

Occurrence and Abundance of Grass Hopper Species on Rice

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Abstract: Occurrence and abundance of grasshopper species on rice crop was monitored on rice variety IRRI-6 at Rice Research Institute, Dokri during summer of 2001. The four species infesting rice crop recorded were, *Hieroglyphus banian* Fb. (Rice grasshopper), *Oxya nitidula* Willemsse (Small green grasshopper), *Chrotogonus trachypterus trachypterus* Blanchard (Surface grasshopper) and *Aiolopus tamulus* F. (Small grasshopper). *Chrotogonus trachypterus trachypterus* was recorded in maximum number (12.8 nymphs and 39.2 adults/observation) during July-October with mean temperature of 37.95°C. *Aiolopus tamulus* and *Oxya nitidula* were observed with their maximum population of nymphs (37.6 and 51.0/observation) and adults (39.0 and 70.0/observation), respectively during September-October with mean temperature range of 34.02-37.95°C. Species *H. banian* was observed maximum during August-October with (4.6 nymphs and adults 15.2/observation) under mean temperature range of 35.65-37.95°C. Maximum nymphal activity of all grasshopper species was noticed during three weeks after transplanting of crop and adults were maximally active at crop maturity.

Key Words: Occurrence, Abundance, Grasshopper *Spp.*, *Oryza Sativa*, Dokri

Introduction:

Rice, *Oryza sativa* L., is one of the most important summer cereal crop grown in Indo-Pak. subcontinent. It is warm season crop and thrives best in temperature range of 24-30°C, a constant plentiful supply of water and heavy clay soil (Pathak and Sexena, 1976). Rice contains 8% protein, 2.5% fat, 90.3% carbohydrates and minor amount of iron and calcium. It provides a rich food nutrient to man and the husk is used for fueling the bricks and straw used for animal feed, as packing material, in poultry shades, thatching roofs and manufacturing of straw board. By-products of rice are used for making sweet dishes (Lakho, 1998). The yield trend shows that the ecological conditions of Sindh are relatively more favorable for rice production as compared to other parts of the country. In Sindh, Larkana, Jacobabad, Shikarpur and Dadu in the North and Badin and Thatta in the South are major rice growing districts (Bhatti and Soomro, 1996).

Rice crop is attacked by some 54 species of insect pests and it has been estimated that each year these pests cause 25-30% losses. Grasshoppers, Stem borers, Leaf folders, and Mealy bugs are the major devastators (Inayatullah, et al., 1989). Among grasshopper species, *Hieroglyphus banian*, *Oxya nitidula*, *Chrotogonus trachypterus trachypterus* and *Aiolopus tamulus* are of more economic significance. Both, nymphs and adults feed on young foliage of the crop and eat the leaf margins (Dharejo, 1983). They are very active and jump from one leaf to another on slight disturbance. Pest usually occurs at the pencil initiation stage and continues to maturity. For getting better yield of rice it is imperative to strengthen pest-scouting system. The farmers need to be trained through extension services and pest population should

be monitored critically. It is also important to survey the damage levels and there is a need to work out the economic threshold level.

Keeping in view the importance of crop and damaged by pest insects, the field evaluation was carried out at Rice Research Institute, Dokri, to observe occurrence and abundance of grasshopper species, which could be helpful in planning the control measures against grasshopper species on rice crop.

Materials and Methods

For recording the population of grasshopper species, the study was conducted at experimental area of the Rice Research, Institute, Dokri during 2001. Total experimental plot size measured 120 x120 ft. The plants were transplanted in the experimental plot with 20cm between row to row. The crop seedlings (Variety IRRI-6) were transplanted on 5th June from the nursery sown a month ago i.e. 5th May. Each plot had 5 sub-plots measuring 10 x 10 ft. one in the center and four plots from each corner of the main plot, placing wooden confined sticks at its corners. The normal cultural practices were performed throughout the growing season of the crop.

Method of Data Collection: Data collection was started after five days of transplanting and subsequent at weekly intervals, using sweeping method. For this purpose, sweeping was done for 15 minutes at each spot of the main plot. The observations continued till harvest of the crop. Population of nymphs and adults of each species were counted separately from each sweep at each spot. Hand-net (1" dia, 2.5" muslin cloth depth and 3ft. handle) was used for sampling and recording of different species of grasshoppers. The observations were recorded at morning hours.

Table 1: Taxonomic Position of Grasshopper Species Recorded on Rice Crop During June-October 2001

Sr.No.	Common Name	Technical Name	Family	Order
1.	Surface Grasshopper	<i>Chrotogonus trachypterus trachypterus</i> Blanchard	Acrididae	Orthoptera
2.	Small Green Grasshopper	<i>Oxya nitidula</i> Willemse.	Acrididae	Orthoptera
3.	Small Grasshopper	<i>Aiolopus tamulus</i> F.	Acrididae	Orthoptera
4.	Rice Grasshopper	<i>Hieroglyphus banian</i> Fab.	Acrididae	Orthoptera

Table 2: Meteorological Record Of Rice Research Institute Dokri During June- October, 2001

Month	Temperature °C			Relative Humidity %	Rainfall In mms
	Max	Min	Average		
10.06.01	45.70	28.88	37.29	68.92	
17.06.01	45.90	28.00	36.95	70.01	
24.06.01	45.60	27.70	36.65	70.90	
01.07.01	46.07	27.18	36.62	27.57	
18.07.01	45.92	28.12	37.52	73.08	
15.07.01	46.00	28.25	37.12	73.90	
22.07.01	45.70	28.13	37.41	74.18	
29.07.01	47.30	28.30	37.95	74.98	
05.08.01	45.90	27.89	36.89	75.80	5.8 Mm
12.08.01	44.80	27.12	35.96	76.00	
19.08.01	44.00	27.30	35.65	75.20	4.3 Mm
26.08.01	43.90	27.11	35.50	75.00	
02.09.01	42.00	27.00	34.05	74.50	
09.09.01	41.50	26.90	34.02	74.00	3.2 Mm
16.09.01	41.00	26.70	33.85	73.01	
23.09.01	40.00	26.60	33.03	73.07	
30.09.01	40.09	26.40	33.24	72.99	
07.10.01	41.99	32.38	37.95	72.60	

Results and Discussion

Different insect pests attacked rice crop during its various growth stages. The taxonomic status of insect pests associated with rice crop is given in Table 1. The meteorological observations are presented in Table 2.

The results on pest occurrence, mode of damage and population frequency of nymphs and adults of different grasshopper species individually are shown in Figs. 1,2,3, 4 and overall position in Fig. 5 and the situation is interpreted in the following paragraphs.

Surface Grasshopper, *Chrotogonus trachypterus trachypterus*: The population frequency of nymphs and adults of *Chrotogonus trachypterus trachypterus* (Fig. 1.) showed great deviation at different crop stages. The peak population of nymphs (12.8/observation) was recorded in the end of July with mean temperature of 37.95 °C (Table 2), when the age of crop was only 50 days, subsequently, the pest started to decline gradually and declined at minimum level at the harvest. The adults were at peak (39.2/observation) in the first week of October under the same degree of temperature, however, the trend of occurrence of both the pest stages was varied. The adults started increasing gradually right from the second week of June and maintained their pace upto second week of July with little variation, but later on, they flared-up to peak position and sustained their tempo upto the crop harvest. Both, nymphs and adults feed on leaves by cutting germinating plants of different crops. Unlike *Oxya nitidula* the attack by the grasshopper is more serious in low rainfall areas

(Thakur, 1984). Whereas, Zafar (1986) have also mentioned the similar results on damage and control for surface grasshopper. Atwal (1991) reported grasshopper as a major polyphagous insect pest for rice crop.

Small Green Grasshopper, *Oxya nitidula*: The small green grasshopper also known as sporadic grasshopper in literature. It appeared on rice three weeks after transplanting, when crop was at initial stage of vegetative growth Fig. 2. Upto second week of July the population of both, the nymphs and adults was negligible. Later on, it started increasing harshly. The nymphs attained peak population (51.0/observation) in the second week of September and later on, sharply came down to (29.6/observation) upto maturity. The trend for adults population was similar to nymphs upto second week of September, but thereafter, adults continued to flared-up upto the final observation with peak population of (70.0/observation). The mean temperature range was 34.02-37.95°C during whole observational period (Table 2). Generally, nymphs and adults feed on berseem, maize, sorghum, rice, bajra and sugarcane when there is a serious infestation, the plants may be completely defoliated. Aziz and Aziz (1985), Mohan and Manohoran (1987) have also reported damage by small green grasshopper to rice crop.

Small Grasshopper, *Aiolopus tamulus*: The fluctuation of small grasshopper, *Aiolopus tamulus* is depicted in Fig. 3. Neither the pest in nymphal nor in adult stage was observed during the first two weeks of

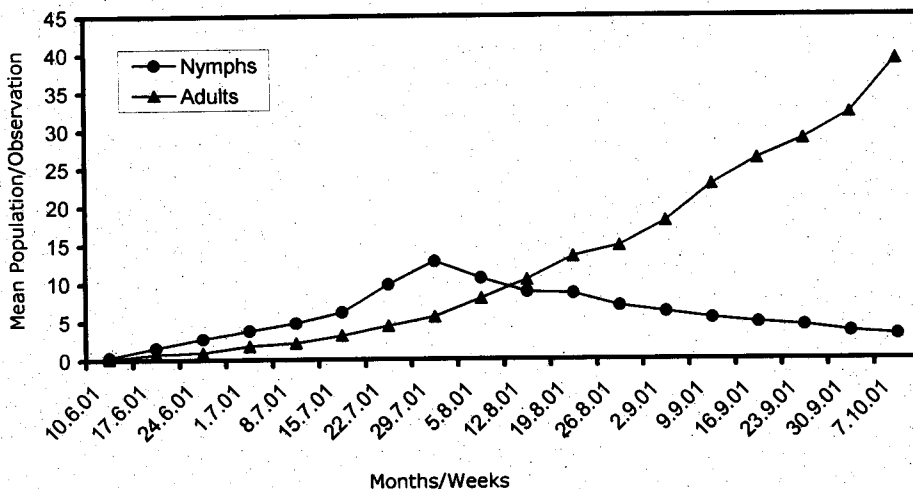


Fig. 1: Mean Population of Chrotogonus trachypterus trachypterus on Rice

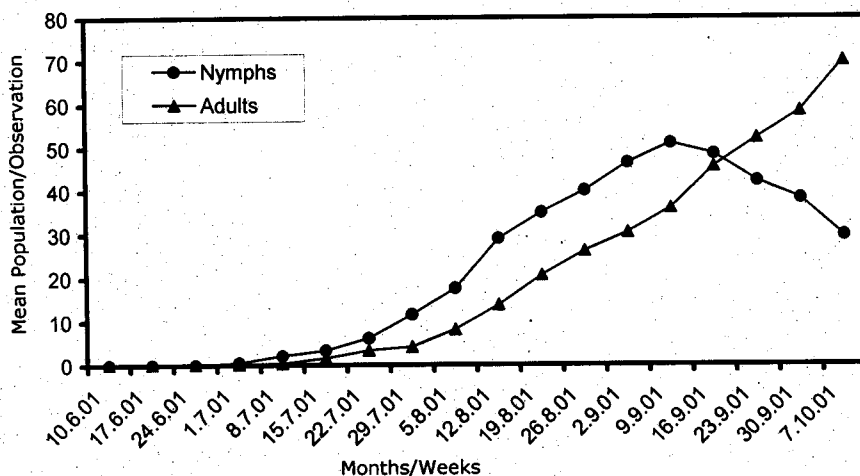


Fig. 2: Mean Population of Oxya Nitidula on Rice

June. The nymph started appearing in the third week of June and population reached at peak (37.6/ observation) in the second week of September. The adults population multiplied tremendously after the second week of July and touched its peak level (39.0/observation) in the first week of October at maturity stage of the crop. The mean temperature

range of 34.02-37.95°C along with food availability seems to have favoured the pest multiplication (Table 2). This grasshopper is smaller in size than *Hieroglyphus banian*. It is also polyphagous in nature and sporadic on paddy crop in certain years. They attack on leaves of rice, maize, millet, sugarcane, grasses and sunhemp have been reported by Bhowmik

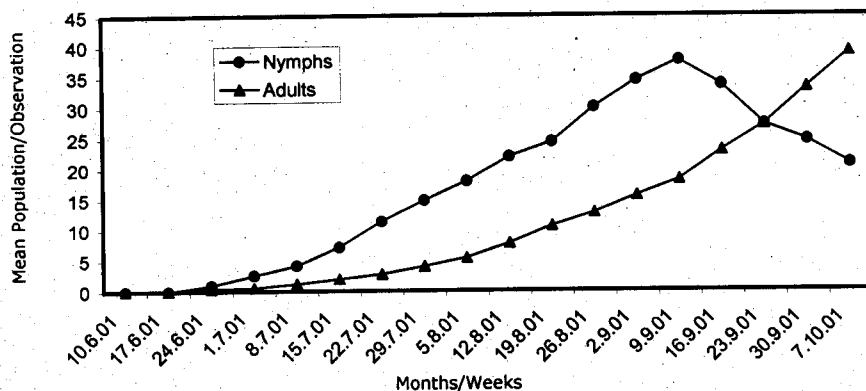


Fig. 3: Mean Population of Aiolopus Tamulus on Rice

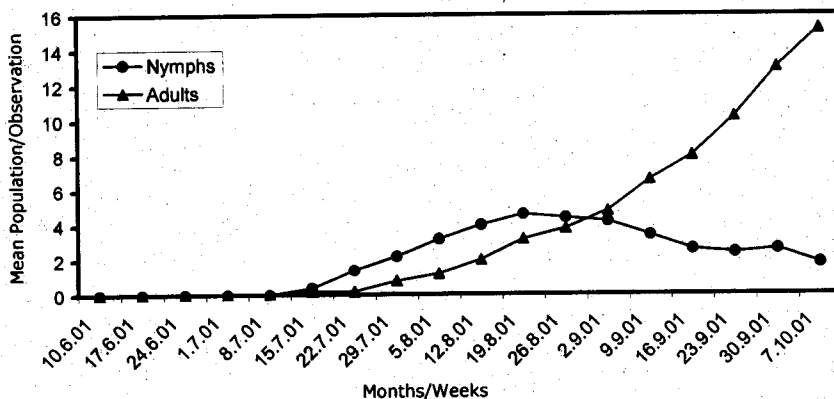


Fig. 4: Mean Population of Hieroglyphus Banian on Rice

and Haldar (1986). The results are also partially supported by the findings of Atwal (1991) and Premchand (1995).

Rice Grasshopper, Hieroglyphus banian : Both, nymphs and adults of *Hieroglyphus banian*, did not show upto the second week of July (Fig. 4). In the second week of July, the nymphs started flaring up and reached to its maximum of (4.6/observation) at the vegetative stage of crop (last fortnight of August). Later on, the pest started decreasing and upto the last observation (first week of October) it was 1.8. The

adults infestation increased gradually upto the last week of July, but afterwards shoot up reached at peak level with the maximum of (15.2/observation) in the end of first week of October. The adults remained in high numbers even upto the crop harvest period. The mean temperature range of 35.65-37.95 °C along with food availability seems to have favoured the adult population (Table 2). It means that this grasshopper remained active during later stage of crop and damaged leaves, young shoots and tender earhead. Both, adults and nymphs fed on paddy and other

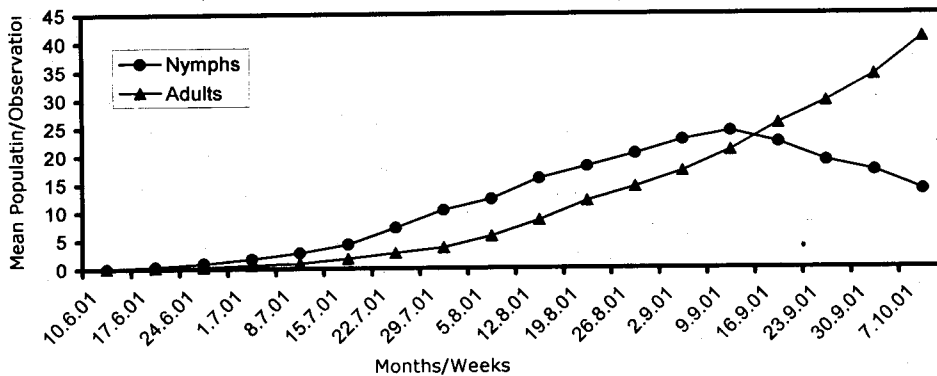


Fig. 5: Mean Population of Nymphs and Adults of Grasshopper Species on Rice

crops, causing defoliation. In certain years, they caused extensive damage, moving from field to field over large areas. Gyidi (1985), Zafar (1986), Shen, *et al.* (1988) and Navak, *et al.* (1990) have also reported the significant damage to rice by *Hieroglyphus banian*. Atwal (1991) and Premchand (1995) have also mentioned about activity of this grasshopper in the rice crop.

Overall Population of All Species of Grasshoppers: The overall position for all the four species of grasshoppers illustrated no greater contrast with their individual situations (Fig. 5). It is obvious from the results, that both the nymphs and adults of one or the other grasshopper species found infesting rice crop three weeks after transplanting upto harvest. The studies conclude with the opinion that grasshoppers remain in rice field right from transplanting upto harvest. Overall, the nymphs were maximum (24.35/observation) at earhead and grain formation stages, while adults were maximum (40.85/observation) at crop maturity. Thakur (1984) and Bhowmik and Haldar (1986) have also reported incidence and damage caused by rice grasshopper. Mohan and Manohoran (1987) have reported his findings well comparable with the present results.

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