

## A Note on the Influence of Manuring on the Incidence of the Fulgorid — *Nilaparvata lugens* S on Paddy.

by

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**Introduction:** Intensive application of manures and fertilisers is one of the chief methods of increasing crop yields.

A close relationship between manuring and incidence of pests and diseases has been observed by research workers. The interesting observations made by the author on the influence of manuring on the incidence of the fulgorid — *Nilaparvata lugens* S on paddy are recorded in this note.

The work done on this aspect in India is rather limited. Andrews (1923) remarks that nitrogenous manures should be used with caution. Dealing with the incidence of *Helopeltis theivora* W on tea, he mentions of a distinct reduction in damage by the bug with the application of potash to the soil. McCollach and Salmon (1923) conclude that silica applied in the form of sodium silicate wards off the Hessian fly — *Mayetiola destructor* S on wheat. Less (1926) and Evans (1938) mention that the reproduction of aphids is positively correlated with nitrogen and protein contents of the plant. Martin (1940) holds the view that increased application of nitrogenous manures creates favourable conditions for diseases and that plots not manured with potash are the first to be attacked by insects. Balasubramaniam and Kesava Iyengar (1950) have recorded that the application of groundnut cake and cattle manure has given rise to an increase in incidence of the cotton jassid — *Empoasca devastans* D.

**Materials and methods:** During investigations on the pest at the Agricultural Research Station, Aduthurai, an overwhelming incidence was noted on some of the heavily manured fields in the farm. With a view to explore the relationship between manuring and incidence of the pest, observations were made in the 'Permanent Manurial Experimental' plots in the farm during 1954 and in the 'Varietal Response to Manuring Experimental' plots in 1955. Actual counts of pest population were taken in such of the plots in the Permanent Manurial Experimental area, where nitrogen, phosphate and potash each at 60 lb. per acre and lime at 1500 lb. per acre were applied, the variety of paddy being ADT. 3. In the

subsequent year, counts of insect population were confined to variety ADT. 20 in the plots treated with nitrogen and phosphate alone and in combination, since it was observed in the previous year that the incidence of the pest was more on ADT. 20 than on ADT. 3. For population counts, random sample of area of 2 sq. ft. per plot was examined at different stages of the crop. Four such samples were taken from each treatment.

**Results:** The counts of pest population recorded in the 'Permanent Manurial' plots are furnished in table I under appendix. Due to the rank growth of the plants, the crop lodged in the nitrogen treated plots early, i.e., before the grains had hardened, while in other treatments, viz., phosphate, potash, lime and no treatment, the lodging was only normal. The incidence of the pest, however, was not so severe as to affect the yield in the area. There was no perceptible difference in the incidence of the pest in the different plots till the lodging of the crop whereas after lodging there was a rise in the population in the nitrogen treated plots. The results of counts taken in the 'Varietal Response to Manuring' trial in 1955 are given in table II under appendix. The data show that there was no perceptible difference in incidence of fulgorids in the different plots till the crop lodged. The population flared up after lodging, as already experienced in the previous season, on account of the ideal conditions created thereby, the semi-decaying stage of the stem being an ideally suited sustenance for the insect. The population figures were highest in plots treated with a combination of 60 lb. nitrogen and phosphate at 30, 45 and 60 lb. per acre and in these plots the crop suffered badly. The crop in these plots lodged earlier than in other treatments, i.e., even at the milky stage. Plots treated with nitrogen alone harboured more fulgorids than plots treated with  $P_2O_5$  alone. The pest proportions were not serious and there was no severe lodging in plots receiving 30 lb. nitrogen. The incidence of fulgorids in 'no treatment' plots and  $P_2O_5$  treated plots was more or less similar. There was no early lodging in the  $P_2O_5$  plots unlike in the nitrogen plots.

The yield figures were vitiated due to fulgorid damage and the crop getting caught in the rains at harvest time and subsequent germination of the grains. Hence a correlation of the yield with the insect factor was not possible.

**Summary and conclusions:** The incidence of the fulgorid—*Nilaparvata lugens* S. was kept under observation during the 1954 and 1955 seasons in the Manurial Experimental plots of the farm

where different manures like nitrogen and  $P_2O_5$  independently and in combination, as also lime and potash were applied. The results showed that the incidence of fulgorids increased rapidly after lodging and that the population was highest in plots treated with 60 lb. of nitrogen and 30, 45 and 60 lb. of  $P_2O_5$  in combination on account of an early lodging of the crop. Plots treated with higher doses (45 and 60 lb. per acre) of nitrogen alone harboured spectacularly larger population of fulgorids than plots treated with  $P_2O_5$ , lime, potash and plots receiving no treatment.

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#### APPENDIX.

##### TABLE I

*Incidence of fulgorids in plots treated with different manure.*  
Permanent Manure Experiment. Kuruvai season — 1954.

Variety — ADT. 3; sown on 26—6—1954;  
planted on 24, 25—7—1954.

Of different variants in the experiment, only 5 were taken for observation....

*Treatments in which observations were made: 5*

Size of plot : 45' x 7½'

Replication: 4. Layout: Split plot design

Counts taken from a 2 foot square sample per plot.

Treatment	Population of fulgorids (total in 4 plots)		
	3 weeks since Planting (21-8-1954)	At the shot blade stage 10-9-1954	Just after lodging 9-10-1954
1. Nitrogen as ammonium sulphate (60 lb./acre)	17	115	355
2. Potash at 60 lb./acre	24	134	218
3. P <sub>2</sub> O <sub>5</sub> at 60 lb./acre	14	105	196
4. Lime at 1500 lb./acre	19	111	182
5. No treatment	21	119	182

The population of fulgorids was relatively more in the nitrogen treated plots after lodging.

TABLE II

Incidence of fulgorids in plots manured with different rates of nitrogen and phosphate, each alone and in combination (Varietal response trial area where ADT. 20 and ADT. 3 were included).

*Kuruwai season 1955* Variety kept under observation ADT. 20; sown on 1-7-1955 and planted on 31-7-1955.

Treatment: 16.

Replications: 4.

Layout: Split plot design.

Size of plot: 10' x 20'. Counts taken from a 2 feet square sample per plot.

Population of fulgorids (total in 4 replications)

Treatment	3 weeks since planting 24-8-1955	At the shot blade stage 10-9-1955	Immediately after lodging 3-10-1955
1. 30 lb. N	13	21	168
2. 45 lb. N	11	28	259
3. 60 lb. N	17	16	245
4. 30 lb. P <sub>2</sub> O <sub>5</sub>	6	22	102
5. 45 lb. P <sub>2</sub> O <sub>5</sub>	18	18	120
6. 60 lb. P <sub>2</sub> O <sub>5</sub>	13	19	149
7. 30 lb. N + 30 lb. P <sub>2</sub> O <sub>5</sub>	14	25	226
8. 30 lb. N + 45 lb. P <sub>2</sub> O <sub>5</sub>	14	26	254
9. 30 lb. N + 60 lb. P <sub>2</sub> O <sub>5</sub>	11	25	222
10. 45 lb. N + 30 lb. P <sub>2</sub> O <sub>5</sub>	10	26	288
11. 45 lb. N + 45 lb. P <sub>2</sub> O <sub>5</sub>	16	29	232
12. 45 lb. N + 60 lb. P <sub>2</sub> O <sub>5</sub>	17	24	264
13. 60 lb. N + 30 lb. P <sub>2</sub> O <sub>5</sub>	21	37	426
14. 60 lb. N + 45 lb. P <sub>2</sub> O <sub>5</sub>	11	35	402
15. 60 lb. N + 60 lb. P <sub>2</sub> O <sub>5</sub>	15	26	393
16. Control	9	24	115

With the lodging of the crop, insect population increased.

The population of fulgorids was highest in plots treated with a combination of 60 lbs. N and P<sub>2</sub>O<sub>5</sub> at 30, 45 and 60 lb./acre. In these plots the crop was noted to lodge early due to luxuriant growth.