

## Effect of Nitrogen on the Incidence of Rust Disease of Pearl-millet Caused by *Puccinia penniseti* Zimm.

Among the various diseases affecting pearl-millet (*Pennisetum typhoides* (Burm. f) Staff & Hubb.) rust disease caused by *Puccinia penniseti* Zimm., is an important one. An attempt has been made to assess the role of different levels of nitrogenous fertilizer on the incidence of rust disease on different hybrid varieties of pearl-millet.

An experiment in randomised block design having six levels of nitrogen viz., 0, 40, 80, 120, 160 and 200 kg N per ha and three hybrid varieties viz., J 1270, J 934 and HB 3 with three replications was laid out at the Cotton and Millet Experiment Station, Kovilpatti. The plot size was 3.0 × 2.7 m net. Nitrogen was applied in the form of urea at equal split doses, once at the time of sowing and the other, four weeks after. No organic or inorganic manure was applied. A spacing of 45 cm between rows and 15 cm between plants within rows was adopted and one plant per hole was maintained. Artificial inoculation of

rust disease was done by dusting spore-talc mixture (1:500) when the plants were in the early flowering stage. Observations on the disease incidence were recorded when the disease was at its maximum. Rust infection was recorded for 50 plants at random in each replication of a treatment. For each plant, five leaves were examined at random and the intensity of infection in the leaf was scored according to the modified Cobb's scale followed by Kandasamy et al. (1971).

The disease incidence data under different levels of N and summary of results are given in Tables 1 and 2. In the present study the data on the incidence of rust due to different levels of N were found not significant. Thus, the results reveal that the nitrogen nutrition to the pearl-millet crop did not influence rust incidence. Among the three hybrid varieties tested, varieties J 934 and HB 3 were highly susceptible than J 1270.

TABLE 1. Effect of N on the incidence of rust in different varieties of pearl-millet

Varieties	Per cent rust incidence					
	Nitrogen levels (kg N/ha)					
	0	40	80	120	160	200
J 1270	51.5 (45.9)	55.0 (47.9)	42.2 (40.5)	39.8 (39.1)	45.7 (42.5)	42.5 (40.7)
J 934	62.0 (52.1)	60.7 (51.2)	59.8 (50.7)	57.5 (49.3)	55.2 (48.0)	56.3 (48.6)
HB 3	58.8 (50.1)	58.7 (50.0)	62.3 (52.1)	58.8 (50.2)	56.0 (48.4)	51.5 (45.9)

Figures in parenthesis are transformed values



TABLE 2. Summary of results on the effect of N on the incidence of rust

Nitrogen levels (kg N/ha)	Rust incidence (%)	Variety	Rust incidence (%)
200	50.1 (45.1)	J 1270	46.1 (42.8)
120	52.0 (46.2)	HB 3	57.7 (49.5)
160	52.3 (46.3)	J 934	58.6 (50.0)
0	57.4 (49.3)		
40	58.1 (49.7)		
80	54.8 (47.8)		

Figures in parenthesis are transformed values

Comparison of significant effects C. D. ( $P = 0.05$ )

- (i) Between varieties: 5.9
- (ii) Between nitrogen levels: Not significant.
- (iii) Between varieties  $\times$  nitrogen levels: Not significant.

Plants fertilized with different levels of N had no effect upon the rust incidence though nitrogen nutrition to the host has been correlated with the disease incidence (Sivaprakasam, 1972 and Sivaprakasam *et al.* 1971). Since the rust disease is a high sugar disease (Hare, 1966), increase in nitrogen nutrition may not have had marked influence on the disease incidence.

The observation on the susceptible reaction of HB 3 and J 934 is in conformity with the earlier observation reported by Kandasamy *et al.* 1971. J 1270 was found to be tolerant to downy mildew infection (Sivaprakasam *et al.* 1975). However, J 1270 appears to be susceptible to rust.

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K. SIVAPRAKASAM

K. PILLAYARSAMY

Cotton and Millet Experiment Station,  
Kovilpatti.

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### Influence of Ragi Root-Aphid, *Tetraneura hirsuta* B., on the Reniform Nematode, *Rotylenchulus reniformis* Linford and Oliveira, 1940

Several species of plant parasitic nematodes are known to be present in the rhizosphere of ragi plants. Linford and Yap (1940) have reported the occurrence of the reniform nematode *Rotylenchulus reniformis* Linford and Oliveira, 1940 on *Eleusine indica*. Subsequently Goodey et al. (1965) have listed a *Meloidogyne* sp. under *E. coracana* as well as three other species of root-knot nematodes, *M. incognita acrita* Chitwood, 1949, *M. arenaria* (Neal, 1889) Chitwood 1949, and *M. javanica* (Treub, 1885) Chitwood, 1949, the lesion nematodes *Pratylenchus penetrans* (Cobb, 1917) Filipjev and Stekhovan, 1941 and *Pratylenchus zea* Graham, 1951 and the reniform nematode, on *E. indica*. The prevalence of reniform nematode in Tamil Nadu on ragi (*E. coracana*) causing poor growth and grassy appearance has been reported by Rajagopal (1965). Sitharamaiah et al.

(1971) have included in their list of nematode species occurring in *E. coracana*, in India, two spiral nematodes, *Helicotylenchus indicus* and *Helicotylenchus* sp., two root-knot nematodes *M. incognita* and *M. javanica*, *Tylenchus* sp., and the reniform nematode.

In order to find out whether the infestation of the root-aphid, *Tetraneura hirsuta* B., has any significant effect on the nematode population, preliminary studies were carried out in the ragi fields of the Tamil Nadu Agricultural University Farm, Coimbatore during June, 1973 and the results of the observations are presented in this note.

CO 7 ragi crop of two months age in a plot of 1 X 2 m was selected and ten soil samples in each from the rhizospheres of the root-aphid infested plants and noninfested plants were drawn. 200 ml of soil from each was