Oryza Vol. 47. No.2, 2010 (161-163)

Effect of nitrogenous fertilization to rice crop on the incidence of rice sheath mite, *Steneotarsonemus spinki* Smiley

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ABSTRACT

Studies on the effect of different levels of nitrogen to rice crop on the incidence of rice sheath mite, Steneotarsonemus spinki Smiley was conducted at the College Farm, N.M. College of Agriculture, Navsari, Gujrat during wet season. The results indicated that unfertilized rice crop had significantly lower number of mites (21.56 mites leaf sheath^{-1}) and discolored leaf sheaths (5.50 cm) than fertilized crop. It showed that the growth of rice plants as influenced by nitrogen level had definite bearing on incidence of mite. The results further indicated that mite population had a tendency to increase in number with an increase in nitrogenous fertilization to rice plants.

Key words: *rice, sheath, mite, Steneotarsonemus spinki, incidence, nitrogen*

The rice sheath mite, directly or indirectly causes considerable amount of quantitative and qualitative losses in rice. The higher doses of nitrogen fertilization encourage the luxuriant plant growth which produces plant more attractive as oviposition site for rice insect pests. The vigorous growth of plant due to nitrogen application created microclimate suitable for the multiplication of pest. Balasubramanian *et al*., (1983) reported that nitrogenous fertilizers produced large and more succulent plant of rice making it more susceptible to different sucking pests including mites than those grown at lower nitrogen levels. Doval *et al.* (1974) reported that nitrogen levels were directly proportionate to the population response of wheat mite, *Petrobia lateens*, Muller. Such information of different levels of nitrogen application on *S. spinki* is lacking.

A field experiment was conducted at College Farm, Navsari Agricultural University, Navsari during wet season. Rice variety Jaya was transplanted at a spacing 20 x15 cm in ransomised block design with four replication fertilization to host plant on incidence of *S. spinki*. Five level of nitrogen 40, 80, 100, 120 and 140 kg ha $^{-1}$ was applied in three splits, as basal dose (40%), at tillering stage (40%) and at panicle initiation stage (20%) in form of Ammonium sulphate. Phosphorus was applied as basal dose in all the plots @ 30kg ha^{-1}. The plots were kept free from pesticide application throughout the crop period. Mite population and intensity of damage was observed at dough stage by sampling 10 leaf sheaths randomly from mite infested plants from each spots. The samples were brought to the laboratory in polythene bags. The number of eggs and other active stages of the mite present in leaf sheaths were observed under binocular microscope and the length of discoloured area on leaf sheath were measured. Such observations were recorded at weekly intervals starting from 15 days after transplanting to maturity.

The highest length of discolored area of leaf sheath (11.74) was observed in plots where 140 kg N ha^{-1} was applied whereas in the control (Table 1). (0 kg N ha^{-1}) it was lowest (5.50cm) which was at par with the application of 40 kg N ha^{-1} and 80 kg N ha^{-1}. The number of egg laid was significantly higher (16.16 leaf sheath^{-1}) when applied in the plot 140 kg N ha^{-1}. Number of eggs laid leaf sheath^{-1} was reduced significantly at the dose 120 kg N ha^{-1} (13.67 leaf sheath^{-1}). The highest population of mites (37.19 leaf sheath^{-1}) was recorded with 140 kg N ha^{-1} was recorded significantly than all other treatments.

The treatment of 120 kg N ha^{-1} recorded significantly highest grain yield (5.04 t ha^{-1}), followed

Table 1. Effect of nitrogen levels on the incidence of *S. spinki* during wet season

Treatment	Mean no of eggs/leaf sheath			Mean no of mobile stage / leaf sheath			Mean length of discolored area			Total no. of mites/ leaf sheath			Yield t ha^{-1}		
	1st year	2nd year	Pooled	1st year	2nd year	Pooled	1st year	2nd year	Pooled	1st year	2nd year	Pooled	1st year	2nd year	Pooled
40 kg N ha^{-1} (06.95)	02.82^{ab} (08.18)	03.03^{b} (07.53)	02.92^{ab} (16.56)	04.19^{b} (18.54)	04.42a (17.58)	04.31^{b} (05.05)*	02.46^{ab} (06.51)	02.74^{a} (05.76)	02.60^{a} (23.01)	04.90 (26.46)	05.24 (24.70)	05.07	2.96	3.02	2.99^{d}
80 kg N ha^{-1}	03.01^{b} (08.06)	03.14^{b} (08.86)	03.07^{b} (08.42)	04.40^{b} (18.36)	04.62^{a} (20.34)	04.51^{b} (19.34)	02.56^{b} (05.55)	02.82^{a} (06.95)	02.69^{a} (06.24)	05.22 (26.25)	05.47 (28.92)	05.35 (27.62)	3.02	3.07	3.05^{d}
100 kg N ha^{-1}	03.38^{c} (10.42)	03.68^{c} (12.54)	03.53^{c} (11.46)	04.84^{c} (22.43)	05.41^{b} (28.27)	05.12^{c} (25.21)	02.93^{c} (07.58)	03.16^{b} (08.99)	03.04^{b} (08.24)	05.79 (32.52)	06.45 (40.60)	06.12 (36.45)	3.69	4.00	3.84^{c}
120 kg N ha^{-1}	03.68^{d} (12.54)	03.99^{c} (14.92)	03.83^{d} (13.67)	05.39^{d} (28.05)	05.84^{b} (33.11)	05.61^{d} (30.47)	03.33^{d} (10.09)	03.34^{c} (10.16)	03.34^{c} (10.16)	06.43 (40.34)	06.99 (47.86)	06.71 (44.02)	4.99	5.08	5.04^{a}
140 kg N ha^{-1} (14.37)	03.92^{d} (18.98)	04.47^{d} (16.56)	04.19^{e} (33.69)	05.89^{e} (40.86)	06.47^{c} (37.19)	06.18^{e} (11.46)	03.53^{e} (12.03)	03.61^{c} (11.74)	03.57^{d} (47.86)	06.99 (59.53)	07.78 (53.61)	07.39	4.40	4.55	4.48^{b}
0 kg N ha^{-1}	02.68^{a} (06.18)	02.90^{a} (07.41)	02.79^{a} (06.78)	03.75^{a} (13.06)	04.24^{a} (16.98)	04.00^{a} (15.00)	02.41^{a} (04.81)	02.69^{a} (06.24)	02.55^{a} (05.50)	04.48 (19.07)	05.02 (24.20)	04.75 (21.56)	2.90	2.91	2.91^{d}
CD (P=0.05)	0.280	0.343	0.261	0.379	0.472	0.290	0.193	0.140	0.208	0.443	0.576	0.362	211.25	289.69	168.36
T x P S.Em.	0.106	0.114	0.148	0.141	0.184	0.214	0.069	0.070	0.050	0.156	0.208	0.252	-	-	-
CD (P=0.05)	0.298	0.322	.0427	0.396	0.515	0.619	0.194	0.196	0.138	0.438	0.583	0.727	-	-	-
Y x T S.Em.	-	-	0.110	-	-	0.164	-	-	0.070	-	-	0.184	-	-	-
CD (P=0.05)	-	-	NS	-	-	0.460	-	-	NS	-	-	0.516	-	-	NS

* Figures in parentheses are 8q root retransformed values; those out side are $\sqrt{X+1}$ transformed means
Figures with the same letters are at par in the respective column

by the treatments 140 kg N ha^{-1} (4.48 t ha^{-1}) and 100 kg N ha^{-1} (3.84 t ha^{-1}). Remaining treatments *i.e.* 80 kg ha^{-1} (3.05 t ha^{-1}) and 40 kg N ha^{-1} (2.99 t ha^{-1}) recorded lowest grain yield and comparable to untreated control (2.91 t ha^{-1}).

The present results indicated that rice crop without the application of chemical fertilizers had significantly lower number of mites than fertilized ones. It showed that the growth of rice plants as influenced by nitrogen levels had a definite bearing on mite incidence. Such phenomenon of increase in sucking pests including mites on rice crop with increase of nitrogen was reported by Rao *et al*., (1999).

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