Analysis of Best Treatment and Variety Based on Nematode Population on Banana using Artificial Neural Networks

P. SUNDARARAJU, R. LEELA DEVI* AND M. MANIMEKALAI*

National Research Centre for Banana (ICAR), 44, Ramalinga Nagar South Extn., Vayalur Road, Tiruchirappalli - 620 017.

India is a largest producer of banana in the world. It accounts for 31.7% of the total fruit production in the country. The entire part of the plant is used for various purposes. Owing to its multifaceted use and high economic returns it is referred to as "***KALPATHARU***" (plant of virtues).

Lesion nematodes causing rotting of root tissues affects water and nutrient uptake as well as plant anchorage. Fruit quality is adversely affected and plant topple easily even in the absence of winds.

Studies were initiated to evaluate effect of organics and inorganics for management of root-lesion nematode on 6 commercial cultivars. An attempt was also made to study the recent engineering tool and Artificial Neural Networks (Kohonen - Self Organizing Maps), for analysis of best variety and treatment based on the nematode population on banana.

A field trial was laid out at National Research Centre for Banana (NRCB) farm, Podavur on 6 commercial cultivars *viz.*, Nendran, Karpuravalli, Monthan, Poovan, Rasthali and Robusta, with 6 treatments, each replicated 4 times.

T_1 - 200 g N inorganic (urea); T_2 - 25% N FYM + 75% N urea; T_3 - 25% N neem cake + 75% N urea; T_4 - 25% N FYM + 25% neem cake + 50% N urea; T_5 - 25% N FYM + 50% N neem cake + 25% N urea; T_6 - 25% N FYM + green manure + 75% N urea.

Pre and post treatment soil and root samples were collected for assessing nematode populations by using modified Baermann's funnel method. These data were used for analysing the best treatment and variety based on the nematode population on 6 commercial cultivars of banana using Artificial Neural Networks.

Analysis of Best Treatment was done in two ways: In the first method, varieties, treatments and number of replication were used to analyse the best treatment based on nematode population by the use of Experimental design method (Completely Randomized Design).

In the second method, analysis of best treatment was selected based on growth parameters. Various plant growth parameters (height, girth, total leaves, petiole length, lamina length, leaf breadth, number of hands and fingers and total fruit weight).

Plant growth of commercial cultivars, used in the experiment, improved as a result of organic and inorgnic applications. Maximum growth was with neem cake (50% neem cake + 25% FYM and 25% N urea). Nematode population was also minimum in this treatment. It was, therefore, adjudged as the best treatment. Based on growth and in comparison to other virieties, Karpuravalli was considered as the best variety.

The analysis of these results are in agreement with studies on various neural networks algorithm, fundamentals of neural networks and computing

* Shrimati Indira Gandhi College, Tiruchirappalli - 620 001, Tamil Nadu.

(Freeman and Skapura, 1991; Laurene Fausett, 1994, Philip, 1989).

REFERENCES

Freeman James, A. & Skapura, D.M. (1991). "*Neural networks Algorithm*" Application and programming technique, Loral space informatin system and adjunct, University of Houstor at Clears Lake.

Laurence Fausett. (1994). "*Fundamentals of Neural Networks*", Prentice Hall Englewood Cliffs.

Philip, W.D. (1989). "*Neural computing* - **Therory and Practice**", ANZA Research, Inc.

Additional Sources of Resistance to the Root-Knot Nematode (*Meloidogyne incognita*) in Tomato

R. MAHAJAN

Department of Vegetable Crops, Punjab Agricultural University, Ludhiana 141 004.

In the on going programme of locating sources of resistance to the root-knot nematode in tomato in the Department of Vegetable Crops, Punjab Agricultural University, additional germplasm has been screened and new sources of resistance have been identified for use in breeding for resistance programme.

Thirty four tomato germplasm collections, acquired recently, were screened in infested nursery beds, being maintained at the Vegetable Experimental Area of the Department. The infested beds had an initial root-knot population of 380 larvae@ 250 cc of soil. The germplasm was sown in rows at a distance of 4" each and line 1-6-1-4 and Punjab Chhuhara were used as resistant and susceptible checks respectively.

Forty five days after sowing of seeds, 10 plants from each entry were uprooted at random, washed gently in running water and graded on a scale of 1-5 based on the number of galls, where 1=no galls, no egg masses and 5=more than 50 gall with egg masses. Lines showing an index of less than 2.0 were considered resistant.

Out of the germplasm tested, CLN 1464 A, CLN 977 A, COFLCR-5 COMLCR-3 and Sunbelt have been identified as resistant and recommended for inclusion in the breeding programme.

TABLE 1. Reaction of some tomato germplasm to the root-knot nematode, *Meloidogyne incognita*

Sr. No.	Germplasm	Source	Root knot index.
1.	CLN 983 A	AVRDC, Taiwan	4.80
2.	CLN 1464 A	AVRDC, Taiwan	1.50
3.	CLN 1462 B	AVRDC, Taiwan	4.70
4.	L-37-7	AVRDC, Taiwan	4.20
5.	CLN 1460 A	AVRDC, Taiwan	3.50
6.	CLN 977 A	AVRDC, Taiwan	1.10
7.	LO 5962	AVRDC, Taiwan	2.70
8.	LA 1310	TGRC, Davis	4.30
9.	LA 1501	TGRC, Davis	3.50
10.	LA 3202	TGRC, Davis	4.00
11.	Hotset	TGRC, Davis	4.30
12.	Malintka 101	TGRC, Davis	4.00
13.	LA 1579	TGRC, Davis	4.10
14.	LA 3526	TGRC, Davis	4.50
15.	LA 1421	TGRC, Davis	3.10
16.	Saladette	TGRC, Davis	4.10
17.	Nagcarlong	TGRC, Davis	3.80
18.	LA 1502	TGRC, Davis	2.10
19.	IP NIL VF 145	TGRC, Davis	2.40
20.	Ebr-6	TGRC, Davis	2.60
21.	COMLCR-1	TNAU, Coimbatore	4.60
22.	COMLCR-9	TNAU, Coimbatore	4.60
23.	COMLCR-7	TNAU, Coimbatore	4.20
24.	COFLCR-3	TNAU, Coimbatore	2.80