Reference

Baig, M., Nataraju.,B and Samson, M.V. (1990). Studies on the effect of antibiotics on the rearing perforaiance and loss due to diseases in silkworm, *Bombyx mori* L. *Indian J. Seric.*, **29(1):** 54-58.

Banuprakash, KG., Govindan, R. and Devaiali, M.C. (1999). Influence of antibiotics on growth and development of silkwonn *Bombyx mori* L. Proc. of Nad. Sent, on Trop. Seric, GKVK Campus, Bangalore.

Norris, J. (1971). The protein crystal toxin of *Bacillus thuringiensis:* Biosynthesis and physical structure. In: *"Microbial Control of Insects and Mites",* H.D. Burges and N.N. Hussey (eds.), Academic Press, London, pp. 229-246.

Samson, M.V. and Baig, M.V. (1976). Effect of antibiotics to check melting and on the various economic characters of mulberry silkworm. Annual Report. (1975-76). CSR&TI, Mysore, pp. 103-106.

Savithri, G., Sujathamma, P. and. Murali Mohan, P. (1999). Beneficial effects of antibiotics on rearing perfonnance of silkworm, *Bombyx mori* L. Proc. Nad. Sem. Trop. Seric. GKVK Campus, Bangalore. pp.123-125.

Sridar, R., Subramanian, A. and Chandramohan, N. (2000). Efficacy of antibiotics against bacterial flacherie of silkworm *Bombyx mori* L. *Indian, J. Seric.*, **39(2):** 176-177.

Walton, J.R.(1977). A mechanism of growth promotion - nonlethal feed antibiotic induced cell wall lesions in enteric bacteria. In: Antibiotics in Agriculture, M. Woodbine (eds). Butterworths, London, pp. 259-264.

Madras Agric. J., 95 (1-6): 222-225 January-June 2008
https://doi.org/10.29321/MAJ.10.100570

Research Notes

Effect of biopesticides as seed dressers on germination and growth of bhendi

P. INDIRA GANDHI AND K. GUNASEKARAN
Department of Agrl. Entomology, Tamil Nadu Agricultural University, Coimbatore - 641 003, Tamil Nadu.

Bhendi is ravaged by many insect pests right from germination of seeds to harvest of fruits. In the early stage, sucking pests like aphid, *Aphis gossypii* Glover, the leaf hopper, *Amrasca biguttula biguttula* Ishida and the whitefly, *Bemisia tabaci* Gennadius desap the leaves. Farmers rely solely on the chemical insecticides for the management of pests of bhendi because of easy adaptability, immediate and spectacular knockdown effects (Pawar *et al.*, 1988). Among the various options for applications, seed treatment is one of the best methods, as insecticidal seed treatment not only ensures the presence of insecticide residues throughout seedling stage when the plant is most vulnerable to sucking pests like aphids, leafhoppers and whiteflies, but it also relatively inexpensive and easy to adopt when compared

Table 1. Effect of seed treatment on germination and growth of bhendi

(Mean of four replications)

S.No	Treatments	Germination percentage		Total phenol content (μg/g) (DAS)		Root length (cm)	Shoot length (cm)	Vigour index
		7 DAS	15 DAS	40	50			
1	*P.fluorescens* 10 g/kg	57.78 (71.57)^{a}	78.88 (68.21)^{a}	0.26 (0.86)^{b}	0.33 (0.91)^{ab}	3.23 (1.93)^{b}	15.63 (4.01)^{d}	1078 (335)^{c}
2	Neem oil 20 ml/kg	67.59 (85.46)^{a}	87.77 (77.57)^{a}	0.21 (0.84)^{b}	0.36 (0.92)^{b}	2.66 (1.77)^{b}	13.80 (3.78)^{b}	768 (286)^{a}
3	TNAU NO 60 EC (C) 20 ml/kg	65.22 (82.46)^{a}	85.77 (68.50)^{a}	0.24 (0.85)^{b}	0.29 (0.88)^{a}	3.13 (.1.90)^{b}	14.40 (3.86)°	1437 (385)^{f}
4	Imidacloprid 7 g/kg	63.86 (80.59)^{a}	96.66 (81.50)^{a}	0.18 (0.82)^{ab}	0.31 (0.90)^{ab}	3.23 (1.93)^{b}	16.26 (4.09)^{e}	1308 (368)^{e}
5	Carbosulfan 7 g/kg	63.65 (80.30)^{a}	88.88 (74.64)^{a}	0.26 (0.87)^{b}	0.33 (0.91)^{ab}	3.63 (2.03)^{c}	12.66 (3.62)^{a}	836 (297)^{b}
6	Control	62.23 (78.29)^{a}	76.00 (63.65)^{a}	0.05 (0.74)^{a}	0.33 (0.91)^{ab}	2.60 (1.76)^{a}	13.76 (3.77)^{b}	647 (264)^{a}

Figures in the parentheses are arcsine / per cent transformed values
Means followed by the same letter in a column are not significantly different by (P=0.05) DMRT
DAS-Days After Sowing

to foliar spray or soil application. But some chemicals may inhibit germination and affect the phenology of plants. With this point in view, the present study was taken up to exploit the utility of various formulations of seed dressers and biopesticides for the control of insects ravaging bhendi to assess the biological compatibility and to find out the biochemical changes in plants due to seed treatment.

The experiment was conducted in a Randomized Block Design (RBD) with six treatments *viz.*, *Psuedomonas fluorescens* 10 g/kg, Neem Oil 20 ml/kg, TNAU NO 60 EC (C) 20 ml/kg, imidacloprid 7g/kg, carbosulfan 7g/kg and untreated check replicated four times. Seed dressing treatments were done in polythene bags, separately for each treatment. The treated bhendi seeds were kept as such for about half an hour and then the seeds were sown in the 12" earthen pots filled with pot mixture. The number of seeds germinated out of 30 seeds per pot in each replication was recorded on 7 Days After Sowing and 15 Days After Sowing and per cent germination of seeds was worked out. The total phenol content was estimated from the plants after 40 and 50 days after germination by the method suggested by Malik *et al.*, (1980). Ten normal seedlings from each treatment were taken at random and root length was measured from the collar region to the tip of the primary root. The mean value was expressed in cm/seedling. In the same ten normal seedlings, which were used to measure root length, the shoot length was measured from the collar region to the tip of the plumule and the mean value was expressed in cm/seedling. The vigour index of the seedling was computed using the formula suggested by Abdul-Baki and Anderson (1973) and expressed in whole number.

Vigour Index = Germination (%) xTotal seedling length (cm)

The effect of seed dressers on germination percentage, total phenol content, root length, shoot length and vigour index is presented in Table 1. Among the different treatments, imidacloprid registered maximum germination of 96.66 per cent on 15 DAS and this was followed by carbosulfan (88.88%), NO (87.77%), TNAU NO 60 EC (C) (85.77%) and *P.fluorescens* (78.88) as against 76.0 per cent in the untreated check. The present investigation is consonance with the earlier findings of Sivaveerapandiyan (2000) indicating that the imidacloprid had not affected the germination. Further, he observed that the germination of bhendi seeds was not affected when the seeds were treated even at a high dose, imidacloprid 600 FS at 40 g/kg.

The highest phenol content of 0.26 μg/g was recorded in carbosulfan and *P. fluorescens* on 40 DAS. As the age of the plant increased, the phenol content increased in all the treatments. The increase in phenol content may be attributed to the activation of plant genes in the induction of resistance. Sivakumar (2000) reported that NO and TNAU NO 60 EC (C) recorded the least number of nematodes in chilli plants because of increased phenol content when compared to untreated check.

Among the different chemical insecticides, imidacloprid proved superior to carbosulfan in stimulating vigour of the seedlings, while TNAU NO 60 EC (C) recorded maximum vigor index. Mote *et al.* (1994) reported that there was no adverse effect on the germination of okra (var. Pusa Sawani) seeds when treated with imidacloprid 70 WS at different concentrations of 5, 5.7, 10 and 15 g/kg.

Similarly, Kumar *et al.* (1994) tested the effect of carbosulfan 25 STD @ 150,300 and 450 g a.i/ha on seeds of okra and observed that it produced no adverse effect on the germination and root and shoot length.

Finally, it could be concluded that the use of biopesticides *viz.*, TNAU NO 60 EC (C) 20 ml/kg and *P. fluorescens* 7 gm/kg as seed dressers were as effective as chemical insecticides like imidacloprid and carbosulfan. Biopesticides like *P. fluorescens* induces multigenic resistance by activating several defense genes encoding proteins and chemicals and thus, it is effective against early sucking pests attacking the bhendi crop.

References

Abdul-Baki, A.A. and Anderson, J.D. (1973). Viability and leaching of sugars from germinating barley. *Crop Sci.*, **10:** 31-34.

Kumar, R., Singh, S.K., Khokhar, K.S. and Jaglan, M.S. (1994). Effect of insecticidal seed treatments on the germination and vigour of okra seeds. *Seed Research*, **24 (1):** 73-74.

Malik, C.P. and Singh, M.B. (1980). *Plant Enzymology and Histoenzymology. A text manual.* Kalyani Publishers, New Delhi. 286p.

Mote, U.N., Datkhile, R.V. and Pawar, S.A. (1994). Imidacloprid as seed dresser against sucking pests of Okra. *Pestology*, **18(3):** 5-9.

Pawar, A.D. and Prasad, J. (1988). Evaluation of some parasites in biocontrol of cotton bollworms in Haryana. *Indian J. Plant Prot.*, **13(a):** 21-24.

Sivakumar, C.V. (2000). Biological control of major nematode pests in chillies and brinjal. *Final report of DBT scheme.* Department of Nematology, Tamil Nadu Agric. Univ., Coimbatore, 72p.

Sivaveerapandiyan, D. (2000). *Bio efficacy of imidacloprid against sucking pests on bhendi and determination of half life.* Unpublished M.Sc. (Ag.) Thesis, Tamil Nadu Agrl. Univ., Coimbatore, India, 100p.

Madras Agric. J., 95 (1-6): 225-229 January-June 2008

Research Notes

Biopesticide seed treatment for the management of sucking pests in bhendi

P. INDIRA GANDHI AND K. GUNASEKARAN
Department of Agrl. Entomology, Tamil Nadu Agricultural University, Coimbatore - 641 003, Tamil Nadu.

Bhendi, *(Abelmoschus esculentus* (L.) Mqench), one of the world's oldest cultivated crops belonging to the family Malvaceae, is ravaged by many insect pests right from germination of seeds to harvest of fruits. In the early stage, sucking pests like aphid, *Aphis gossypii* Glover, the leaf hopper, *Amrasca biguttula biguttula* Ishida and the whitefly, *Bemisia (abaci* Gennadius desap the leaves. Farmers rely solely on the chemical insecticides