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Research Notes

Ovicidal action and ovipositional deterrence of certain neem product against bhendi fruit borer (*Earias vittella* Fabricius)

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The fruit borer *Earias vitella* Fabricius (Lepidoptera : Noctuidae) causes extensive damage to bhendi (*Abelmoschus esculentus* L.) fruits, resulting in 69 per cent reduction in yield (Rawat and Sahu, 1973). Farmers rely solely on chemical insecticides for the management of bhendi fruit borer due to their perceived efficiency. As bhendi fruits are harvested in frequent intervals, the dependence on the chemical pesticides may lead to accumulation of residues in the fruits and pose problems to the consumers

Realizing the gaining importance of botanicals an investigation was made at Department c Entomology, Tamil Nadu Agricultural University Coimbatore during the year 2000 to evaluat certain neem products for their ovicidal an ovipositional deterrant effect against *E.vittell* The experiments were conducted in a Completel Randomized Design (CRD) under laborator condition. The transformed data were analyse and the means compared by Duncan's Multipl Range Test (DMRT) (Gomez and Gomez, 1976

a) Ovicidal action

The experiment was conducted with eight eatments, replicated thrice with 25 eggs per eplication. The eggs collected from the laboratory eared adult insects were placed on filter paper ithin petriplates and were treated with sprays f respective treatments, whereas the eggs treated ith distilled water served as control. The sprayed ggs were allowed to dry before transferred arefully to untreated petridishes. The number f larvae hatching out of 25 eggs in each eplication was recorded and the per cent atchability of eggs was worked out.

The ovicidal action of neem products n the eggs of *E.vittella* showed (Table 1) hat the mortality of eggs from endosulfan 2 ml L^{-1}) was greater than that of from ieem products. Among the latter Neemazal- (1 ml L^{-1}) resulted in maximum mortality f egg (53.33%), followed by TNAU NO 60 C (c) (30 ml L^{-1}) (44.00%). The other treatments were moderately effective (21.67-32.00%). The er cent hatchability of *E.vittella* eggs was he highest (93.33) in control. Earlier Verkerk nd Wright (1993) reported that azadirachtin t 100 µg concentration effected 48 per cent nortality of *Plutella xylostella* L. eggs. Mehta *et al.* (1994) and Suryakala *et al.* (1995) proved he ovicidal effet of neem oil and NSKE at different concentrations on *Heliothis armigera* Hubner and *Spodoptera litura* Fab., respectively. Similarly, neem oil inhibited the hatchability of eggs of rice leaf folder, *Cnaphalocrosis medinalis* Guenee and *S. litura* (Saxena *et al.* 1981; Ramachandra Rao *et al.* 1990).

(b) Ovipositional deterrance

A free choice test was conducted to assess the ovipositional deterrent effect of neem products against fruitborer moths. Bhendi fruits with their petioles kept in water in glass vials were sprayed with neem products individually and placed inside the ovipositional cage of size 30x30x30 cm. Each treatment was replicated three times. Fruits treated with distilled water served as the control. Five pairs of active moths were released into each cage. A cotton swab soaked in ten percent sugar solution was provided in a pencillin vial to serve as the adult feed. The number of eggs laid in each treatment was recorded daily until all the moths were dead. The hatchability of larvae was also recorded in percentage.

The results revealed that although inferior to endosulfan, TNAU NO 60 EC(c) (30 ml L^{-1}) was the most effective treatment in deterring *E.vittella* moths from eggs laying (20.00 eggs per fruit), followed by Neemazal-F (1 ml L^{-1}) and TNAU NO (1 ml L^{-1}), which recorded 24.00 and 30.00 eggs per fruit respectively as against 53.00 eggs per fruit in water-sprayed control (Table 1). The treatments Econeem (3 ml L^{-1}) and Neemazal-T/S (3 ml L^{-1}) were on par, NSKE (100 g L^{-1}) deterred the moths least (44.67/fruit). Regarding the egg hatchability, the lowest hatchability of 43.56 per cent was recorded in endosulfan (2 ml L^{-1}), followed by TNAU NO 60 EC(c) (30 ml L^{-1}), Neemazal-F (1 ml L^{-1}), TNAU NO (1ml L^{-1}) and Econeem (3 ml L^{-1}), which resulted in 58.61, 63.84, 68.01 and 71.47 per cent hatchability and were all on par statistically. NSKE (100 g L^{-1}) was least toxic to the eggs as it recorded 79.80 per cent hatchability as against 94.96 per cent in the check.

In the present investigation, spraying of endosulfan, TNAU NO 60 EC(c) and Neemazal-F deterred the oviposition by *E.vittella* moths, recording significantly fewer eggs per fruit than the rest of the neem treatments. The hatchability of eggs was also considerably less on the fruits treated with endosulfan, TNAU NO 60 EC(c) and Neemazal-F. The results of this investigation are in agreement with the earlier findings on the ovipositional deterrent effect of Neemark on bhendi fruit borer, *E.vittella* (Sojitra and Patel, 1992; Patel *et al.* 1994), of Neemazal-F (0.1%) on brinjal fruitborer *Leucinodes orbonalis* Guen. (Kumar, 1996), and of Achook, Granim, Neemark, Nimbecidine, Neemol and NSKE on citrus leaf miner, *Phyllocnistis citrella* Stainton (Patel and Patel, 2000).

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Table 1. Ovicidal and ovipositional deterrent action of neem products against *E. vittella*

Treatments	Dose/lit	Ovicidal and ovipositional deterrent action		
		Mortality of eggs (1%)*	Number of eggs laid**	Hatchability of eggs (%)*
Neemazal-T/S (Azadirachtin-1%)	3 ml	25.33 (30.20)e	39.00 (6.25)e	78.63 (62.46)e
Neemazal-F (Azadirachtin-5%)	1 ml	53.33 (46.91)b	24.00 (4.90)c	63.84 (53.04)bc
Econeem (Azadirachtin-0.03%)	3 ml	28.00 (31.91)de	35.00 (5.92)e	71.47 (57.72)d
TNAU NO (0.03%)	1 ml	32.00 (34.42)d	30.00 (5.47)d	68.01 (55.56)cd
TNAU NO 60 EC (c)	30 ml	44.00 (41.55)c	20.00 (4.46)b	58.61 (49.96)b
NSKE	100 g	21.67 (27.72)e	44.67 (6.68)f	79.80 (63.52)e
Endosulfan 35 EC	2 ml	64.00 (53.14)a	15.33 (3.91)a	43.56 (41.30)a
Control	-	6.67 (14.80)f	53.00 (7.28)g	94.96 (77.08)f

Figures within parentheses are * arcsin and ** $\sqrt{x + 0.5}$ transformed values
Means followed by the same letter(s) in a column are not significantly different (P=0.05) by DMRT

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Research Notes

Effect of different agro-wastes on mineral content of edible (dehydrated) mushrooms

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Mushroom is a form of plant life, a fungus and is being used by man as food since time immemorial. Mushrooms provide a rich addition to the diet in the form of protein, valuable salts of phosphates, potassium, sodium, sulphur, magnesium, calcium, chlorides, silicates, iron, copper, zinc, manganese, molybdenum and vanadium. For vegetarians, mushrooms add valuable proteins, vitamins and minerals. Verma *et al.* (1987) reported that *Pleurotus sajor-caju* contain phosphorus-1542, calcium-1360, sodium-710, potassium-3125 and iron-14.46 mg/100 g. High potassium: sodium ratio content of mushrooms is excellent for the persons suffering from hypertension and heart diseases (Rai *et al.* 1998). The present study was therefore conducted to evaluate *Pleurotus* spp. in order to get an idea of the status of various mineral content in it. Though, the mineral content of some mushroom species are known, there is no literature available on effect of different agro-wastes on mineral content of *Pleurotus* spp.

The *Pleurotus* spp. *viz. P.sajor-caju, P.eous, P.flabellatus, P.florida* and *P.sapidus* were grown on different agro-wastes *viz.* soybean, wheat, paddy, cotton and their combinations (1:1) during 1999-2000 at Department of Plant Pathology, College of Agriculture, Parbhani and the mineral contents were estimated at Department of Biochemistry, College of Food Technology, M.A.U., Parbhani. The mushroom samples were harvested during various stages, dehydrated in cabinet dryer (40°C for 6 to 8 hours) and ground to fine powder (60 mesh), packed in bottles and stored in refrigerator till used for analysis.

The chemical estimates were considered in RBD with five replications and the mean values have been reported. The samples were digested in tri-acid mixture. For digestion 1g of powdered samples of dehydrated mushrooms from various harvestings were taken in 100ml conical flask, 5ml of conc. HNO_3 was added to it and kept overnight. On next day 10ml of tri-acid mixture (HNO_3: H_2SO_4 and $HClO_4$) in 10:1:4 ratio was added and digested on hot plate as described by Piper (1966). After digestion, the material was filtered (Whatman No.1) filter paper and volume was made to 100 ml. This acid digest was used for the determination of minerals *viz.* phosphorus, potassium, sodium, calcium and iron (Jackson, 1958). Phosphorus content was determined by Vanadomolybdate yellow colour method as described by Piper (1966). Sodium and potassium content were determined by using Flame Photometer (Chapman and Pratt, 1961). Calcium content was estimated by the versenate titration method (Black, 1965). The iron content was determined on Spectro-photometer at 480 nm (Ranganna, 1995).

The mineral contents of *Pleurotus* spp. differed significantly when grown on different