



BIO-EFFICACY OF AQUEOUS BOTANICAL EXTRACTS WITH PANCHAGAVYA COMBINATION AGAINST SHOOT AND FRUIT BORER, *LEUCINODES ORBONALIS* (GUENE) IN BRINJAL.

Sowmiya, K¹., Pazhanisamy, M^{1*}., Archunan, K¹. and S. Ezhilkumar²

¹Department of Entomology, Faculty of Agriculture, Annamalai University, Annamalainagar-608002, Tamilnadu, India

²Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University, Annamalainagar-608002, Tamilnadu, India

*Corresponding Author

Abstract

Leucinodes orbonalis (Guene) is a commonly encountered and economically important insect pest of brinjal. The bio efficacy of plant products in combination with Panchagavya such as Panchagavya 3% + Senna leaf extract (SLE) 5%, Panchagavya 3% + Caltrophis leaf extract (CaLE) 5%, Panchagavya 3% + Prewrinkle leaf extract (PLE) 5% Panchagavya 3% + Clerodendron leaf extract (CLE) 5%, Panchagavya 3% + Ocimum leaf extract (OLE) 5%, Panchagavya 3% + Tamarind fruit extract (TFE) 5% were tested against *L. orbonalis* in brinjal on comparison with standard i.e., Neem oil 3% under laboratory condition. Leaf disc with no choice method were conducted to determine the per cent antifeedant activity and mortality rate of botanical mixed with panchagavya against *L. orbonalis* in brinjal. The result revealed that the maximum antifeedant activity were recorded in CLE (5%) + panchagavya (3%) (65.23%) which is on par with OLE (5%) + panchagavya (3%) (64.87%) and followed by Neem oil (3%) (61.53%) at 24 HAT and higher mortality rate in Neem oil (3%) (81.43%) and it is followed by OLE (5%) + panchagavya (3%) (78.13%) and SLE (5%) + panchagavya (3%) (66.39%) at 72 HAT, respectively.

Keywords: Shoot and fruit borer, *In vitro* study, Botanical extracts, Panchagavya, Brinjal.

Introduction

Vegetables are important food crops playing a vital role in food trade in India and also in our daily diets. India ranks second in the world production of brinjal with 12800.4MT and total area of cultivation includes 730.4 ha with the productivity of 17.5 MT/ha (Anon., 2018). Brinjal (*Solanum melongena* L.), which is commonly known as eggplant or aubergine belongs to the nightshade family 'Solanaceae'. This plant species is believed to have originated in India. Among the various biotic and abiotic stress that constrains the successful cultivation of brinjal crop, one of the important limiting factors in the cultivation of Brinjal is insect pests. Brinjal shoot and fruit borer, *Leucinodes orbonalis* Guenee is the key pest of eggplant (Saimandir *et al.*, 2012). This pest is reported from all brinjal growing areas of the world and most destructive, especially in South Asia (Thappa, 2010). It is known to damage shoot and fruit of brinjal in all stages of its growth. The yield loss due to the pest is to the extent of 70-92 per cent. The infested fruits become unfit for consumption due to loss of quality and hence, lose their market value. Kalawate *et al.* (2012). The residue deposition is the serious problem associated with the use of chemical pesticides in brinjal crop. To overcome this problem, locally available botanical extracts are used for the management of *L.orbonalis*. Therefore some botanicals extract on combination with panchagavya were tested against Shoot and fruit borer on brinjal to find out antifeedant activity and per cent mortality.

Materials and Methods

The collection and preparation of botanical extract using the aqueous method of Archunan (2018). The laboratory experiment was conducted during October 2019, to evaluate the efficacy of panchagavya mixed with botanical insecticides against mass cultured third instars larvae of *L. orbonalis*. Different treatments are T₁ - Panchagavya 3% +

Senna leaf extract (SLE) 5%, T₂ -Panchagavya 3% + Caltrophis leaf extract (CaLE) 5%, T₃ - Panchagavya 3% + Prewrinkle leaf extract (PLE) 5%, T₄ - Panchagavya 3% + Clerodendron leaf extract (CLE) 5%, T₅ -Panchagavya 3% + Ocimum leaf extract (OLE) 5%, T₆ - Panchagavya 3% + Tamarind fruit extract (TFE) 5%, T₇ - Panchagavya 3 % (alone), T₈ – Neem oil 3% (std) and T₉ – control.

The experiment was conducted by following the fruit disc no-choice method of Muthu *et al.* (2014). In each plastic petri dish, a wet filter paper was placed to avoid early drying of the test materials. There were 10 number of 3rd instar larvae (pre starved in 12 hours) were introduced into each petri dish containing five discs of brinjal fruit treated with combination of botanical insecticides with panchagavya. Three replications were maintained for each treatment. Observations and workout the per cent antifeedant activity and per cent mortality was calculated using the formula followed by Pazhanisamy and Archunan (2018),

$$\text{Antifeedant activity} = \frac{(\text{Consumption in Control} - \text{Consumption in treated})}{\text{Consumption in control}} \times 100$$

$$\text{Per cent mortality} = \frac{\text{Observed mortality in treatment}}{\text{Total No. of larvae released per treatment}} \times 100$$

Result and Discussion

Bio efficacy of Panchagavya alone and combination of panchagavya with plant products was studied against *L. orbonalis* under lab condition. The result shows that substantial reduction in larval population in all treatments against *L. orbonalis*. Among the various treatments conducted, the high range of antifeedant activity revealed in CLE (5%) + panchagavya (3%) (65.23%) which is on par with OLE (5%) + panchagavya (3%) (64.87%) and followed by Neem oil (3%) (61.53%) which is used as standard compared to untreated check (3.89%) at 24 HAT. Abbaszadeh *et al.* (2014) suggested the extracts of *C.*

infortunatum shows higher antifeedant effects against *Helicoverpa armigera* because of some specific compounds. The antifeedant activity of *C. infortunatum* was due to active ingredients such as neoclerodane diterpenoids, 3-epicaryoptin and 15-hydroxyepicaryoptin (Kumari et al., 2003). Futhur, when it is mixed with panchagavya it shows higher antifeedant potential against insect pests.

The high rate of mortality was observed in standard i.e., Neem oil (3%) (81.43%) and it is followed by OLE (5%) + panchagavya (3%) (78.13%) and SLE (5%) + panchagavya (3%) (66.39%) and low death rate was seen in panchagavya alone (3%) (6.57%) at 72 HAT compared to untreated control. The above result were in accordance with Chatterjee (2004) observed that application of Azadex (neem based insecticide) were more effective in reduction of borer infestation in brinjal (76.59%). Similarly, Ashadul et al.

(2014) reported that neem leaf extract (5%) were effective in various botanicals used against *L. orbonalis* and also gives higher yield.

Among the various treatments, OLE (5%) (71.27%) recorded maximum mortality rate at 72 DAT. The present finding are in accordance with Sharma (2010) highlighted the effectiveness of various concentration of Ocimum leaf extract causing high mortality rate against *Acrida exaltata* in maize and also Ouka et al. (2017) reported the toxic effect of Ocimum leaf extract in controlling maize weevil, *Sitophilus zeamais*. The factors of causing mortality in ocimum leaf extract is due to the presence of certain active compounds such as terpenoids, steroids, alkaloids, flavonoids and glycosides that shows positive in analysis of phytochemiclas (Ileke and Oni, 2011).

Table 1 : Activity of panchagavya alone and combination of panchagavya with plant products against *L. orbonalis* under lab condition

Treatment	Per cent of Antifeedant activity*	Per cent of Mortality*		
	24 HAT	24 HAT	48 HAT	72 HAT
T ₁ – Panchagavya 3% + Senna leaf extract (SLE) 5%	58.27 (49.74) ^c	36.53 (37.17) ^c	46.57 (43.01) ^c	66.39 (54.55) ^c
T ₂ – Panchagavya 3% + Caltrophis leaf extract (CaLE) 5%	47.33 (43.45) ^d	10.21 (18.63) ^e	32.47 (34.72) ^e	49.31 (44.59) ^e
T ₃ – Panchagavya 3% + Prewinkle leaf extract (PLE) 5%	35.13 (36.32) ^e	5.67 (13.77) ^f	24.43 (29.61) ^f	42.31 (40.56) ^f
T ₄ – Panchagavya 3% + Clerodendron leaf extract (CLE) 5%	65.23 (53.85) ^a	13.23 (21.37) ^d	34.67 (36.05) ^d	52.33 (46.32) ^d
T ₅ – Panchagavya 3% + Ocimum leaf extract (OLE) 5%	64.87 (53.63) ^a	41.21 (39.92) ^a	59.67 (50.56) ^b	78.13 (62.12) ^b
T ₆ – Panchagavya 3% + Tamarind fruit extract (TFE) 5%	32.41 (34.69) ^f	0.00 (0.00) ^f	18.21 (25.25) ^g	27.53 (31.63) ^g
T ₇ – Panchagavya 3% (alone)	4.93 (12.82) ^g	0.00 (0.00) ^f	3.31 (10.48) ^h	6.57 (14.84) ^h
T ₈ – Neem oil (3%)	61.53 (51.63) ^b	39.00 (38.63) ^b	62.33 (52.11) ^a	81.43 (64.46) ^a
T ₉ – control	3.89 (11.37) ^g	0.00 (0.00) ^f	0.00 (0.00) ⁱ	0.00 (0.00) ⁱ
SE(d)	0.812	0.344	0.549	0.827
CD (0.05%)	1.719	0.729	1.16	1.750

*Mean of three replications

Figures in parentheses are arcsine (x + 0.5) transformed values, mean in column followed by common letter are not significantly different at the 5 per cent level (DMRT), HAT- Hour after treatment.

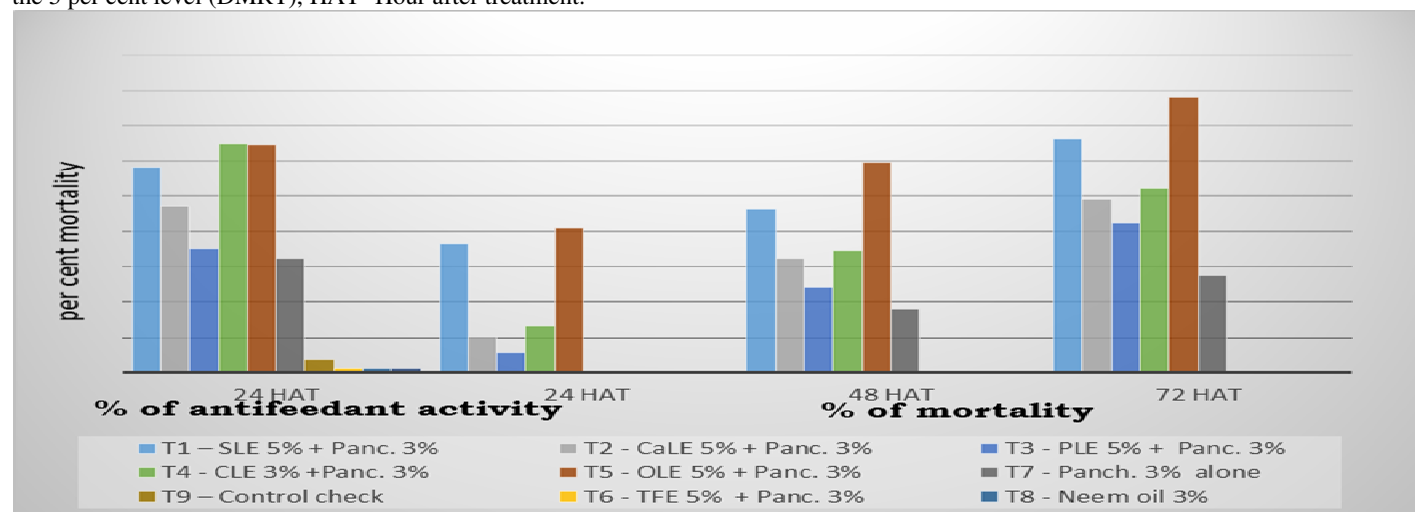


Fig. 1 : Studies on the efficacy of panchagavya alone and combination of panchagavya with plant products against *L. orbonalis* under lab conditions.

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