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BIO-EFFICACY OF DIFFERENT INSECTICIDES AGAINST GRAPE FLEA BEETLE

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ABSTRACT : Intensive and extensive cultivation of grapes leads to a serious pest problem in major grape-growing areas of the world. The climate in India is ideally suited for the high production of table and wine grapes as well as a high prevalence of several pests. Among different insect pests, adult flea beetles are observed from mid-July and reach peak numbers in October-November and cause damage to the plants immediately after pruning in October. The loss increases to 50 per cent when the sprouting buds are damaged, particularly after October pruning. Several newer molecules and botanical insecticides were evaluated against grape flea beetle at Horticulture Research and Extension Centre, Vijayapur (Tidagundi), Karnataka, India during 2020-21. Among the insecticides, Lambda-cyhalothrin 5 EC @ 0.50 ml/l recorded the lowest number of flea beetles and bud damage followed by Lambda-cyhalothrin 4.9 CS @ 0.50 ml/l, Fipronil 80 WG @ 0.06 g/l, Spinosad 45 SC @ 0.25 ml/l, Cyantraniliprole 10.26 OD @ 0.70 ml/l, Thiamethoxam 25 WG @ 0.25 g/l, Flonicamid 50 WG @ 0.30 g/l, and Alphamethrin 10 EC @ 0.50 ml/l. Finally, the significantly highest marketable yield (t/ha) was also recorded in the treatment Lambda-cyhalothrin 4.9 CS @ 0.50 ml/l (42.82 t/ha) followed by Cyantraniliprole 10.26 OD @ 0.70 ml/l, Fipronil 80 WG @ 0.06 g/l, Alphamethrin 10 EC @ 0.50 ml/l, Lambda-cyhalothrin 5 EC @ 0.50 ml/l, Thiamethoxam 25 WG @ 0.25 g/l, Spinosad 45 SC @ 0.25 ml/l, Flonicamid 50 WG @ 0.30 g/l and Azadirachtin 1 EC @ 2.00 ml/l (40.46, 40.32, 39.88, 39.15, 37.73, 37.61, 36.96 and 31.15 t/ha, respectively).

Key words : Flea beetle, insecticides, grapes, Vijayapur.

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INTRODUCTION

Grape (*Vitis vinifera* L.) belongs to the family Vitaceae and is one of the most widely grown fruit crops in the world. It is a temperate crop by origin, originated in Western Asia and Europe. Although, it is basically a temperate crop, now-a-days it is well-acclimatized to tropical and subtropical climatic conditions.

The major grape-growing states in India are Maharashtra (56.9%), Karnataka (21.8%), Andhra Pradesh (1.52%), Mizoram (3.05%) and Tamil Nadu (2.99%) accounting for nearly 90 per cent of the total production (Anonymous, 2021). The present area and production of grapes in India is 1,40,000 hectares with a production of 31,25,000 metric tonnes per year and a productivity of 27.9 tonnes per hectare, mostly in the states of Maharashtra, Karnataka, Andra Pradesh, and Tamil Nadu (Anonymous, 2021). More than 80 per cent of the crop is produced in Maharashtra, with Karnataka coming in second with an area of 33,770 acres and a production of 8,54,660 tonnes (Devaraj, 2021). Vijayapur is one of the major districts of Karnataka with an area of 8670 hectares and production of 102790 tons in grape cultivation. But compared to other fruit crops, the area planted in grapes is growing as a result of higher net revenue. About 71 per cent of the entire grape production is used for table purposes; approximately 27 per cent is dried to make raisins; the remaining 1.5 per cent is used

Table 3 : Economics of flea beetle management in grapes.

Treatments	Dosage/ lire	Fruit yield (t/ha)	Gross returns (Rs/ha)	Total cost of cultivation (Rs/ha)	Treatment cost (Rs/ha)	Net returns (Rs/ha)	BC Ratio
T_1- Fipronil 80 WG	0.06 g	40.32	1209600	257640	1640	951960	3.69
T_2- Flonicamid 50 WG	0.30 g	36.96	1108800	256750	750	852050	3.32
T_3- Spinosad 45 SC	0.25 ml	37.61	1128300	263500	7500	864800	3.28
T_4- Thiamethoxam 25 WG	0.25 g	37.73	1131900	256600	600	875300	3.41
T_5- Lambda cyhalothrin 5 EC	0.50 ml	39.15	1174500	256380	380	918120	3.58
T_6- Lambda cyhalothrin 4.9 CS	0.50 ml	42.82	1284600	256440	440	1028160	4.01
T_7- Alphamethrin 10 EC	0.50 ml	39.88	1196400	256300	300	940100	3.67
T_8- Cyantraniliprole 10.26 OD	0.70 ml	40.46	1213800	265450	9450	948350	3.57
T_9- Azadirachtin 1 EC	2.00 ml	31.15	934500	258380	2380	676120	2.62
T_{10}- Untreated control	-	25.35	760500	250000	-	510500	2.04

Note: Fruit rate: Rs 30/kg; BC ratio: Benefit-cost ratio.

seasons, respectively and did not differ statistically from Fipronil 80 WG @ 40 g a.i./ha, Spinosad 45 SC @ 84.375 g a.i./ha, Standard check, Imidacloprid 200 SL @ 45 ga.i./ha and Fipronil 5 SC @ 40 g a.i./ha (Balikai, 2018).

The highest benefit-cost ratio was obtained in Lambda-cyhalothrin 4.9 CS @ 0.50 ml/l (4.01) followed by Fipronil 80 WG @ 0.06 g/l (3.69) and Alphamethrin 10 EC @ 0.50 ml/l (3.67). Further, the next best treatment which got a higher BC ratio was Lambda-cyhalothrin 5 EC @ 0.50 ml/l (3.58), Cyantraniliprole 10.26 OD @ 0.70 ml/l (3.57), Thiamethoxam 25 WG @ 0.25 g/l (3.41), Flonicamid 50 WG @ 0.30 g/l (3.32) and Spinosad 45 SC @ 0.25 ml/l (3.28). However, the lowest BC ratio was recorded in the untreated control (2.04) and Azadirachtin 1 EC @ 2.00 ml/l (2.62) (Table 3).

CONCLUSION

The present investigation concluded that, among the insecticides, Lambda-cyhalothrin 5 EC @ 0.50 ml/l recorded the lowest number of flea beetles and bud damage followed by Lambda-cyhalothrin 4.9 CS @ 0.50 ml/l, Fipronil 80 WG @ 0.06 g/l, Spinosad 45 SC @ 0.25 ml/l, Cyantraniliprole 10.26 OD @ 0.7 ml/l, Thiamethoxam 25 WG @ 0.25 g/l, Flonicamid 50 WG @ 0.3 g/l and Alphamethrin 10 EC @ 0.5 ml/l during the study.

REFERENCES

Anonymous (2021) *Annual Report 2019-20.* National Horticulture Database, p. 15.

Balikai R A (2018) Evaluation of Fipronil 80 WG (Regent 80 WG) against grape thrips in comparison with selected insecticides. *Int. J. Hort*. **8**(17), 197-203.

Balikai R A and Kotikal Y K (2003) Pest status of grapevine in Northern Karnataka. *Agric. Sci. Digest* **23**(4), 276-278.

Butani D K (1979) *Insects and Fruits.* Periodical Expert Book Agency, Delhi, India, p. 154.

Devaraj M (2021) Growth and Instability Analysis of Grapes Production in Karnataka. *Int. J. Extn. Edn.* **18**, 94-98.

Hussain M and Raghava Rao N (1968) Insect pests of grape. Grape Souvenir, Andhra Pradesh Grape Growers Association, Hyderabad, p. 73-74.

Kulkarni N S and Patel A B (2012) Field efficacy of thiamethoxam 25 WG (Actara 25 WG) against flea beetle, jassids and thrips in grapes. *Karnataka J. Agric. Sci*. **25**(1), 146-147.

Kulkarni N S and Adsule P G (2006) Efficacy of Actara 25 WG (Thiamethoxam) on management of flea beetle, jassids and thrips in grapes. *Pestology* **30**(5), 13-17.

Kwaifa N M, Ibrahim B I, Aliyu U, Muhammad A and Dangana A (2015) Insecticidal effects of neem kernel extracts on flea beetle (*Podagrica uniforma* J.) of okra (*Abelmoschus Esculentus* L.) in Jega, Kebbi, Nigeria. *J. Agric. Vet. Sci*. **8**, 57-60.

Lefroy H M (1907) An insect attacking grapevine. *Agric. J. India* **2**, 292.

Sharma A K, Somkuwar R G, Upadhyay A K, Sawant S D and Naik S (2018) Production of quality and safe dried grapes. NRC, Pune, p. 12.

Tansey J A, Dosdall L M and Keddie B A (2009) *Phyllotreta cruciferae* and *Phyllotreta striolata* responses to insecticidal seed treatments with different modes of action. *J. Appl. Entomol.* **133**, 201-209.