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Management of Sweet Potato Weevil (*Cylas formicarius* Fab.) through Barrier Crops of Yam Bean and Marigold

Sweet potato is one of the important crops of tropical, subtropical and temperate regions of the world. It is the seventh most important food crop in developing countries and produces more calories than rice, wheat and maize per hectare per day. The crop has high photosynthetic efficiency and is a chief source of energy. Among the Asian countries, China ranks first in area and production and accounts for 80% of the world's production, while the rest of the contribution is from Japan, Vietnam, Uganda, India, Indonesia and Korea. India is the largest sweet potato producer in South Asia and occupies sixth position in the world with an area of 0.124 million hectare, annual production of 1.12 million tonnes and productivity of 9.01t ha^{-1} (CMIE, 2010), which is more than half of the world average. In India, Orissa, Bihar and Uttar Pradesh account for 39.5% area and 37% production (CMIE, 2010). Sweet potato tubers contain 15-28% starch and 3-6% sugar (Harvat et al., 1991).

Cylas formicarius Fab. (Curculionidae, Coleoptera), sweet potato weevil, was first described in 1798 from a specimen collected at Tranquebar near Chennai, India. It is found throughout the tropics and subtropics wherever the crop is cultivated. The adults feed only on the surface of exposed roots and foliage and the damage is insignificant. The grubs feed inside the roots and vines causing significant damage (Palaniswami and Mohandas, 1991). Even the slightly infested tubers are unfit for human consumption. Presently management of any pest by biological, cultural or non-chemical methods assumes significance. Hence in the present investigation an attempt has been made to manage sweet potato weevil by cultural means using barrier crops of yam bean and marigold.

A field experiment was conducted at the Regional Horticulture Research and Extension Centre (RHREC), Dharwad, Karnataka during 2010-2011. The soil was shallow red embedded with small sand and gravel with pH of 5.9-6.3. The experiment was laid out in Randomized Block Design with three replications and eight treatments. The treatments comprised of T1-Border row of yam bean on all sides, T2-Border row of marigold on all sides, T3-Alternative row of sweet potato and yam bean, T4-Paired row of sweet potato and one row of marigold, T5-Alternative row of sweet potato and marigold, T6-Paired row of sweet potato and one row of marigold, T7-Sole crop of sweet potato, T8-Chemical control (Dimethoate 0.05%). The vines of sweet potato variety, Vikram, was planted at a spacing of 60×20 cm in plots of size 4.8 m×3.6 m. Each plot was manured, fertilized and irrigated as per the package of the practices recommended by University of Agricultural Sciences, Dharwad. The plots were irrigated at weekly intervals. The barrier crops like yam bean and marigold were raised as per the treatments. The observations on marketable, non-marketable and total tuber yield per hectare, per cent of weevil infestation, weevil population per kg of infested tuber were recorded at the time of final harvest. The data were subjected to statistical analysis.

Among the various treatments, the treatment consisting of border row of marigold on all sides (T_2) resulted in significantly higher marketable tuber yield (15.42 t ha^{-1}) (Table 1). The magnitude of weevil infestation (17.31%) and weevil population per kg of infested tuber (25.33) was lower in the above treatment. Significantly lower marketable tuber yield (9.54 t ha^{-1}) and higher weevil infestation (37.50%) and weevil population per kg of infested tuber (37.33) was noticed in sole crop of sweet potato (T_7). This result is similar to the findings of Pillai et al. (1996). The treatment consisting of border row of marigold on all sides (T_2) and chemical control (T_8) were on par with respect to weevil population per kg of infested tuber. This result is in accordance to the report of Suris

Table 1. Tuber yield and weevil infestation as influenced by barrier crops in sweet potato

Treatments	Tuber yield (t ha^{-1})			Weevil infested tuber (%)	Weevil population per kg of infested tuber
	Marketable	Non-marketable	Total		
T_1	12.37	3.29	15.67	26.64	39.67
T_2	15.42	2.66	18.07	17.31	25.33
T_3	10.99	4.09	15.08	37.16	30.67
T_4	12.84	3.10	15.94	24.18	38.67
T_5	10.22	3.37	13.59	33.14	30.00
T_6	10.06	3.56	13.63	35.37	33.33
T_7	9.54	3.58	13.12	37.50	37.33
T_8	8.98	2.45	11.44	27.33	21.67
C.D (0.05)	1.10	0.57	1.39	5.15	4.53

et al. (1995) that sweet potato intercropped with maize had a lower percentage of sweet potato weevil damage than sweet potato pure stand in Cuba.

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