International Journal of Farm Sciences **8(3):** 89-91, 2018; doi: 10.5958/2250-0499.2018.00089.7

Management of sweet potato weevil, *Cylas formicarius* Fab through barrier crops of yam bean and marigold

BN BHANGARE, AP SANAS, AL NARANGALKAR and KP PICHAD

Department of Agricultural Entomology, Dr Balasaheb Sawant Konkan Krishi Vidyapeeth Dapoli, Ratnagiri 415712 Maharashtra, India
Email for correspondence: ambarishsanas@gmail.com

 Received: 28.5.2018/Accepted: 2.6.2018

ABSTRACT

A field experiment was conducted in four consecutive years during kharif 2008, 2009, 2010 and 2011 at Central Experimental Station, Wakawali, Dapoli, Maharashtra to control the sweet potato weevil (*Cylas formicarius* Fab) through barrier crops of yam bean and marigold. Among various treatments the treatment paired rows of sweet potato and one row of marigold showed significantly lower weevil infestation (23.12%) in comparison to the highest infestation in treatment having sole crop of sweet potato (47.65%). The treatments paired rows of sweet potato + one row of marigold and alternative row of sweet potato + marigold were at par with each other with respect to per cent weevil infestation. In case of weevil population per kg of infected tubers, the treatment paired rows of sweet potato and one row of marigold showed that significantly less number of weevils emerged from infected tubers and the treatment was at par with alternative row of sweet potato and marigold.

Keywords: Sweet potato; weevil; *Cylas formicarius*; marigold

INTRODUCTION

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. The crop has high photosynthetic efficiency and is a chief source of energy. India is the largest sweet potato producer in South Asia and occupies sixth position in the world with an area of 0.124 Mha, annual production of 1.12 MT and productivity of 9.01 tons/ha with more than half of the world's average. In India Orissa, Bihar and Uttar Pradesh account for 39.5 per cent area and 37 per cent production (Allolli et al 2011). Sweet potato tubers contain 15-28 per cent starch and 3-6 per cent sugar (Horvat et al 1991).

The sweet potato weevil is the major pest of this crop. The weevil has become widely dispersed mainly in tropical and subtropical regions of the world. 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. The weevil is the major insect pest of sweet potato in the northeastern hill region of India where farmers cultivate this crop. In the present investigations an attempt has been made to manage sweet potato weevil by cultural means using barrier crops of yam bean and marigold.

MATERIAL and METHODS

The field experiment (Fig 1) was conducted at Central Experimental Station, Wakawali, Maharashtra during kharif season of 2008, 2009, 2010 and 2011 in randomized block design with three replications and eight treatments. The treatments comprised T_1 (Border row of yam bean on all sides), T_2 (Border row of marigold on all sides), T_3 [Alternate rows of sweet potato and yam bean (1:1)], T_4 [Paired rows of sweet potato and one row of yam bean (2:1)], T_5 [Alternate rows of sweet potato and marigold (1:1)], T_6 [Paired rows of sweet potato and one row of marigold (2:1)], T_7 [Sole crop of sweet potato (control)] and T_8 [Chemical control

Fig 1. Field view of the experiment

(check) (dimethoate 0.05% spray at monthly interval)]. The vines of sweet potato variety S-56-2 were planted at a spacing of 60 x 20 cm in plots of size 4.8 x 3.6 m. Each plot was manured and fertilized as per the package of practices recommended by Dr Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri, Maharashtra. The border, alternate and paired rows of yam bean and marigold were sown at the time of planting of sweet potato. The pesticide was sprayed at an interval of one month after planting. The tuber damage by sweet potato weevil was worked out at the time of harvesting on weight basis and 1 kg infested tubers from each treatment were kept for counting the number of weevil emergence. Data thus obtained were analysed statistically.

RESULTS and DISCUSSION

The data presented in Table 1 depict that all the treatments were significantly superior to untreated control for the management of sweet potato weevil. The pooled data clearly reveal that the tuber infestation due to weevil ranged from 23.12 to 47.65 per cent among the various treatments. The treatment T_6 [Paired rows of sweet potato and one row of marigold (2:1)] was observed to be the most effective with only 23.12 per cent sweet potato infestation and it was at par with T_5 [Alternate rows of sweet potato and marigold (1:1)]. Similar results were recorded in every season except kharif 2008. During kharif 2008 T_6 [Paired rows of sweet potato and one row of marigold (2:1)], T_5 [Alternate rows of sweet potato and marigold (1:1)] and T_2 (Border row of marigold on all sides) were at par with one another. These results are in accordance with the observations of Anon (2009, 2011) and Allolli et al (2011).

As per pooled data of mean number of weevils per kg of tubers one month after harvest (Table 2) the lower number of weevil population (12.41/kg) was recorded in T_6 which was at par with T_5 (14.66/kg) and these were superior over all other treatments.

In overall the treatments paired rows of sweet potato and one row of marigold (2:1) and alternate rows of sweet potato and marigold (1:1) were found to be most effective for managing sweet potato weevil.

REFERENCES

Allolli TB, Athani SI and Imamsaheb SJ 2011. Management of sweet potato weevil (*Cylas formicarius*) through barrier crops of yam beans and marigold. Asian Journal of Horticulture **6(2):** 462-464.

Anonymous 2009. Biennial report 2008-2009. All lndia Coordinatrd Research Project on Tuber Crops, Central Tuber Crops Research Institute, Thiruvanantapuram, Kerala, lndia, pp 132-138.

Anonymous 2011. Biennial report 2010-2011. All lndia Coordinated Research Project on Tuber Crops, Central

Table 1. Mean per cent tuber damage by weevil at harvest as influenced by barrier crops in sweet potato (pooled data for kharif 2008, 2009, 2010 and 2011)

Treatment	Mean per cent tuber damage at harvest				
	Kharif 2008	Kharif 2009	Kharif 2010	Kharif 2011	Pooled
T_1	21.55 (27.58)	35.81 (36.35)	51.11 (45.63)	46.67 (43.66)	38.79 (38.31)
T_2	17.25 (24.50)	32.06 (34.46)	36.18 (36.97)	36.41 (37.10)	30.48 (33.26)
T_3	19.59 (26.24)	34.63 (36.02)	39.97 (39.20)	40.94 (39.77)	33.78 (35.31)
T_4	25.70 (30.35)	37.49 (37.74)	46.67 (43.08)	44.38 (41.77)	38.56 (38.24)
T_5	16.23 (23.73)	21.46 (27.57)	33.49 (35.55)	29.90 (33.15)	25.27 (29.99)
T_6	13.98 (21.93)	18.82 (25.68)	31.20 (34.17)	28.49 (32.25)	23.12 (28.50)
T_7	32.34 (34.63)	43.61 (41.32)	56.05 (48.48)	58.58 (49.95)	47.65 (43.60)
T_8	26.41 (30.89)	37.81 (37.92)	42.71 (40.80)	45.92 (42.65)	38.21 (38.07)
SEm±	1.28	0.61	0.71	0.84	0.87
$CD_{0.05}$	3.88	1.90	2.05	2.55	2.16

Figures in parentheses are arc sine transformed values

T_1= Border row of yam bean on all sides, T_2= Border row of marigold on all sides, T_3= Alternate rows of sweet potato and yam bean (1:1), T_4= Paired rows of sweet potato and one row of yam bean (2:1), T_5= Alternate rows of sweet potato and marigold (1:1), T_6= Paired rows of sweet potato and one row of marigold (2:1), T_7= Sole crop of sweet potato (control), T_8= Chemical control (check) (dimethoate 0.05% spray at monthly interval)

Table 2. Mean number of weevils per kg tuber one month after harvest as influenced by barrier crops in sweet potato (pooled data for kharif 2008, 2009, 2010 and 2011)

Treatment	Mean number of weevils (one month after harvest)				
	Kharif 2008	Kharif 2009	Kharif 2010	Kharif 2011	Pooled
T_1	51.00 (8.12)	47.00 (7.84)	36.33 (7.02)	32.33 (6.68)	41.66 (7.42)
T_2	28.00 (6.27)	27.66 (6.24)	19.66 (5.42)	21.33 (5.61)	24.16 (5.89)
T_3	35.33 (6.93)	31.00 (6.56)	27.00 (6.18)	22.33 (5.71)	28.92 (6.35)
T_4	46.00 (7.53)	41.66 (7.45)	23.33 (5.82)	19.00 (5.46)	32.50 (6.57)
T_5	18.33 (5.50)	16.66 (5.07)	11.33 (4.35)	12.33 (4.49)	14.66 (4.86)
T_6	16.33 (5.03)	14.66 (4.82)	8.33 (3.84)	10.33 (4.19)	12.41 (4.47)
T_7	57.00 (9.22)	52.00 (8.20)	40.33 (7.34)	39.66 (7.29)	47.25 (8.02)
T_8	68.00 (8.52)	41.00 (7.39)	30.00 (6.47)	33.00 (6.74)	43.00 (7.28)
SEm±	0.23	0.15	0.11	0.18	0.16
$CD_{0.05}$	0.69	0.47	0.33	0.56	0.45

Figures in parentheses are n+1 values

T_1= Border row of yam bean on all sides, T_2= Border row of marigold on all sides, T_3= Alternate rows of sweet potato and yam bean (1:1), T_4= Paired rows of sweet potato and one row of yam bean (2:1), T_5= Alternate rows of sweet potato and marigold (1:1), T_6= Paired rows of sweet potato and one row of marigold (2:1), T_7= Sole crop of sweet potato (control), T_8= Chemical control (check) (dimethoate 0.05% spray at monthly interval)

Tuber Crops Research Institute, Thiruvanantapuram, Kerala, lndia, pp 186-187.

Horvat RJ, Arrendale R, Dull GG, Chapman Jr GW and Kays SJ 1991. Volatile constituents and sugars of three diverse cultivars of sweet potatoes, *Ipomoea batatas* (L) Lam. Journal of Food Science **56(3):** 714-715.

Palaniswami MS and Mohandas N 1991. Incidence of *Cylas formicarius* F on sweet potato at different intervals of crop growth. Journal of Root Crops **17(1):** 60-66.