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# Management of sweet potato weevil (*Cylas formicarius*) through barrier crops of yam beans and marigold

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**Abstract :** A field experiment was conducted during 2010-11 at Regional Horticulture Research and Extension Center (RHREC), Dharwad (Karnataka) to control the sweet potato weevil (*Cylas formicarius*) through barrier crops of yam beans and marigold. Data revealed that, among various treatments, the treatment containing boarder row of marigold at all sides had shown significantly lower weevil infestation (17.31 per cent). While significantly higher infestation were noticed in the treatment having sole crop of sweet potato (37.50 per cent). Where as the treatments includes boarder row of yam bean at all side and paired row of sweet potato and one row marigold were an par with each other with respect to per cent weevil infestation. In case of weevil population per kg of infected tuber, the treatment with chemical control (Dimethoate 0.05 per cent) had shown significantly less number of weevils emerged from infected tuber 21.67. This was at par with boarder row of marigold on all side (25.33)

**Key words :** Sweet potato, Sweet Potato weevil, *Cylas formicarius*

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Sweet potato is one of the important crops of tropical and subtropical countries and temperate climatic zones that are frost free in 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. This is a crop bestowed with photosynthetic efficiency and ability to accumulate calories and nutrients in tubers. Among the Asian countries, china rank first in area and production, and account 80 per cent of the worlds production, the rest of contribution being 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 in an area of 0.14 million hectare with an annual production of 1.7 million tonnes and the productivity of 8.3t/ha (Edison, 2001), which is more than half of the world average. In India the districts of Orissa, Bihar and Uttar Pradesh account for 89 per cent area and 88 per cent production. (Edison, 2002). This crop is the principal source of starch and contains 15-28 per cent starch and 3-6 per cent sugar (Harvat *et al*., 1991). The red skinned sweet potato contains anthocyanin pigment, which are dicaffeoyl derivatives of cyaniding and peonodin-3-glycosyglucoside. The major amino acids available in total protein are valine, leucine, isolucene, arginine and lysine (Purcell and Walter, 1982), the peel contains more protein than the flesh. The digestive energy value of sweet potato has been reported to be 3490kcal/kg, which is almost comparable with maize which is 3837kcal/kg (Kay, 1973).

*Cylas formicarius* F. (Curculionidae= Coleoptera), the so called sweet potato weevil, which was first time described in 1798 from a specimen collected at Tranquebar near Madras, India and is found thoughtout tropics and subtropics wherever crop is cultivated. Though the pest damages the tubers both in field and in storage, the major damage occurs in the field. Even the slight infested tubers are unfit for human consumption. The adults feed only on the surface of exposed roots and on foliage and damage is insignificant. Weevil grubs feed inside the root and vines causing significant damage (Palaniswami and Mohandas, 1991). To manage this destructive pest with cheaper economically viable strategy on scientific footing has to be found out. Hence, the present investigation was under taken to manage of sweet

potato weevil through barrier crops of yam beans and marigold.

## RESEARCH METHODS

A field experiment was conducted at Regional Horticulture Research and Extension Center (RHREC), Dharwad (Karnataka) during 2010-11. The soil was shallow red embedded with small sand and gravels with pH 5.9-6.3. The experiment was laid out with randomized blocked design with three replications and eight treatments. The sweet potato vine variety Vikram was planted at a spacing of 60x20 cm in a gross plot size of 4.8 m x 3.6 m. each treatment was mannured, fertilized and irrigated as per the package of the practices given by University of Agricultural sciences Dharwad. The barrier crops were sown along with the planting of sweet vines. The observation such as infected tuber yield, tuber yield per hectare, per cent of weevil infestation, weevil population per kg of infected tuber were recorded at time of final harvest. The data were subjected to statistically analysis.

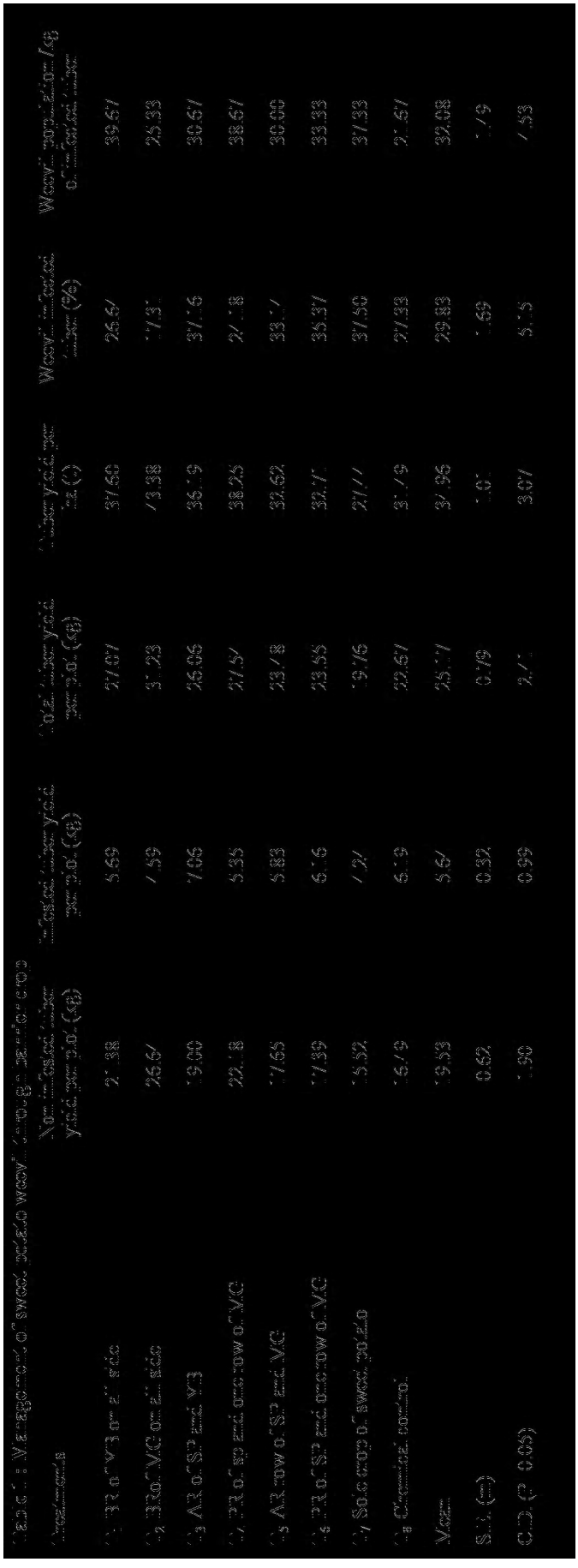
Details of the treatments are $T_1$-Boarder row of Yam bean on all side, $T_2$- Boarder row of marigold on all side, $T_3$-Alternative row of sweet potato and yam bean, $T_4$-Paired row of sweet potato and one row of marigold, $T_5$- Alternative row of sweet potato and marigold, $T_6$-Paired row of sweet potato and one row of marigold, $T_7$-Sole crop of sweet potato, $T_8$-Chemical control (Dimethoate 0.05%).

### Life cycle:

Soon after mating, the female *C. formicaries* lay eggs on the tuber or on the leaf. The eggs hatch in 5-14 days and the larvae live for 10-35 days. The pupal stage last for 7-28 days. In general, the total development completes in 33 days. The duration of each stage in the life cycle depends mainly on the temperature. Hot and dry weather favour the weevil development (Rajamma and Padmaja, 1981; Palaniswami *et al.*, 1990; Bhat, 1996). The adult weevil can survive upto 94 days. The life cycle of the SPW is shown in Fig. 1.

## RESEARCH FINDINGS AND DISCUSSION

Among the various treatments, the treatment consisting of boarder row of marigold at all side resulted in significantly higher tuber yield per plot and hector (31.23 kg and 43.38 t $ha^{-1}$, respectively) (Table 1). Further it is relevant to note that the magnitude of weevil infestation (17.31 per cent) and weevil population per kg of infected tuber (25.33) were lower due to above treatment. And significantly lower yield of tuber per plot and hectare (19.76



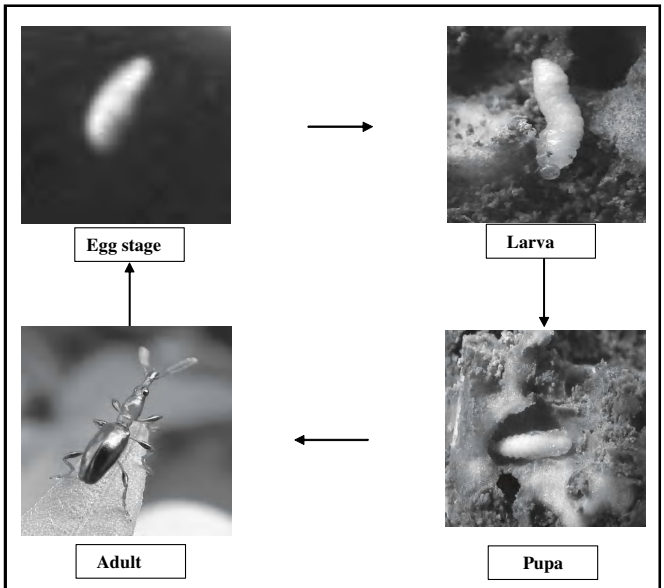



**Fig. 1 : Life cycle of sweet potato weevil *Cylas formicarius***

kg and 27.44 t $ha^{-1}$) was noticed in sole crop of sweet potato, and it is also noticed that significantly higher per cent weevil infestation (37.50 per cent) and weevil population per kg of infected tuber (37.33) were recorded in the same treatment. The results are in agreement with the findings of Pillai *et al*. (1996). While the treatments consisted of boarder row of marigold at all side and chemical control were at par to each other with respective to weevil population per kg of infected tuber. Similar result reported by Suris *et al*. (1995). They found that sweet potato intercropped with maize had a lower percentage of SPW damage than sweet potato pure.

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