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FIELD SCREENING OF ORANGE FLESH SWEET POTATO GENOTYPES AGAINST SWEET POTATO WEEVIL (*CYLAS FORMICARIUS* FAB.)

Rabindra Prasad*, Nakkala Divakar Reddy, Ashish Narayan, T. Alam, G. S. Giri and P. P. Singh

Tirhut College of Agriculture, Dr. Rajendra Prasad Central Agricultural University, Dholi - 843 121, Muzaffarpur, India.
*e-mail : rabindratcadholi@gmail.com

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ABSTRACT : Field screening of orange fleshed sweet potato (OFSP) genotypes against sweet potato weevil was conducted at research farm of Dholi, Muzaffarpur (Bihar) during 2019-20. Ten sweet potato genotypes, CIPSW-2, SV-98, Kamala Sundari, 4400-38, 440-127, 362-7, ST-14, TSP-16-3, TSP-16-10 and Cross-4 were evaluated to study their relative susceptibility against sweet potato weevil under natural infestation condition. The genotypes under the investigation are grown as per recommended agronomic practices without insecticide application. The susceptibility/resistance reaction to sweet potato weevil were ascertained on the basis of colour and shape of tuber, depth of tuberization (cm), neck length (cm), thickness of vine (mm), weevil infestation in vine and tuber (%) and marketable tuber yield (t/ha). All studied variables had impact on infestation of sweet potato weevil. The data on stem injury revealed that none of the genotypes was free from vine infestation caused by sweet potato weevil. On the basis of final results, genotypes are arranged on account of susceptibility to weevil infestation in descending order as TSP-16-3> CROSS-4> SV-98> TSP-16-10> Kamala sundari > CIPSWA-2 > ST-14 > 362-7> 440038> 440127.

Key words : Field screening, sweet potato, genotypes, sweet potato weevil.

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INTRODUCTION

Sweet potato (*Ipomea batatas* L.) serves as staple food and feed for human and animal consumption respectively. In India, sweet potato is mostly grown in Odisha, Bihar, Jharkhand, Uttar Pradesh, Madhya Pradesh, Assam, West Bengal, Tamil Nadu and, Kerala. In India, it is cultivated in an area of 0.13 million ha with a total production of 1.47 million tons (FAO, 2017). In Bihar, it is commercially cultivated in an area of 910 ha with a total production of about 8480 metric tons and productivity 9.3 metric tons/ha (FAO, 2017). Sweet potato starch is used for the manufacture of adhesive, textile confectionery and baking industries. Sweet potato contains starch, complex carbohydrates, dietary fiber, beta carotene, vitamins C and B and minerals. Due to superior quality starch of sweet potato, it has great potential for reducing hunger, specifically; in low-income households in developing countries (Narayan *et al*, 2022).

Earlier experiments has confirmed that sweet potato weevils, *Cylas formicarius* attacks almost every part of the plant and immature larvae and pupae can successfully grow on mature stem as well as on storage roots. The use of resistant varieties can be one of the most effective methods to manage this key pest. Presently emphasis was given to identify resistant and susceptible genotypes based on morpho-agronomical features of sweet potato rather than relying on high cost and ecosystem damaging chemical control methods. One of the major objective behind this investigation was to know resistant or susceptible genotypes of sweet potato against sweet potato weevil and the strategies based on economic viability and ecological implication on agro-ecological situation of north Bihar need to be developed for the management of sweet potato weevil.

MATERIALS AND METHODS

Field screening of orange fleshed sweet potato (OFSP) genotypes against sweet potato weevil was conducted at research farm of Tirhut College of Agriculture, Dholi (Muzaffarpur), Bihar. Dholi falls in the Gandak command area of North Bihar and is situated at

tuberization started just below the soil surface (Table 2 and 4). The maximum tuberization depth (18.9 cm) was observed in V_5 (440127), which recorded lowest tuber infestation (9.65%), while the maximum tuber infestation (31.37%) was recorded in genotype V_8 (TSP-16-3) having medium tuberization depth (6.7 cm) followed by V_{10} (Cross-4) having tuberization depth of (7.3 cm) and tuber infestation (27.52%). On the basis of tuberization depth genotype V_8 (TSP-16-3) and V_{10} (Cross-4) are identified as medium tuber depth genotypes, whereas genotypes V_1 (CIPSWA-2), V_2 (SV-98), V_3 (Kamala Sundari), V_4 (440038), V_5 (440127), V_6 (362-7), V_7 (ST-14) are identified as deep rooted genotypes (Table 4). The present findings are in conformity with the findings of Mishra *et al* (2006).

Neck length (cm)

Neck length (connection of tuber with crown) ranged between 1.65 cm to 7.25 cm with maximum neck length in the genotype V_5 (440127) and minimum in the genotype V_8 (TSP-16-3) respectively. Among ten sweet potato genotypes, six genotypes viz.; CIPSWA-2, SV-98, V7-ST-14,TSP-16-3,TSP-16-10 and Cross-4 recorded shortest neck length ranging from 1.65 cm to 4.13 cm. Only four genotypes *viz*; Kamala Sundari, 440038, 362-7 and 440127 recorded medium neck length ranging from 5.43 cm to 7.25 cm (Table 4). It can be inferred that medium necked genotypes *viz*; V_5 -440127 (7.25 cm), V_4 -440038 (6.47 cm), V_6 -362-7 (5.83 cm) and V_3 - Kamala Sundari (5.43 cm) had significantly lower level of infestation (9.65%, 10.82%, 12.71%, 19.65%) respectively (Table 2). In case of short necked genotypes grubs found easy access to the tubers being attached just beneath the crown. Therefore, it clearly revealed that short necked genotypes (<5 cm) were more prone to weevil attack, when compared to medium and long necked genotypes. Similar observations were recorded by Singh *et al* (1987), Rajamma and Pillai (1990) in sweet potato.

Vine thickness (cm)

Vine thickness varied from 1.0 cm to 2.13 cm with minimum and maximum in the genotype V_5-440127 and V_8-TSP-16-3, respectively. It indicated that genotypes having thick vine exhibited maximum tuber infestation (31.37 %) while the genotypes having thin vine recorded minimum tuber infestation (9.65%), remaining genotypes exhibited intermediate positions between these two (Table 2). It appeared that thin vine facilitated egg laying to the adults as well as downward movement of the grub to the tuber by virtue of having loosely arranged vascular bundle in the vines and thus provided least resistant to the pest. Singh *et al* (1987) found negative correlation between thickness of vine and weevil infestation. Similar observations were also reported by Rajamma and Pillai (1990) in sweet potato.

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