

SEED BORER***Trymalitis margarias* Meyrick
(*Lepidoptera* : *Tortricidae*)****K. D. Bisane, B. M. Naik,
P. K. Modi and A. P. Patel**

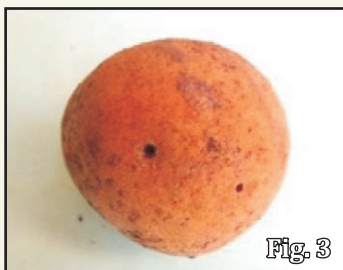
Sapota or *Chiku* [*Manilkara achras* (Mill.) Forberg] is an important sweet fruit crop of tropical region of India. The yield loss due to succession of about 33 insect pests at the different crop stages happened due to continuous and overlapping flowering and fruiting pattern under varying ecological situation (Bisane *et al.*, 2018). Recently in sapota orchards, seed borer became an emerging insect pest of the crop causing very serious damage at peak fruiting stage, due to which the quality of fruit deteriorated and posing threat to export as it directly affect the seed.

Identification of Damage:

Seed borer is a micro-lepidopteran caterpillar which attacks immature fruits of sapota. The just hatched caterpillars make hole on the surface of the fruit and make galleries through the fruit pulp. Its entry into the fruit is seen as streak at earlier phase and later it disappears as fruit hardens. It finally reached to the seed, where it bores through the seed coat and damages the kernel of the fruit seed (Fig. 1). Earlier instars are not visible in the fruit and could not be detected from outside. It is difficult to distinguish between infested and uninfested fruits before emergence of larvae.

The larva feeds only on endosperm of the seed and completes its larval period inside the seed. For pupation, the mature larva prepares a tunnel (Fig. 4) to emerge out from the infested fruit prior to ripening of fruits and pupate on the leaf surface. Affected fruits show a tiny exit holes (Fig. 2). Sometimes, more than one larva damages the seeds of a fruit and emerge out through different tunnels (Fig. 3). On exit, the larva cuts a leaf and folds it over to make a fine shell-like structure to pupate. Later through its exit hole, the fungus and ants enters inside the fruit, depreciate the quality and fruit becomes unfit for consumption.

Generally, older trees with higher fruit bearing infested more by seed borer as compare to younger tree with low bearing capacity. The damaged fruit get less selling price at wholesale or cooperative or dealer or retailer level and ultimately causes economic losses to growers at various stages. The adults have the chances of emergence during transport or in market and that the way, the fruits are the major pathways for its spread.

**Fig. 1****Fig. 2****Fig. 3****Fig. 4****History:**

Seed borer is an exotic pest and first reported from Dahanu area of Maharashtra in year 2000 (Patel, 2001). As per the Jayanthi and Verghese (2010) hypotheses, *T. margarias* is a non-native species of India and had reached India from Sri Lanka as accidental introduction through cargo *via* sea route and established in Dahanu area in Maharashtra due to similar ecological circumstance and suitable host availability between western Sri Lanka and western India's coastal part.

After its introduction during 2000, about 21% incidence of seed borer was reported in Thane dist. (Maharashtra) during 2001 (Anonymous, 2001) and up to 40% damage in Gandevi (Gujarat) during 2003-04 (Anonymous, 2004). Now, this pest has spread and established in major sapota growing belts of Gujarat, Maharashtra, Tamil Nadu, Karnataka and Chhattisgarh.

Life Cycle:

Seed borer lays eggs on marble size fruit towards the end of monsoon season. The single female lays up to 250 eggs in their life span under favourable ecological condition with incubation period lasted for 10-12 days. The caterpillar of pest is dark red in colour (Fig. 5) and make hole on soft coat of fruit to enter seed. Seed borer larval and pupal stages duration ranged between 10-12 and 10-11 days, respectively. The mature larvae emerge out of fruit for pupation on leaf surface (Fig. 6). The adult male and female survives for a period of 3-4 and 4-5 days, respectively (Fig. 7). The total life cycle of seed borer completes within 34-42 days.

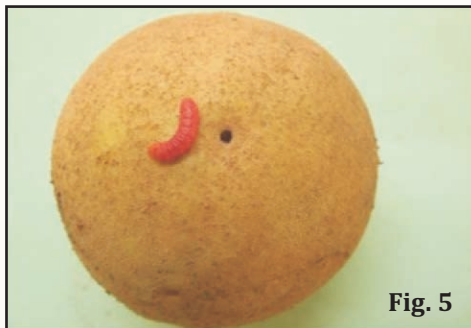


Fig. 5



Fig. 6

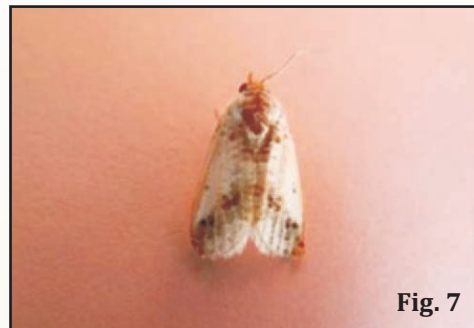


Fig. 7

Peak Activity Period:

The pest incidence commenced from September onwards and the peak activity noticed during October to December at early fruiting phase (Fig. 8). The fruit damage slightly decline from January onwards. But fruit damage is again conquered higher in March-April and decline June onwards at end of fruiting span. Generally, the incidence of seed borer observed round the year except during monsoon period of July-August at fruit development stage. The lower fruit damage reported on varieties like Chala collection 1, Chala collection-3, CO-1, CO-3 and PKM-4, however the higher fruit loss was noted in Kalipatti, Kirtibarthi, DHS-2, CO-2 and Cricket ball (Bisane and Naik, 2021).

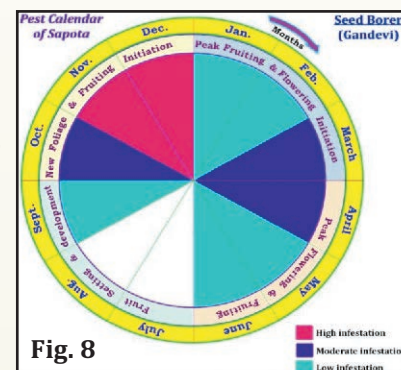


Fig. 8

Management:

- Conservation and augmentation of parasitoids and predators for the management of eggs and early instar larvae before enter into fruit should be effective strategy.
- Keep the sapota orchard clean to minimize the spread of seed borer.
- Collection and removal of the off-season stray mature fruits after end of fruit harvest lower the further pest infestation in orchard. Keep the sapota orchard clean.
- Erecting light traps in the orchard during fruiting span minimize the further pest incidence.
- Sequential four application of deltamethrin 2.8 EC @ 1 ml/lit and Bt powder (*Bt* var. kurstaki - 1×10^{11} CFU/gm) @ 1 g/lit at 15 days interval OR three alternate sprays of profenophos 50 EC @ 1.5 ml or novaluron 10EC @ 0.5 ml/lit or indoxacarb 14.5 SC @ 0.5 ml/lit at 15 days interval at marble stage of fruit (October onwards) to minimize fruit damage of seed borer in sapota.
- Post harvest treatment like fumigating the container/ conveyance means / ripening places during arrival period definitely cut down the risk.

References:

- Anonymous (2001). Annual Report, Dr. Balasahab Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra.
- Anonymous (2004). Annual Report 2003-04. All India Coordinated Research Project on Tropical Fruits. Fruit Research Station, NAU, Gandevi. pp: 32-34.
- Bisane, K.D. and Naik, B.M. (2021). Evaluation of sapota varieties against seed borer, *Trymalitis margarias* Meyrick. *Indian J. Ent.*, 83(4): 606-609.
- Bisane, K.D.; Dhane, A.S.; Irulandi, S.; Singh, Sandeep and Patil, Prakash (2018). Insect pest of sapota in India - Monograph. Pub: ICAR-AICRP (Fruits), ICAR-IIHR, Bengaluru (Karnataka). pp. 1-88.
- Jayanthi, P.D.K. and Verghese, A. (2010). Establishment of sapota seed borer, *Trymalitis margarias* Meyrick, an invasive species in India: Exigencies involved in limiting the spread. *Karnataka J. Agril. Sci.*, 23(1): 165.
- Patel, Z.P. (2001). Record of seed borer in sapota, *Manilkara achras* (Mill.) Forsberg. *Insect Environ.*, 6(4): 149.