

INSECT PESTS OF SAPOTA AND THEIR MANAGEMENT

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Sapota or sapodilla [*Manilkara achras* (Mill.)

Fosberg popularly known as chiku in India, is one of the prized introduction from south America. It is an evergreen fruit tree, has a unique behaviour of continuous flowering and fruiting throughout the year in warm and humid climate. Therefore, it has become most popular fruit crop of coastal region of the country especially in the state

of Gujarat, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh and Kerala.

Undoubtedly, Sapota is well settled and shows remarkable performance in warm and humid climate that also favours to the insect pests and diseases. Though, this fruit is growing since long back, majority farmers are not well aware by pest menace in this crop. The main reason behind this is the inability of farmers to realize the losses accounted by the insect pests because of the continuous flowering habit and long duration between bud initiation and harvesting. Thus there is belief among farmers that no plant protection measures are required in Sapota. Proliferation of insect



pest in wider area is enhanced because of the intensive cultivation of Sapota coupled with monoculture of *Kalipatti* variety supported by changing environmental conditions as well as unchecked pest population. Till date 25 insect pests have been reported attacking Sapota tree in India (Butani, 1979). In Gujarat, persistent efforts of last two decades by scientists have resulted in identification of more than 16 insect pests and mite on Sapota. However, awareness regarding this is altogether lacking among Sapota growers throughout the country.

The pests damaging the Sapota can be classified in following groups on their damage to the various plant parts.

The information regarding identification, nature of damage and to manage these insect pests are described as follows:

Bud borer (*A. achrasella*): The larva is an internal feeder being pink in colour with brownish head and having a white transverse band in it. Moths are small in size having dark ashy grey forewing while hindwings are fringed yellowish. Larva found boring inside the buds and flowers lead to their complete

failure to develop as fruit. The presence of the hole with secretion of milk as well as an excreta on buds is the identification of damage caused by this pest. Thus it can be considered as yield potential pest. During the larval period of 10 to 14 days a single larva can damage 3 to 5 buds. The larva of *A. anthrivora* species is found damaging to new leaves. The pest is observed throughout the year with a peak activity during March to June. An increasing in temperature and relative humidity favours the population build up of this pest during that it can damage upto 20-35 per cent.

Chiku moth (*N. eugraphella*): The larvae of this is reddish brown or dirty green in colour. It is very active and soon falls down by spinning a fiber with a slight disturbance. Ash coloured moths having white hindwings are medium in size. Larva causes considerable damage to terminal leaves which are fastened together with silken threads. Young larva scrapes and feed on green tissue and produce a parchment. Full grown larva is found feeding on tender leaves, buds and young fruits. As a

Bud/ Flower	Bud borer, <i>Anarsia achrasella</i> Bradley Chiku moth, <i>Nephtopteryx eugraphella</i> Ragonot
Fruit	Fruit fly, <i>Bactrocera dorsalis</i> Hendel Fruit mite, <i>Tuckerella kumaonensis</i> Mealy bug, <i>Rastococcus iceriodes</i> Fruit borer, <i>Virachola isocrates</i>
Seed	Seed borer, <i>Trymalitis margarias</i> Meyrick
Leaves	Leaf miner, <i>Achrocercops gemoniella</i> Stainton Midrib folder, <i>Banisia myrsusalis</i> Walker Semilooper, <i>Achea mercatoria</i> Leaf eating caterpillar, <i>Metanastria aconyta</i> Bud borer, <i>Anarsia achrasella</i> Bradley Chiku moth, <i>Nephtopteryx eugraphella</i> Ragonot Mealy bug Scale insect Aphid, <i>Aphis gossypii</i>
Other	Termite Twig/ Trunk bore

result of extensive feeding on buds, the tree bears less number of flowers and later on injury on the tender fruits resulted in premature shedding which ultimately results into poor yield. Infested trees could be easily recognized by numerous webbed brown terminal shoots and dried up clusters of leaves. During its larval period of 12 to 22 days a single larva can damage to 10 to 14 buds. The pest can be observed throughout the year but maximum infestation is observed during September to November.

Fruit fly (*B. dorsalis*): It is a polyphagous pest and sapota is also one of its preferred host. The attack is more in mixed orchard of mango and sapota. The adults are yellowish golden while maggots are pale white in colour. Female flies puncture the matured fruits for oviposition which can be recognized by oozing out latex on the fruits. The affected fruit deteriorate completely and becomes unfit for human consumption. Moreover its infestation results in one time loss for buying but for producer it imposes a recurring loss *i.e.*, a loss of goodwill.

Sapota seed borer (*T. margatias*): It is a new pest of sapota found damaging for the first time in Dahanu area of Thane district of Maharashtra. The larva is dark pink in colour, while moths are grayish with white patches. After hatching the larva enters in fruit and finally reaches to the seed. It feed exclusively on endosperm of seed and comes out for pupation by preparing a gallery through the fruit. Infested fruits having an exit hole through which fungus as well as ants enter and spoil the fruit later on. As high as 40 to 80 per cent damage by this pest has been recorded during October to January. Thus pest can be considered as the most endemic as it cause direct loss in yield and quantity.

Fruit mite (*T. kumaonensis*): The fruit mite is red in colour which damages to the marble size fruits. It scrape the fruit and suck the cell sap due to which an outer surface becomes rough and black. Thus the quality of fruit deteriorate and market price will be reduced.

Leaf miner (*A. gemoniella*): The tiny larvae mine young and tender leaves feed within and the affected leaves show glistening galleries get distorted dry and ultimately fall down. As high as 15 to 18 per cent damage is recorded during June to September.

Midrib folder (*B.m. eleaealis*): The larva is dirty white in colour with prominent brown head. It folds the leaf singly or in batches of two to three and feeds on chlorophyll. The folded leaf looks like a pea pod. In the field the infested leaves on terminal shoot dries up with an emergence hole which can be clearly visible from a distance. During its larval period of 12 to 15 days it can damage 3 to 4 leaves. Infestation of this pest is coinciding with new flush of leaves and maximum 10 to 15 per cent damage recorded during November to January.

Semilooper (*A. mercatoria*): Larva of this pest is ash or brown in colour. During its larval period of 16 to 18 days, initially feed on flowers and new leaves and later on devours voraciously on leaves leaving on midrib.

IPM strategies for management of Sapota Pests: Bud boring insects (*A. achrasella* and *N. eugraphella*)

- Three spray at 15 days interval starting from March with DDVP 0.03 % or monocrotophos 0.05% give effective control.

- Among new insecticides, Lamda cyhalothrin 0.005% or polytrin-C 0.04% are also found very effective.

- Among the microbial pesticides B.t. 0.05% found effective.

- Botanical pesticides like Nimbicidine 0.3% or Azadex 0.1% or Ageisaf 5% or Neemark 1% are also found effective which can be incorporated to reduce the pesticide load.

- Installation of trap prepared from black *tulsi* (*Ocimum* sp.) leaves extract @ trap/two trees is useful for capturing the males of *A. achrasella* (500 g of tulsi leaves and one liter of water grind in electric grinder and filter through the fine cloth and than add 2 ml of dichlorvos).

- About 15 to 25 per cent parasitism by *Phanerotoma* sp nr. *Hendecasisella* in larvae of bud borer and 15 to 20% by *Macrocentrus* sp. In larvae of chiku moth is also observed. This can be exploited after finding out the mass multiplication.

- Varietal screening indicated that PKM-1 found tolerant against bud birer which can be taken advantage in future breeding programme.

Leaf Miner (*A. gemoniella*):

- Spraying of monocrotophos 0.05% or phosphamidon 0.03% at the time of leaves give control of this pest.

- Variety PKM-1 also found tolerant against the attack of leaf miner.

Fruit mite (*Tuckerella* sp.): Two sprays at 15 days interval either of monocrotophos 0.05% or ethion 0.05% or dichlorvos 0.03% at marble size fruit can effectively control the fruit mite.

Fruitfly (*Bactrocera* sp.): A regular installation of methyl eugenol trap in sapota orchard can effectively reduce the population.

Semilooper (*A. mercatoria*): For the effective control of semilooper, spraying of profenophos 0.075 % or fenobucarb 0.1 % or lamda cyhalothrin 0.005% can be effective.

Seed borer (*T. margatias*): Spray endosulfan 35 EC (21 ml per 10 liter of water) for the control of this insect. further experiments are in progress for the effective management.