II. Pest Surveillance

Surveillance on pest occurrence in the field should commence soon after crop establishment and at weekly intervals thereafter by walking across the field and choosing 300 fruits from 20 trees/acre randomly across the diagonal of the field. For fruit flies/mealy bug count and record the number of both nymphs and adults on five randomly selected fruits/leaves per plant. For leaf webbers count the number of webs formed in each direction, thus covering the whole tree. Number of scale infested shoots per five tender shoots from each of the four directions of the selected tree should be counted for scale insects. For defoliators/borers count the number of young and grown up larvae on each plant and record. Pest monitoring for fruit flies using methyl eugenol should be done regularly from fruiting stage onwards.

III. Integrated Pest Management Strategies

- Deep ploughing of orchard immediately after harvest to expose eggs and pupae.
- Avoid dense planting, prune the overcrowded and overlapping branches for control of hoppers.
- Heavy irrigation in October also helps in destruction of eggs.
- Collection and destruction of stone weevil infested fallen fruits and stones help in reduction and carryover of infestation.
- To control first instar nymphs of mealy bugs mud plastering 25 cm wide, 400 gauge Polythene sheet should be fastened to the tree.
- Early harvesting of mature fruits to avoid fruitfly infestation.
- Bagging of fruits to avoid egg laying by fruit flies.
- Collection and destruction of dropped fruits.
- Removal of webs made by leaf webber by leaf removing device and burning them.
- Bio-agents play a significant role in population suppression of various insect pests and diseases and should be conserved in the field.
- A large number of parasitoids and predators are very active against mango pests in the fields. These are *Rodolia fumida, Suminus renardi, Coccinellids, Beauveria bassiana, Verticillium lacani, Mallada boninensis, Podynema spp., Platygaster sp, Eupulmus sp., Systasis dasynearue, Micronimus timidis, Baccha pulchrifrons, etc*.

Recommended pesticides against Mango insect pests

Pests/Pesticides	Dosage			Waiting Period (days)
	a.i (gm)	Formulation (gm/ml)	Dilution (Litre)	
Hoppers				
BUPROFEZIN 25% SC	0.025% to 0.05%	1-2ml/liter of water	5-15 liter/tree	20
DELTAMETHRIN 2.8% EC	0.03-0.05%	0.33 to 0.5 ml/lit	-	1
DIMETHOATE 30% EC	0.05%	2475-3300	1500-2000	-
IMIDACLOPRID 17.8% SL	0.4 – 0.8 g/tree	2-4 ml/tree	10 litre	45
LAMBDA-CYHALOTHRIN 5% EC	0.0025-0.005%	0.5-1.0 ml/l water	-	7
MALATHION 50% EC	0.075%	2250-3000	1500-2000	-
OXYDEMETON – METHYL 25% EC	0.025%	1500-2000	1500-2000	-
THIAMETHOXAM 25% WG	25	100	1000	30
Mealy bug				
MALATHION 50% EC	0.075%	2250-3000	1500-2000	-
MONOCROTOPHOS 36% SL	0.04%	1500-2000	500-2000 20 lit./trees	-
Shoot Gall Psylla				
MONOCROTOPHOS 36% SL	0.04%	1500-2000	500-2000 20 lit./trees	-

For more details please contact:

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Integrated Pest Management (IPM) in Mango (*Mangifera indica*) for export purpose

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Mango (*Mangifera indica* L.) is king of all fruits. India is major producing and exporting country in world. There are number of insect pests damaging mango tree but the most abundant and destructive are mango hoppers, mealy bug, stem borer, fruit fly, mango nut weevil and play a major role in bringing down the fruit quality and yield.

I. Identification of important pest

1. Fruit flies (*Bactrocera dorsalis, B. correcta & B. zonata*):

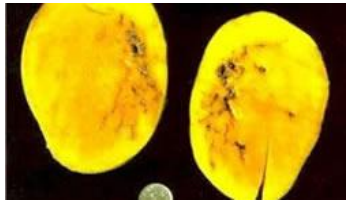
The female punctures outer wall of mature fruits with the help of its pointed ovipositor and insert eggs in small clusters inside mesocarp of mature fruits. On hatching, the maggots feed on fruit pulp and the infested fruits start rotting due to further secondary infection. Mango fruit flies distributed all over mango growing areas.


2. Stone weevil (*Sternochetus mangiferae*):

Adult weevils are stout and dark brown, grubs are white legless and stumpy. On hatching grubs bore through the pulp, feed on seed coat and later damage the cotyledons. Pupation is inside the seed. Stone weevil prone to attack on Totapuri, Neelam, Banglura and Banganpalli varieties and distributed in southern parts of India.


3. Mango Pulp Weevil (*Sternochetus frigidus*):

The newly hatched larva tunnels directly through the fruit pulp to the kernel. Weevils leave the ripe fruit through a hole in the peel. Before they emerge, the fruit shows no outward sign of infestation. Adult puncture wounds are found on the fruit. There are small brown oviposition sites and circular adult emergence holes in the peel of the fruit.

4. Fruit borer (*Deanolis albizonalis*):

Hatched larvae bore into fruits. Fully grown caterpillars have red bands on body alternating with white bands caterpillars bore into the fruit at the bottom (beak region) and feed inside reaching Kernels. Entrance hole is plugged with excreta. Affected fruits rot and fall prematurely. This pest is widely distributed in Andhra Pradesh and Orissa.


5. Thrips (*Scirtothrips dorsalis*):

Nymphs and adults lacerate the tissues and suck the oozing cell sap. Leaf feeding species feed on mesophyll near leaf tips. Affected leaves show silvery sheen and bear small spots of faecal matter. Thrips are widely distributed in all mango growing areas of India.


6. Mealy bug (*Drosicha mangiferae*):

The adult bugs are covered with whitish powder and colonize between bark of tree trunk, young shoots and panicles causing flower drop, affecting fruit set. They also excrete honey dew, a sticky substance, which facilitates development of sooty mould. Mealy bugs known to occur in all mango growing areas of India.


7. Scale Insects (*Aspidiotus destructor, Ceroplastis* sp.):

The nymph and adult scales suck the sap of the leaves and other tender parts and reduce the vigour of the plants. They also secrete honeydew, which helps in the development of sooty mould on leaves and other tender parts of the tree. Scale insects are occurring in all mango growing areas of India.


8. Shoot Borer (*Chlumetia transversa*):

Larvae bore into the young shoot by tunneling downwards resulting in dropping of leaves and wilting of shoots. Larvae also bore into the inflorescence stalk. Female moths lay egg on tender leaves. Widely distributed in India.


9. Hoppers (*Amritodus atkinsoni*):

The wedges shaped Nymphs and adult insects puncture and suck sap of tender parts, reducing vigour of plants and particularly destroying the inflorescence and causing fruit drop. Heavy puncturing and continuous draining of sap causes curling and drying of infested tissue. Hoppers are widely distributed in all mango growing areas of India.