MAJOR PESTS OF CITRUS							
Pest	**Scientific Name**	**Host**	**Oviposition**	**Pupation**	**Nature of damage**	**Management**	**Typical characters**
Shoot psyllid/ Citrus Psylla	***Diaphorina citri* (Psyllidae: Hemiptera)**	Members of rutaceae family.	on the underside of soft young leaves	-	Both nymphs and adults suck cell sap from leaves, which curl up, dry and fall off. Nymph secretes honeydew on which sooty mould grows. Psylla is also known to inject toxin in plant due to which die-back of shoot occurs.	Prune the affected trees and dried shoots. parasitoid *Tamarixia radiate*, and predators - *Coccinella septumpunctata, Chilomenes sexmaculata, Brumus suturalis, Chrysoperla carnea.* Spray NSKE 5 %, neem oil 10 L, dimethoate 30 EC 3.0 L, of monocrotophos 36 SL 1.5 L, methyl demeton 25 EC 2.5 L, quinalphos 25 EC 1.0 L, imidacloprid 200 SL 250 ml in 1500-2000 L of water/ha during new flush.	transmit "Greening melody", a micoplasma disease in citrus
Citrus blackfly/ White fly	***Aleurocanthus woglumi* / *Dialeurodes citri* (Aleyrodidae: Hemiptera)**	Citrus, sweet orange, avacado, grape vine, mango, guava, pear, plum.	On leaves in spiral manner	Pseudo pupa On underside of leaves	Nymphs and adults suck plant sap, causing curling of leaves and premature fall of flower buds and developing fruits. Nymphs excrete honey dew on which black sooty mould develops - "*Kolshi*". Fruits turn black & insipid taste	Avoid Close planting, water logging or stress conditions. Avoid excessive irrigation and application of nitrogen. Use yellow trap at the time of adult emergence, Release *Mallada boninensis* predator, Pupal parasitoids: *Encarsia formosa*, Spraying of *Verticillium lecanii* 2 Kg/ha Spray neem oil 3% or Fish Oil Rosin Soap 30 g/L or quinalphos 25 EC 2.0 L or methyl demeton 25 EC 1 .0 L or ethion 50 EC 2.5 L or triazophos 40 EC 3.0 L in 1500 – 2000 L water per ha.	As only first nymphal instar of the pest is vulnerable to insecticides. The 50% eggs hatching is the most critical period for application of insecticide.
Thrips	***Scirtothrips spp.* (Thripidae, Thysanoptera**	Polyphagous	In leaf tissues		The nymphs and adults suck the sap from fully developed flower and leaf buds, young and grown-up	Spray NSKE 4% or Dimethoate 30 EC @ 2 ml or Thiamethoxam 25 WG @ 0.3 g or Acetamiprid 20 SP @ 0.3 g /L. water at bud burst stage & on berries and the	Two white line parallel to leaf midrib and a whitish silvery ring around the

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					fruits and leaves The leaves become cup shape and leathery.	surrounding vegetation should also be sprayed as the pest thrives on it.	fruit neck are characteristics of thrip infestation.
Pest	**Scientific Name**	**Host**	**Oviposition**	**Pupation**	**Nature of damage**	**Management**	**Typical characters**
Citrus Aphids	***Toxoptera aurantii* (Aphididae: Hemiptera)**	Rutaceae family	Giving birth to young ones		Aphid nymphs and adults suck the sap of leaves, leaves become curled (cup shaped). Secrete a honey like substance attracts sooty- mould impairs photosynthesis. Wilting, flower drop, premature falling of the unripe fruits. Ripening and quality of the fruits is affected.	Natural enemies (coccinelids, chrysopids, and syrphids). Spray imidacloprid 17.8 SL @ 2.5 ml/10 lit. dimethoate 30 EC @ 16.5 ml or malathion 50 EC @ 6 ml (0.03%) in 10 lit of water.	Transmit tristeza virus disease. Aphid reproduce parthenogenetic ally and viviparously
Citrus leaf miner	***Phyllocnistis citrella* (Gracillaridae : Lepidoptera)**	Citrus, Pommelo willow, cinnamon, *Loranthus* spp.	On leaf	In the mines	Larva mines in zig-zag manner forming galleries by feeding on epidermal cells. The leaves turn pale, get distorted and dry up.	Spray NSKE 5% or neem cake extract 5% or neem oil 3 % or imidacloprid 17.8 SL 125 ml per ha, Spray dichlorvos 76 WSC 1.0 L, dimethoate 2 .0 L per ha, Use 5-15 L of water per tree/1500-2000 L of water per ha	Nursery pest. Secondary infection by fungi and bacteria cause 'citrus canker'.
Fruit piercing moths	***Othreis materna, O. fullonica, Achoea janata* (Noctuidae: Lepidoptera)**	Citrus, mango, grapes and apple	on wild plants and weeds like *Tinospora cordifolia, Cocculus pendulus, C. hirsutus* ***Gulvel, Wasanvel and Chandvel***	Soil	Adult moth pierces the fruits for sucking the juice and makes characteristic pin-hole damage in fruits. Bacterial and fungal infections at the site of attack. Whole fruit turns yellow, drops from tree and looks like a premature fruit.	Destroy the weed host, Apply smoke to repel adult moth, light traps to attract adults. Cover the fruit with perforated poly bags. Set up Bait with fermented molasses / jaggery (10 g/ L) + malathion 50 EC 1 ml/L or Dispose fallen fruits, Spray with 2.5 kg of carbaryl 50 WP in 1000 L of water per ha at the time of maturity of fruits.	
Fruit fly	***Dacus dorsalis* (Trypetidae,**	Citrus, mango, grapes, pomegranate	just below the fruit epidermis	In soil	Maggots feed on pulp of fruits. As a result a brown patch appears	Harvest the fruits before ripening. Plough around the trees during winter to kill the	

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	Diptera)	and apple			around the place of oviposition and the infested fruits start rotting, results in fruits drop prematurely	pupae. Fallen fruits should be collected and buried deep in the ground. Use male attracting fly trap baited with 0.1% methyl eugenol and 0.05% malathion @ 25 traps / ha.	
Pest	**Scientific Name**	**Host**	**Oviposition**	**Pupation**	**Nature of damage**	**Management**	**Typical characters**
Bark caterpillar	***Indarbela tetraonis* (Inderbelidae: Lepidoptera)**	Mango, guava, zizyphus, litchi, orange, pomegranate, bauhinia, loqua t, mulberry, moringa, rose, guava and eugenia.	under loose bark of the trees	inside the stem	Young trees succumb to the attack. Caterpillars bore into the trunk or junction of branches make zig zag galleries made out of silk and frass. They feed on the bark. Flow of sap is hindered, plant growth arrested and fruit formation is drastically reduced.	Kill the caterpillars by inserting an iron spike into the tunnels. Injecting ethylene glycol and kerosene oil in the ratio of 1:3 into the tunnel, seal the opening with mud. Or piece of cotton in chloroform or petrol or kerosene ordichlorvos into the tunnel.	They hide in tunnel during day time, and feed at night Presence of webbings old trees are preferred
Citrus butterfly	***Papilio demoleus*, (Papilionidae: Lepidoptera)**	Citrus and other Rutaceae plants	On leaves	On twig	The young larvae feeding on the leaf lamina from margin to midrib. Grown up larvae feed on matured leaves and cause severe defoliation.	Hand pick larvae in nurseries and orchards. bird perches, *Trichogramma chilonis* Spray *Bacillus thuringiensis* 1 g /L or neem seed extract 3%. Spray Thiodicarb 75 WP @10 g or Acephate 75 SP @ 7 g or Quinalphos 25 EC @ 20 ml or Fenvalerate 20 EC @ 5 ml in 10 lit of water.	Newly hatched larvae look like a excreta of bird.
MAJOR PEST OF POMEGRANATE							
Anar butterfly / Fruit borer:	***Virachola* (*Duodorix*) *isocrates* (Lycaenidae: Lepidoptera)**	Aonla, apple, ber, citrus, guava, litchi, loquat, peach, mulberry, pear, sapota, tamarind.	on calyx of flowers and on tender fruits	inside fruit but occasionally outside on stalk of fruits,	Larvae bore inside the developing fruits and feed on pulp and seeds. Rind exhibit round bore holes. Infested fruits are attacked by bacteria and fungi, fall off and	Mechanical - Bagging of developing fruits with cloth or paper bag. Use light trap @ 1/ ha to monitor the activity of adults, Release *Trichogramma chilonis* at one lakh/acre. Spray NSKE 5% at flower initiation, At the beginning of	

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					give an offensive smell.	fruit formation spray with Thiodicarb 75 WP @10 g or Acephate 75 SP @ 7 g in 10 lit of water.	
MAJOR PESTS OF MANGO							
Pest	**Scientific Name**	**Host**	**Oviposition**	**Pupation**	**Nature of damage**	**Management**	**Typical characters**
Mango hoppers	***Idioscopus clypealis, Amritodus atkinsoni* (Cicadellidae : Hemiptera)**	Mango, citrus, mulberry, Sapota	Into the tissues of the young leaves		Both nymphs and adults suck the sap from tender shoots and inflorescence resulting in withering and shedding of flower buds and also wilting and drying of shoots and leaves. The flower stalks and leaves become sticky due to the the honey - dew secreted by the hoppers that attracts growth of black sooty mould on foliage and other parts.	Avoid close planting, Cleaning, Pruning of dense canopy, Avoid excess use of nitrogenous fertilizers. Spray Neem oil 5 ml/lit of water can be mixed with any insecticide. Spray neem seed kernel powder extract 5 per cent. Spray dimethoate 30 EC or malathion 50 EC 1.5 -2.0 L in 1500 – 2000 L of water per ha or acephate 75 SP @ 1 g/L, Thiamethoxam 25 WG @ 0.1 ml or Clothianidin 50 WP @ 0.12 g or imidacloprid 17.8 SL 0.3 ml/tree or lambda cyhalothrin 5 EC 0.5-1.0ml/L of water at 10 - 15 L of water per tree.	The hoppers take shelter in cracks and crevices on the bark during non-flowering season. Clicking sound - movement of jassids amidst leaves.
Stemborer	***Batocera rufomaculata* (Cerambycidae : Coleoptera)**	Mango, rubber, jack-fruit, fig, papaya, apple, eucalyptus and mulberry, morings and silk cotton.	on the bark or cracks and crevices on the tree trunk or branches	inside the larval tunnel in the stem	The grubs feed by tunneling the bark of branches and main stem. Shedding of leaves and drying of terminal shoots takes place in early stage of attack while damage to main stem causes tree death.	Grow varieties viz., Neelam. Remove and destroy dead and affected branches, Remove alternative hosts, Use probe to pull out the grubs from the bore holes. The bore holes be filled with DDVP @ 5 ml or monocrotophos 36 WSC 10 to 20 ml or one celphos tablet (3 g aluminum phosphide) and plug	

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						with clay + copper oxychloride paste.	
Fruit fly	***Bactrocera dorsalis* (Tephritidae: Diptera)**	Mango, guava, peach, apricot, cherry, pear, ber, citrus, banana, papaya, passion fruit, coffee, melons, jack fruit, strawberry.	just beneath the skin of the fruit	in the soil	The maggots destroy and convert the pulp into bad smelling, discoloured semi liquid mass unfit for consumption, results in fruit drop and liquid oozes out from the fruit upon pressing.	Plough interspaces to expose and kill the puparia. Infested and fallen fruits should be disposed. Bait-spray of malathion 50 EC @ 2 ml/ L with molasses or jaggery (10 g/L) before ripening. Set up fly trap using methyl eugenol. – Rakshak traps.	
Pest	**Scientific Name**	**Host**	**Oviposition**	**Pupation**	**Nature of damage**	**Management**	**Typical characters**
Mango nut weevil	***Sternochaetus mangiferae* (Curculionidae: Coleoptera)**	Mango	on the marble sized fruits by scooping out the surface tissue	inside the nut	The grub tunnels in a zig-zag manner through the pulp endocarp, seed coat and finally destroys the cotyledons. Tunnel get closed As the fruit develops. The adults inside also feed on the developing seed and hasten the maturity of infested fruit.	Under-sized fruits should be picked and destroyed. General cleanliness, fallen fruits and stones, weevils. Cloth or paper bags for fruits. Spray malathion 50 EC 1ml/L or Quinalphos 3- 4 L in 1500-2000 L water per ha at marble stage of the fruit. During non flowering season spray the base of the trunk. Spray deltamethrin 1.5 - 2.0 L per ha after 6 weeks of fruit set.	
Gaint mealybug	***Drosicha mangifera* Margarodidae Hemiptera**		Inside the soil		Mealy bugs suck the sap from tender leaves and shoots, release a honey dew that attracts sooty mould fungus. Drying of leaves and inflorescence. Infested fruits covered with the white waxy coating, lead to fruit drop, or drying. If flower	Ploughing below the tree to expose eggs. Soil application of 2% methyl parathion dust to kill newly emerged nymphs. Use of greasy band to prevent the climbing of nymphs on trees or polythene sheets. Release Australian ladybird beetle, *Cryptolaemus montrouzieri* @ 10/tree. Spray Monocrotophos 36 SL @ 3 ml or Dimethoate 30 EC @ 1.5 ml/lit. water.	

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					blossom is attacked, the fruit sets poorly.		
MAJOR PESTS OF BANANA							
Rhizome weevil:	***Cosmopolites sordidus* (Curculionidae: Coleoptera)**	Banana, cocoa	laid in small burrows scooped out by the beetle on the root stock or within leaf sheaths	Grub pupates within chamber made near the outer surface of the rhizome	Grubs bore into the rhizome causing death of unopened pipe, withering of outer leaves and finally death of the plant. Adult tunnels within stem, feeding on tissues. Bacterial and fungal infections lead to rotting. strong blast of wind, break plants..	Use healthy and pest free suckers. Trap the adult weevils by placing chopped pseudostem Uproot and destroy infested rhizomes. Soil incorporation of carbaryl 5D 10-20 g/plant or carbofuran 3G 20 g/plant or phorate 10 G 10 g/plant around pseudostem.	
Pest	**Scientific Name**	**Host**	**Oviposition**	**Pupation**	**Nature of damage**	**Management**	**Typical characters**
Banana aphid:	***Pentalonia nigronervosa* (Aphididae: Hemiptera)**	Banana, cardamom, *Alocasia* sp, *Colocasia* sp, caladium	Adults reproduce parthenogenetically		Aphids in colonies on leaf axils and pseudostems suck the sap. Aphid produces honeydew that is colonized by sooty mold. The affected leaves become brittle and small.	Employ Coccinellids, Spray monocrotophos 36 SL 1.5 - 2.0 L, methyl demeton 25 EC or dimethoate 30 EC 3.0-4.0 L in 1500-2000 L water/ ha towards the crown and pseudostem base. Inject pseudostem with monorotophos @1 ml in 4 ml of water per tree.	Transmit Bunchy top of banana-Viral disease
Pseudostem borer:	***Odoiporus longicollis*** Dryophthoridae Coleoptera			inside the tunneling	Grub bore into pseudostem making tunnels, Cutting holes on outer surface, blackened mass comes out from the bore hole, Tunneled part decomposes and pseudostem wilts.	Remove dried leaves periodically and keep the field clean Prune the side suckers every month Use healthy and pest free suckers to check the pest incidence Do not dump infested materials into manure pit Uproot infested trees, chop into pieces and burn Use longitudinally split pseudostem	

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						trap at 65/ha	
MAJOR PESTS OF GUAVA							
Spiralling whitefly	***Aleurodicus disperses (Aleyrodidae : Hemiptera)***	Banana, Citrus, Guava, papaya, mulberry, tapioca etc.	On the lower surface of leaves	On the lower surface of leaves	As a result of the sap sucking by nymphs and adults leaves show signs of chlorosis, wither, crinkle and curl, are covered with sooty mould and ultimately drop down.	Collection and destruction of infested leaves. Setting of yellow sticky traps @ 25 / ha for adults. Natural enemies *Encarsia* spp. Spray Monocrotophos 36 EC @ 1.5 ml or Dimethoate 30 EC @ 1.5 ml/L. water or Dichlorvas 76 EC @ 2 ml/L water.	Quarantine pest from Central America
Fruit Borers	***Congethes (Dichocrocis) punctiferalis (Crambidae : Lepidoptera)***	Papaya, citrus, cardamom	On tender leaves and fruits	Inside the fruit	Caterpillar bores into young fruits, Feeds on internal contents (pulp and seeds) Dry up and fall off in without ripening	Collect and destroy damaged fruits, Clean cultivation as weed plants serve as alternate hosts Use light trap @ 1/ ha to monitor the activity of adults. Spray malathion 50 EC 0.1%	

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GRANULAR INSECTICIDES

Carbofuran 3 G @ 25 kg/ha
Benfuracarb 3 G @ 33 kg/ha
Chlorantraniliprole 0.4 G @ 10 kg/ha
Fipronil 0.3 G @ 17-25 kg/ha
Cartap hydrochloride 4 G @ 18.75 kg/ha
Phorate 10 G @ 10 kg/ha
Quinalphos 5 G @ 15 kg/ha
Clothianidin 50 WDG @ 250 g/ha
Carbaryl 4 G @ 6.250 kg/ha
Imidacloprid 0.3 G @ 15 kg/ha

SYSTEMIC INSECTICIDES

Thiamethoxam 25 WG 100 g/ ha using water @ 500-600 L/ha
Acetamiprid 20 SP 50 g/ ha using water @ 500-600 L/ha
Imidacloprid 17.8 SL 100 ml / ha using water @ 500-600 L/ha
Dimethoate 500 ml / ha using water @ 500-600 L/ha
Profenofos 50 EC 1.0 L/ ha using water @ 500-600 L/ha
Thiacloprid 21.7 SC 100-125 ml / ha using water @ 500-600 L/ha
Monocrotophos 36 SL 1.0 L/ ha using water @ 500-600 L/ha
Fipronil 5 SC 1.5-2.0 L/ ha using water @ 500-600 L/ha

STOMACH AND CONTACT INSECTICIDES

Quinalphos 25 EC @ 1.0 L/ ha using water @ 500-600 L/ha
Chlorpyriphos 20 EC @ 1.0 L/ ha using water @ 500-600 L/ha
Acephate 75 SP @ 1000 g/ ha using water @ 500-600 L/ha
Thiodicarb 75 WP 1.0 L/ ha using water @ 500-600 L/ha
Indoxacarb 14.5 SC 500 ml / ha using water @ 500-600 L/ha
Indoxacarb 15.8 EC 500 ml/ ha using water @ 500-600 L/ha
Methomyl 40 SP 750-1125 g/ ha using water @ 500-600 L/ha
Profenofos 50 EC 1.5-2.0 L/ ha using water @ 500-600 L/ha
Malathion 50% EC 1.0-1.5 L/ ha using water @ 500-600 L/ha

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CONTACT INSECTICIDES

Lambda-cyhalothrin 5 EC @ 250 ml/ ha using water @ 500-600 L/ha
Cypermethrin 10 EC 500-700 ml/ ha using water @ 500-600 L/ha
Deltamethrin 1.8 EC 600 ml/ ha using water @ 500-600 L/ha
Fenvalerate 20 EC 500 ml/ha using water @ 500-600 L/ha
Permethrin 25 EC 500 ml/ha using water @ 500-600 L/ha

STOMACH INSECTICIDES

Chlorantraniliprole 18.5 SC @ 150 ml/ ha using water @ 500-600 L/ha
Flubendiamide 20 WG @ 125 g/ ha using water @ 500-600 L/ha
Flubendiamide 39.35 SC @ 125 ml/ ha using water @ 500-600 L/ha
Spinosad 45 SC @ 150 ml/ ha using water @ 500-600 L/ha
Emamectin benzoate 5 SG @ 220 g/ ha using water @ 500-600 L/ha
Novaluron 10 EC 750 ml ha using water @ 500-600 L/ha

ACARICIDES

Dicofol 18.5 EC 1.0 L in 500-600 L water per ha
Wettable sulphur 40 WP 3.0 kg in 500-600 L water per ha
Chlorfenapyr 10 SC 750-1000 ml in 500-600 L water per ha
Diafenthiuron 50 WP 600 g in 500-600 L water per ha
Lambda cyhalothrin 5 EC 300 ml in 500-600 L water per ha
Ethion 50 EC 1.5-2.0 L in 500-600 L water per ha
Milbemectin 1 EC 325ml in 500-600 L water per ha
Propargite 57 EC 1.5 L in 500-600 L water per ha
Spiromesifen 22.9 SC 400 g in 500-600 L water per ha

INSECTICIDES FOR DUSTING

Chlorpyrifos 1.5 DP @ 15 kg/ha
Cypermethrin 0.25 DP @ 20 kg/ha
Fenvalerate 0.4 DP @ 20 kg/ha
Malathion 5 DP @ 25 kg/ha
Methyl parathion 2 DP @ 25 kg/ha
Phosalone 4 DP @ 25 kg/ha
Quinalphos 1.5 DP @ 25 kg/ha

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