

MAJOR PESTS OF SORGHUM							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Sorghum Shootfly:	<i>Atherigona soccata</i> (Muscidae: Diptera)	Maize, ragi, bajra, rice, wheat and grasses	white, cigar-shaped eggs on the lower surface of leaf	base of the stem or in soil	The maggot cuts the growing point resulting in "dead heart". Side tillering is initiated.	Resistant varieties IS 18551, Maldandi and Phule Yashoda, Early Sowing, Higher seed rate, Fishmeal trap, Seed Treatment with imidacloprid, Granular application of phorate 10 G 25kg/ha, Spray dimethoate 30 EC @ 500 ml/ha.	It infests the crop upto one month after sowing Maggot is dirty white ETL : 10% dead hearts or 1 egg / plant
Stem borer:	<i>Chilo partellus</i> (Crambidae: Lepidoptera)	Maize, sorghum, sugarcane, bajra, rice etc.	300 scalelike flat oval eggs in batches on the under surface of leaf near the midrib	inside the stem	Larva feeds on tender folded leaves : "shot hole" Withering of central shoot : "dead heart" Bore holes, Stem tunneling, Broken stem	Clean cultivation, Resistant cultivars : IS 2205, ICSV 700, Remove dead hearts Lab lab as an intercrop (4:1), Light trap till midnight, <i>Trichogramma</i> (egg parasitoids) <i>Bracon</i> and <i>Apanteles</i> (larval parasitoids) Apply Phorate - 10 G 8 kg and carbofuran 3 G 17 kg in the leaf whorls.	It infests the crop a month after sowing Larva is yellowish brown ETL : 10% dead heart
Pink stem borer:	<i>Sesamia inferens</i> (Noctuidae: Lepidoptera)	Sorghum, maize, rice, wheat, sugarcane, bajra, barley and ragi,	creamy-white and hemispherical eggs arranged rows between leaf sheath and the stem	In the larval tunnel in the stem	larva bores into the stem and damages the central shoot : "Dead heart"	Release egg parasitoid <i>Trichogramma</i> ; Larval parasitoids: <i>Apanteles</i> , <i>Bracon</i> ; Spray chlorpyrifos 20 EC 1.0 L / ha or carbofuran 3 G @ 25 kg/ ha or cartap hydrochloride 4 G @ 18.75 kg/ha after germination of the crop.	The fully grown larvae (25 mm) is pale yellow with a purple pink tinge and a reddish-brown head.
Sorghum midge	<i>Contarinia sorghicola</i> (Cecidomyiidae Diptera)	Cultivated sorghum and wild species	Lays eggs singly in developing florets	Beneath the glume	A maggot feeds on the developing grains. Chaffy grains with holes are the damage symptoms.	Grow resistant cultivars like DJ 6541, AF 28, ICSV 197, Larval parasitoids - <i>Apanteles</i> sp., Give first application at nearly 90% earhead emergence and repeat after 4 or 5 days. Spray Malathion 50 EC 1.0 L (or) carbaryl 50 WP 2 kg/ha or quinalphos 1.5 D at 25 kg/ha	White pupal cases protruding out from the grains. Fully grown larvae are dark orange in colour.
Aphids	<i>Rhopalosiphum maidis</i> , <i>Melanaphis sacchari</i> (Aphididae: Hemiptera)	Sorghum, maize, ragi	Female give birth to young ones without mating (Parthenogenetic and Viviparous)		Colonies of aphids in leaf whorl, stems, or in panicles, suck the plant juice. Yellowing of the leaves. Produces honeydew - black sooty molds grow.	Spray systemic insecticide like dimethoate 30 EC or methyl demeton 25 EC 500 ml in 500 L of water	<i>R. maidis</i> : The aphid is dark bluish-green and somewhat ovate <i>M. sacchari</i> : The sugarcane aphid is yellow to buff.
Gram caterpillar	<i>Helicoverpa armigera</i> (Noctuidae: Lepidoptera)	Cotton, sorghum, lab lab, soybean, pea, safflower, chillies, tomato, groundnut, tobacco, gram, okra, maize etc.	Singly on leaves	In soil	Larvae feeds on grains of ear heads. Partially eaten Ear heads appear chalky. Faecal pellets are visible.	As per Pigeonpea/Cotton	Larva is green with dark broken grey lines and dark pale bands.

MAJOR PESTS OF PIGEONPEA							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Gram pod borer:	<i>Helicoverpa armigera</i> (Noctuidae: Lepidoptera)	Cotton, sorghum, lab lab, soybean, pea, safflower, chillies, tomato, groundnut, tobacco, gram, okra, maize etc.	Singly on leaves, buds, Calyx of flowers	In soil	Caterpillar first feeds on foliage; later bores into pods and feeds on seeds. Large irregular holes on pods, absence of seeds on pods and defoliation in early stages are the symptoms of attack.	Grow resistant varieties like ICPL 332, ICPL 84060, PPE 45-2, ENT – 11. Install bird perches @ 50/ha. Light trap, Pheromone traps @ 5/ha, Spray nuclear polyhedrosis virus (HaNPV) @ 500 LE/ha, spray Indoxacarb 15.8 SC @ 335 m, Spinosad 45 SC 125-160 ml, Methomyl 40 SP 750-1125 g, Lambda cyhalothrin 5 EC 400-500 ml lin 700-1000 L of water per ha.	Larva is seen feeding with the head alone thrust inside the parts and the rest of the body hanging out.
Plume moth	<i>Exelastis atomosa</i> (Pterophoridae: Lepidoptera)	Red gram, lablab, niger and horse gram	On flower buds and tender pods.	On the pods	The larva bores into buds, flowers and tender pods (small circular holes).	Same as above except HaNPV	Larvae never enter inside the pods
Pod fly	<i>Melanagromyza obtusa</i> (Agromyzidae: Diptera)	Redgram, Bhenidi and Safflower	Inside the pod wall	Inside the pods	Maggots bore into the soft seeds and feed on grains. Damaged seeds are discoloured and are unfit for consumption and germination.	Early sowing in endemic areas. Grow resistant varieties like PPE 45-2. Spray Carbaryl 50 WP 1.5 kg or lambda cyhalothrin 5 EC 400 -500 ml or Lufenuron 5.4 EC 2.5 L with 700 L water/ha	
Red Gram Sterility Mite:	<i>Aceria cajani</i> (Eriophyidae : Acari)	perennial and volunteer pigeonpea	Milky white eggs are found on vegetative terminals.		Infected plants develop chlorotic leaves with mosaic patterns. Infected plants do not bear flowers/pods.	Use resistant pigeonpea varieties. BSMR 736, ASHA. Spray dicofol 18.5 EC 1.0 L or wettable sulphur 40 WP 3.0 kg in 700 L water per ha. Dont grow ICP 8863 – highly susceptible genotype.	Plant-to-plant infestation occurs by the wind. Vector of Sterility Mosaic Disease in Pigeonpea
Spotted pod Borer	<i>Maruca testulalis</i> (Pyraustidae: Lepidoptera)	Beans, peas, castor, groundnut, cowpea, rice, sesame, soybean, tobacco, daincha, sugarcane, redgram, lablab, niger, greengram and blackgram	Female lays eggs singly on flowers, buds or pods.	Pupates in dry leaves (or) debris.	The larva bores the buds, flowers or pods; infested pods and flowers are webbed together. The larva feeds on seeds.	Grow resistant cultivars like ICPL 98001, ICPL 98003, ICPL 98008, ICPL 9804 Larval parasitoids <i>Bracon hebetor</i> Chemical control measures are the same as redgram pod borer	
Redgram pod bug	<i>Cavigralla gibbosa</i> Coreiidae: Hemiptera	Beans, peas greengram and blackgram	On leaves		Nymphs and adults suck sap from the shoots and pods. Shoots fade, pods shrivel and seeds with dark patch loose germination	Collection and destruction of bugs Dusting or spraying with carbaryl 10D 10 kg/ac or foliar spray with dimethoate 2 ml/l or Monocrotophos 1.5 ml/L.	

MAJOR PESTS OF COTTON								
Pest	Scientific Name	Host		Oviposition	Pupation	Nature of damage	Management	Typical characters
Cotton aphid	<i>Aphis gossypii</i> (Aphididae: Hemiptera)	Cotton, brinjal, guava	bhendi, chillies,	Multiply parthenogenetically and viviparously.		Pest infest tender shoots and under surface of the leaves. Suck the sap and cause stunted growth, gradual drying. Development of black sooty mould due to the excretion of honey dew.	Intercropping with pulses viz., cowpea, greengram, blackgram and soybean reduce the population of sucking pests of cotton, viz., aphid and leaf hopper. Natural enemies viz., Lady bird beetle, Chrysopa, Syrphids. Spray Acetamiprid 20 SP 50 g, Monocrotophos 1000 ml, Imidacloprid 17.8 SL 100 ml, Dimethoate 500 ml, Profenofos 50 EC 1.0 L Thiacloprid 21.7 SC 100-125 ml in 500 L water/ha.	ETL : 5% of infested plants.
Leafhopper	<i>Amrasca devastans</i> (Cicadellidae: Hemiptera)	Cotton, brinjal, bhendi, hollyhock sunflower	potato, castor, tomato, and	Lay eggs singly within leaf veins		Nymphs and adults suck the sap from the under surface of leaves, leaves turn yellow, leaf margins curl downwards and reddening sets in. "hopper burn". Crop growth retarded.	Intercropping with pulses viz., cowpea, greengram, blackgram and soybean, Early sowing and close spacing of cotton, Setup light trap, Release predators viz., <i>Chrysopa carnea</i> , Spray monocrotophos 36 WSC @ 1000 ml/ha and NSKE 5% @ 25 kg/ha in 1000 L of water per hectare. Use resistant varieties like MCU 3, MCU 5 and MCU 9.	ETL: 50 nymphs/ adults per 50 leaves or yellowing and curling from the middle to upper portion of the plants in 25 % of plants in the field Adult green and wedge shaped, walk diagonally.
Thrips	<i>Thrips tabaci</i> (Thripidae: Thysanoptera)			Underside of leaves in tissues Even parthenogenesis is observed	On leaves	Nymph and adult lacerate the tissue and suck the sap from the upper and lower surface of leaves, leaves curl up and become crumbled. Silvery sheen on the lower surface.	Spray insecticides as in aphids Fipronil 5 SC 1.5-2.0 L/ha	
Whitefly:	<i>Bemisia tabaci</i> (Aleyrodidae: Hemiptera)	Cotton, tobacco, sweet potato, cassava, cabbage, cauliflower, melon, brinjal and bhendi.	tomato, sweet potato, cassava, cabbage, cauliflower, melon, brinjal and bhendi.	on leaves	on the under surface of the leaves	Nymphs and adults suck the sap from the under surface of leaves results in premature defoliation, development of sooty mould, shedding of buds and bolls and poor boll opening. Transmits the leaf curl virus disease.	Tolerant varieties - Amravathi, Kanchan, Supriya. Treat 1 kg seeds with Imidacloprid 48 FS 5 ml or Thiamethoxam 30 FS 1ml. Timely sowing, recommended spacing, Avoid alternative host crops, Adopt crop rotation with such as sorghum, maize etc. Judicious irrigation management and nitrogenous fertilizer application, Yellow sticky traps at 1 foot height. Spray NSKE 5% and neem oil 5 ml/L Avoid repeated spraying of synthetic pyrethroids. Spray insecticides as in aphids, <i>Verticillium lecanii</i> 1.15 WP 2.5 kg/ha	ETL: 5-10 nymphs / leaf

MAJOR PESTS OF COTTON							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
American bollworm	<i>Helicoverpa armigera</i> (Noctuidae:Lepidoptera)	Sorghum, lablab, soybean, peas, sunflower, safflower, chillies, groundnut, tobacco, bhendi, maize, tomato.	On leaves, buds, flowers, bolls	In soil	The caterpillars feed on leaves, squares, flowers and small bolls by thrusting their head inside leaving the rest of the body outside. The damaged squares and young bolls drop. The developed bolls and open bolls are not attacked.	Pest monitoring through light traps, pheromone traps. Grow Bt cotton viz., Bollgard I & II. Grow <i>Helicoverpa</i> resistant varieties like Sujata, Abadhita. Avoid ratooning. Avoid monocropping. Grow less preferred crops like greengram, blackgram, soybean, castor, sorghum etc., as intercrop or border crop or alternate crop. Remove and destroy crop residues. Optimize the use of nitrogenous fertilizers. Application of nuclear polyhedrosis virus (HaNPV) at 1×10^9 POB /ha. Release of egg parasite, <i>Trichogramma</i> spp. and the predator <i>Chrysoperla</i> . Spray phosalone 50 EC 2.5 L, quinalphos 25 EC 2.0 L, carbaryl 50 WP 2.5 kg (1000 L of spray fluid/ha), <i>Bacillus thuringiensis</i> 5WP 750-1000 g, <i>Beauveria bassiana</i> 1.15 WP 400g, Chlorantraniliprole 18.5 SC 150 ml, Emamectin benzoate 5 SG 220 g, Flubendiamide 39.35 SC 100-125 ml, Thiodicarb 75 WP 1.0 L, Indoxacarb 14.5 SC 500 ml or 15.8 EC 500 ml, Methomyl 40 SP 750-1125 g, Lambda cyhalothrin 2.5 EC 600-1000 ml or 4.9 CS 500 ml or 5 EC 300-500ml, Profenofos 50 EC 1.5-2.0 L, Spinosad 45 SC 160 -220 ml in 500-750 L water/ha	ETL : 10% of affected fruiting parts or bolls or one egg/plant or one larva/plant
Spotted bollworms	<i>Earias vitella</i> & <i>E. insulana</i> (Noctuidae: Lepidoptera)	Cotton, bhendi, holly hock, <i>Hibiscus cannabinus</i> , <i>Abutilon indicum</i>	on the shoot tips, buds, flowers, fruits.	On bolls	Initially the caterpillar bores into top tender shoot, the portion of the shoot above the damage withers, droops and dries up. When the squares and bolls begin to develop, these caterpillars start damaging buds and bolls by making conspicuous holes. larvae eat the seeds and fill them with excreta. The squares and small bolls drop.	Same as <i>Helicoverpa</i>	

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Cotton pink bollworm	<i>Pectinophora gossypiella</i> (Gelechiidae: Lepidoptera)	Cotton, bhendi, holly hock and other malvaceous plants	whitish eggs singly on various parts of young shoots.	in boll, often in seed hollowed out by larva	The caterpillars feed on flower buds, flowers and bore into bolls. When they bore into flower buds, the flowers do not open and give rosette appearance. The young bolls, when attacked, are shed after a few days, but the larger bolls remain on the plant. Locules are damaged and interocular burrowing can be noticed. Seeds are destroyed and lint gets stained.	Use pheromone trap @ 12/ha. Collect and destroy the shed fruiting parts. Crush the pink bollworm larvae in the rosette flowers, Dispose off the crop residues, Avoid staking of stalks in the field. Avoid ratoon. Adopt proper crop rotation. Use optimum irrigation and fertilizers. Intercropping with pulses viz., cowpea, greengram, blackgram and soybean reduce the bollworm incidence. Grow resistant cultivars like G 27, LD 135, Lohit, Abadhita, MCU 7, Sujata, Digvijay, Use acid delinted seeds. During boll and maturation stage, spray fenpropathrin 30 EC 250-340 ml or triazophos 40 EC 1.5 - 2.0 L or cypermethrin 10 EC 500-700 ml or quinalphos 20 AF 1.75 - 2.5 L in 1000 L of water/ha.	The aperture through which larvae make their entry into the boll is closed, and it becomes difficult to differentiate between a healthy and infested boll.
Red cotton bug	<i>Dysdercus cingulatus</i> (Pyrrhocoridae: Hemiptera)	Cotton, bhendi, maize, pearl millet, hollyhock, clover, sorghum and silk cotton.	In the soil		Nymphs and adults suck the sap of plant as well as bolls and stain the lint. "cotton boll strainers" The bacterium <i>Nematospora gossypii</i> enters the site of injury and stains the fibre. Attacked seeds loose viability.	Biocontrol agent <i>Harpactor costalis</i> is predaceous on nymph and adult; The infested leaves or bolls can be shaken in water and pest can be drowned. Plough the field to expose the eggs. Spray fluvalinate 25 EC 200-400 ml/ha, Profenofos 50 EC 1.5-2.0 L,	The bugs are gregarious in habit.
MAJOR PEST OF GROUNDNUT							
Red hairy caterpillar	<i>Amsacta albistriga</i> (Arctiidae: Lepidoptera)	Maize, sorghum, green gram, sesame, pearl millet, finger millet, groundnut, sunhemp, castor, cotton.	Under surface of the leaves	along the field bunds and in moist shady areas under the trees in the field	Larvae feed on the tender leaflets gregariously by scraping the under surface. Later they feed voraciously on the leaves and main stem of plants. Severely affected field looks as though they are grazed by cattle. Sometimes it results in the total loss of pods.	Collect and destroy the pupae after summer ploughing, Grow cowpea or red gram as an intercrop. Set up 3-4 light traps and bonfires at the onset of rains. Collect and destroy egg masses, gregarious early instar larvae, migrating grown up caterpillars. Dig out a trench around the field to avoid the migration of caterpillars, trap larvae and kill them. Use nuclear polyhedrosis virus @ 250 LE/ha. For young caterpillars - apply carbaryl 10 D 25 kg/ha. For grown up caterpillars - spray dichlorvos 625 ml/ha (or) chlorpyrifos 1250 ml/ha in 375 litres of water.	Seasonal outbreak takes place twice a year May-June and August-October They march from field to field gregariously..

MAJOR PEST OF BAJRA							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Banded blister beetle:	<i>Mylabris phalerata</i> (Meloidae: Coleoptera)	Bajra, Green gram, okra, cotton, Hibiscus,	In soil	In soil	Adult beetles attacks the flowers and devour them completely.	Collect and Destroy, Spray contact insecticides like cypermethrin 10 EC 10 ml/10 L water	In August, the population becomes high more prominent than flowers.
MAJOR PEST OF SUNFLOWER							
Tobacco caterpillar	<i>Spodoptera litura</i> (Noctuidae: Lepidoptera)	Groundnut, citrus, soybean, cotton, tobacco, castor, pulses, millets, safflower, banana, cabbage, tomato, sweet potato, bhendi, chillies, etc.	laid in groups and covered with hairs on the leaves	In soil	Neonate, caterpillars feed on the leaves voraciously by scraping the under surface and Later instars feed voraciously on leaves giving an appearance to the field as if grazed by cattle. Faecal pellets are seen on the leaves and on the ground which is the indicator of the pest incidence	Grow castor as a border (or) intercrop in groundnut fields, Grow resistant cultivars like ICGV 86031, FDRS 10, Set up of light traps, pheromone trap Collect egg masses and destroy. Collect the gregarious larvae and destroy them. Avoid migration of larvae by digging a trench 30 cm deep and 25 cm wide. Apply NPV @ 250 LE/ha with crude sugar 2.5 kg/ha. Apply any one of the following insecticides per ha to control early instar larvae (1st to 3rd instar). Carbaryl 10 D 25 kg, carbaryl 50 WP 2 kg, quinalphos 25 EC 750 ml, phenthoate 50 EC 1250 ml and dichlorvos 76 SC 750 ml. For 4th to 6th instar larvae. Chlorpyrifos 2 L, dichlorovos 1 L, phenthoate 2 L or Diflubenzuron 25 WP 400 g or Methomyl 40 SP 750-850 g in 375-500 L of water/ha.	Since this pest is nocturnal in habit larvae hide under the plants, cracks and crevices of soil and debris during the day time.
Semi looper	<i>Trichoplusia ni</i> (Noctuidae: Lepidoptera)	Groundnut, soybean, cotton, tobacco, castor, pulses, millets, safflower, cabbage, tomato, Okra etc.	Leaves	On plant	Leaves are with holes and severe damage results in skeletonization and defoliation.	Hand-pick and destroy caterpillars. Use light trap to attract and kill adults. Insecticide as above	
MAJOR PEST OF SAFFLOWER							
Safflower Aphid:	<i>Uroleucon compositae</i> (Aphididae: Hemiptera)		A female produces 6-56 young ones		The aphids suck the sap from leaves, twigs, flowers and capsules. The height, number of leaves and shoots are reduced significantly. The plants become weak, stunted dry up. Seed yield is affected. The aphids secrete honeydew which attracts a black sooty mould – Photosynthesis is affected.	Spray 250 ml of dimethoate 30 EC or monocrotophos 36 SL or 625 ml of chlorpyrifos 20 EC in 750 litres of water/ha and repeat the spray after 15 days. Conserve parasitoid <i>Aphidencyrthus aphidivorus</i> and predator <i>Brumoides suturalis</i>	

MAJOR PEST OF MUSTARD							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Mustard Aphid	<i>Lipaphis erysimi</i> (Aphididae:Hemiptera)		females give birth to 26-133 nymphs		Both the nymphs and adults suck cell-sap from leaves, stems, inflorescence or the developing pods. Vitality of plants is greatly reduced. The leaves acquire a curly appearance, the flowers fail to form pods and the developing pods do not produce healthy seeds. The yield of an infested crop is reduced to one-fourth or one-fifth.	Sow the crop early wherever possible, preferably up to third week of October. Apply recommended dose of fertilizers. Apply anyone of the following insecticides when the population of the pest reaches 50-60 aphids per 10 cm terminal portion shoot or when plants infested by aphids reach 40-50 per cent. Foliar sprays - 625 - 1000 ml of oxydemton methyl 25 EC, dimethoate 30 EC, quinalphos 25 EC, malathion 50 EC; 940-1500 ml of chlorpyrifos 20 EC in 600-1000 L of water per ha depending on the stage of the crop. Granular insecticides - 10 kg of phorate IO G, 33 kg of carbofuran 30 per ha followed by a light irrigation. Conserve parasitoids <i>Diaeretiella rapae</i> , predators viz., <i>Syrphus serarius</i> <i>Coccinella septempunctata</i> Linnaeus, <i>Menochilus sexmaculatus</i> (Fabricius) (Coccinellidae) and entomopathogens viz., <i>Entomophthora coronata</i>	
Mustard Sawfly	<i>Athalia lugens</i> (Tenthredinidae: Hymenoptera)	on raddish and other crucifers	singly, in slits made with saw like ovipositors along the underside of the leaf margins	in soil	The grubs bite holes into leaves (young growth) skeletonize the leaves. The epidermis of the shoot is eaten up. The seedlings succumb; the older plants, do not bear seed.	Spray 1.0 L of malathion 50 EC or quinalphos 25 EC in 500-600 L of water per ha once in October and again in March-April. Conserve larval parasitoid <i>Perilissus cingulator</i>	larvae feed in groups of 3-6 on the leaves during morning and evening. They remain hidden during the day time and, when disturbed, fall to the ground and feign death.
MAJOR PEST OF SESAMUM							
Sphinx moth	<i>Acherontia styx</i> (Sphingidae: Lepidoptera)	Sesame, Potato, Brinjal, Green gram, black gram, soybean and Jasmine	Leaves	Soil	The damage is caused by the larvae which feed voraciously on leaves and defoliate the plants.	Hand-pick the larvae and destroy by keeping in kerosene oil. Plough the field during winter to expose the hibernating larvae. Insecticide as above	
Gall fly	<i>Asphondylia sesami</i> (Cecidomyiidae: Diptera)	Sesame	Eggs in the flowers or buds	Inside the malformed capsules	Maggots feed on the ovary and results in the malformation of pods without proper setting of seeds. Flowers and young capsules with gall like swelling.	Dust any one of the insecticides per ha on 25, 35 and 50th day of sowing. phosalone 4D 25 kg, malathion 5D 25 kg. Spray any one of the insecticides on 25, 35 and 50th days of sowing phosalone 1.0 L, quinalphos 1.0 L, dichlorvos 500 ml/ha in 700 L water per hectare.	

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Capsule & Shoot borer	<i>Conogethes punctiferalis</i> (Pyraustidae: Lepidoptera)	Castor, mango, sorghum ears, guava, cardamom, ginger, turmeric, pomegranate, sunflower, cotton	on the developing capsules	in the stem or capsule.	The damage is caused by the caterpillar, which bores into the main stem of young plant and ultimately into the capsules. The borer is distributed throughout India where castor is grown.	Spraying the infested crop with Chlorpyrifos 20 EC 2.0 L (or) carbaryl 50 WP 2 kg or methyl parathion 50 EC 2.0 L @ 1000-1200 L water per hectare proved effective in controlling the pest.	
MAJOR PEST OF LINSEED							
Linseed Gall-midge	<i>Dasineura lini</i> (Cecidomyiidae: Diptera)	Linseed	in the folds of flowers or in tender green buds.	in soil	Damage is the result of feeding by maggots on buds and flowers. No pod-formation takes place.	The adult flies can be killed by using light traps. The flies are also attracted in day-time to molasses or gur added to water. As the incidence of this pest is more on the late-sown crop normal-sown crops should be adopted if possible. Dust 5 per cent carbaryl 15-20 kg/ha or spray carbaryl 50 WP 1.125 kg/ha in 600-750 L of water/ha.	

MAJOR PESTS OF SUGARCANE							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Early shoot borer	<i>Chilo infuscatellus</i> (Crambidae: Lepidoptera)	Pearl millet, oat, barley and maize	underside of leaf sheath or leaves	Inside stem	Dead heart in 1-3 month old crop, which can be easily pulled out, dead-heart emits an offensive odour. A number of bore holes at the base of the shoot just above the ground level.	Grow resistant varieties: CO 312 and CO 853. Planting in December – January escapes the incidence. Intercrop with Daincha, Trash mulching Earthing up – 30th day, Ensure adequate moisture, Remove and destroy dead hearts, Apply Granulosis virus (GV) @ 1.1 x 10 ⁷ granules, Release parasitoid: <i>Sturmiopsis inferens</i> @ 125 gravid females, Apply carbofuran 3G @ 33 kg or fipronil 0.3 G 25.0-33.0 kg / ha in the soil, Apply cartap hydrochloride 4G or fipronil 0.3 G at 25 kg/ha by mixing in 50 kg soil and sprinkle along the rows at 45 days after planting followed by earthing up. Spray monocrotophos 36 SL 1000 ml or chlorpyrifos 20 EC 1000 ml or chlorantraniprole 18.5 SC 375 ml or fipronil 5 SC 1.5-2.0 L or /ha	It is major pest in the early stage of the crop. ETL - 15% dead heart rotten portion of the straw coloured
Internode borer	<i>Chilo sacchariphagus indicus</i> (Crambidae: Lepidoptera)	Pearl millet, rice and sorghum	on the sheath or leaves	in the leaf sheath		Avoid use of excessive nitrogen fertilizers, Release egg parasitoid: <i>Trichogramma chilonis</i> @ 2.5 m.l / ha – 6 releases, Release larval parasitoids: <i>Stenobracon</i> , <i>Apanteles</i> , Release pupal parasitoids: <i>Tetrastichus ayyari</i> , Apply carbofuran 3G granules to soil @ 30kg/ha.	
Top Shoot borer	<i>Scirpophaga excerptalis</i> (Pyralidae: Lepidoptera)	Millet and other grasses	near mid ribs	inside the stem	Dead heart in grown up canes, cannot be easily pulled; parallel row of shot holes in the emerging leaves and red tunnels in the midribs; bunchy top appearance due to side shoots. Larva bores into the midrib of unfolded leaves, mine to the base.	Grow resistant varieties: Co 724, Co 1111, Collect and destroy the egg masses, Release <i>Isotima javensis</i> @ 100 pairs/ ha (prepupal parasitoid); egg parasitoids: <i>Telenomus beneficiens</i> , <i>Trichogramma chilonis</i> ; larval parasitoids: <i>Goniozus indicus</i> , SprayChlorantraniprole18.5 SC 375 ml in 1000 L water per ha	dead heart reddish brown in colour;
Termites:	<i>Odontotermes obesus</i> (Termitidae: Isoptera)	Polyphagous			poor germination of setts, semi-circular feeding marks on the leaf margin. Entire shoot dries up and can be pulled out. Setts hollow inside and filled with soil. Cane collapses if disturbed; rind filled with mud.	Locate and destroy the termite colony, Destroy the affected setts from the field Treat setts with Imidacloprid 70 WS 100-150 g per 100 setts. Spray chlorantraniprole 18.5 SC 500-625 ml or imidacloprid 17.8 SL 350 ml with 500 L water/ha.	A major problem in light soils.

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Whitegrub	<i>Holotrichia consanguinea</i> (Melolonthidae: Coleoptera)	Sorghum, maize, pearl millet, chillies, bhendi and brinjal	In soil	In soil	Drying of crown, preceded by yellowing and wilting of leaves. Affected canes come off easily when pulled. Cause extensive damage to roots.	Grow resistant cultivars like Co 1158, Co 5510, Set up light trap to attract and destroy the adults, adequate irrigation, Crop rotation, Collect and destroy the adult beetles – neem, Ber, Ailanthus and Acacia	
Leaf hopper/Sugarcane pyrilla	<i>Pyrilla perpusilla</i> (Lophopidae: Hemiptera)	Sugarcane, wheat, barley, oats, maize, sorghum, baru, guinea grass and sudan grass	on the underside of leaves.		Symptoms are yellow leaves, covered with black sooty mould; top leaves get dried up and lateral buds germinate.	Avoid excessive use of nitrogenous fertilizers, Set up light trap, Detrash on 150 and 210 DAP. Release 4000 -5000 cocoons or 4-6 lakhs egg of <i>Epiricania melanoleuca</i> (Lepidopteran predator) per ha Conserve predators viz., <i>Brumus suturalis</i> , <i>Chilomenes sexmaculatus</i> and <i>Coccinella septumpunctata</i>	It can cause severe damage when long spells of rainy or cloudy days are prevalent. As high nitrogen application favours multiplication, it is also referred to as Richman's pest.
Sugarcane woolly aphid	<i>Ceratovacuna lanigera</i> (Aphididae: Hemiptera)				Congregation of nymphs and adults on the undersurface of leaves suck the sap; honeydew secretion with sooty mould on upper surface of the leaves. Canes with short internodes and narrow leaves with reduced girth.	Monitor the areas under shade where colony establishes first. Avoid transport of sugarcane for crushing from infested area. Treat setts in malathion 0.1% solution pack in gunny bags and transport without using green or dry leaves. Practice wide-row/paired-row planting and de-trashing. Avoid late application of nitrogenous fertilizer and excessive irrigation. Spray infested crop with acephate 75 SP 2.0 kg or monocrotophos 36 WSC 2.0L or dimethoate 30EC 2.0 L in 1000 L of water directing the spray fluid towards the under surface of leaves. Release predators viz., <i>Dipha aphidivora</i> , <i>Micromus igorotus</i> and <i>Eupeode confrater</i>	

MAJOR PESTS OF RICE							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Thrips:	<i>Stenchaetothrips biformis</i> (Thripidae: Thysanoptera)	<i>Echinochloa</i> sp.	Inserts the eggs singly within the leaf tissues in young leaves.		Nymphs and adults lacerate the tender leaves and suck the plant sap, causing yellow or silvery streaks on the leaves of young seedlings. Terminal rolling and drying of leaves from tip to base.	Spray monocrotophos 36 WSC 40 ml/800 m ² nursery. Spray Monocrotophos 36 WSC 1.0 L or Azadirachtin 0.15% w/w 1.5-2.5 L or Lambda-Cyhalothrin 5 EC 250 ml in 500 L water/ha. Grow resistant cultivars like PTB 12, PTB 20, PT 321, H 4	ETL: 60 Nos. per 12 wet hand sweeps in nursery. It causes damage both in nursery and main field.
Green leafhopper:	<i>Nephotettix virescens</i> , <i>N. nigropictus</i> and <i>N. cincticeps</i> (Cicadellidae: Hemiptera)	Rice, millets, grasses	In midrib of leaf		Nymphs and adults desap the leaves and cause "hopper burn". Yellowing of leaves from tip downwards. It is a vector of rice tungro virus, rice yellow dwarf and transitory yellowing diseases.	Use resistant varieties like IR 20, IR 50, Vani, Lalit. Nursery should not be near lamp. Apply neem cake @ 12.5 kg/800 m ² nursery as basal dose. Apply carbofuran 3 G @ 3.5 kg or phorate 10 G @ 1.0 kg or quinalphos 25 EC 80 ml per 800 m ² nursery. Spray Acephate 75 SP 666-1000 g, Imidacloprid 17.8 SL 100 -125 ml, Quinalphos 25 EC 1000 ml Buprofezin 25 SC 800 ml, Phosphamidon 40 SL 875 ml, Thiamethoxam 25 WG 100 g, Fipronil 5 SC 1-1.5 kg or 0.3 GR 16.7 - 25.0 kg, Lambda-Cyhalothrin 5 EC 250 ml in 500 L water/ha	ETL: 60 Nos. / 25 sweeping – Nursery 10 Nos. / hill - Flowering stage 5 Nos. / hill - Vegetative stage 2 Nos. / hill - Tungro endemic area. The population is maximum during September - October.
Brown plant hopper	<i>Nilaparvata lugens</i> (Delphacidae: Hemiptera)	Rice, sugarcane, grasses	within parenchymatous tissues of the plant along the midrib of leaves		Nymphs and adults suck the sap from the tillers. The affected plant dries up and gives a scorched appearance called "hopper burn". Circular patches of drying and lodging of matured plants. It is the vector of grassy stunt , ragged stunt and wilted stunt diseases.	Use resistant varieties like Aruna, Abhey, Asha, Divya, neela. Avoid close planting, use of excessive nitrogenous fertilizers. Intermittent draining. Light traps. Release natural enemies like spider and green mirid bug. Avoid use of synthetic pyrethroids, methyl parathion, and quinalphos. Direct the spray towards the base of the plants. Spray neem seed kernel extract 5% (25 kg/ha) (or) neem oil 2% (10 L/ha). Spray imidacloprid 17.8 SL 125 ml or acephate 75 SP 625 g or or /ha. Methyl demeton 25 EC 1000 ml, Dichlorvos 76 WSC 350 ml, Chlorpyrifos 25 EC 1250 ml, Benfuracarb 3 GR 3.3 kg, Clothianidin 50 WDG 20-24 g, Imidacloprid 70 WG 30-35 g, Fipronil 5 SC 1.0 - 1.5 L or 0.3 GR 16.7- 25 kg.	Nymphs and adults congregate at the base of the plant above the water level
White backed plant hopper:	<i>Sogatella furcifera</i> (Delphacidae: Hemiptera)	Rice, maize, millets, sugarcane, grasses	in leaf sheath and in the mid rib of leaves		Nymphs and adults suck the sap and cause stunted growth and "Hopper Burn" in irregular patches leading to yield loss.	Same as given for BPH. Use resistant varieties like AR 133, IC 25687, Tangner, Amelbero, HKR-10, HKR-126, IET 8116	

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Rice earhead bug	<i>Leptocorisa acuta</i> (Alydidae: Hemiptera)	Rice, Millets	close to midrib on the upper surface of leaves		Nymphs and adults suck the sap from grains at milky stage. Grains become chaffy with black spots at the site of feeding. Yield loss 10- 40%.	Remove alternate host, <i>Echinocloa</i> . Ensure synchronous planting. Use neem seed kernel extract 5% or <i>Ipomoea</i> leaf powder extract 5%. Dust quinalphos 1.5 D or carbaryl 10 D or malathion 5 D @ 25 kg/ha or spray malathion 50 EC 500 ml or monocrotophos 36 WSC 500 ml/ha.	ETL: 5 bugs/100 panicles or 1 bug/hill - Offensive odour on disturbing the bugs.
Yellow stem borer	<i>Scirpophaga incertulas</i> (Pyraustidae: Lepidoptera)	Rice	Eggs in a mass of 15-80 on the upper surface of leaf tips covered with buff coloured hairs	in white silken cocoon	Larva feeds on the stem drying of the central shoot "dead heart" in the young seedlings, and drying of the panicle in grown up plant called "white ear". Damage ranges from 30-80%.	Resistant varieties viz., Ratna, Jaya, IR 20, Saket, Clip the seedling tips before transplanting, Collect & destroy the egg masses. Avoid close planting and continuous water stagnation at early stages. Collect and destroy the dead hearts and white ears. Light traps to attract and kill the moths. Pheromone traps. Release <i>Trichogramma japonicum</i> twice on 30 and 37 DAT @ 5 cc/ha. Apply <i>Bt</i> and neem seed kernel extract in the combination of 2.5 g/L and 1%. Apply carbofuran 3 G @ 25 kg or benfuracarb 3 G 33 kg or chlorantraniliprole 0.4 G 10 kg or fipronil 0.3 G 17-25 kg or cartap hydrochloride 4 G 18.75 kg or spray acephate 75 SP 666-1000g cartap hydrochloride 50 SP 1 kg or monocrotophos 36 SL 1.0 L or quinalphos 25 EC 1.0 L or carbosulfan 25 EC 800-1000 ml or chlorantraniliprole 18.5 SC 150 ml or fipronil 5 SC 1-1.5 L or flubendiamide 20 WG 125 g or lambda-cyhalothrin 5 EC 250 ml or thiacloprid 21.7 SC 500 ml or thiamethoxam 25 WG 100 g/ ha using water @ 500 L/ha	ETL : 2 egg masses/m ² , 10% dead hearts - Vegetative stage, 2% white ear - Flowering stage
Gall midge:	<i>Orseolia oryzae</i> (Cecidomyiidae: Diptera)	Rice, wild species of <i>Oryza</i> and grasses like <i>Paspalum scrobiculatum</i> , <i>Panicum</i> spp., <i>Cyanodan dactylon</i> and <i>Eleusine indica</i> .	reddish, elongate, tubular eggs just near the ligule of the leaf blade.	at the base of the gall	The maggot feeds at the base of the growing shoot causing formation of a tube like gall similar to "onion needle" or "silver-shoot". Infested tillers produce no panicles.	Early planting, quick growing varieties to escape infestation. Resistant varieties like Shakthi, Vikram, Sureka, IR 36, Lakshmi. Plough, immediately after harvest. Remove alternate host. Balanced fertilizers. Light trap @ 1/ha. Infra red light trap to attracts gall midge. Larval parasitoid, <i>Platygaster oryzae</i> . Conserve predatory spiders and carabid beetle. Apply carbofuran 3G @ 25 kg or fipronil 0.3 G 16.7 - 25.0 kg or quinalphos 25 EC 1.0 L or fipronil 5 SC 1.0 -1.5 kg or lambda-cyhalothrin 5 EC 250 ml or thiamethoxam 25 WG 100 g in 500 L water/ha	ETL: 10% silver shoots.

PESTS OF STORED GRAINS						
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Typical characters
INTERNAL FEEDERS						
Rice weevil	<i>Sitophilus oryzae</i> (Curculionidae: Coleoptera)	Rice, sorghum, wheat, barley, maize	on the grain	inside the grain	Adults and grubs cause damage. The larva lives and feeds inside the grain causing irregular holes on grains before harvest and in storage. The weevils destroy more than what they eat.	
Lesser grain borer	<i>Rhyzopertha dominica</i> (Bostrychidae: Coleoptera)	Wheat, rice, maize, sorghum, barley, lentils, stored potatoes, corn flour, beans and millets.	among the frass or are glued to the grain	Inside the grains	The adults and grubs bore into the grains and reduce them to shells make irregular holes. Adults produce a frass, spoiling the grains.	The adults are powerful fliers and migrate from one godown to another, causing fresh infestation.
Angoumois grain moth	<i>Sitotroga cerealella</i> (Gelechiidae: Lepidoptera)	Paddy, wheat, maize, sorghum, barley, oats etc.	On grains	Inside grain	Larvae bores into grain feeding on the grain kernels before harvest and also in store. Exit holes with pellets of excreta giving unhealthy appearance and smell.	The damage is at its maximum during the monsoon. In a heap of grain, the upper layers are most severely affected.
Pulse beetle	<i>Callosobruchus maculatus (chinensis)</i> (Bruchidae: Coleoptera)	Gram, mung, moth, peas, cow peas, lentil and pigeonpea, cotton seed, sorghum and maize.	On grains	Inside grain	The adult and grub feed on the grain by making a small hole.	Infested seed have white eggs on the seed and the round exit holes with the 'flap' of seed coat.
EXTERNAL FEEDERS						
Red flour beetle	<i>Tribolium castaneum</i> (Tenebrionidae: Coleoptera)	Wheat-flour, dry fruits, pulses and prepared cereal foods, such as cornflakes.	in the flour or in the, frassy material among the grains and other foodstuff.	in the flour.	Both the larvae and adults cause damage. Adult construct tunnels as they move in food products. Flour turns greyish and mouldy, with pungent, disagreeable odour, unfit for consumption.	The greatest damage is during the hot and humid monsoon season.
Indian meal moth	<i>Plodia interpunctella</i> (Phycitidae: Lepidoptera)	Grains, soybean, dried fruits, nuts, dried roots, herbs.	on or near the foodstuffs	In the food stuffs	The larva completely web over the surface of a heap of grains with silken threads.	The adults fly from one bin to another and spread the infestation.
Almond Moth / Fig moth	<i>Ephestia cautella</i> (Pyralidae: Lepidoptera)	dried fruits viz., currants, raisons, dried apples, dates, berries, figs, almonds, walnuts, etc. Lac, , dried mango, pulp, garlic bulbs, cereal grains products.	in cracks and crevices of the receptacles or on the food stuff	among the infested grains	The caterpillars make tunnels in the food materials. The number of silken tube is sometimes extremely high and these clog the mill machinery where the infested grains have been sent for milling.	
Rice moth	<i>Corcyra cephalonica</i> (Pyralidae: Lepidoptera)	rice, sorghum, maize, gram, groundnut, cotton-seed, milled products, cocoa beans and raisins	on the grains, bags and on other objects in the godowns	among the infested grains	The larvae damage the grains by feeding under silken webs. Under higher infestation, stock of grains is converted into a webbed mass. Foul odour, grains unfit for human consumption.	
Khapra beetle	<i>Trogoderma granarium</i> (Dermestidae: Coleoptera)	Dried plant matter. grain and cereal products, wheat, barley, oats, rye, maize, rice, flour, malt.	On the grains	Among the grains	The grubs feed on grain near embryo or other weak point and proceed inwards. Reduce the grain to a mere frass.	Pest confines to the upper 50 cm layer of grains in a heap or to the periphery in a sack of grains.
SECONDARY STORAGE PESTS						
Saw toothed grain beetle	<i>Oryzaephilus surinamensis</i> (Cucujidae: Coleoptera)	Rice, wheat, maize, cereal products, oil seeds and dry fruits.	in cracks of storage receptacles of godown.	among the infested grains	It feed on grains, dried fruits etc by scarving of grain surface or burrowing holes in them.	
Long headed flour beetle	<i>Latheticus oryzae</i> (Tenebrionidae: Coleoptera)	Cereal flour, packaged food, rice and rice products. Stored sorghum, wheat, etc.	on grain and seams of the bags	among the infested grains	Both grubs and adult beetles feed on the milled products.	It occurs as secondary infestation in stored grain.

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
MAJOR PESTS OF BRINJAL							
Shoot and fruit borer	<i>Leucinodes orbonalis</i> (Pyraustidae: Lepidoptera)	Brinjal, potato, other wild plants belonging to solanaceae, peas.	on leaves, tender shoots, flowers and developing fruits	on plant	Larva bores into tender shoots and causes withering of terminal shoots / dead hearts - also bores petioles of leaves, flower buds and developing buds, causes withering of leaves, shedding of buds and make fruits unfit for consumption. Attacked fruits are with boreholes plugged with excreta. Fruits become out of shape also.	Avoid continuous cropping of brinjal and ratooning. Resistance varieties - Annamalai, Pusa purple round, Arka Kusumakar, Doli - 5, Pusa purple Long, Pusa Purple Round, Collect and destroy the damaged tender shoots, fallen fruits, Use light traps @ 1/ha, Release egg parasitoids <i>Trichogramma chilonis</i> @1.0 lakh/ha. Spray <i>B. thuringiensis</i> - Dipel @ 1.5 to 2 ml /L of water. Spray Quinalphos 25 EC 1.5 L + Neem oil 1.0 L, NSKE 5%, Azadirachtin 1.0% 1.0-1.5 L or Fenpropathrin 30 EC 250-340 ml or Thiodicarb 75 WP 625-1000 g Flubendiamide 20 WG, 375 g with 500 – 750 L water/ha, Uproot and burn old plants after harvest.	Avoid using synthetic pyrethroids as they cause resurgence of sucking pests. Avoid using insecticide at the time of fruit maturation and harvest.
Hadda spotted beetle	<i>Henosepilachna vigintioctopunctata</i> ; (Coccinellidae: Coleoptera)	Brinjal, potato, tomato, cucurbitaceous plants, wild solanaceous plants.	on lower leaf surface	on the stem or leaves	Both adult and grubs scrap the lower epidermis of leaves in characteristic manner leaving behind stripes of uneaten areas. The leaves give a stifled appearance. In severe infestation all leaves may be eaten off leaving only the veins intact (Skeletonization) and plants may wither.	Collect and destroy adult beetles, grubs and pupae. Shake plants to dislodge grubs, pupae and adults in the morning Spray malathion 50 EC 1.5L or Azadirachtin 0.03% 2.5-5.0 L in 500 - 750 L of water Emulsify 1 lit of Neem oil with 60 g of soap dissolved in ½ L. of water, dilute emulsion by adding 20 lit of water, then mix about 400 g of well crushed garlic and spray. Mix diflubenzuron invariably with chlorpyrifos 1.0 L /ha and spray on the crop which reduces the population by nearly 95% in field.	
MAJOR PESTS OF PEA							
Pea Leaf-miner	<i>Chromatomyia horticola</i> (Agromyzidae: Diptera)	Cruciferous plants, pea, potato and linseed	in leaf tissues	within the galleries	The tunnels made by the larvae between the lower and upper epidermis interferes with photosynthesis and proper growth of the plants, look unattractive.	Spray 1.0 L of dimethoate 30 EC in 750 L of water per ha and repeat spray at 15 day interval.	
Pea Stem Fly	<i>Ophiomyia phaseoli</i> (Agromyzidae: Diptera)	Peas green gram, black gram, soybean, cowpeas, <i>Lablab</i> .	in leaf tissues	within its gallery	The maggots bore into the stem causing withering and drying of the affected shoots, reducing the bearing capacity of plants.	Avoid sowing of the crop earlier than mid-October. Remove and destroy all the affected branches, Apply 7.5 kg of phorate 10G or 25 kg of carbofuran 3 G per ha in furrows at sowing, On the crop, spray three times 750 ml of oxydemeton methyl 25 EC in 750 L of water per ha	The damage is more severe on seedlings than on the grown up plants.

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
MAJOR PESTS OF CHILLI							
Chillies thrips	<i>Scirtothrips dorsalis</i> (Thripidae: Thysanoptera)	Tea, grapes, castor, cotton, Prosopis	into the veins		Leaves become crinkled, curled upward and shed. Buds become brittle and drop down. Plants get stunted and bronzed. Nymphs and adults are tiny, slender, fragile and yellowish straw in colour.	Resistant varieties like G5, K2, X 235. Inter crop with a green manure crop <i>Sesbania</i> to provide shade, Avoid chilli after sorghum, chilli and onion mixed crop, Sprinkle water over the seedlings, carbofuran 3G @ 200g/ 40 m2 area in the nursery, Dip the roots of seedlings in monocrotophos 36 WSC @ 0.05% before transplanting, Dust carbaryl 5 D 25 kg /ha in the early morning, Spray Imidacloprid 70 WS 500-1000 g Imidacloprid 17.8 SL 125-250 ml or 70 WS / 100 kg seed 1.000-1.5L , Lambda cyhalothrin 5 EC 300 ml, Ethion 50 EC 1.5-2.0 L, Methomyl 40 SP 750-1125 g, Fenpropathrin 30 EC 250-340 ml, Spinosad 45 SC 160 ml, Fipronil 5 SC 800-1000 ml, Thiacloprid 21.7 SC 225-300 ml, Dimethoate 30 EC 500 ml water 500 L/ha, Methyl demeton 25 EC 500 ml with water 500 L/ha	
Muranai mite/ Broad mite/ yellow mite	<i>Polyphagotarsonemus latus</i> (Tarsonemidae: Acarina)	Green gram and black gram	on the ventral surface of young leaves or on leaf buds		Sudden curling and crinkling of leaves followed by blister patches. Petiole becomes elongated referred as "rat tail". Later they stop growing and die.	Spray Buprofezin 25 SC 300-600 ml, Chlorfenapyr 10 SC 750-1000 ml, Diafenthiuron 50 WP 600 g, Lambda cyhalothrin 5 EC 300 ml, Ethion 50 EC 1.5-2.0 L, Milbemectin 1 EC 325ml, Fenazaquin 10 EC 1.25 L, Propargite 57 EC 1.5 L, Fenpropathrin 30 EC 250-340 ml, Spiromesifen 22.9 SC 400 g, Dicofol 18.5 EC @ 2 L, Phosalone 35 EC 1.5 L or Wettable sulphur 50 WP @ 4 kg	
MAJOR PESTS OF OKRA							
Shoot and fruit borer	<i>Earias vitella</i> , <i>E. insulana</i> (Noctuidae: Lepidoptera)	cotton, bhendi, hibiscus, holly hock and other malvaceous vegetables.	on shoot tips, buds, flowers and fruits	On plant	Larva bores into tender terminal shoots in the vegetative stage and flower buds, flowers and young fruits in the fruit formation stage. The damaged shoots droop, wither and dry up. The infested fruits present a deformed appearance and become unfit for consumption. Bore holes - plugged with excreta.	Grow resistant cultivars like AE 57, PMS 8, Parkins Long green, Karnual Special, Collect and destroy infested shoots, buds, flowers and fruits. Remove the alternate hosts, Release egg parasitoid <i>T. chilonis</i> and larval parasitoid <i>Chelonus blackburnii</i> . Release first instar larvae of <i>Chrysoperla carnea</i> @ 1 lakh/ha. Set up light traps, Set up pheromone traps @ 5/ha. Spray <i>B.t</i> formulation such as dipel @ 2 g / lit. Spray carbaryl 50% WP 1 kg or monocrotophos 36 WSC 1.0 L or NSKE 5% or Azadirachtin 5% 400 ml or Fenpropathrin 30 EC 250-340 ml or Pyridalyl 10 EC 500-750 ml with 500 L – 700 L water/ha.	

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Red spider mite	<i>Tetranychus telarius</i> (Tetranychidae:)	Bhendi, cotton, tomato, brinjal, castor, cucurbits, tea, citrus, grapes, rose, jasmine, marigold.	On leaves		Nymphs and adults feed on ventral leaf under fine silken webs. Yellow spots appear on dorsal side of leaves. Affected leaves start curling, finally wrinkled and crumpled.	Spray wettable sulphur 50 WP 1.0 kg (or) dicofol 1.0 L or abamectin 1.9 EC @ 500 ml which is a new acaricide or fenpropathrin 30 EC 250-340 ml in 500 L water/ha.	
MAJOR PESTS OF CUCURBITS							
Pumpkin beetles:	<i>Aulacophora foveicollis</i> , <i>A. cincta</i> , <i>A. intermedia</i> (Galerucidae: Coleoptera)	Ash gourd ,pumpkin, tinda, ghia tori, cucumber and melon.	in moist soil, near the base of the plants	in the soil	Both grubs and beetles damage. Grubs feeds on roots, underground stems of creepers and on fruits in contact with soil. The adults feed on plant above the ground.	Frequent raking of soil, Hand collection and destruction of infested leaves and fruits. Spray malathion 50 EC 750 ml, dimethoate 30 EC 500 ml, methyl demeton 25 EC 500 ml, 500 g of carbaryl 50WP in 500-750 L of water per ha or apply 7.0 kg of carbofuran. 3G per ha 3-4 in the soil just after germination and irrigate.	Early sown cucurbits are severely damaged needs resowing.
MAJOR PESTS OF CRUCIFEROUS VEGETABLES							
Diamond back moth	<i>Plutella xylostella</i> (L.) (Plutellidae: Lepidoptera)	Cabbage and cauliflower, but also feeds on other crucifers and solanaceous plants.	underside of leaves	Leaf surface	First instar larvae mine epidermal surface of leaves producing typical white patches. Larvae, second instar onwards feed externally making holes on the leaves and soil them with excreta. Heavy infestations leave little more than the leaf veins.	Grow mustard as trap crop. (2 rows of mustard after 25 rows of cabbage) Install pheromone trap. <i>Bacillus thuringiensis</i> @1 g/L or NSKE 4% spray. Conserve larval parasitoids viz., <i>Cotesia plutellae</i> . spray insecticide at primordial or head initiation stage. Azadirachtin 0.03% 2.5 L, Lufenuron 5.4 EC 600 ml, Chlorantraniprole 18.5 SC 50 ml, Indoxacarb 14.5 SC 200-265 ml, Chlorfenapyr 10 SC 750ml, Novaluron 10 EC 750 ml, Emamectin benzoate 5 SG 200 g, Fipronil 5 SC 800-1000 ml, Thiodicarb 75 WP 1.0-1.3 g or Quinalphos 25 EC 1000 ml with 500 -1000 L water/ha	
MAJOR PESTS OF PEPPER							
Pollu beetle	<i>Longitarsus nigripennis</i> (Chrysomelidae: Coleoptera)	Pepper	on the berries	in soil	The grubs bore into the berries of pepper. berries dry up and turn dark in colour. Berries are hollow and crumble when pressed. Such berries are called "POLLU" (Empty). Grub also eat the spike causing it to dry up. The grub move from one berry to another and feed continuously.	Rake the soil and incorporate quinalphos 1.5 D, carbaryl 5 D, @ 25 kg/ha to kill the pupae in the soil, Spray dimethoate 30 EC 1.5 L or quinalphos 25 EC 2.0 L in 500 - 1000 L of water per ha.	

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
MAJOR PESTS OF COCONUT							
Rhinoceros beetle	<i>Oryctes rhinoceros</i> , (Scarabaeidae: Coleoptera)	Pineapple, sugarcane, arecanut, sago, oilpalm, palmyra, date palm and wild dates.	Oval creamy white eggs in manure pits	In earthen cells	Central spindle appears cut or toppled; fully opened fronds show characteristic diamond shaped cuttings. Holes with chewed fibre sticking at the base of central spindle	Destroy and dispose all dead trees. Avoid manure pits in the vicinity of gardens. Rake up the decaying manure to expose grub, egg and pupae to sun drying and predation. Use <i>Metarrhizium anisopliae</i> to manure pits Encourage reduviid predators, <i>Platymeris</i> . In seedlings, place naphthalene balls @ 3 / tree. Soak castor cake @ 1 kg/5 lit of water to attract and kill adults. The crown region may be properly cleaned during harvests, adults may be hooked. Light traps during monsoon months. Use sand + Neem Seed Powder (2:1) once in three months (150 g/tree) in leaf axils. Aggregation trap with Rhinolure @ 1/ha.	Grubs feed on the decaying matter
Red palm weevil	<i>Rhynchophorus ferrugineus</i> (Curculionidae: Coleoptera)	oil palm, date, sago and other species of Palmae	Oval, white eggs in scooped out small cavities on palms	Pupates in a fibrous cocoon inside the trunk.	Holes on the trunk with brownish ooze; yellowing of inner leaves and gradual wilting of central shoot in the crown.	Removal and disposal of damaged and wilted trees, Avoid injuries on trunk, plaster injury with clay or copper oxychloride, Avoid cutting green fronds, Root feeding with monocrotophos @ 10 ml + 10 ml water after harvest of nuts. Set up attractant traps with molasses + acetic acid + yeast + split tender stems @ 30/ac. Use 1-2 aluminium phosphide tablets inside the tunnel and plug the holes. Use aggregation traps @ 1/ha or use Ferrolure in combination with food baits	Upto 50 Nos. of grubs can be found feeding on the soft tissues inside the trunk.
Black headed caterpillar	<i>Opisina arenosella</i> (Cryptophasidae: Lepidoptera)		In groups on leaves	inside the web in a thin silken cocoon.	Dried up patches on leaflets of the lower leaves. Galleries of silk and frass on underside of leaflets.	Cutting and burning all the infested leaves and fronds. In small plantations spray carbaryl 50 WP 2 g/L. In summer, release bethylids, braconid and eulophid parasitoids. Root feeding monocrotophos @10 ml + 10 ml water.	
Coconut Eriophyid mite	<i>Aceria guerreronis</i> (Eriophyidae : Acari)				The mite infests on the meristematic tissues under perianth. Triangular pale white or yellow patches are seen. Necrosis of tissues leading to brown color patches, fissures and splits on the husk; oozing of brown gummy exudates reduced nut size, copra content and malformation of nuts.	Nutrients (per tree/ year) Urea 1.3 kg, super 2.0 kg, potash 3.5 kg, neem cake 5 kg, borax 50 g, gypsum 1 kg, MgSO ₄ 500 g, FYM 50 kg. Root feeding with TNAU - Agro Biocide 30 ml/tree or carbosulfan 15 ml + 15 ml water / tree at 45 days interval or fenpyroximate at 10 ml/tree. TNAU - Agro biocide - 30 ml/tree - (60 days after Carbosulfan root feeding).	Before root feeding, pluck nuts. After root feeding, next harvest should be done 45 days later.

MAJOR PESTS OF MANGO							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Mango hoppers	<i>Idioscopus clypealis</i> , <i>Amritodus atkinsoni</i> (Cicadellidae Hemiptera)	Mango	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 in infested trees become sticky due to the deposition of honey-dew secreted by the hoppers that encourages the 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 dimethoate 30 EC or monocrotophos 36 SL 2.5-3.3 L, methyldemeton 25 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, phosalone 35 EC @1.5 ml/L, or buprofezin 25 SC 1-2ml/L of water or imidacloprid 17.8 SL 2-4ml/tree or lambda cyhalothrin 5 EC 0.5-1.0ml/L of water at 10 -15 L of water per tree. Neem oil 5 ml/lit of water can be mixed with any insecticide. Spray neem seed kernel powder extract 5 per cent	The hoppers take shelter in cracks and crevices on the bark during non-flowering season.
Stemborer	<i>Batocera rufomaculata</i> (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 Neelam, Humayudin, Remove and destroy dead and affected branches, Remove alternative hosts, Use long wire 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 with clay + copper oxychloride paste.	
Fruit fly	<i>Bactrocera dorsalis</i> (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 at places in one ha between 6 and 8 am.	
Mango nut weevil	<i>Sternochaetus mangiferae</i> (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; Carbaryl 3-4 kg or Quinalphos 3-4 L in 1500-2000 L water per ha at marble stage of the fruit second at 15 days interval. During non flowering season direct spray towards the base of the trunk. Spray deltamethrin 1.5 - 2.0 L per ha after six weeks of fruit set.	

MAJOR PESTS OF CITRUS							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Shoot psyllid/ Citrus Psylla	<i>Diaphorina citri</i> (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.	Prune the affected trees and dried shoots. Conserve natural enemies parasitoids - <i>Tetrastichus radiates</i> and predators - <i>Coccinella septempunctata</i> , <i>Chilomenes sexmaculata</i> , <i>Brumus suturalis</i> , <i>Chrysoperla carnea</i> . 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.	
Citrus leaf miner	<i>Phyllocnistis citrella</i> (Gracillariidae : Lepidoptera)	Citrus, Pommelo willow, cinnamon, <i>Loranthus</i> 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. The Secondary infection by fungi and bacteria cause 'citrus canker'.	Spray NSKE 5% (50 g/L) 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	
Citrus blackfly	<i>Aleurocanthus woglumi</i> (Aleyrodidae: Hemiptera)	Citrus, sweet orange, avacado, grape vine, mango, guava, pear, plum.	On leaves in spiral manner		Nymphs and adults suck plant sap, causing curling of leaves and premature fall of flower buds and developing fruits.	Close planting, water logging or stress conditions are avoided. Excessive irrigation and application of nitrogen and pesticidal sprays are avoided Spray neem oil 3% or Fish Oil Rosin Soap 30 g/L or quinalphos 25 EC 2.0 L or monocrotophos 36 SL 1.5 L or methyl demeton 25 EC 1.0 L or ethion 50 EC 2.5 L or triazophos 40 EC 3.0 L or per ha. Use 5-15 L water/tree or 1500 – 2000 L water per ha during flush.	
Fruit piercing moths	<i>Othreis materna</i> , <i>O. fullonica</i> , (Noctuidae: Lepidoptera)	Citrus, mango, grapes and apple	on wild plants and weeds like <i>Tinospora cordifolia</i> , <i>Cocculus pendulus</i> , <i>C. hirsutus</i> <i>Gulvel, Wasanvel and Chandvel</i>	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. In severe cases, all fruits are lost.	Destroy the weed host, Apply smoke to repel adult moth, light traps to attract adults. Cover the fruit with perforated poly bags. Set up food lures with pieces of citrus fruits to collect and kill, 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.	

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Bark caterpillar	<i>Indarbela tetraonis</i> (Metarbelidae: Lepidoptera)	Mango, guava, zizyphus, litchi, orange, pomegranate, bauhinia, loquat, 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. Gallery is 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, into the tunnel.	They hide in tunnel during day time, and feed at night
Citrus butterfly	<i>Papilio demoleus</i> , (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. Spray <i>Bacillus thuringiensis</i> 1 g /L nematode DD- 136 strain or neem seed extract 3%. Spray quinalphos 25 EC or carbaryl 50 WP 2.0 L in 1500-2000 L of water per ha	
MAJOR PESTS OF GUAVA							
Fruit fly	<i>Bactrocera diversus</i> (Tephritidae: Diptera)	Guava, Tomato and other commercial fruits.	on soft skin of fruits	In soil	Maggots bore into fruits and feed on soft pulp. The infested fruits show small cavities with dark greenish punctures with wriggling maggots inside. The infestation causes rotting and dropping of fruits.	Collect and destroy the damaged plant parts. Summer plough to expose and kill pupae. Harvest the fruits when slightly hard and green. Spray fenvalerate 20 EC 1 L or malathion 50 EC 2 L in 1500 – 2000 L of water per ha. Rake the soil around the tree and apply lindane dust 1.3 D @ 25 kg per ha.	
MAJOR PESTS OF SAPOTA							
Leaf webber or Chickoo moth	<i>Nephoteryx eugraphella</i> (Pyraustidae: Lepidoptera)	Sapota and cured tobacco	on leaves and buds of young shoots	in the leaf webs	Leaves webbed together in a bunch by larvae, chlorophyll scrapped and leaves reduced to a network of veins; clusters of dried shoots; flower buds and tender fruits bored, become withered and shed.	Remove and destroy the infested fruits and dried clusters of leaf webs. Spray phasalone 35 EC 3 L or carbaryl 50 WP 3kg in 1500 – 2000 L water per ha	
MAJOR PEST OF POMEGRANATE							
Anar butterfly / Fruit borer:	<i>Virachola (Duodorix) isocrates</i> (Lycaenidae: Lepidoptera)	Aonla, apple, ber, citrus, guava, litchi, loquat, peach, mulberry, pear, sapota, tamarind.	Shiny, white, oval shaped eggs laid singly on calyx of flowers and on tender fruits	Larvae pupates inside fruit but occasionally outside even, attaching themselves to 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 give an offensive smell.	Mechanical - Bagging of developing fruits with cloth or paper bag. At the beginning of fruit formation spray with carbaryl 0.2% .	

MAJOR PESTS OF BANANA							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Rhizome weevil:	<i>Cosmopolites sordidus</i> (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	Use healthy and pest free suckers. Trap the adult weevils by placing chopped pseudostem Uproot and destroy infested rhizomes. Under take soil incorporation of carbaryl 5D 10-20 g/plant or carbofuran 3G 20 g/plant or phorate 10 G 10 g/plant around pseudostem.	
Banana aphid:	<i>Pentalonia nigronervosa</i> (Aphididae: Hemiptera)	Banana, cardamom , <i>Alocasia</i> sp, <i>Colocasia</i> sp, caladium	Adults reproduce parthenogenetically		Aphids in colonies on leaf axils and pseudostems. The affected leaves become brittle and small. Transmit Bunchy top of banana- Viral disease	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 at 45 days interval from the 3rd month till flowering.	
MAJOR PEST OF APPLE							
Apple woolly aphid	<i>Eriosoma lanigerum</i> (Pemphigidae: Hemiptera)	Apple	Female produces 116 young ones		Sap sucking by nymphs and adults from the bark of the twigs and from the roots results in weakening and death of the smaller plants; galls on the roots and white woolly patches on the trunk. Swelling or knots appear on the roots which hinder the normal plant functions.	Use resistant root stock like Golden delicious, Release eulophid parasitoid viz, <i>Aphelinus mali</i> , Select healthy plants in the nursery and spray chlorpyrifos 20 EC 0.05% (2.5 ml per L of water) before planting in the main field. During leaf fall, spray diazinon 3.75 L 20 EC in 1500 -2000 L of water / ha against aerial forms.spray methyl demeton 25 EC or malathion 50 EC 2.0 L in 1500-2000 L of water per ha For controlling root forms. Apply the fumigant paradichlorobenzene at 30-110 g/tree in a 15 cm deep trench around the tree.	Aphids crowd together covered with wooly white patches on the trunk.
San Jose scale	<i>Quadraspidiotus perniciosus</i> (Diaspididae: Hemiptera)	Cherry, plum, pear, peach and most other temperate fruit trees	ovo-viviparous		Due to sap sucking by nymphs and adults the infested bark becomes reddish pink, purple colouration in fruits.	Regularly prune the infested branches and burn them. Release the parasite <i>Encarsia perniciosi</i> Spray diazinon 20 EC 3.75 L or methyl demeton 25 EC 2.0 L in 1500 – 2000 L of water per ha. Apply carbofuran 3G @ 20g /plant in nursery.	
Cottony Cushion Scale	<i>Icerya purchasi</i> (Margarodidae: Hemiptera)		In ovisac attached to the body of females		Sap sucking by nymphs and adults causes yellowing of leaves, Reduced tree vigor. Leaf and fruit drop can occur along with twig dieback.	Conserve natural enemies, avoiding use of persistent insecticides. vedalia beetle. spray malathion 50 EC 3.0 L or acephate 75 SP 2.0 kg in 1500 -2000 L of water per ha	Do not apply imidacloprid for cottony cushion scale as it is very toxic to vedalia beetles.

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Apple Codling Moth	<i>Cydia pomonella</i> (Tortricidae: Lepidoptera)	Apple	on developing fruits, leaves and twigs	in cracks and crevices of bark near soil	Two types of fruit damage: Stings - entries where larvae bore into the flesh a short distance before dying. Deep entries - larvae penetrate the fruit skin, bore to the core, and feed in the seed cavity. Young larvae enters the fruit through calyx penetrates and attacks the core and flesh. Holes plugged with frass on the fruit's	Kill larvae by mopping up with a pole and some rags dipped in kerosene tied on its end. Place kerosenized water in an open vessel below the tree so that the larvae that fall may also be killed. Spray carbaryl 50 WP 2.5 kg in 1500 -2000 L of water/ha.	
MAJOR PEST OF GRAPES							
Grape Vine Flea Beetle:	<i>Scelodonta strigicollis</i> (Eumolpidae: Coleoptera)	Monophagous, specific to grape	Beneath bark or in soil in groups	In soil	Adult makes small holes on tender leaves, on swelling buds and tender shoots soon after pruning of vines. The grubs damage roots.	Remove loose bark after pruning. Collect adult beetles and kill. Spray carbaryl 50 WP 1.0 kg or chlorpyrifos 20 EC 1 L in 500 - 1000 L of water/ha.	
Mealy bug	<i>Maconelicoccus hirsutus</i> Pseudococcidae Hemiptera	Hibiscus, bhendi, ambadi, mulberry, custard apple, guava etc.	Under bark, cracks, crevices in cottony cushion ovisac		Nymphs and adults suck the cell sap from leaves, shoots and bunches. Black sooty mould develops.	Debarking of vines and pasting with insecticides. Spraying of fruit with 0.2 % dicolorvos with fish oil rosin. Release of Australian lady bird beetle <i>Cryptolaemus montrouzier</i> @2500-3750 / ha	
MAJOR PEST OF PAPAYA							
Aphid –	<i>Myzus Periscae</i> , Aphidae Hemiptera				Vector of papaya mosaic viral disease.	Manage the Vector	
White fly	<i>Bemisia tabaci</i> Aleurodidae Hemiptera				Vector of papaya leaf curl viral disease.	Manage the Vector	
MAJOR PESTS OF ONION							
Onion thrips	<i>Thrips tabaci</i> (Thysanoptera: Thripidae)	Onion, garlic, cotton, cabbage, cauliflower, potato, tobacco, tomato, cucumber, brinjal, tea, pear, chillies, tomato, radish, grapes etc.	50-60 kidney-shaped eggs singly in slits made in leaf tissue with its sharp ovipositors.	In soil	Adults and nymphs lacerate the leaf tissue and feed on the plant juice. Leaves of attacked plants turn silvery white, curl, wrinkle and gradually dry from tip downwards. The plants do not form bulbs nor set seed. Leaf tip discoloration and drying is the main symptom.	Grow resistant varieties White Persian, Sweet Spanish and Crystal Wax. Use neem coated urea. Install blue sticky traps@ 25/ha. Spray 625 ml of malathion 50 EC or methy demeton 25 EC or dimethoate 30 EC or monocrothos 36 SL 500 ml- 750 ml in 500 - 750 L of water per ha as soon as the pest appears. Conserve predators like <i>Scymnus, Orius, Chrysopa</i> sp, and predatory thrips	They usually congregate at the base of a leaf or in the flower.

Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Onion Maggot	<i>Delia antiqua</i> (Anthomyiidae: Diptera)	Onion and garlic	near the base of the plant, in cracks in the soil	In soil	The maggots bore into the bulbs, plants become flabby and yellowish, withering in the field and rotting in storage. Damaged bulbs has invasion of <i>Bacillus</i> causing soft rot.	Grow <i>Allium fistulosum</i> as it is more tolerant than <i>A. cepa</i> . Apply 10 kg of carbaryl 4G or phorate 10 G to the soil followed by light irrigation. Spray methy demeton 25 EC or dimethaote 30 EC 1.0 L in 500 – 750 L of water per ha.	
Cutworms	<i>Agrotis ipsilon</i> , (Noctuidae: Lepidoptera)	potato, barely, beet-root, cole crops, okra, linseed, lucerne, millets, oats, peas, poppy, pulses, tobacco, wheat etc.	on ventral surface of leaves or moist soil	Soil	Young larva feeds on tender foliage and grown up larva cuts the stem at collar region.	Fork soil during summer months. Install light traps during summer to attract adult moths. Install pheromone traps @ 5/ha to Sprinkler irrigation system, Drench collar region of plants in evening hours with chlorpyrifos 20 EC a day after planting. In endemic areas, apply NSKE 5%, or chlorpyrifos 20 EC 1 L or neem oil 5 L in 500 - 750 L of water per ha .	Polyphagous pests, ETL: 2 larvae /meter row. Caterpillars are nocturnal in habit hide during day in cracks and crevices in soil or under debris
MAJOR PESTS OF TAPIOCA							
Cassava scale	<i>Aonidomytilus albus</i> (Diaspididae: Hemiptera)		laid inside scale		Scales infest stems. Leaves become discoloured and dry up. Desiccation of the stem and death of plants occur. Stunting of the plants.	Select pest-free setts for planting. Collect and burn the stems infested with scales, Encourage activity of coccinellid predators, <i>Chilocorus nigrinus</i> , Dip setts in methyl demeton 25 EC or dimethoate 30 EC 0.05% or malathion 50 EC 0.1%	
MAJOR PESTS OF POTATO							
Potato tuber moth	<i>Phthorimaea operculella</i> (Gelechiidae: Lepidoptera)	Tomato, tobacco, brinjal, potato, sugarbeet and solanaceous weeds.	near eyes of exposed tubers and on ventral surface of leaves.	Near the tubers	Pest of field and storage. Larva tunnels into foliage stem and tubers which lead to loss of leaf tissue, death of growing points and weakening or breaking of stems. In tubers, irregular shaped galleries are seen with excrements near tuber eyes.	Select healthy tubers and avoid shallow planting of tubers, inter-cropping with chillies, onion or pea, Earthing-up at 60 days after planting to avoid egg laying on the tubers, pheromone traps @ 20/ha, Remove and destroy infested tubers Release egg-larval parasitoid, <i>Chelonus blackburni</i> @ 30, 000 adults/ha, Store only good and clean tuber in well-ventilated, cool, dry place, pheromone traps in godowns also, Fumigate godowns (CS2) Spray NSKE 5% or quinalphos 25 EC 1.0 L in 500 L of water per ha to manage foliar damage, Treat seed tubers with quinalphos 1.5 D @ 1 kg/100 kg of tubers	

MAJOR PESTS OF SWEET POTATO							
Pest	Scientific Name	Host	Oviposition	Pupation	Nature of damage	Management	Typical characters
Sweet potato weevil	<i>Cylas formicarius</i> (Apionidae: Coleoptera)	<i>Ipomoea litoralis</i> , <i>I. learii</i> , <i>I. purpurea</i> , <i>I. prescaprae</i> , <i>I. trifida</i> and <i>I. sepiaria</i>	In small cavities on tubers	in larval burrows	Grubs bore into stems, cause tunneling inside and feed on soft tissues. Grubs and adults bore into tubers both in field and storage. Affected tubers develop dark patches, start rotting.	Remove previous sweet potato crop residues and alternate host, Discourage growing sweet potato in the same field year after year, pest free planting materials, Mulch with leaves, Use cut sweet potato tubers (100 g) as trap, Dip planting materials in monocrotophos 36 WSC 15 ml per L of water. Rake up soil and earth up at 50 days after planting, Drench soil with Chlorpyrifos 20 EC @ 4 ml/L. Spray Chlorpyrifos 20 EC 1.5 L in 750 L of water per ha, Harvest immediately after maturity, yellow sticky trap @12/ha, In godowns, treat the bag surface with malathion 5% or carbaryl 5 % dust.	Pest is disseminated from field to field through infested vines and is carried over from season to season by breeding in damaged tubers left in the fields after harvest.
MAJOR PESTS OF SWEET POTATO							
Tea mosquito bug	<i>Helopeltis theivora</i> (Miridae: Hemiptera)	Cashew, neem, moringa and guava	Inserted into tender shoot.		Adults and nymphs suck the sap from buds, young leaves and tender stems by puncturing with needle like stylets and injecting toxic saliva. Punctures appear as reddish brown water soaked spots. Necrosis. Leaves curl up, become badly deformed and remain small. Gradually, shoots dry up.	Collect and destroy the damaged plant parts, Spray profenofos 50 EC 800-1000 ml, Thiamethoxam 25 WG 100 g, or phosalone or chlorpyrifos or dimethoate at 1000ml/ha with 500 L water/ha, Spray in early morning or late in the evening hours on trunks, branches, foliage and inflorescence	