

FARMER FACTSHEET – IPM

Ampalaya

Crop group: Cucurbit (ampalaya, melon, cucumber)

Summary

The best insect pest and disease management is prevention and knowledge. Each farm have a few insect pests and diseases that regularly infest or infect ampalaya and usually one or two regularly cause major crop loss unless actively managed. Knowing which are the major insect pests or diseases, early signs of infestation or infection, understanding what conditions favour their growth and what are their natural enemies lead to specific management practices that will give the best outcomes (Refer to the pest and disease specific factsheets for more information). However there are some general crop management or 'cultural' practices that can be used to reduce chances of bringing pests and diseases into crops and once there in minimising their spread. Crops that have optimal (not too much or too little) nutrition and water, and are growing in environmental conditions that they are suited to will grow more quickly, produce higher yields and in general be more resistant to disease infection and outgrow damage (See the Best Practice Guides for Ampalaya).

Site selection

Practice crop rotation and choose a site that has not recently grown ampalaya, other cucurbits such as melon or cucumber, or if bacterial wilt is a problem, other host crops such as tomatoes and sweet pepper. Do not plant next to, down-wind or down-slope of an older ampalaya crop to reduce movement of insect pests or diseases from the older to younger crop.

Land preparation

Waterlogging favours many soilborne diseases, especially bacterial wilt, stops plants growing and reduces their chance of resisting infection or infestation so good drainage is important. Raised beds, soil amendments and protected cropping can reduce chances of waterlogging. Make soil more suppressive by adding microbial inoculants such as EM, Vermi-compost, chicken dung and other organic matter as soil amendments. Cabbage residues, wild sunflower (*Tithonia diversifolia*) and hagonoy (*Chromolaena odorata*) were proven effective in reducing soil-borne diseases, especially bacterial wilt caused by *Ralstonia solanacearum*. (Note: these plants



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should only be used if locally abundant. Do not plant in new areas as they are common weeds). If soil pH is acidic, lime should be applied to the soil at a rate of 250 g/m. Where possible align beds in direction of prevailing winds to improve airflow through the growing crop. Protected cultivation is recommended in areas with high levels of soil borne diseases.

Seedling production

Use certified disease-free seed and clean planting materials. Clean media for planting seeds (sterilized best), monitor seedlings, grow seedlings away from main production area and net well to prevent pest infestation. Check seedlings are pest and disease free before transplanting (see Best Practice Guide to Seedling Production) in bacterial wilt prone areas.

If direct seeding, lightly cover seedlings with rice straw or dry weeds to discourage feeding by squash beetles. Monitor for squash beetle feeding.

Transplanting

Handle seedlings with care when pricking and transplanting. Extra care should be done to minimise root wounding. Fungicide drenching may be applied to newly transplanted seedlings to protect them from soil-borne fungi. Alternatively, 200 ppm chitosan solution can be applied to the seedlings by root drenching during transplanting. Mulch around seedlings with rice straw to reduce attractiveness to squash beetles.

Use sticky traps around seedling production area and in newly transplanted crop for sucking insects, particularly aphids that can transmit Namamarako or leafhoppers that can transmit little leaf.

Vegetative

Monitor establishing plants and check undersides of leaves as most insect pests will be found there, especially next to leaf veins. Look for and destroy aphids as they can transmit Namamarako. Look for folded leaves and squeeze larva inside to kill. Monitor for cutworm egg masses and larvae causing windowing of leaves. Continue to monitor for squash beetle feeding and population. Squash beetle eggs are deposited in the soil and the larvae will feed on the roots, causing wilting, stunting and possibly death.

Not all insects or mites that are seen in crops are causing economic losses. Many are 'natural enemies' or 'beneficials' and need to be maintained to assist in managing pest insect populations.

Learn to recognise the common natural enemies. Monitor pest and natural enemy populations 1–2 times per week and record numbers to track whether populations are increasing or decreasing. If pest populations are increasing and natural enemies absent or in very low numbers an insecticide spray may be needed. Where possible choose insecticides that are specific to the pest group and least toxic to natural enemies and humans. Always read the label and use appropriate personal protection when spraying.

Monitor the plants for disease symptoms such as wilting, stunting, leaf spots, grey mould on lower leaf surface and leaf yellowing. Check stems for rots and lesions. Rogue infected plants showing systemic symptoms and carefully prune away infected parts for localized diseases. If pruning is required, sanitary pruning should be done, i.e. disinfect pruning tools after use on every plant. Bacterial wilt and blight can be transmitted via pruning tools. Preferably carry a container for pruned plant materials (eg. a plastic bag) during pruning and immediately place the pruned diseased plant parts inside the bag to minimise dispersal of inoculum to healthy plants. Control weeds to minimize alternate reservoir of plant pathogens or vectors of plant diseases. Leaf deformation and thickening, production of male-only flowers or no flowers are signs of Namamarko – a viral disease which is not curable. Similarly profusions of small leaves are likely to be caused by a phytoplasma disease which is similarly not curable.

Regulate moisture, do not over-irrigate the plots because a film of moisture in the soil is favourable to bacterial wilt, sclerotium rot and fusarium wilt. Drain the field quickly after rain by providing drainage canals, especially in open field cultivation. Isolate diseased spots. Prevent water flow in or out of the section and limit the traffic of people and machinery in the infested area. Disease spots can be biofumigated with cabbage residues, *C. odorata* or wild sunflower. More frequent irrigation for a shorter time is less favorable for disease.

Avoid excessive nitrogen fertilization especially with ammonium form of fertilizer since they will make plants susceptible to most pests and diseases. Fungicides can be applied to control fungal diseases. Copper-based fungicides can also be applied to protect plants against bacterial leaf spots and blights. Resistance boosters, such as chitosan, benzothiadiazole and phosphonates, may also be sprayed to plants if available.

Flowering/Fruit set

Set up fruitfly traps (sticky or baited pheromone) early flowering. Soon after fruit set, bag fruit with a large enough bag to allow for fruit development. Early fruit drop may be a result of insect feeding, disease infection or poor nutrition.

Fruit development

Yellowing fruit may be caused by a number of insects feeding on the fruit including fruit fly, cutworm, melon worm and sweet potato bug. Monitor for cutworm eggs and small larvae before they burrow into fruit soon after hatching. Melon worm live in folded leaves but will feed on surface of fruit and in high populations may also burrow into fruit. Deformed and yellowing fruit can also be caused by sweet potato bug feeding, look for egg masses, nymphs and adult bugs. If pest populations are increasing and few natural enemies are present an insecticide spray may need to be applied.

Collect any infested (cutworm, melon worm or fruit fly) or disease infected fruit and properly dispose to ensure no pests can continue to develop or diseases spread.

Harvesting

Collect any infested fruit and properly dispose to ensure no pests can develop. Avoid packing wet or damp fruit as secondary rots may develop.

Postharvest

As soon as possible after harvest has finished the crop should be removed and soil ploughed to prevent pest populations continuing.

In the tables below is information on common ampalaya diseases or pests. See the individual disease or pest factsheets for more detailed information.

Proper identification of the problem is a pre-requisite for effective pest and disease management.

Table 1. Major diseases of ampalaya

Image	Disease name	Damage symptoms	Management strategies
	Bacterial wilt (<i>Ralstonia solanacearum</i>)	Sudden wilting of plant, plant can die, root system/stem damaged, dead	Crop rotation. Remove infected plants. Avoid planting in areas with bacterial wilt history. Graft on to sponge gourd.
	Damping off (<i>Phytophthora</i> and <i>Pythium</i> spp.)	Basal part of the stem becomes water-soaked and rotten, causing the seedling to wilt (damp-off). In pre-emergence damping-off, seeds rot and fail to germinate.	Sterilize potting mix, use clean seeds. Prevent re-contamination of potting mix by placing seedlings on elevated benches and avoid water splashes during watering. Treat water for irrigation if the source is not chlorinated, especially if the source is a river. Avoid excessive watering. Thin seedlings to allow air circulation.
	Fusarium wilt (<i>Fusarium oxysporum</i>)	Yellowing of leaves, initially from base of plant, wilting and plant death	Resistant varieties. Removal of infected plants. Crop rotation with non-hosts.

Image	Disease name	Damage symptoms	Management strategies
	<p>Sclerotium rot (<i>Sclerotium rolfsii</i>)</p>	<p>Loss of vigor, wilting leading to death of affected plants.</p> <p>Rotting of the stem, starting at the base, with the formation of dense white mycelium that later turns into smooth spherical structures measuring ~1–3 mm in diameter. These begin as white, turning light brown and later dark brown, structures called sclerotia.</p>	<p>Practice sanitation in the nursery and farm.</p> <p>Ensure all equipment is free of soil before being brought to a farm or transferred from farm to farm.</p> <p>Rapidly eliminate plants that show initial symptoms of the disease and quarantine the area where it is found.</p> <p>Disinfect hands after handling infected plants.</p>
	<p>Leaf spot (<i>Cercospora citrullina</i>)</p>	<p>Small, circular, brown leaf spots with pale to tan brown center that starts on the older leaves.</p> <p>The spots also affect the fruit, where it appears as sunken brown small lesions.</p> <p>Severe infections may cause yellowing and defoliation.</p>	<p>Removal and destruction of infected leaves and fruit.</p> <p>Early fungicide treatment when initial symptoms are observed.</p>
	<p>Downy mildew (<i>Pseudoperonospora cubensis</i>)</p>	<p>Yellow spots on leaves, turning brown.</p> <p>Grey mould present on lower leaf surface.</p> <p>A problem, especially during rainy season.</p>	<p>Removal and destruction of leaves.</p> <p>Open up crop by lower planting density and pruning (but not too much).</p>
	<p>Target spot (<i>Corynespora cassicola</i>)</p>	<p>Lesions start as small pinpoint water-soaked spots on the upper surface. These later turn brown and increase in size. Lesions with rings are usually surrounded by yellow halo.</p> <p>Lesions may coalesce forming blighted leaves leading to premature defoliation.</p> <p>Brown lesions may form on stems.</p>	<p>Use healthy seedlings.</p> <p>Practice sanitation in the nursery and farm.</p> <p>Eliminate weeds.</p> <p>Rotate with non-host crops.</p>

Image	Disease name	Damage symptoms	Management strategies
	Namamarako (CABYV)	Leaves thicken, vein banding, stunted plants, male flowers or no flowers. Transmitted by aphids.	Remove and destroy infected plants. Crop rotation and removal of crop debris. Control of aphids (see below). Removal of alternative broadleaf weed hosts (e.g. <i>Commelina</i> , Gabi-gabihan <i>Monochoria hastata</i>), and other infected cucurbits.
	Little leaf/witches' broom (<i>Phytoplasma</i>)	Symptoms include little leaf and shoot witches' broom, small and elongated fruit, with or without yellowing of leaves. Transmitted by leafhoppers, particularly <i>Ricania speculum</i> and a cicadellid leafhopper.	Remove and destroy infected plants. Control vectors.

Table 2. Major pests of ampalaya

Image	Pest name	Damage symptoms	Management strategies
	Aphids (<i>Aphis gossypii</i>)	Aphids especially present on growing tips. Leaves turn yellow and curl, plants are stunted. Ants and sometimes sooty mould present. Aphids transmit viruses, especially Namamarako.	Prune heavily infested plants. Use yellow sticky traps. Aphids have many natural enemies, but these may not be sufficient, especially when the virus is present nearby. Imidacloprid Organophosphates Synthetic pyrethroids Soap sprays

Image	Pest name	Damage symptoms	Management strategies
	Sweet potato bug (<i>Physomerus grossipes</i>)	Adults and nymphs suck fruit. Cause deformation and yellowing of infested fruit.	Collect egg masses and young nymphs.
	Melon worm (<i>Diaphania indica</i>)	Folded leaves with larvae inside. Feed and chew on outer skin of fruit and bore inside at high populations.	Hand pick off larvae and pupae. Parasitic wasps
	Cutworm (<i>Spodoptera litura</i>)	Early instar larvae feed close together, causing windowing. Larger larvae separate and chew larger ragged holes in leaves. Chew holes in fruit, depositing frass, causing fruit rots.	Hand pick egg mass and larvae. Remove and properly dispose of infested plant/parts. Plant trap crops such as castor plant. Plough soil to minimise pupae survival between crops. Predatory and parasitic wasps I
	Melon fruit fly (<i>Bactrocera cucurbitae</i>)	Flies lay eggs in developing fruit, causing tissue death around puncture marks. Larvae (maggots) feed inside fruit causing fruit to turn yellow and rot.	Wrap young fruit with paper or polyethylene sleeve. Make sure sleeve is large enough, and does not cause premature ripening. Time planting of crop to avoid fruit fly (dry season e.g. late February in Leyte). Pheromone fruit fly traps (good for monitoring and some control if used area-wide) Fungicides to reduce rots.

Refer to the pesticide table for further information.

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For more information, see individual factsheets and crop best practice guides also produced from this project.
Other information available from www.plantwise.org.

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