National Agricultural Research Organisation

Mbarara Zonal Agricultural Research and Development Institute

Guidelines for enhancing productivity of passionfruit

Selection of passionfruit type

There are two commercially grown passionfruit types in Uganda.

1. Purple passionfruit

Gives purple colored superior fruits with aromatic flavors. Its good for fresh fruit market and juice market.





2. Yellow passionfruit

This type is more acidic and is mostly used for extracting juice. It is resistant to Fusarium wilt, tolerant to Phytophthora, nematodes and brown spot.

The yellow passionfruit normally serves as rootstock for grafting purple passionfruit





Preparation of planting materials

passionfruit fields can be established using;

i) Seed derived seedlings

For purple passionfruit type, using seed is NOT good due to its susceptibility to soil borne diseases like collar rot.

Yellow passionfruit can be raised using seed.

ii) Grafted seedlings

Purple passionfruit type scion is grafted on rootstock of yellow passionfruit type.

Seed extraction

Collect healthy mature fruits from parent plant and scoop out seeds from the fruits.

Put seeds in water for 3 days to ease separation of seed from pulp.

Dry the seeds under shade

Store in a cool, dry dark place to avoid loss of viability

Planting seed

Seeds are either planted in a prepared seed bed or into a 6cm wide potting bag filled with sterilized soil.

Sterilization can be done by steaming the soil so as to kill parasitic nematodes and soil borne pathogens.

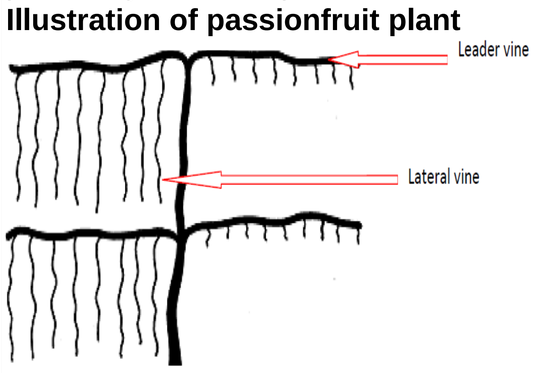
Grafting

Seedlings of yellow passionfruit type (rootstock) are grown until a height of about 50cm and 3-4mm tick (just about pencil size).

Select healthy seedlings with dark green leaves for grafting.

Select scions from healthy, high yielding true type vines of purple passionfruit preferably when the plants have flowered.

Illustration of passionfruit plant



Planting and crop support structure

Passionfruit is a climbing plant with the help of tendrils hence climbing support must be provided. (Plate A and B).

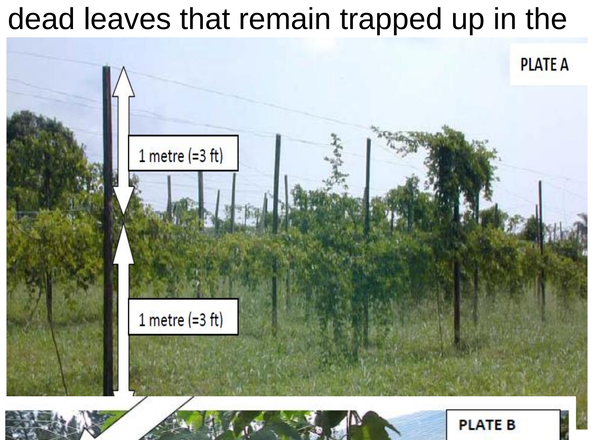
The support structure orientation should be in the direction of sun rise to sun set. This minimizes occurrences of foliar diseases associated with high humidity.

Plate A shows supporting structure comprising of poles with two lines of galvanized wires or nylon strings.

First line is at least 1m from the soil surface and the second line is at least 1m above the first line.

This kind of open structure allows easy execution of management operations i.e. pruning, pest & disease management, vine trainings and harvesting.

Plate B shows a structure that is constructed like a shade either using tree logs or nylon net. With this structure, carrying out management operation is quite difficult as the vines intertwined and crisscross. Further shading is created by dead leaves that remain trapped up in the



Passionfruit plant should be spaced 3-4.5 meters apart and row should be spaced 1.2-2 meters apart. The planting hole should be prepared well with decomposed farm yard manure added. Seedlings should be hardened before planting. Only healthy plants with no symptoms of passionfruit viruses should be selected for planting. It is important to obtain seedlings from accredited nursery bed operators. Soil and water conservation practices should be employed in the fruit fields i.e. mulching, water retention basins, manuring, etc.

Pollination and fruit set

Pollination is essential for fruit production. Purple passionfruit flowers normally set fruit when self-pollinated. However, most cultivars of yellow passionfruit are self-incompartible and cross pollination is required for fruit set. Naturally, bees especially the carpenter bees and honey bees play major role in cross pollination of passionfruit flowers. Hand pollination has been proved to increase passionfruit yields

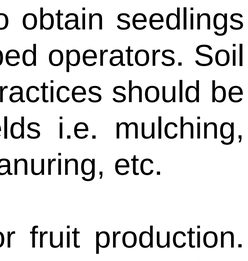
Fruit maturity indices and harvest

Fruits are harvested when they are 75% turning yellow or

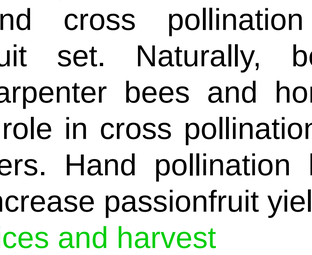
Purple. Purple passionfruits at the light purple stage are more suitable for long distance transport. In some cases, fruits are allowed to abscise and fall, and then picked from the ground. Do not harvest immature fruits as it will have unripe flavor.

passionfruit Pests

1. Aphids- Sucking pests and are vectors of most passionfruit viruses. Aphids are more severe during dry season

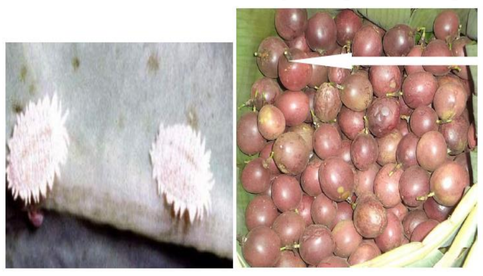


2. Thrips (*Thysanoptera spp*)- Tiny sucking insects. They suck sap mainly from passionfruit flowers resulting into flower drop.



3. Mealy bugs(*Planococcus citri*)

These are mobile sap sucking pests usually covered in woolen like coatings. They normally attack the vines, leaves and fruit stalks. The feeding effect of mealy bug is sooty molds (black substance). Mealy bugs are usually associated with ants that offer protection against natural enemy and ants benefit from honey like substances produced due to mealy bug feeding.



Sooty moulds on fruit stalks as a result of mealybugs infestations

Pest management

The above pests can be managed in the orchard through integrated pest management:

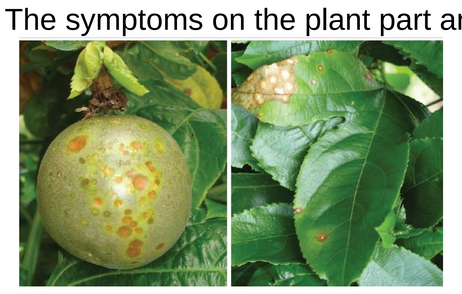
- Appropriate orientation of orchard supporting structure
- Regular monitoring to detect infestation early before economic threshold
- Appropriate pruning of orchard
- Use of chemical pesticides appropriately and carefully

Passionfruit diseases

1. Brown spot- A common air-borne fungal disease affecting stems, leaves and fruits. The disease symptoms on different parts are shown below



2. Alternaria spot- Also an air-borne fungal disease and it`s almost similar to brown spot but its caused by a different pathogen. The symptoms on the plant part are shown.



Control of brown spot and Alternaria spot

- Pruning and removing infected canes and leaves and opening up the canopy to allow better aeration
- Affected leaves retained in the canopy should be removed to reduce spore numbers
- Application of appropriate fungicides (e.g Azoxytrobin, copper based fungicides, etc.

3. Anthracnose- Also a common air-borne fungal disease which attacks all aerial parts of passionfruit plant. The symptoms on fruits, leaves and stems are shown.



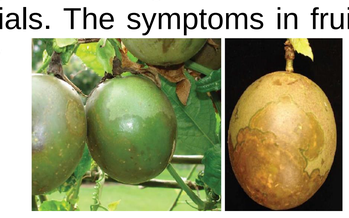
Anthracnose symptoms

- In fruit, lesions can cover large areas of the surface and at first infection is superficial but as the fruit matures, lesions may extend to the pulp.
- On leaves, the disease causes brown spot and the centre of the spot is brittle and breaks apart.
- Infection of the tendrils and canes can be seen as dark brown lesions and results in die-back of canes and tips.

Control of Anthracnose

- Pruning to remove affected canes and leaves to open up and improve ventilation of the canopy
- Pruning should be followed with application of a protective fungicide

4. Grease spot- This is a bacterial disease common in most passionfruit orchards. The infection is favored by heavy rains. Spots are initially small, dark green and oily. It later develops into large round greasy and/or water soaked lesions on fruits. The fruit later forms hard greasy spot in dry conditions. The bacterium enters the plant through wounds. The disease is spread through pruning tools and planting materials. The symptoms in fruits is shown below



Control of grease spot disease

- Use clean planting materials
- Disinfect pruning tools after pruning one plant before pruning the next.
- Also disinfect hands after handling diseased plants
- Removal and burning of infected plants is recommended

5. Collar rot/Black leg

This is a soil borne fungal disease favored by cold and wet weather conditions. Early symptoms of the disease are purplish spots on the bark of the trunk and later progresses and the trunk become girdled leading to wilting of leaves and stem. Eventually the entire plant dies.



Control of collar rot

- Use grafted seedlings with the yellow passionfruit type as rootstock.
- Ensure good drainage in the feed
- Soil drenching using fungicides may reduce the problem

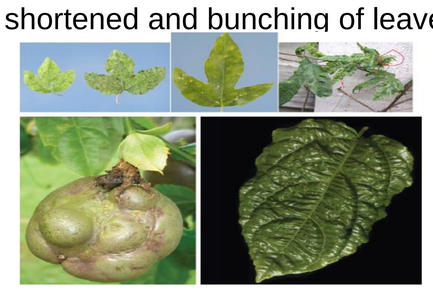
PASSIONFRUIT VIRUS DISEASES

i. Passionfruit woodiness virus,
ii. Passionfruit mottled virus
iii. Passionfruit crinkled virus

These virus diseases are vectored mainly by aphids but the major source is through vegetative propagation of passionfruit. Infected plants cannot be cured and severe symptoms manifests on plants with nutrient deficiencies.

Symptoms on infected plants include;

- Infected fruits become distorted, with a thick, hard and woody rind. Sometimes, the distortion causes the fruit to crack.
- Pulp yields are much reduced and the fruits are not marketable.
- Leaves of infected vines become crinkled and distorted
- Yellow spots, flecks or mottling
- Plants are stunted, the stems are shortened and bunching of leaves occur



Management of passionfruit virus

- Use virus free planting/grafting materials
- Remove and destroy infected plants to avoid further virus spread whether by vegetative propagation or aphid infestation
- Disinfect tools when pruning from one plant to another
- Control of the vectors may assist