

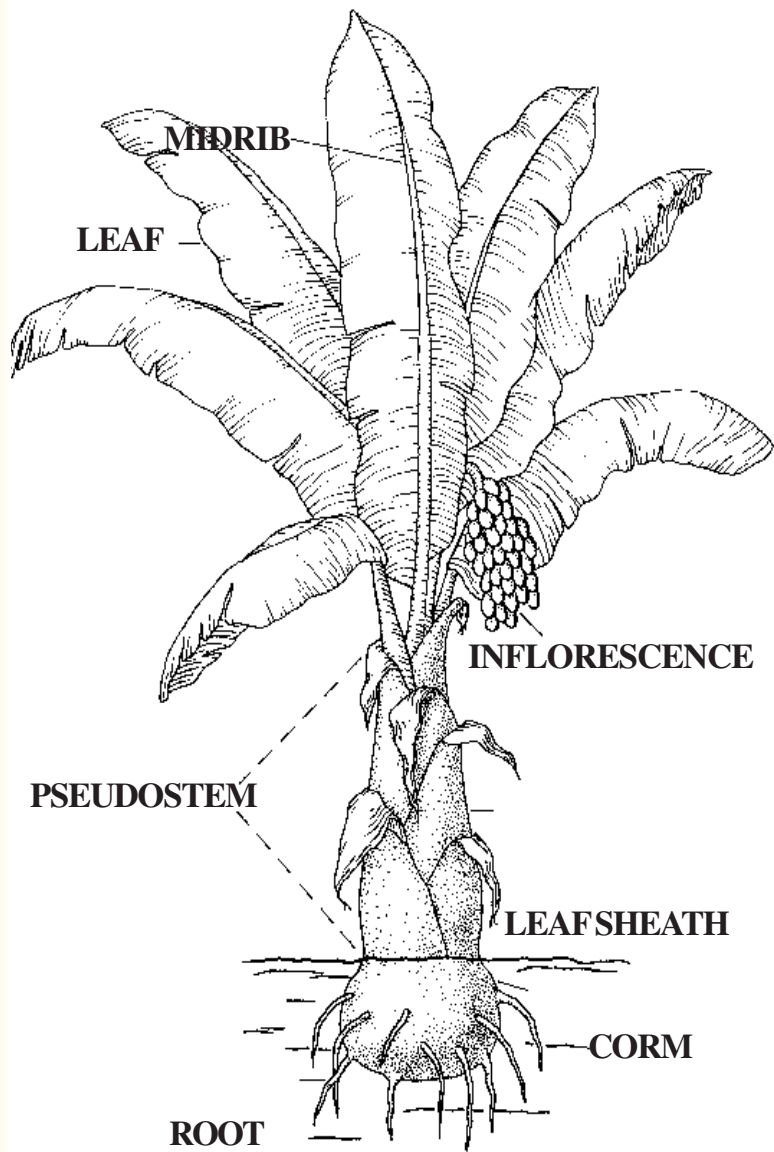


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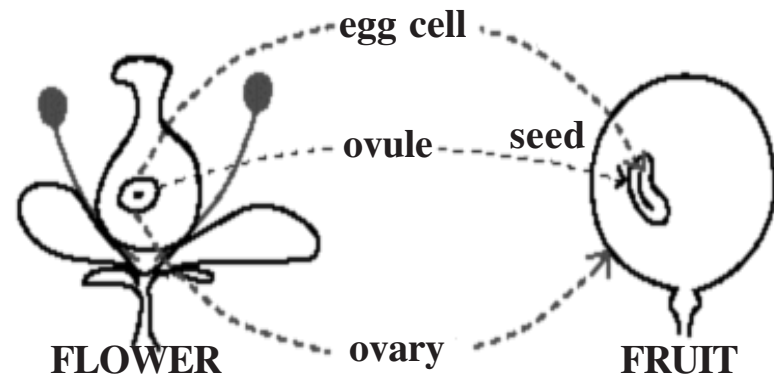
BANANA



FLOWER

FRUIT

Ovary	_____	Fruit
Ovule	_____	Seed
Egg cell	_____	Plant embryo

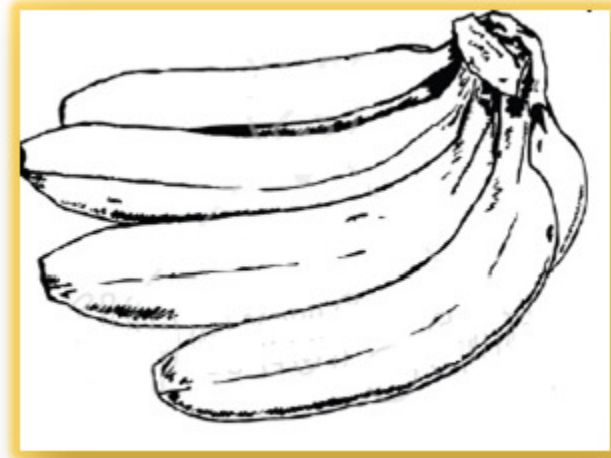


- Pseudostem and corm cut crosswise will show brown to purple color of the vascular tissue with a reddish tinge extended throughout the pseudostem and the fruit stalk but no symptom is observed on the fruits.

Control Measures

- Plant tolerant banana cultivars e.g. Saba or Cardaba.
- Plant/replant only with disease-free planting materials.
- Implement sanitation practices on tools moving equipment and infected materials to prevent spread of the disease.
- Remove disease mat including healthy plants found within a 5 m radius and treat the soil with formaldehyde solution if possible or fallow the soil for one year.
- Minimize cultivation to prevent the spread of the disease.

BANANA



Banana (*Musa sp.*) is one of the most common and widely grown fruit crops in the Philippines. It is also one of the country's major dollar earners, and banana has consistently ranked next to coconut oil and prawns in terms of value earning during the last five years. In 1993, banana topped local production of other major fruits such as pineapple and mango.

Banana has many uses. The ripe fruit is pureed, candied, and preserved in various forms when not eaten fresh. Its extract is used in the manufacture of catsup, vinegar, and wine. The unripe fruit is powdered and chipped. Among the more popular varieties are the Bungulan, Lacatan, Latundan, Saba, and Cavendish.

In rural areas, the young leaves are pounded and applied to injuries to suppress bleeding. The leaves are also used widely as packing materials for fruits and vegetables in market centers. Banana fiber is woven into rope, and mat. Sheets of paper and paper boards are also made from banana peel. Banana blossom is exported dried and usually added to meat recipes.

VARIETY

Banana is native to Southeast Asia where the climate is warm and humid.

Of the 57 banana cultivars, the following are the most common in the Philippines:

SABA grows to as tall as 20 feet; fruit is angular; has thick peel that is green when unripe, yellow when ripe; flesh is white when ripe; gestation period is 15 to 16 months.

LAKATAN grows to a height of five to nine feet; fruit is round, seedless; has thick peel that is green when unripe, yellow-orange when ripe; gestation period is 14 to 15 months.

LATUNDAN grows from six to 10 feet tall; fruit is round; has thin peel that is green when unripe, yellow when ripe; flesh is white when ripe; gestation period is 12 months.

BANGULAN fruit is round, very sweet, seedless, and easily rots; has thick peel that is green when unripe and remains green when ripe; flesh is white when ripe; gestation period is 12 months.

CAVENDISH reaches five to 10 feet high; fruit is bigger than Bungulan; peel is green when unripe, yellow when ripe; flesh is yellow when ripe; export quality; gestation period is six to eight months.

Other varieties grown in the country include the Morado, Pitogo, Los Baños, Señorita, Tindok, Gloria, Granada, and Tumok.

CLIMATE AND SOIL REQUIREMENTS

CLIMATE

Bananas are very sensitive to strong winds. If bananas are planted in places frequently visited by strong winds, they should be provided with windbreakers. Wind velocity of 40 to 50 km per hour can cause

- Remove infected leaves to prevent faster spread of the disease. Cut whole leaf when 75% entire leaf is spotted, 50% or less infection must be trimmed to remove spotted areas. Deleafing should not be overdone.
- Provide drainage canals to avoid water logging which triggers high humidity favorable for disease development.
- Maintain proper plant nutrition.
- Institute a planned chemical control program. For small farmers, apply fungicidal spray at the rate of 100 li/ha with either Dithane M-45 at 3-5 g/li, Daconil at 2 g/li, or Benlate at 1-2 g/li water at an interval of 14-21 days. Proper and adequate shaking of the spray solution must be maintained to avoid phytotoxicity on banana leaves and fruits.

PANAMA DISEASE (Fusarium Wilt of Banana)

Introduction

Panama disease or Fusarium wilt is a highly destructive disease affecting the vascular system of banana. The casual organism is a soil-borne fungus. *Fusarium oxysporum* f. sp. cubense which colonizes and occludes the xylem of susceptible cultivars to cause a terminal wilt. Chemical control measures are not effective against the disease and soil, once infected with the pathogen it cannot be planted with susceptible cultivars for up to 10 years or more. Latundan, Señorita and Lakatan are very susceptible to this pathogen. Recently Cavendish succumbed to the new race (Race 4) of this disease. Saba or Cardaba, on the other hand, is a resistant cultivar.

Symptoms

- Early symptom is the yellowing, collapse and drying of the older leaves.
- The inner leaves exhibits the same symptoms one after the other until all the leaves turn yellow and wilt.
- The pseudostem may develop a crack at the base and will remain standing for several weeks until decays.

Transmission

Once *P. nigronevosa* Coq. acquired the virus after feeding on an infected plant, it can transmit the virus to a healthy plant throughout its life. The virus multiplies, translocated to all parts of the plant and stays there for life. The earliest symptom appears 28 days after infection.

BANANA FRECKLE

Introduction

Banana freckle is caused by a fungus, *Phyllostictina musarum* (Cooke) Petr. It is commonly found on the older leaves of susceptible cultivar. Sometimes, it is called black spot because of the numerous black spots formed by the pycnidia of the fungus. Lakatan, Latundan, Cavendish and Saba or Cardaba are susceptible while Seniorita is resistant.

Infection

The pycnidia of the fungus infect the upper leaf surfaces. Heavy infestation can affect even the fruits and sword sucker leaves. Pycnidia are carried by wind and water. When water contaminated with spores trickles into the cigar leaf and the leaf unfurls and matures, the spore lines appear.

Symptoms

Its symptom consists of numerous rough, black spots about 1 mm in diameter formed in the midrib and lamina of the older leaves. The spots may coalesce to form large blackened areas on upper leaves which can result in serious defoliation. Freckles may also be present in the transition leaves and bracts. Infected fruits are full of blemishes which lessens their quality.

Control Measures

- Space bananas according to the recommended population per unit area in relation to the variety to avoid overlapping of leaf canopy that would create a favorable microclimate for disease development.

crowns while wind velocity of 95 km per hour can cause complete destruction of the banana plant. In the absence of windbreakers, banana plants should be planted on the leeward side not the windward side.

It is best grown in warm moist regions or areas with temperature ranging from 15 °C to 35 °C. Above 35 °C it is not good for growing bananas.

Growth is impaired when rainfall drops below 10 cm a month. Banana's rainfall requirement is 20 cm – 22 cm distributed evenly throughout the year.

Regions with long dry season could also be developed with banana plantation provided that there would be a good irrigation facility.

SOIL

Banana grown from the poorest to the richest type of soil with varying success, but banana is well adapted to well drained sandy or clay soil that is rich in organic matter. Soil pH preferred by banana is 4.5 to 7.5.

Banana is very sensitive to water logging, hence, required a deep, moist fertile and well-drained soil.

It can grow in flat and rolling terrain. Newly opened forest lands are ideal for growing banana. Ravines and hilly areas can also be utilized provided erosion control and production practices are considered.

PROPAGATION

Secure virus-free planting materials like tissue-culture bananas from reputable tissue culture laboratories. If none, select sword-leaf suckers, maiden-leaf suckers, water suckers or even peepers growing in a disease-free mat for planting.

LAND PREPARATION

The field is disc plowed and harrowed thrice. All stumps and bushes must be removed. Size and shape of the hole will depend

on the kind of planting materials. Knee-deep holes with 45cm diameter are dug and each hole is fertilized with 10 grams of complete fertilizer and a few of granular nematodes.

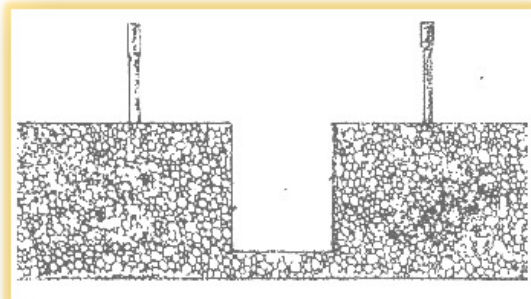


PLANTING

Distance of planting

Lakatan	3-4 meters apart
Latundan	3-4 meters apart
Bangulan	3-4 meters apart
Cavendish	2-5 meters apart
Saba	4-7 meters apart

Dig a hole large enough to accommodate the corn or ball of soil that goes with the seedling.



- Institute a planned chemical control program. For small farmers, apply fungicidal spray at the rate of 100 li/ha with either Dithane M-45 at 3-5 g/li, Daconil at 2 g/li, or Benlate at 1-2 g/li water at an interval of 14-21 days. Proper and adequate shaking up of spray solution must be maintained to avoid phytotoxicity on banana leaves and fruits.

BUNCHY TOP

Introduction

Banana bunchy top is the most important virus disease affecting the *Musa* family. It was recognized, as a disease in Fiji in 1889. In 1990, Taiwan reported its occurrence and was in Egypt in 1901. In Australia, symptoms were seen in 1913. In the Philippines, it was reported that bunchy top first appeared in abaca. It is caused by a virus with isometric particles transmitted by a brown banana aphid comma. *Pentalonia nigronervosa* Coq. That feeds and multiples primarily on banana, abaca, gabi-gabi and camia. They were commonly found in the funnel leaf and in between leaf sheaths of banana and abaca.

The disease is called bunchy top due to its rosette appearance with narrow, upright and progressively shorter leaves.

Control Measures

- Use virus-free planting materials e.g. suckers or tissue culture derived plantlets.
- Immediate removal of infected plants using the following strategy:
 - 1) Spray plants growing within a radius of 6m including the soil with suitable insecticide to kill the aphids. Twenty-four (24) hours after spraying, completely dig out the plants, chop into small pieces, allow to dry to prevent regrowth, or 2) Twenty-four hours after the spraying, cut the pseudostem close to the ground, chop into small pieces and allow to dry. Stop the middle of the remaining pseudostem in the ground with herbicide impregnated bamboo stick (2-4-D or round up + urea) to prevent regrowth. If regrowth occurs, repeat application to the sucker arising from the same mat.
- Regular spraying of insecticides e.g. diazinon, malathion, pyrethroids, etc. at manufacturer's recommendation to control aphids.

Infection

Infection of the disease leads to early drying of the leaves; resulting in the production of small-sized bunch and fingers. Saba Cardaba is resistant while Lakatan, latundan, Bungulan and Senorita are susceptible cultivars.

When the conidia are released, they are disseminated by water while the ascospores are discharge during wet periods and dispersed by wind. The furling leaf and the first open leaf are initially infected.

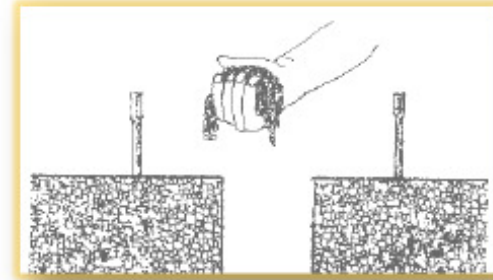
Symptoms

The first symptom of the disease is the appearance of yellow-green specks in the lower surface of the third and fourth youngest open leaf. The specks elongate and expand into clearly visible brown streaks. As the streaks further increase in size, they become elliptical brown spots surrounded by a yellow halo that separate the spot from the normal green leaf tissue. When the spots become fully developed, the central areas turn gray, which eventually are surrounded by dark brown or black margin with yellow halo. The spots group together to form large areas of light brown, dried-up leaf tissue. This leads to premature drying of the leaves. Moreover, it accelerates fruit maturation which leads to premature ripening and result in low yields.

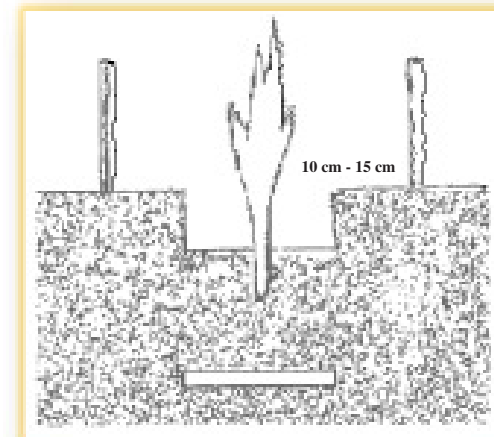
Control Measures

- Space bananas according to the recommended population per unit area depending on the variety to avoid overlapping of leaf canopy that would create favorable microclimate for disease development.
- Remove infected leaves to prevent faster spread of disease. Cut whole leaf when 75 percent of entire is spotted, 50% or less infection must be trimmed to remove spotted areas. Deleafing should not be overdone.
- Provide drainage canals to avoid water-logging which triggers high humidity favorable for disease development.
- Maintain proper plant nutrition.

Put the right amount of basal fertilizer, be it organic or inorganic.



Cover the fertilizer with at least one inch thick of soil.



Remove the seedling from the plastic bag, and plant. Fill the hole with soil and pack gently to hold the seedling in place. Leave a hollow space 10 cm to 15 cm from the surface of the soil to avoid floating suckers when the bananas are fully grown and producing suckers already. Water after planting.

CULTIVATION AND MAINTENANCE

Cultivation should not go beyond six inches from the base of the plant to avoid root injury. Intercropping between rows can control weed growth. Commercial sprays, such as Glamoxine or Karmex control weed. Plants must be propped up with bamboo poles during fruiting for support against strong winds. Propping is done as soon as the inflorescence has already bent.

DESUCKERING OR PRUNING

Unnecessary suckers must be killed by cutting them off from mother plants. Only one or two suckers must be allowed per hill to reduce competition for soil nutrients.

LEAF PRUNING

Deleaf regularly to avoid leaf disease. If there are eight (8) or less leaves in a plant, remove only the dried part and not the whole leaf, even if only the midrib is left, so that photosynthetic active of the plant will not be greatly reduced. Be sure to maintain 8-15 functional leaves in a plant in order to produce big bunches of fruit.

FERTILIZER APPLICATION

During the early stages of growth (1-5 months old bananas), apply the fertilizer 30-60 cm from the base of the plant in a ring or band method. Follow the same procedure on older plants.

Divide the recommended amount of fertilizer in 12 equal parts, if you prefer to apply every month. If labourers are few, divide the recommended amount into four parts.

Use the first part as first application as basal fertilizer at planting time. Every three months, apply one part of the remaining recommended fertilizer around the plant. If suckers are allowed to grow, apply the fertilizer in band 30-60 cm away from the base of each sucker. However, if the land is hilly, apply the fertilizer on the uphill side of the plant. Be sure to cover the fertilizer, then water after application.

IRRIGATION AND DRAINAGE

In areas with long dry period, irrigation is very necessary. It can be applied by overhead sprinkler, furrow irrigation, drip or trickle irrigation especially during wet season. Construct drainage canal to prevent waterlogging.

even when ripe. It is caused by the bacterium *Pseudomonas solonacearum*, a strain which is less virulent compared to that causing the Moko disease.

Transmission

The ingress of the bacterium is believed to be above ground and carried by insect since even if the mother plant is infected, sucker are not.

Symptoms

- Internally, brown vascular streak are observed in the fruit peduncle, fruit stem, and the pseudostem at extreme cases. Discoloration sometimes extends to the corm.
- No writing or death of plant can be observed, however, the fruit is hard even when ripe or cooked.
- Bracts of the male bud fail to death or fall off even if these were already dried.

Control Measures

- Regular stem sanitation and deleafing.
- Early debudding or removal of male bud when the “false hand” appears.
- When bagging is possible, bag the inflorescence at bending stage with about 0.75 x 1.5 m bagging material (plastic bags, cement bags, sacks or any suitable material) with an open end. Remove the bag and debud when the “false hand” appears.

YELLOW SIGATOKA (Leaf Spot of Banana)

Introduction

The causal organism of yellow sigatoka is a fungus, *Mycosphaerella musical* Leach ex. Mulder. The fungus produces spores called conidia and ascospores. This is present in all banana areas of the world.

- After the streak stage, spots develop in a similar way as in yellow sigatoka.
- Specks elongate into reddish-brown streaks which later become dark brown or black.
- Dense aggregation of the black streaks may form and when these areas become water soaked, the leaf turns black, dries up rapidly and become brown.

Control Measure

- Space bananas according to the recommended population per unit area depending on the variety to avoid overlapping of leaf canopy that would create favorable microclimate for disease development.
- Remove infected leaves to prevent faster spread of disease. Cut whole leaf when 75% of entire leaf is spotted, 50% or less infection must be trimmed to remove spotted areas. Deleafing should not be overdone.
- Provide drainage canals to avoid water logging which triggers high humidity favorable for disease development.
- Maintain proper plant nutrition.
- Institute a planned chemical control program.

For small farmers, apply fungicidal spray at the rate of 100 li/ha with either Dithane M-45 at 3-5 g/li, Daconil at 2 g/li, or Benlate at 1-2 g/li water at an interval of 14-21 days. Proper and adequate shaking up to spray solution must be maintained to avoid phytotoxicity on banana leaves and fruits.

BUGTOK DISEASE

Introduction

Saba or Cardaba and to some extent Latundan have been observed to be infected with the disease called Bugtok or “Tibagnol”. This term is used to describe the infected fruits which are discolored and hard

FRUIT CARE

PROPPING

Once the inflorescence of the banana is out, prop the plant to support it until harvest. Reposition the props and cut leaves that touches the fruits during the early fruit development stage.

BUNCH SPRAY

When three hands are out, spray the bunch with appropriate insecticide and fungicide to prevent thrips and other insects that may damage the fruits and fungal disease too. Spray at weekly interval until the fruit false appears.

Removal of the style, perianth and male bud

For phyto sanitary purposes, remove the perianth and the style while the bunch is still young. This is usually during the bagging operation. The male bud is removed immediately after the false hand has appeared and the fruits start to curve up.

BAGGING

Bag the bunch to protect it from pests and to hasten maturity. This is done when the last hand has emerged.

HARVESTING

Regardless of variety, the maturity of banana can be distinguished when the last leaf turns yellow. The angle formation of the fingers also determines ripeness. The rounded the angle of the fingers, the more mature they are. **Saba** is harvested 15 to 16 months after planting; **Lakatan**, 14 to 15 months; **Latundan**, 12 months; **Bungulan**, 12 months; **Cavandish**, six to 8 months.

Harvesting needs two people, to serve as the cutter and the backer. It involves cutting deep into the middle of the trunk and letting the top fall gradually until the bunch is at the reach of the backer. The peduncle is cut long enough to facilitate handling. Use shoulder pad to protect fruits. Avoid dropping the fruit bunches.



Fruits for immediate shipping are harvested five to 10 days before ripening. Bananas for marketing are packed in crates as tightly as possible to lessen unnecessary vibrations during transport.

POSTHARVEST HANDLING

MATURITY INDEX

- Fullness of finger in Lakatan, Latundan and Cavandish.
- Weeks after shoot appearance.

Cuarenta Dias	6 – 7
Lakatan	12 – 14
Saba	20 – 24
Latundan	9 – 10
Bungulan	12 – 14

MARKET PREPARATION

- Remove dried flower parts and dehand bunches.

Control Measures

- Early detection and elimination of infected plants by cutting the pseudostem and digging up the corms.
- Spray the remaining plant parts with herbicides. Remove also all the other surrounding banana plants.
- Follow the area where the infected plant had been removed for at least 3 months.
- Disinfect tools with 10% formaldehyde solution for at least one minute before using.
- Improve drainage condition of the area.
- Minimize cultivation to prevent the spread of the disease.

BLACK SIGATOKA (Leaf Spot of Banana)

Introduction

Black leaf streak or black sigatoka was recognized for the first time in Fiji in 1963. Since then, it has been found elsewhere and had steadily replaced yellow sigatoka in banana producing countries. It is caused by a fungus, *Mycosphaerella fijiensis* and is considered to be more virulent than yellow sigatoka. Saba or Cardaba is resistant while Lakatan, Latundan, Bungulan and Señorita are susceptible cultivars.

Infection

When the conidia are released, they are disseminated and dispersed by the wind. The unfurling leaf and the first open leaf are initially infected.

Under a crowded canopy and humid condition, the conidia can rapidly spread the disease in a susceptible variety.

Symptoms

- Initially, tiny brown streaks appear on the underside of the third and fourth leaf.

- Avoid intercropping banana with Cucurbits or other alternate host of the insect vector.
- Use virus-free planting materials e.g. suckers or tissue culture derived planting materials.
- Control of weeds through mechanical method or with the use of herbicide.

MOKO (Bacterial Wilt of banana)

Introduction

Moko disease or bacterial wilt is a highly contagious disease that kills an infected banana in just a few weeks. It is caused by a soilborne bacterium, *Pseudomonas solanacearum* E.F. Smith. Cavendish, Latundan, Lakatan, Morado, Señorita and Saba are susceptible cultivars.

Infection

The disease can be transmitted through the use of contaminated tools and by flower-visiting insects. The movement of the bacteria in the soil via root transfer is low but the presence of water results in the rapid spread of the bacteria to lower areas. Symptoms are visible in 10 days or more after the entry of the bacteria into the plant.

Symptoms

- The second to fourth youngest leaves turn pale green or yellow and break down at the junction of the petiole with the lamina or the pseudostem.
- Presence of grayish-white or brownish ooze on longitudinal cut pseudostem or corm.
- Blackening of the fruit pulp.
- Deformed fingers prematurely turn yellow.
- Sliced fingers show dry-rotting of the pulp with brown or black color.

- Trim the crown.
- Wash in 5 percent alum solution (50 g alum per liter of water) to prevent latex (dagta) staining.
- Sort fruits according to size and quality (free from defects, mechanical damage, and overripe fruits)

PACKAGING

- Pack fruits in crates as tightly as possible to prevent bruising during transport due to vibration.
- Line crates with perforated plastic sheets to prevent abrasions which result in unsightly bruises.

STORAGE

- Pack green and damage-free fruits on 0.05 mm polyethylene bags with ethylene absorbent.
- Store at temperature not lower than 12°C.

RIPENING

- Induce ripening of fruits using ethylene gas, ethephon, or calcium carbide (kalburo).
- Ventilate fruits adequately after exposure to carbide.
- Keep ripe banana in a cool dry place but do not refrigerate.

BANANA PROCESSING

BANANA CHIPS

- Sweetened or salted banana chips are prepared from hard, green Saba or Cavendish.
- Prepare Brix syrup or “arnibal” for sweetened chips by mixing three parts sugar to every one part water.

- Clean, peel and slice the bananas to about .05 to 1.0 mm thick. Soak in cooking oil, turning frequently to prevent sticking.
- Place the banana chips in a strainer, allowing the oil to drip while heating cooking oil in a pan. Dip and fry the chips in the cooking pan without removing them from the strainer. Turn until yellowish brown, then lift the strainer and allow the oil to drip.
- Soak the fried chips in “arnibal” for two to three minutes. Let the syrup drip, then fry again until the chips become shiny.
- Let cool before packing or placing in bottles, cans or plastic bags.

For salted banana chips, use salt instead of refined sugar and soak in salt solution instead of “arnibal”.

PASTILLAS DE SAGING

- Boil ripe Saba, then peel and slice to 3-cm thick.
- Prepare half a cup of water for every two cups of sliced banana and 300 grams sugar for every kilo of the same. Mix and mash the ingredients and cook in low heat while mixing until the ingredients become uniform, shiny and no longer stick to the pan.
- Transfer the mixture to a kneading board covered with wax paper and with sugar sprinkled over it. Press with a rolling pin until the mixture becomes 1-cm thick, then add butter and sugar according to taste. Slice to pieces 4 cm x 4 cm thick. Let cool before packing in candy wrappers.

BANANA WINE

- Peel ripe bananas and slice thinly.
- Measure. To every one part sliced bananas, add one-and-a-half parts water.
- Boil for 30 minutes or longer depending upon the quality of the pulp.
- Strain.

BANANA BRACT MOSAIC

Introduction

Banana bract mosaic is a disease which was first recognized in the Philippines in 1988 and thought to be just another strain of banana mosaic or infectious chlorosis. It was found to have spread in almost every established field planted to “Caradaba” or “Saba” in the country wherein yield losses reached as high as 30-40%. The disease also occurred in “Cavendish” and “Lakatan” in Davao City, Davao del Sur, Davao del Norte and General Santos City.

Banana bract mosaic disease is caused by a flexuous, filamentous virus particle.

Transmission

Banana bract mosaic is transmitted by two aphid vectors which are scientifically known as *Rhopalosiphum maidis* fitch (cotton aphids) and *Aphis gossypii* Glover.

Symptoms

Symptom expression may take place at any stage of plant development.

At the initial stage, an infected plant exhibits the presence of a continuous greenish to brownish spindle shaped streak of long continuous/discontinuous stripes scattered irregularly along the leaf petiole. As the disease progresses, similar discolorations become very distinct on the bract of the male bud and fruit bunch. In severe cases, the leaf shows distinct discontinuous dashes and streaks along the primary vein while on the pseudostem, spindle shaped streaks to stripe discoloration of varying lengths and sometimes scattered mottle appears after removal of the dead leaf sheath.

Control Measures

- Removal of infected plants. This is done by immediately excavating the infected plants and cut into piece to dry.

The commercial cultivars of banana e.g. Latundan, Lakatan, Cavendish, etc. Are susceptible to this disease.

Transmission

Transmission from infected cucurbits to banana occurs by means of aphids vectors of which *Aphis gossypii* Glover is the most important. The corn aphid, *Rhopalosiphum maidis* Fitch was also found to transmit the virus.

Control Measures

- Removal of infected plants.
- Control of weeds and aphid vectors during three growing period.
- Use of virus-free planting materials.
- Continuous monitoring and inspection of banana plants.

Symptoms

- Early symptoms consist of small, white and yellow spots which are usually confined to one side of the leaf.
- Later the spot coalesce to form linear streaks or bands on the lamina.
- The streaks may be either continuous broken and in some cases, may form elongated, irregular bands with ring-spot type pattern.
- Localized browning and necrosis on portions of the streaks and bands usually occur later. Emerging leaves are misshapen with irregular wavy margins due to the uneven development of the lamina.
- Rarely, normal leaf comes out but it eventually dries up resulting in a heart rot condition. The rotting of the heart leaf subsequently develops as soft rot down to the stem.
- Fruit from infected plants may appear normal, may exhibit chlorotic streaking or may show necrosis.

- Add sugar to the extract (one part sugar to every three parts extract).
- Stir and boil to dissolve the sugar. Sugar content should be 22-24 degrees. Brix.
- Allow to cool.
- Place in clean glass containers or demi johns.
- Inoculate with yeast (one tablespoon Red Star yeast to every 40 liters of boiled sweetened juice).
- Plug mouth of demi john a clean piece of paper to protect from dust.
- Ferment for a month.
- Siphon out the clear fermented liquid.
- Filter and transfer to a sterilized oak barrel for aging.
- Cover hole with a wooden plug and seal with melted paraffin.
- Age for two years or longer.
- Clarify the wine with eggwhites (eight eggwhites for every 30 liters of wine by heating the aged wine in steam bath or a double boiler to a temperature of 55-60 degrees Celsius while adding the well-beaten eggwhites.
- Stir for 15-20 minutes to maintain the temperature.
- Cool.
- Filter the wine by siphoning into clear and sterilized bottles.

BANANA VINEGAR

Materials

One part peeled ripe bananas (25 pieces, medium-sized)

Two parts water

¼ part sugar

Procedures

- Wash ripe bananas.
- Peel and cut into pieces.
- Add water and boil for five minutes.
- Cool.
- Strain.
- Add sugar and heat again.
- Cool again.
- Pour into suitable containers.
- Add one teaspoon yeast for every kilo of fruit used.
- Plug mouth of container with a piece of paper to protect it from dust.
- Ferment for two to three weeks.
- Siphon out clear, fermented liquid into a sterilized container.
- Add 100 cc of mother liquor to every kilo of fruit used.
- Plug mouth of container with cotton and cover it with clean paper.
- Ferment for one to two months.
- Pasteurize at 70 degrees Celsius for 20 minutes.

BANANA FIGS

- Select firm, ripe Cavendish bananas.

- Peel.
- Blanch for 30 seconds in boiling water.
- Drop bananas into boiling syrup made up of one part water and ¾ part sugar. Brown sugar may be used.
- Cook for one minute.
- Remove from fire and let bananas soak in the syrup overnight.
- Drain bananas.
- Add ¼ part sugar to syrup and boil.
- Add bananas and cook for one minute.
- Everyday for three more days, concentrate syrup by boiling for five to seven minutes.
- Soak bananas. On the final consistency.
- Soak bananas in the thick syrup for a week to plump and be thoroughly impregnated with syrup.
- Drain bananas and dry. The figs when dried can be handled without sticking to the finger.

PEST AND DISEASES

BANANA MOSAIC

Introduction

Banana mosaic, also known as infectious chlorosis or heart rot is caused by cucumber mosaic virus (CMV) which has a worldwide distribution and found in most Musa-growing area.

The virus particle which is spherical in shape has a wide host range which includes: cucurbits, solonaceous crops, corn, and several broadleaf weeds like commelina.