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# FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

# Cultivation of Banana

- Botanical Name : *Musa paradisiaca* L / *M. cavendish*i L
- Family : Musaceae
- Chromosome No. : 2n = 22, 33, 44

Banana is an important fruit of tropics. The fruit is recognized as the fourth most important global food commodity. India's share is 32 per cent of the total fruit production. This is the only tropical fruit which is exported in large quantities and is leading fruit in the international trade. It is one of the oldest and commonest of the Indian fruits that has been cultivated since ancient times. Eve was said to have used banana leaves to covers her modesty in the garden of paradise. Banana is thus called apple of paradise. It is also known as "Adam's fig or tree of wisdom. It is used as staple fruit in most of the African countries and is used as ripe (table) or raw fruit (cooking). This fruit is available throughout the year. All the plant parts are being used.

## Uses and Composition

- Banana by virtue of its, multiple uses is popularly known as **"Kalpataru"** (a plant with virtue).
- Usually banana is eaten when ripe as dessert / table fruit.
- Plantain or cooking bananas are the staple food of people in many countries of central and western Africa.
- Apart from fresh consumption, some types are also used for culinary purposes.
- The flower bud and also the central core of the pseudostem are used to prepare tasty dishes.
- Banana leaf is used as plates for serving food, leaf sheaths are used as wrapping material and dry leaves as fuel, while, tender pseudostems, leaves, underground rhizomes are used as cattle feed.
- Various processed products like banana chips, toffee, puree, powder, flour, vinegar, jam, jelly and wine can be prepared from the fruit.
- Banana fiber can be made in to attractive napkins, table mats and carry bags.
- The fruits have a lot of medicinal properties and are used for treating various health disorders specially acidity, ulcer, joint pains, high blood pressure and heart diseases.
- Banana is rich source of energy (350 to 550 kilo joules/100g) and is a good source of minerals and vitamins.
- It contains 73 per cent moisture, 25-30 per cent carbohydrates, 1.4 per cent protein, 0.3 per cent fat, 0.5 per cent mineral matters (Ca, Fe, P, K) and Vit- C and K.

## Origin and Distribution

- The origin of banana is believed to be in the hot, tropical regions of South-East Asia, stretching from India to Papua New Guinea, Malaysia and Indonesia.
- India has the second largest diversity of indigenous bananas in the world.
- India has more than 300 germplasms, out of 600 reported worldwide.
- Edible Banana has arisen as a result of natural crosses between two wild progenitors viz,. *Musa paradisiaca* and *Musa balbisiana*.

- Banana is being grown in many of the African countries between 300 N and 500 S latitudes.
- Important countries are India (1st place) with a total production of 17 million tons from an area of 0.50 million hectare, and the other countries growing banana are Kenya, Uganda, Sudan, Fizi, Honduras, Hawai, Canary Island, Philippines, Taiwan, Australia, Bangladesh, South Africa, Pakistan etc.
- In India, it is the 2nd major fruits, occupying about 20 per cent of the total area under fruit crops and 32 per cent of total fruit production, Tamil Nadu (88,000 ha.), Maharashtra (59, 000 ha.), Karnataka (61, 000 ha.), Assam, Andhra Pradesh, Orissa, Gujarat and Kerala are the leading producers.
- Though, India is the leader in banana production, Indian export of fresh banana is meager (12 million tons).

## Soil and Climate

- Banana can be grown in almost all types of soil provided adequate soil moisture is available.
- Deep well drained, loamy soil with adequate organic matter is ideal for its cultivation.
- The plant has restricted root zone. It can grow well in slightly alkaline soils.
- Though banana requires large quantity of water, it cannot tolerate water stagnation.
- The optimum soil pH is 6.5-7.5.
- Banana being a tropical fruit crop, adapted to wide range of climatic conditions.
- It is grown up to an altitude of 1200 m from mean sea level.
- The temperature range is 13-40$^0$C, but the optimum is 25-30$^0$C for getting good yield, Heavy storms, frost, low temperature (Less than 10$^0$C) or extremely high temperature are detrimental to plant growth which leads to abnormal or malformed condition.

## Species and Cultivars

**Species and cultivars**: The family musaceae has two genera viz.,. Ensete and Musa with about 50 species.

1. **Ensete**-It is an old genus, which probably originated in Asia and spread to Africa. It has about 6-7 species, of which Ensete and Ventricosa has been reported to be grown as a food crop.
2. **Musa** –It is having 40-45 species, all the varieties under these species are under cultivation. The genus Musa is divided into following sections.

- **Eumusa (2n=22):** This is the largest section with 13-15 species, all are cultivated forms; Pseudostem usually exceed 3 m in height with pendent or semi pendent inflorescence, produces 10-25 nodes of flowers and covered with dull brown colour bracts, gives the edible cultivated parthenocarpic banana and are derived from 2 wild species. *Musa accuminata* (A) and *Musa balbisiana* (B).
- **Callimusa: (n=10)** -It is having 5-6 species. Plants with less than 3 mtrs in height, suited as ornamental, parthenocarpy absent completely.

- **Australimusa (2n=20)-** These fruits are parthenocarpic and predominantly female sterile; The fruiting bunch is erect and contains a red sap, the skin is orange in colour when ripe. eg-*Musa textilis* (Manila hemp).
- **Rhodochlamys (2n=22)** -It is having 5-7 species, spreads from India to Indonesia, pseudostem less than 3m height with erect inflorescence, parthenocarpy absent eg-M. ornate & M velutina are sometimes grown as ornamental plants.
- **Incertae sedis-** (x=7; 2n=14) - It is the largest among the Musaceae family, grows to a height of over 10m. eg-*M. ingens & M. beccarii* (x=9, 2n=18).

All the edible bananas are descendents by natural cross between 2 wild ancesters, ie., *Musa acuminata* (A) and *Musa balbisiana* (B). These edible bananas have 22, 33 or 44 chromosomes i.e., Diploids, Triploids and Tetraploids respectively. Triploid cultivars are generally numerous, diploids somewhat less and tetraploid forms are very rare. The basic haploid numbers is 11. Simmonds and Shephered (1995) have distinguished the major morphological charecters of *M. acuminata* and *M. balbisiana*, which are as follows;

| Sl.No | Characters | *Musa acuminata* | *Musa balbisiana* |
|---|---|---|---|
| 1 | colour of pseudostem | Heavily marked with black or brown blotches | Blotches slightly or absent |
| 2 | Peduncle | Usually downy or hairy | Glabrous |
| 3 | Pedicel | Short | Long |
| 4 | Ovules | Two regular rows in each loculus | Four irregular rows in each loculus. |
| 5 | Bract curling | Bracts roll after opening | Bracts lift but do not roll |
| 6 | Bract shape | Lancedote or narrowly ovate tepering sharply. | Broadly ovate not tapering sharply |
| 7 | Bract apex | Acute | Obtuse. |
| 8 | Bract colour | Red, dull purpose or yellow outside, pink dull purple inside. | Brownish purple outside bright crimson inside. |
| 9 | Male flowers colour | Creamy white | Variably flushed with pink. |
| 10 | Stigma colours | Orange or rich yellow | Cream, pale yellow. |

The best known banana all over the world belong to the pure acuminata (AAA) group but the clones which are having both the parents is associated with the greater drought tolerance and resistance to diseases. Eg-AB, AAB, ABB, AA or AAA-suited for rainy condition.

**Genomic constitution**

In India bananas are distributed in southern, eastern, central and north eastern parts within 800 and 300 N latitudes. Major genomic groups and cultivars are AA group:

- AA- Anaikomban, Matti, Kadali, Tongat, pisanglilin.
- AB- Ney poovan (Elakki bale), Kunnan, Nathu Poovan. Thaen kunnan, Adakka Kunnan.
- AAB- Poovan, Rasthali, Pachanadan/Kaali/Galibale, Nendra paditha, Rajapuri, Virupakshi/Sirumalai, Nendran/Rajeli, Chinali.
- AAA- Dwarf Cavendish/Basrai, Giant Cavendish, Robusta, Gross michel, Grand naine, William, Nagabale, Chenkadali/Red banana, Chakkarakeli, Amrit sagar.
- ABB- Nalla Bontha, Monthan/Kanchkela, Keribontha, Peyan, Karpuravalli, Sugandhi.
- AAAA- Bodles Altafort, IC-2.
- ABBB- Klue Taparod
- AABB- Kalamagol
- AAAB- Atan, Goldfinger (FHIA).

**Characteristics of different varieties if Banana**

**Ney poovan/Elakkibale (AB)**:

- It is commercially cultivated in Kerala and Karnataka.
- The plants are medium sized with slender, yellowish pseudostem, having reddish petiole margin.
- Small fruits flesh firm, sweet and highly fragrant.
- The average bunch weight is about 12 kg.
- It is tolerant to leaf spot and fusarium wilt, but susceptible to banana bract mosaic virus.

**Kunnans (AB):**

- It is a back yard cultivar of Kerala and Karnataka.
- The plants are medium sized and slender fruits with firm pulp with good taste.
- Mainly used as infant food after conversion into banana flour.
- It is tolerant to leaf spot and fusarium wilt.

**AAA group: Cavendish sub-group**

**Dwarf Cavendish/Basrai (AAA)**

- It is the most important commercial cultivar of India the plant is dwarf, fruit large, curved, skin thick and greenish, flesh soft and sweet.
- Even after ripening the fruit is greenish in colour, but fruits ripening during winter season develop yellow colour.
- The keeping quality is not good; The average bunch weight is about 20kg and suitable for high density planting, and susceptible to leaf spot disease.

**Gross Michel (AAA)**

- It is the main cultivar of this sub-group.
- Gross Michel was the leading cultivar in the world banana trade until the late 1950.
- The variety has lost its commercial status due to susceptibility to panama wilt.

## Red Banana Sub-group

### Red Banana (AAA)

- This cultivar is grown throughout the world.
- The colour of the pseudostem, petiole, midrib and fruit peel is purplish red.
- The fruit is of good size and has a characteristic aroma.
- The average bunch weight is 20 kg.
- It thrives well in humid tropics and at higher altitudes.
- It is highly susceptible to bunchy top, fusarium wilt and nematode.

## Silk Sub-Group

### Rasthali (AAB)

- It is one of the most popular commercial choicest table cultivar of West Bengal, Tamil Nadu, Karnataka, Andhra Pradesh, Kerala and Bihar.
- The plant is tall and can be easily identified by the yellowish green stem with brownish blotches.
- Reddish margins of the petiole and leaf sheath.
- The average bunch weight is about 12 kg.
- Fruits are medium, thin skin, yellow in colour flesh firm, sweet with a pleasant aroma.
- It has the disadvantage of longer duration, severe susceptibility to fusarium wilt, easy dropping of fruits from bunch.
- Susceptible to sun injury and formulation of hard lumps in the pulp.

## Mysore Sub-group

### Poovan/Champa (AAB)

- The plant is tall, hardy and grows vigorously, one of the distinguishing characters of the plant is the rose pink colour on the outside of midrib, fruit is medium to small, yellow skin firm flesh with sub-acidic taste, good keeping quality, the average bunch weight is about 15kg.
- It is resistant to panama wilt and fairly resistant to bunchy top highly susceptible to banana bract mosaic and streak virus.

**Other varieties/Cultivars**

| | | | |
|---|---|---|---|
| **Grand Naine** | **Wata Bale** | **Kari Bale** | **Monthan** |
| | **Nendran** | **Boodi bale** | |

## Crop Improvement

The commercially cultivated bananas are susceptible to pest and diseases. Also to increase the yield and improve the post-harvest quality of fruits, some of the national and international institutes are working out for improvement of banana crop.

- International Network for Improvement of Banana and Plantain (INIBAP) - France.
- International Institute for Tropical Agriculture (IITA) - Nigeria.
- ICAR: Aduthurai-Tamil Nadu i.e NRC on banana & later it was shifted to Trichy.
- FHIA. i.e Foundacion Hondurena de Investigation Agricola, Handura released different banana hybrids.
- **Indian Institute of Horticultural Research (IIHR)**, Bangalore, KAU, Kannara, Kerala, Fruit Research Station, Kavoor, Andhra Pradesh. All these institutions have worked on collections, evaluation and improvement of banana germplasm for further breeding programme. All the cultivated varieties i.e, 303 cultivars, which are all natural hybrids between acuminata and bulbisiana. Cultivated and edible types belongs to pure acuminata (AA) family.
- IC-1- The first hybrid between Gross michel x Musa acuminata sub species Malacensis developed in 1990 from IITA, Nigeria, resistant banana clone for wilt disease, which is similar to that of Gross michel, a premier cultivar in that zone. It was not accepted because it produces small fruits. Also IC-2, 5-19 - none of them are better than Gross michel. Later,
- FHIA-01: It is popularly known as Gold finger. It is the cross between a dwarf lady finger type ie., Dwarf prata x SH-3142. It is a desert banana, produces heavy bunch (20-25 kg) and has Apple flavour & suitable for export. It is resistant to black sigatoka & fusarium wilt race 1&4.
- FHIA-03: GH-3386xSH3320-It is a Robusta, Disease resistant cooking banana.
- FHIA-04: AVP67xSH3437-A French type hybrid, has very attractive golden coloured pulp, resistant to black leaf streak or black sigatoka resistance.
- FHIA-17: high gate x SH-3362-Cavendish hybrid resistant to black sigatoka.
- FHIA-21: AVP-67x SH3142 resistant to black sigatoka

**The other hybrids are-FHIA-19,20,22**

- **TNAU- C0-1**: It is a multiple cross hybrid involved

Kallar laden x *M balbisiana cv savani*.

- AA ? BB
- F1 AB x AA (Kadali)
- AAB - C0-1 also called H-135
- **H-135**- It is a pome hybrid. It retains the typical virupakshi characteristics. However, the bunch is small in size.
- **H1-Agniswar x Pisang lilin** – released by Kerala Agricultural University- resistant to leaf spot, fusarium wilt & burrowing nematode, yields 14-16 kg bunch
- **H2- Vannan x Pisang lilin** -tolerent to leaf spot & nematode, yields - 15-20kg.

## Propagation

Banana is traditionally propagated vegetatively through suckers or rhizome or tissue culture plants. Sexual propagation is not possible due to Parthenocarpic nature of fruits.

**Banana produces two types of suckers**

1. Water suckers.
2. Sword suckers.

**Water suckers**: Water sucker is one which is characterized by broader leaves which do not produce a healthy banana clump, with slender pseudostem. Rhizome/corm is not well developed. It takes more time (more than 18 months) for yielding. Yield also less. These types normally develop from shallow buds away from pseudostem near the soil surface.

**Sword sucker**: Sword sucker is one with well developed rhizome, well developed pseudostem with sword like leaves. It takes 12-13 months to yield and gives bigger bunches. Sword suckers are closely associated with the mother plant and therefore develop strong thick rhizomes of their own.

**Important criteria's to select the suckers for planting.**

- The orchard/mother block should be disease free.
- The weight of the suckers should be 1.0- 1.5 kg.
- The mother plant should be heavy yielder.
- Always select sword suckers for planting.
- Select the suckers free from rhizome weevils.
- Age of suckers: 3-4 months

The whole or split rhizomes can also be used when suckers are not available. Bits of rhizomes may also be used as a planting material. Tissue cultured plants were also used as planting material on commercial scale.

**Pairing & Prolinage**

It is the removal of older leaves, roots, adhered soil and other particles on the surface of rhizome and top portion of the suckers leaving 15cm from rhizome should be removed and immersed in cow dung slurry, sprinkle phorate granules @ 10-15 g/rhizome in order to avoid soil pathogen & rhizome weevils.

- Also rhizomes are dipped in fungicide solution by giving a slant cut.

## Planting

- Banana can be planted throughout the year except in severe winter and during heavy rains. In general, June-July is the most common season of planting.

**Pit method**

- Pit method and furrow methods are commonly followed.
- The pit size of 60cm3 should be opened at 1.8 x 1.8m or 2 x 2m (Tall varieties) adopting square system.
- These pits are filled with top soil with 20-30 kg. FYM should be applied at least 15-30 days prior to planting.

- During planting each pit will be supplied with 250gm neem cake and 50 gm of trichoderma to prevent nematode & rhizome rot problems.
- Planting of suckers at the centre of pit and irrigate immediately after planting. Spacing should be adopted variety wise.

**Furrow method**

- This is the most common method of planting. Furrows of 15-20cm deep are opened at a regular distance and rhizomes are planted in the furrows.
- Paired row planting in tissue culture plants

## Tissue Culture

**Tissue culture plants**

- Banana is also grown commercially by using tissue cultured plants, these plants required much care throughout the growth period compare to suckers and yields about 10-20 per cent more than suckers.
- In recent years the concept of HDP is being practiced, suckers are planted at closer spacing or planting two suckers per pit by accommodating more number of plants at specified spacing to get higher yield and reduced cost of production.
- The cultivar Robusta and Dwarf Cavendish spaced at 1.5 x 1.5m accommodates 4444 plants/ha is recommended by IIHR was recorded highest yield.

## Irrigation

- The soil in banana plantation should not be allowed to dry completely. Banana requires high amount of water ranging from 1800-2500 mm annually.
- About 40-45 irrigations are required from planting to harvest at 4-5 days interval.

## Nutritional Management

- Banana is a heavy feeder, Due to shallow root system of the crop, it responds well to applied nutrients.
- The high fertilizers requirement of banana is mainly due to their rapid and vigorous growth and high fruit yield.

| State | N | P | K | FYM (t/ha |
|---|---|---|---|---|
| **Karnataka** | | | | |
| Dwarf cavendish<br>Robusta<br>others | 540kg/ha<br>405kg/ha<br>400kg/ha | 325kg/ha<br>245kg/ha<br>240kg/ha | 675kg/ha<br>507kg/ha<br>500kg/ha | 40<br>40<br>40 |
| **Maharastra** | 600g/plant | 720g/plant | 600g/plant | 100 carts/ha |
| **Andhra Pradesh** | 200g/plant | --- | 200g/plant | 40 |
| **Tamil Nadu** | 110g/plant | 35g/plant | 330g/plant | 10kg/plant |

| **Kerala** | | | | |
|---|---|---|---|---|
| Nendran<br>Others | 190g/plant<br>160g/plant | 115g/plant<br>160g/plant | 300g/plant<br>320g/plant | 10kg/plant<br>10kg/plant |

- Fertilizers have to be applied before initiation of inflorescence in 3 splits i.e. 2nd, 4th and 6th months after planting.
- The fertilizers should be applied at 30-45cm radius from the plant by making basin and mix with the soil then irrigates the plant.

**Weed Management**

- In banana, weed is a problem at the early stage of growth, for conservation of moisture, proper utilization of nutrients as well as for effective control of pests and diseases weed free environment is essential in banana.
- Integrated weed management programme should include growing of cover crops, use of herbicides, inter cropping and hand weeding where ever necessary.
- Pre emergence application of Diuron at the rate of 4kg/ha controlled grasses and broad leaved weeds without affecting the yield and quality of banana or application of Glyphosate 2kg/ha followed by gramoxone 1.8kg/ha proved effective in controlling weed growth.

**Cultural practices**

**Desuckering**

- Desuckering is done by cutting the pseudostem of sucker at the ground level followed by application of kerosene/2-4, D @ 0.5 per cent also the growth of suckers can be inhibited by damaging the cut end to prevent further growth.
- As banana produces number of suckers, if allowed, they compete for moisture nutrition with mother plant; one or two healthy sword suckers may be allowed to grow for ratoon crop.

**Earthing up**

- To prevent uprooting of plant by wind soil is mounded around the pseudostem during rainy season.

**Propping**

- Providing support to the plant when it is at bunching stage.
- If dwarf variety and closed spacing no propping is required but for all tall varieties, it is required by using bamboo poles or any other supports.

**Denaveling**

- Removal of male buds after the last set of fruit. It increases the bunch weight/fruit weight and quality of fruits also.

**Thrashing**

- A process of removal of old, dry, diseased and senescent leaves this could reduce the disease and facilitate better light, temperature and air.

- However, if leaves are pruned before bunch initiation, flowering is delayed and cycle time increased.
- A minimum of 12 leaves are required to be retained for maximum yields

**Bunch covering**

- Bagging of bunch with perforated polythene cover or dried leaves to protect against cold sun scorching, attack of thrips and other scrapping insects, during bunch maturity stage, the bags may be coated with pesticides.

## Growth and development of crop

- During the life cycle, the plant produces 30-40 at 4 leafs per month depending on variety.
- The last leaf produced at shooting which is small in size is called flag leaf.
- The first distinguishing feature between vegetative and reproductive phase is the production of bract primordium.
- The basal (proximal) nodes of the inflorescence bear female and the upper (distal) nodes contain male flowers.
- In between male and female buds, hermaphrodite flowers and have stunt ovaries and do not develop in to edible fruit.
- Banana fruit botanically known as berry.
- The edible bananas are vegetative parthenocarpic, the female sterility gene and lack of pollen due to triploidy causes seedless nature.
- While pollination is essential for fruit development in the wild seeded bananas.

## Use of plant growth regulators

- The process of flowering governed by Gibberlin like substances helps in development of plant, later on anthecin hormone inducing flowering of plant, both combiningly called as “Dual factors hypothesis”.
- Spraying of NAA at 100 ppm after 5 and 7 months of planting markedly increases fruit size and yield. Spraying of 2-4 D@ 20ppm increased the quality of fruits.
- It is poured in the growing apex, than bunch will have more of female flowers/fingers.
- Application of GA3 at 50mg/L resulted in maximum yield and required less number of days for fruit maturity in Giant Governor Banana.

## Fruit maturity and harvest

Under favorable conditions, banana starts flowering in 9-12 months and fruits matures in about 4-5 months depending upon varieties, climate etc. Banana are harvested at 3/4th maturity stage for distant markets or for chips making purpose while, for local markets are harvested at full maturity.

**The following are the indications of maturity of banana.**

- Drying of top leaves.
- Changing of fruit colour from green to light green.
- The floral ends of fruits are shed with slight hand touch at apices.
- Fruit become plumpy and angles are filled & disappear.

- One or two fruits ripe at the basal end (yellow colour).
- Starch content of the fruit (22-25%).
- The bunches are to be harvested by leaving 2 ft of peduncle on the bunch.

**Post harvest management**

- Banana can be stored at about 130C with the Relative Humidity of 85-95 per cent for 3 weeks and is ripened in a week at 16.5-21.00C.
- The fruits should not be stored / shifted under refrigerated condition.
- The storage life can be increased by keeping the fruits in high concentration of carbon dioxide and low concentration of oxygen.
- Also storing in sealed polythene bags containing ethylene absorbent like potassium permanganate.
- Shrink film wrapping or Waxol (12 per cent) treatment can extend shelf life up to 3 weeks.
- Bananas are not usually allowed to ripen on the tree; Smoking done with straw, leaves & cow dung in a closed chamber for 18-24 hours in summer and 48 hours in winter and later shifted to ventilated room for uniform ripening.
- The exogenous application of 100 ppm ethylene gas in an enclosed chamber for 24 hrs for will produce uniform colour and ripening.

**Rhizome and sucker production**

- The true stem of banana is technically tuberous rhizome.Botanical description of the bananas by various authors indicate that the banana stem should be regarded as a short rhizome. The mature rhizome is about 300 mm in diameter and has extremely short internodes covered externally with closely packed leafscars. The rhizomes should remain completely below the surface of the soil for stability of the plant.
- Production of banana suckers in large quantities is currently receiving attention in the wake of great demand for elite planting material. Besides, rapid multiplication of suckers in successful hybrids will enable their quick spread in short period. Suckers production in banana is influenced by a complexity of factors. Some authors reported that, the diploids ranked first in suckers production followed by triploid and tetroploid in the order.
- Puer accuminata diploids and triploids produced larger number of suckers than the balbisiana derivatives. The nutritional status of the mother plant has an overwhelming influence on sucker production. Among the cultivars, greater uptake of nutrients by a cultivar of the same ploidy level resulted in more sucker production. for instance, Anaikomban (AA among the diploids and Monthan (ABB) among the triploids showed higher uptake of nitrogen with resultant increase in the production of suckers.

**Pests and Diseases**

Some of the important pests and diseases are listed here under.

**Pests**

1. Pseudostem borer-most of the commercial cultivars are attacked by the borer. Exudation of plant sap is the initial symptom and blackened mass comes out from the holes bored by the larvae.
2. Rhizome weevil-Nendran is highly susceptible, damaged corms show feeding tunnels filled with mass of rotten tissues.
3. Banana aphid-vector of the virus disease bunchy top
4. Fruit and leaf scarring beetle-The beetle feeds on young leaves and skin of young fruits, occurance is maximum in rainy season.

**Diseases**

1. Panama wilt - *Fusarium oxysporium F.sp cubens*, It is the most severe and important disease of banana. Rasthali is highly susceptible cultivar. It is serious in poorly drained soil. Resistant varieties are Robusta & Dwarf Cavendish.
2. Leaf spot/Sigatoka – It is a fungal disease, initially,presence of light yellowish spots on the leaves under sever condition formation of brown spots and lator dies, turning light grey surrounded by a brown ring. The Gros Michel and Cavendish group are all (AAA ) highly susceptible to sigatoka. While, all ABB clones are resistant.
3. Banana bunchy top virus (BBTV):-Transmitted by aphid vector, *Pentalonia nigronervosa*. The dwarf banana cultivars are very Susceptible. The leaves are bunched together like a rosette at the top, the margins are wavy and slightly rolled upward. Dark green streaks of the lamina or midrib. The plants are stunted and do not produce bunch of commercial value. Some of the other diseases are Pseudostem heart rot, Diamond spot, Anthracnose, Cigar end tip rot, Crown rot, Bacterial soft rot, Bacterial wilt or moko disease, banana streak virus, banana bract mosoic virus etc., causing damage to banana plants.