UNIVERSITY OF FLORIDA
Cooperative Extension Service
Institute of Food and Agricultural Sciences

HS 10

The Banana in Florida[1]

Jonathan H. Crane and Carlos F. Balerdi[2]

Scientific name: *Musa acuminata* and *Musa balbisiana*
Common names for banana: English - banana, plantain; Spanish - banano, platano, guineo, cambur
Common names for plantain: English - plantain, horse banana; Spanish - platano
Family: Musaceae
Relatives of banana within the Order Zingiberales: Numerous ornamental plants including traveler's tree, bird-of-paradise, heliconia, and ginger.

Introduction

Bananas are vigorously growing, monocotyledonous herbaceous plants. There are two species of banana, *Musa acuminata* and *M. balbisiana*, and most banana cultivars are hybrids of these species. Banana cultivars vary greatly in plant and fruit size, plant morphology, fruit quality, and disease and insect resistance. Most bananas have a sweet flavor when ripe; exceptions to this are cooking bananas and plantains.

Plantains are hybrid bananas in which the male flowering axis is either degenerated, lacking, or possesses relicts of male flowers. Plantains are always cooked before consumption and are higher in starch than bananas. The two groups of plantains, French and Horn, produce fewer fruit per plant than sweet bananas. The groups differ in whether the male parts of the inflorescence are persistent or absent.

History and Distribution

The banana and plantain are native to southeast Asia, where they have been cultivated for thousands of years. Bananas are believed to have been introduced to Africa in prehistoric times. Recent evidence suggests bananas were introduced into the New World (Ecuador) by southeast Asians around 200 B.C., and more recently by Portuguese and Spanish explorers in the early 16th century. The Portuguese introduced bananas into the Canary Islands and the Spanish to the Island of Hispaniola during the 1500s.

Susceptibility to frost keeps the banana from spreading beyond the tropics and the warm subtropics. However, bananas are grown commercially in a number of subtropical areas such as Australia, Morocco, South Africa, Egypt, Israel, the Canary Islands, and south Florida. In some areas, bananas are grown inside plastic or glass covered structures.

Plantains are an important food source in parts of Africa, southern India, and throughout tropical America. This is because of the ease and stability of production and the highly nutritious nature of the fruit.

1. This document is HS-10, one of a series of the Department of Horticultural Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First printed 1972 as FC-10. Revised January 1998. Please visit the FAIRS Website at **http://hammock.ifas.ufl.edu**

2. Jonathan H. Crane, Associate professor, Tropical Fruit Crops Specialist, Tropical Research and Education Center, Homestead, Florida, and Carlos F. Balerdi, Multi-county Tropical Fruit Crops Extension Agent III, Tropical Fruit, Dade County Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

Bananas have been grown in scattered locations throughout Florida since their introduction during the 16th century. Limited commercial production has occurred since the late 1800s. Florida is considered a climatically marginal area for commercial banana production due to our subtropical climate and occasional freezes. However, small scale commercial production does occur in southern Florida and producers supply local and regional markets.

Uses

Bananas are eaten fresh and used in salads, desserts, breads, and candy. Bananas are a good source of ascorbic acid (Vit. C), Vitamin B_6, and potassium. Plantains are cooked before use and may be baked, fried, or grilled. Plantains have similar nutritive value as fresh eating bananas plus Vitamin A, and are an excellent source of carbohydrate (starch).

Plant Description

Whole plant: The banana is a fast-growing plant consisting of one or more pseudostems (upright, trunk-like structures) formed by tightly packed concentric layers of leaf sheaths, an underground rhizome, and a fibrous root system. The entire plant is called a mat. The pseudostem constitutes the functional trunk which supports the leaves and the flower and fruit bearing stalk.

Rhizome: A rhizome is an underground stem with numerous meristems (growing points) from which the pseudostems, flowering and fruiting stalks, and fibrous roots arise.

Sheath and leaves: The banana leaf consists of a long, tube-like structure called a sheath, a stout petiole (leaf stalk), and a lamina or leaf blade. The tight packing of numerous sheaths form the pseudostem. One pseudostem may have over 40 leaves during its lifetime.

Roots: Numerous (200-500) fibrous roots arise from the rhizome. In well drained, deep, fertile soils, roots may extend 5 ft (1.5 m) deep and 16 ft (4.9 m) laterally.

Flowers and fruit: The banana inflorescence (flowering stalk) emerges from the center of the pseudostem 10 to 15 months after planting; by this time 26 to 32 leaves have been produced. The process of banana flowering is called shooting. The flowers appear spirally along the axis of the inflorescence in groups of 10 to 20, covered by purplish-to-greenish fleshy bracts which shed as flowering development progresses. The first flowers to emerge are functionally female. In the edible cultivars, the rapidly growing ovaries develop parthenocarpically (without pollination) into clusters of fruits, called "hands." Although most banana cultivars produce seedless fruit, some are fertile and can set seed. The last flowers to emerge are functionally male. In plantains, the male part of the inflorescence and/or male flowers may be absent or greatly reduced. The time from shooting to fruit harvest depends upon temperature, cultivar, soil moisture, and cultural practices and ranges from 80 to 180 days.

Environmental Factors

Temperature: Bananas flourish under uniformly warm to hot conditions. Shoot growth is best between 78°F to 82°F (26-28°C) and fruit growth at 84°F to 86°F (29-30°C). Plant growth slows below 60°F (16°C) and stops at 50°F (10°C). Symptoms of chilling injury (temperatures below 60°F/16°C but above 32°F/0°C) include failure of the flowering stalk or fruit bunch to emerge from the pseudostem (called choking), development of a dull yellow or greenish-gray color to ripening fruit, distorted fruit shape, and an increase in fruit rotting.

Chilling damage and irreversible freeze damage may occur at or below 32°F (0°C). Symptoms of freeze damage include a water-soaked appearance to all above ground parts of the banana plant and desiccation, browning, and death of leaves, pseudostems, and fruit. Temperatures below 28°F (-7°C) may kill plants to the ground. However, new growth usually sprouts from the underground rhizome with the return of warm weather.

Temperatures at or above 98°F (37°C) may result in leaf scorch and emerging new leaves may have very narrow blades.

Wind: Wind is a common constraint in subtropical production areas. Winds above 25 mph and 45 mph may cause tall and short banana cultivars

(respectively) to topple. In addition, continuously windy weather may cause severe leaf shredding (mild shredding may be beneficial), drying of the leaves, and plant crown distortion.

Drought and flooding: Temperature and soil moisture are the most important factors in banana production. Lack of water at anytime may cause a reduction in fruit number and size and ultimate crop yield. Banana cultivars with *Musa balbisiana* genes tend to be more drought tolerant than cultivars of *Musa acuminata*. Symptoms of drought stress include folding of the leaves, pale green to yellow leaf color development, and premature leaf death. Severe drought stress may cause choking and pseudostem collapse.

Banana plants are not flood tolerant. In general, plants may survive 24 to 48 hours of flooding caused by moving water. Stagnant water kills plants quickly. Bananas should not be planted in flood-prone areas. In areas where the water table is high and/or frequent soil saturation or very brief flooding occurs, planting on beds is recommended. Symptoms of continuously wet but not flooded soil conditions include plant stunting, leaf yellowing, and reduced yields.

Shade: Banana plants are reported to be moderately shade tolerant (up to 50%). However, shading delays plant and fruit growth and development. In more subtropical areas like Florida, full or near-full sun is recommended for best production. Excessively shaded plants are stunted and produce small, poor quality fruit.

Salinity: Banana plants do not grow or fruit well in saline soils. Symptoms of salt damage include yellowing and death of the leaf margins and thin, deformed fruit.

Altitude: Depending upon the local climate, bananas may be grown from sea level to 6,562 ft (2,000 m).

Soils

Bananas do best on flat (slope 0-1%), well drained, deep soils high in organic matter with a pH of 5.5-7.0. However, many cultivars perform satisfactorily on the sandy, loamy, muck, and calcareous marl and rocky soils found in south Florida. The most important factor is soil drainage. In those areas susceptible to wet or flooded soil conditions, sufficiently high beds should be constructed and proper engineering (sloping) of the land for water drainage should be done. The beds will place most of the root system above the saturated soil layer and proper sloping of the ditches between beds should allow for drainage of excessive water off the land.

Propagation

The most common propagation material is suckers, or pieces of the rhizome. There are 3 types of suckers: maidenhead, a large non-fruiting pseudostem (plus roots and some rhizome); sword sucker, a sucker attached to the original (mother) rhizome with narrow sword-like leaves, and; a water sucker, a sucker next to but only superficially attached to the mother rhizome with broad leaves. Water suckers produce inferior fruit and are therefore not recommended. Large sword suckers and maidenheads are the preferred planting material. Sword suckers should be removed from vigorous clumps with a spade when they are 4-5 ft (1.2-1.5m) tall. The largest leaves are cut off, leaving only the youngest or none at all. Suckers should have many healthy roots, without symptoms, such as nodulations and internal lesions, of nematode or borer damage. The pseudostems of maidenhead suckers are cut down to 8 inches (20 cm) high and the remaining rhizome is cut into “seed” pieces for planting. In the event that healthy propagating material is not available, the sucker is cut off and its rhizome is pared of all damaged roots and dark tissue, or is cut into pieces containing only white, healthy tissue and a few buds. If nematodes are a problem in the area, it is strongly recommended that nematode-free or hot water treated (described under nematodes) propagating material be used.

Bananas have recently begun to be commercially propagated from meristems by tissue culture. The advantage of this system is that plants are uniform and free of nematodes and most diseases. The disadvantage is the time it takes for small plants to be grown to a sufficient size for field planting and their lack of availability. Another tissue culture technique which uses somatic embryos has not been entirely successful because of the production of off-type plants.

In south Florida, March, April and May are the best months for planting if irrigation is available. Otherwise planting should be delayed until the onset of the rains in June. Planting holes should be large (3 ft wide by 2 ft deep; 0.9 m x 0.6 m) if possible. Addition and mixing with the native soil of completely composted organic matter or a sand-peat moss mixture may be desirable. Plants should be watered-in thoroughly, and a heavy layer of mulch placed around the suckers immediately after planting will assist in keeping the soil moist and will suppress weeds.

Cultivars

There are many banana cultivars. Parents of the cultivated types are *Musa acuminata* and *Musa balbisiana*, two wild species which are usually seedy. Banana cultivars are complex diploid, triploid, and tetraploid hybrids among *M. acuminata* and *M. balbisiana*. In general, those with a high proportion of *M. acuminata* produce sweet fruit, whereas those with a high proportion of *M. balbisiana* produce starchy fruit.

Conventionally, the relative contribution of *M. acuminata* and *M. balbisiana* to the cultivar is indicated with As and Bs, respectively. They are further classified as to the presence of one or more sets of chromosomes (called ploidy level). For example, an AB is diploid, an AAB, triploid, and ABBB, tetraploid. Triploid cultivars are the most common, diploids somewhat less common, and tetraploids, uncommon.

There are numerous banana and plantain cultivars listed in Table 1. However, many of them are not adapted to Florida's climate and are not readily available. Cultivars have many local names making identification of specific clones difficult by common name. To help avoid this, common names along with their A/B constitution and ploidy level are used.

Comments on Selected Banana Cultivars in Florida

'Gros Michel' (AAA) does not produce well in Florida. It has poor cold tolerance and is susceptible to Panama disease. It is not recommended for planting in the home landscape or commercially.

In general, the Cavendish group (AAA) is resistant to Panama disease, but is susceptible to Sigatoka. The characteristic that distinguishes the best known clones is the height of the pseudostem. The tallest clone is 'Lacatan' followed by 'Robusta' and 'Giant Cavendish,' 'Grand Nain,' and 'Dwarf Cavendish.' 'Valery,' a common type in Central America, is considered the same as 'Robusta' by some taxonomists.

'Dwarf Cavendish' produces large bunches of medium-sized fruit. It is widely planted and better adapted to the cool climate of the subtropics than most other commercial cultivars. 'Dwarf Cavendish' is recommended for south Florida where, in frost-free years and with good care, it produces abundant fruit. Another with reported tolerance to cool subtropical areas is 'Williams' (also called 'Williams Hybrid').

There are many cultivars named 'Lady's Finger.' The most common 'Lady's Finger' in south Florida is an AAB, also called 'Pome,' 'Brazilian,' and 'Prata.' It is a tall-growing clone tolerant to cool conditions with small, sweet fruit. However, because of its susceptibility to wind damage and Panama disease it is not recommended for commercial planting.

There are numerous common cultivars named 'Apple.' The most common 'Apple' in south Florida is an AAB. It is also called 'Silk,' 'Manzana,' and 'Manzano.' It is a dessert-type banana with a pleasant, sub-acid flavor when fully ripe. It is very common in the Caribbean. The plant is medium-sized and susceptible to Sigatoka and Panama disease. It is recommended for home landscape and commercial planting in Panama disease-free sites with disease-free planting material.

'Hua moa' (AAB) also called 'Hawaiano' is a leading cultivar in south Florida despite its susceptibility to Panama disease and poor cold tolerance. The fruit can be eaten fresh or cooked and is reported to make excellent fried green and smashed bananas. 'Hua moa' requires intensive care and is recommended only for planting with disease-free material in warm, protected sites free of Panama disease.

Table 1. Selected banana cultivars that may be available in south Florida.

Species	Subgroup	Ploidy Level	Group	Selected cultivars and synonyms[4]	T[1]	Pan. Susc.[2]	Recom. Use[3]
M. acuminata	---	Diploid	AA	**Nino**, Lady's Finger[5], Sucrier[5], Honey[5], Datil[5], Bocadillo[5], Pisang mas[5]	P	R	N
	---	Triploid	AAA	**Gros Michel**, Pisang ambon[5], Guineo gigante[5], Banano[5], Platano roatan[5]	P	S	N
	Cavendish		AAA	**Dwarf Cavendish**, Dwarf Chinese[5], Pisang serendah[5], Governor[5], Enano[5], Johnson[5]	F	R	H, C
	Cavendish		AAA	**Dwarf Red, Green Red**	F	R	H, C
	Cavendish		AAA	**Giant Cavendish**, **Giant Chinese**, **Mons mari**, **Williams**, Williams Hybrid[5]**, Pisang buai, Robusta**, **Valery**, **Porto Rique**	F-G	R	H, C?
	Cavendish		AAA	**Grand Nain**, **Umalog**	F	R	H, C
	Cavendish		AAA	**Red**, Cuban Red[5], Red Jamaican[5]	F	R	H, C
	Cavendish		AAA	**Lacatan**, Pisang masak hijau[5], Monte Cristo[5], Giant Fig[5]	F	R	H
M. acuminata x M. balbisiana hybrids	---	Diploid	AB	**Ney poovan**, Lady's Finger[5], Apple[5], Farine France[5]	?	R	H
	---	Triploid	AAB	**Pisang raja**, Grindy[5]	F	R	H
	---		AAB	**Mysore**, Pisang keling[5], Poovan[5], Thousand Grain[5]	G	R	H
	---		AAB	**Apple**, Silk[5], Pisang rastali[5], Manzana[5], Maçã[5], Sugar[5], Manzano[5]	F	S	H, C
	---		AAB	**Lady's Finger**, Pome[5], Pisang kelat jambi[5], Brazilian[5], Prata[5]	G	S	H
	---		AAB	**Hua moa**[6], Hawaiano[5]	P	S	H
	Plantain/ French Types		AAB	**Green French**, Banane creole[5], **Pink French**, Wine, Banae rouge[5], **Black French**, Banae noire[5], **Tiger**, Banae Puce[5], **Giant**, Banae cent livres[5]	F-P	R	H
	Plantain/ Horn types		AAB	**Horse plantain**, **Banane corne**, **Dominico Gigante**, **Pisang tandok**, **Common plantain**	P	R	H
	---		ABB	**Bluggoe**[6], Burro[5], Chato[5], Moko[5], Orinoco[5], Horse banana[5]	F-G	S	H, C?
	---		ABB	**Pisang awak**[6], Kluai nam wa[5], **Pisang abu keling**[6], **Largo**[6] , **Apple Plantain**[6], **Ice cream**[6], Blue java[5]	F-G	S	H
	---		ABB	**Pelipita**[6], **Saba**[6], **Cardaba**[6]	?	R	H

[1] Cold tolerance temperature rating: G, good cold tolerance; F, fair cold tolerance; P, poor cold tolerance; ?, not known.

[2] Panama disease rating for south Florida: R, resistant; S, susceptible - recommend planting only in Panama disease-free soil with disease-free material.

[3] Recommended use: H, home landscape; C, commercial; C?, may have commercial possibilities for Florida; N, not recommended.

[4] Common name used locally is underlined.

[5] Another common name for the highlighted cultivar name **preceeding** it.

[6] Cooking banana.

Spacing

Planting distance for 'Dwarf Cavendish' in home gardens should not be less than 8 ft (2.4 m) between plants. With judicious irrigation, fertilization, timely weeding and pruning, and the use of large healthy suckers for planting material, fruits will mature in 10-18 months after planting. Rhizomes usually take longer to produce fruit and the first bunch is, as a rule, smaller than normal.

Commercially, plant spacings of 8 ft x 8 ft (2.4 m x 2.4 m) to 11 ft x 11 ft (3.4 m x 3.4 m) result in 360 to 680 plants per acre (865-1736 plants per ha), respectively. The closer spacings result in higher yields and less weeds, but usually also result in slightly less hands per bunch, moderate to much reduced bunch weight and a slight delay in time to bloom. The grower must make a decision based on market needs, availability and price of land and plant material, spraying and harvesting equipment, irrigation method, and fertilizer program. For equipment operation, it is better to have a rectangular rather than square planting pattern, e.g., 8 ft x 12 ft (2.4 m x 3.7 m) rather than a 10 x 10 ft (3.0 x 3.0 m) spacing.

Fertilization

Banana plants need fertile conditions and an abundance of soil moisture for best growth and production. The type of development the plant makes in the first 3 to 4 months determines the weight of the bunch and the number of hands. Consequently, it is essential to provide the best of care during this period.

In soils with low fertility, such as the sandy and calcareous soils of south Florida, bananas should be fertilized frequently (4 to 6 times) for maximum production. The potash requirement is high and fertilizers with a high K_2O content should be used, e.g., N-P_2O_5-K_2O in a ratio of 3-1-6. The amount of fertilizer depends on size and age of the stalk and on the number of stalks per clump.

Young plants should be started with 1/2 lb (0.23 kg) of a 6-2-12 or similar formula with 2-3% magnesium applied every 2 months, and increasing gradually to 5.0 lb to 6.0 lb (2.3-2.7 kg) at flowering and fruiting time, 10 to 18 months later. For mature plantings, a range of 100 lbs to 300 lbs per acre (45-136 kg) of nitrogen, 35 lbs to 130 lbs per acre (16-59 kg) of P_2O_5, and 180 lbs to 400 lbs (82-181 kg) per acre of K_2O are recommended per year.

In Florida, at least one nutritional spray containing manganese and zinc is recommended annually. Commercial sources of these elements should be used; follow label directions. Copper should be included in the spray if no copper-containing fungicide is used.

Leaf analysis is useful as a guide to fertilizer needs. Leaf nutritional levels have not been determined under south Florida conditions, however, levels reported from other production areas may serve as a useful guide. The third leaf from the top of the pseudostem of recently flowering (shot) plants is usually sampled for analysis. The recommended leaf nutrient content for bananas is shown in Table 2.

Irrigation

Bananas require large amounts of water and are very sensitive to drought. Drought results in increased time to flowering and fruiting, reduced fruit size, fruit number, and crop yields. Bananas need about 4 to 6 inches (102-152 mm) of water per month for normal growth and production. High volume sprinklers and low volume microsprinkers and drip systems may be used. Run properly, low volume systems are more efficient than high volume systems.

Since an adequate soil moisture is essential for good production, particularly during the dry months of the year, provision should be made for irrigation. However, caution should be exercised against over-irrigation. Bananas are extremely susceptible to damage by flooding, continuously wet soils, and soil with inadequate drainage.

Cultivation

The most important time to control weeds is from planting until a full, enclosed canopy has been established. More weeds will be present while the planting is young because of light penetration. As the grove gets older, weed pressure will decrease. Keep the area between trees in the row weed free at all times. Mechanical as well as chemical means of weed control are available. For newly established plantings, plastic or organic mulch will greatly reduce weeds within rows and reduce the need for chemical weed control. However, plastic mulch may have to be removed to facilitate the emergence of new suckers from the underground rhizome.

Table 2. Recommended critical nutrient levels using the third leaf as sample leaf.

Nutrient	Percent dry weight (range)	Nutrient	Part per million (range)
Niitrogen	2.4 - 3.0	Manganese	25 - 150
Phosphorus	0.25 - 0.24	Zinc	15 - 18
Potassium	2.7 - 3.5	Iron	60 - 80
Calcium	0.4 - 1.0	Copper	5 -9
Magnesium	0.20 - 0.36	Boron	11

Pruning

Pruning the banana mat is necessary for best vegetative growth and fruit production. Allowing numerous pseudostems to grow from a single mat may lead to small bunches of low quality fruit and encourage disease development.

A banana pseudostem produces fruit only once. After harvest, the stalk is cut off at the base and chopped into small pieces which are left on the ground and incorporated in as mulch. New pseudostems (follow-up stalks) which have been allowed to grow from the rhizome (also called a mat) will produce the next crop. For best production, there must be ample space between plants to avoid crowding and competition for water, light and nutrients.

The number of pseudostems and their replacement is controlled by cutting off new suckers as soon as they appear. A good practice consists of having only one pseudostem flowering and fruiting, one pseudostem about half grown, and one small sucker per mat. Cutting unwanted suckers off at ground level and then gouging out as much as possible of what remains with a metal digging bar will kill the underground bud. It is important that the internal bud is killed, otherwise regrowth occurs very quickly and it takes an unnecessary amount of labor to keep suckers from growing. Though labor intensive, the cutting of dead leaves and of leaves that rub against the bunch is recommended. Removing the end of the flowering stalk which has no fruit and hangs below the last hand of bananas may speed fruit development.

Harvesting

Yields vary considerably depending on many factors, but 3 to 7 tons per acre (6.7-15.7 tons/ha) per year may be obtained. Yields above 10 tons per acre (22.4 tons/ha) per year are considered good. In Florida, a banana grove lasts 2 or 3 years, after which fields are replanted. Factors such as weather, pests and diseases, and cultural practices affect the life of a banana planting.

Bunches are harvested when the fingers are plump but before they begin to turn yellow. The harvesting and ripening process for large-scale banana production is probably not economically justified for small-farm production and will not be discussed here in detail. Homeowners may want to harvest fruit 7 to 14 days prior to ripening on the plant. Hanging the fruit in a shady, cool place to ripen seems to allow development of better flavor than if allowed to ripen on the plant.

Commercially, recently harvested bananas should be precooled by forced-air or placed in a cool room at temperatures between 55-58^{o}F (13-14^{o}C) and relative humidity at 90-95%. Temperatures below 55^{o}F (13^{o}C) cause chilling injury.

The optimum temperature for ripening bananas under commercial conditions is 62-68^{o}F (18-20^{o}C). Ethylene helps initiate and stimulate ripening. Commercially, special storage rooms equipped with ethylene gas generators are used to control the ripening process. For homeowners, ripening can be hastened by covering the bunch with a polyethylene bag.

Disease, Insect, and Nematode Problems

There are several major diseases, one major insect, and several nematode species which attack bananas in south Florida.

Panama disease (Fusarium wilt). Panama disease is of worldwide importance and is caused by the soil borne fungus *Fusarium oxysporum* f. sp. *cubense*. There are four known races of the disease, three of which attack one or more banana cultivars. Symptoms of the disease do not appear on young suckers. On mature plants symptoms include progressive yellowing and eventual death from older to younger leaves, so that only the youngest emerging leaf may remain; brown and black discoloration and slimy appearance of the water conducting vascular system (it may give off a bad odor as well); and death of the plant. At present there is no chemical control available. The only effective control measures are planting in land not infested with the fungus, the use of disease-free propagation material, and the planting of cultivars with resistance to the disease (Table 1). Plantains are resistant to the fungus.

Sigatoka (Yellow Sigatoka). Sigatoka is an important leaf disease in Florida. It is caused by the fungus *Mycosphaerella musicola*. Symptoms of Sigatoka begin as minute yellow streaks on the lower leaf surface which enlarge into dark brown to black streaks 1/2 to 1 inch (1.3-2.5 cm) long. As the streaks merge they form irregularly shaped spots surrounded by a yellow halo. Warm temperatures, high humidity, and frequent rainfall are ideal for disease development. Sigatoka does not kill the plant but causes premature defoliation which results in reduced crop yield. Black Sigatoka, caused by *M. fijiensis*, produces similar, but more severe symptoms. It is widespread in tropical America, but is currently not found in Florida.

Banana cultivars differ in their susceptibility to Yellow Sigatoka with the Cavendish group (AAA) and 'Pome' (AAB) bananas being highly susceptible. 'Sucrier' (AA), 'Bluggoe' (ABB), and 'Silk' (AAB) are of intermediate susceptibility, while 'Mysore' is only slightly susceptible. Fungicides are available for control. For more information, please contact your local Cooperative Extension Agent.

Banana borer or weevil (*Cosmopolites sordidus*). The banana borer lays eggs at the base of the pseudostem and the larvae bore into the pseudostems and rhizome causing extensive damage. Young plants may be killed by extensive tunneling and mature plants may weaken and topple with a subsequent reduction in yield. Control of the pest includes use of clean (non-infested) planting material and sanitation (removal and/or grinding up old pseudostems). For more information, please contact your local Cooperative Extension Agent.

Sugar cane weevil (*Metamasius hemipterus*). The sugar cane weevil causes similar damage and problems as the banana weevil. The larvae tunnel into the pseudostem, building galleries that weaken the plant. For more information, please contact your local Cooperative Extension Agent.

Burrowing nematode (*Radopholus similis*) and spiral nematode (*Helicotylenchus multicinctus*). Feeding of the burrowing nematode causes extensive damage to the root system and rhizome of banana. The spiral nematode causes extensive damage to the fibrous root system. Injured plants are susceptible to invasion by pathogens and toppling. The use of non-infested plant material (suckers or rhizomes) is the best control. Disinfestation of the suckers to be used for planting should be made at a site away from the planting to prevent infestation by contaminated soil or plant debris. Suckers to be used for establishing a new planting should first be thoroughly washed and pared of roots and any damaged areas of the rhizome. The sucker should then be heat treated by immersion in a hot water bath at 122-129°F (50-54°C) for 10 minutes. Establishing a planting in virgin land and the use of nematicides are additional control tactics. For more information, please contact your local Cooperative Extension Agent.