

CULTESA	GENERAL ADVICE FOR BANANA FROM IN VITRO MATERIAL IN THE FIRST CYCLE OF CULTURE	Annex IT-01/01 21/10/2008 PAGE 1 of 6
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## GENERAL ADVISE FOR BANANA FROM IN VITRO MATERIAL IN THE FIRST CYCLE OF CULTURE

### PLANTATION SEASON

There are three different types of plantation:

- a) *Early plantations*: done from February to April, generally in the first or lowest areas (0-100 m.). It is advisable to use plants from the greenhouse with 12-14 emitted leaves (80-100 cm. high) supplied in 3 litres pots. The shooting usually takes place 7 or 8 months after the plantation. There is usually a reduction in the cultivation costs due to the shortening of the culture cycle and there is also a reduction in the bunch's size (9-10 hands). It is necessary to pay special attention to the suckers, since the successor sucker must be selected beforehand.
- b) *Summer plantations*: done from June to October. Shooting occurs after 10-12 months. This widening of the cycle length also gives place to a considerable rise in the harvest (13-15 hands depending on the cultivar). This type of plantation is done with plants having 7-8 leaves (30-40 cm. high) supplied by the greenhouse in 14 cm. pots.
- c) *Replantations*: done from the second fortnight of February to May, being possible to delay it until the beginning of April in the lowest and southern areas. The replanted banana plants must dispose of enough light. To assure that some leaves of the neighbouring plants can be cut if necessary. This leaf removal must be done in those plants in which the fruit is at least half-filled. Otherwise an important decrease in harvest will be produced.

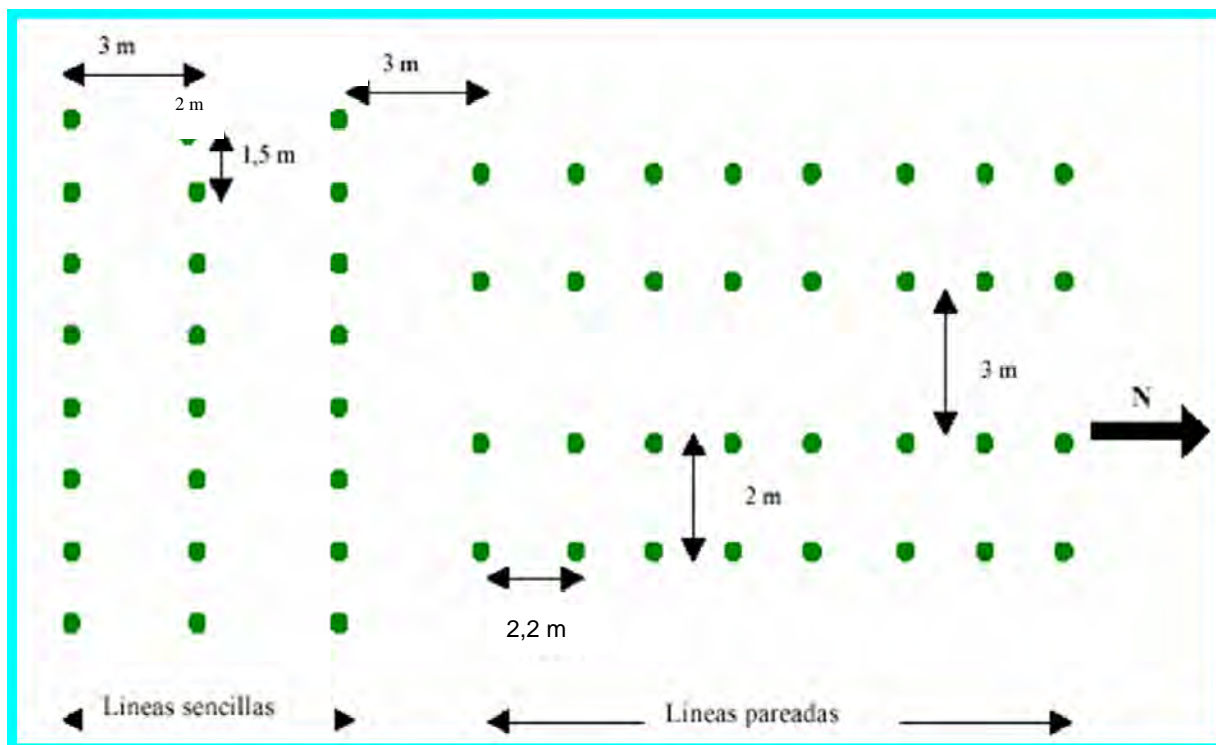
### PLANTATION DATE

The plantation date will be chosen according to:

- *The planting area (1<sup>a</sup>, 2<sup>a</sup> ó 3<sup>a</sup> area, North or South)*: Earlier plantations are recommended in the medium-high fields of the island as well as in those fields placed in the north of the island, because the average temperature is lower than in the coast or in the southern areas.
- *The plantation frame*: It is advisable to bring the planting date forward when narrow planting frames are used.
- *Type of covering of the culture*: In a bow roofed greenhouse the plantation will be delayed 2 or 3 weeks in comparison to open air plantations in the same area. The delay must be a month if the covering is plastic.

### PLANTATION FRAME

In the open air it is recommended to do single line plantations. Nevertheless, when culturing in a greenhouse, a plantation in paired lines must be done, in order to take advantage of the greenhouse's structure to tie the plants.



Note: these frames are for Dwarf Cavendish plantations in 1<sup>st</sup> or lowest area, open air/single lines and under greenhouse/paired lines. The graphic shows the case of a greenhouse where there's a distance of 5m. between the tubes. If we had a Giant Cavendish plantation we would make the corridor narrower (1,5 m. instead of 2m.) to prevent the plants from emitting the shoots towards the middle of the corridors and making the plants shoot towards the outer part. This will make the labour much easier.

### SOIL PREPARATION:

1. It is convenient to have the soil analysed to be able to do a preparation and an amendment according to the conditions of the field. In an orientative way the following amounts of fertilizers are usually added per "fanega" (1 fanega= 1,59 acres):

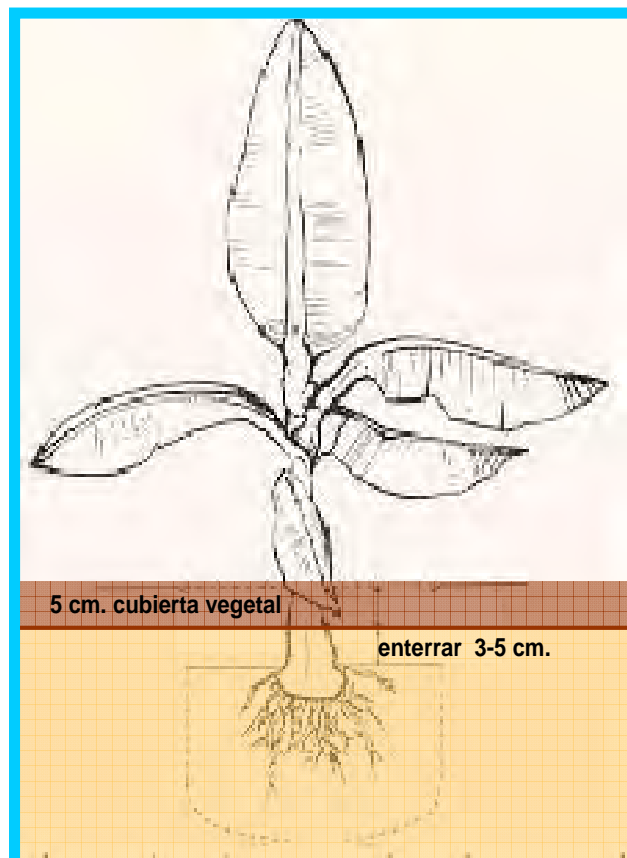
400 Kg. Potassium sulfate  
400 Kg. de Superfosphate of lime  
2000 Kg. Agricultural gypsum

2. Before the plantation organic matter and/or well decomposed manure (2-3 kg/plant) must be added. It is convenient, also, to mix it well with the soil (not to add it all at once to the bottom of the planting hole). If this organic fertilization is done after planting (especially if sprinkling irrigation is used) it is usually done this way: a furrow is opened in the moment of plantation. The banana plant is planted at the bottom of the furrow and at the end of the summer the manure is carefully added in the rest of the furrow, avoiding the contact with the pseudostem and covering it slightly with soil.
3. In the moment of plantation the soil must be soft, loose and previously moistured (tilth) especially in the summer plantations to prevent the burning of the shoots due to the contact with hot soil (which would favour fungal attacks).

4. All the Cucurbitaceae (cucumbers, watermelons...) must be removed in the surroundings of the plantations in order to avoid the virus transmission.

### PLANTATION

1. Once the plants are acquired in the greenhouse, they must be planted in their final location as soon as possible. If for any reason the client can't collect the plants in the scheduled date, CULTESA undertake to keep them in the greenhouse in the best conditions and without added costs provided that the client informs us beforehand and that the delay is not superior to 15 days.
2. The plantation must be done early in the morning or late in the afternoon (when there is less insolation).
3. Plants must be buried in such a way that about 3-5 cm. remain below the soil level. This is because due to the growth and the emission of "deep suckers" (from the corm's base) the plant tends to get out of the soil. This practice is convenient because of the wind and also to assure the good rooting of the second generation suckers. Afterwards, a vegetal cover (about 5 cm.) must be added to avoid the drying of the soil and the apparition of weeds (thus reducing the use of herbicides).



Note: The common practice of adding pine needles is not advisable in those areas affected by banana weevil (*Cosmopolitas sordidus*), since this insect is often found refuged among them.

### WATERING

1. The soil must be in tith before opening the holes, since a 5-6% of the plants can be lost if the soil is dry during the plantation (especially in the summer).
2. If necessary the plants will be watered before being taken out of the pots. This will be done preferably by immersion (immersing the pot in a water bin).
3. Once they are planted they will have a settlement irrigation to promote the bulb formation.
4. During the first 15 days plants must be watered daily to promote the rooting.

5. Swamping of the soil and excess of watering must be avoided in any case, since this gives place to cavitation, Panama Disease and False Panama Disease, being the symptoms of these diseases shown in the following months.

In an orientative way, this is what the plant needs in each stage:

**a) Initiation** (7-8 leaves plant in summer):

- Dripping: 6-10 liters/plant and day (20 minutes/plant and day or half an hour every three days, with 4 l/h drippers).
- Sprinkling: 2 waterings of 10 m per week (800 l/h sprinklers).



*Note:* When drip irrigation is used, the lines must be near the main stem and the bigger the plants are, the bigger the separation between the lines must be, since the rooting system gets more widespread. When the hose is placed in a circle around the plant (collar dripping hose), several drippers must be closed, leaving usually only two of them opened.

**b) Settled culture** (adult plant in summer)

- Dripping: 20-25 litres/plant and day.
- Sprinkling: 30-45 minutes/week.

**c) Irrigation in Replanting:**

In this case the addition of water must be individually adequately to each plant. Depending on the type of irrigation used, we give the following tips:

- If a dripping collar hose is used, several drippers will be strangled leaving only two of them.
- If watering is done "in line", we'll place a hose next to the stem, and the other will be placed quite separate.
- If sprinkling irrigation is used, a physic barrier will be placed to reduce the water loss.

## PHYTOSANITARY TREATMENTS

- In fields which have been previously dedicated to the culture of banana or other crops (especially tomato), it is recommended the application of a nematicide treatment. After 3 or 4 months an analysis will be done in order to determine whether a second treatment is necessary.
- If there are precedents of Banana weevil in the area, once the plantation is done a granulated insecticide must be distributed around the stem following the dose recommended by the fabricant. It mustn't be applied it directly in the planting hole. It is also recommended the use of pheromone traps in order to be aware of the population size.
- Systemic herbicides mustn't be used until the plant is at least 2 m. high. Furthermore the watering will be avoided 2 days before and two days after the application, to prevent the possible absorption of the herbicide by the plant roots. The use of contact herbicides must be reduced until the plant is at least 1 m. high. If they are used they should be applicated early in the morning (when there is less breeze) and using the chamber in the difussors to prevent the herbicide to reach the plant.
- In the first stages of the culture it is necessary to pay a close attention on caterpillars attacks (Spodoptera). Since the first symptoms are shown plants must be treated with the recommended insecticides (Bacillus thuringiensis).
- Those fields with antecedents of Panama disease mustn't be transited with the tractor to avoid spreading the fungus. Furthermore, it is convenient to raise the soil pH over 7.5 (with calcium) and to add organic matter.

Note: If the tractor is going to be rented, their implements must be disinfected before entering the field. This can be done with a 16 litres rucksack, mixing 14,40 litres of water and 1,6 litres of bleach (solution of 9 parts of water per 1 of bleach).

## FERTILIZATION

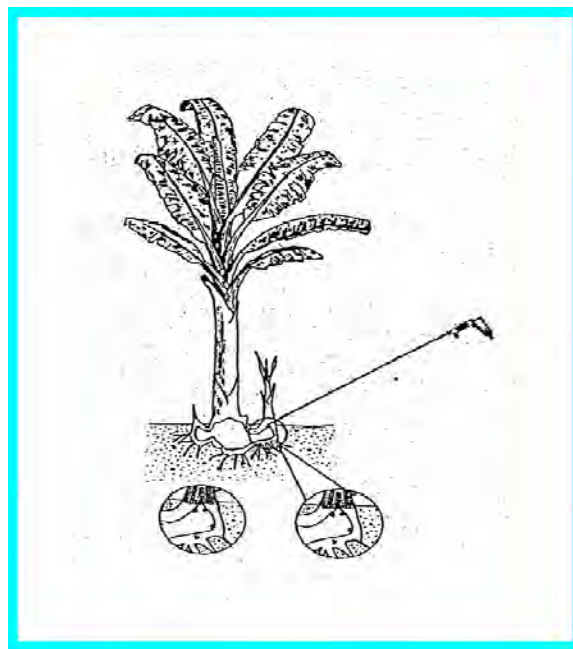
- Fifteen days after the plantation it is convenient to start with the fertilization. During the first two months it is recommended to fertilize the plants with an equilibrium 1:1:1 and 0,25 of Calcium (there are compound fertilizers with this equilibrium to which Calcium Nitrate could be added if necessary and which make the fertilization easier, such as Polifeed, Akaphos, Kristallon, etc.).
- During the first months it is convenient to apply a foliar fertilization with macro and micronutrients as complement, since the corm of the plant (nutrients storage area) is not



developed yet. The application of this foliar fertilization will be done preferably early in the morning and with the difussors orientated towards the back of the leaves.

### DESUCKERING

1. Plants musn't be desuckered until they are at least 1 m. high.
2. The first desuckering must be done chemically, since the "deep suckers" are more difficult to remove with the desuckering tool (a flattened bar or iron rod). This desuckering is done when the sucker is about 25 cm. high, using 2 cc. kerosene per sucker.
3. If the desuckering tool is used to remove the "deep suckers", it is convenient to use an smaller edge and not to remove more than three suckers at one time, to avoid damaging in excess the rooting system of the plants.
4. It is not recommended to desucker with a desuckering tool during the winter, since the plant will not be able to emit new roots in this season and there is more risk of pathogens (Panama disease).
5. The late desuckering reduces the final production a great deal (bunches with a smaller number of hands) and gives place to serious problems in the plant development (poor rooting system and bad suckering).
6. In early plantations (February-march) shootings often take place in 7 months. This must be taken into account when desuckering, choosing the successor sucker beforehand.



### NOTES:

- 1) The culture techniques, advices and suggestions given must only be taken as an orientative guide and they lack any binding effect as far as the sale contract is concerned.
- 2) The use in this crop of the here indicated phytosanitary products is authorized on the release date of this document.

Should you have any technical question or any problem, don't hesitate to contact us by telephone (922 562 611), fax (922 562 310), e-mail ([cultesa@cultesa.com](mailto:cultesa@cultesa.com)), or contacting directly our Agricultural Technic Engineer (mobile phone: 629 858 228).