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*Roadside hawkers in India (S. Uma, NR*CB)

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Editorial Office:
INFO*MUSA*, INIBAP,
Parc Scientifique Agropolis II,
34397 Montpellier Cedex 5, France.
Telephone + 33-(0)4 67 61 13 02;
Telefax: + 33-(0)4 67 61 03 34;
E-mail: inibap@cgiar.org

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The mission of the International Network for the Improvement of Banana and Plantain is to sustainably increase the productivity of banana and plantain grown on smallholdings for domestic consumption and for local and export markets.

The Programme has four specific objectives:

- To organize and coordinate a global research effort on banana and plantain, aimed at the development, evaluation and dissemination of improved cultivars and at the conservation and use of *Musa* diversity
- To promote and strengthen collaboration and partnerships in banana-related research activities at the national, regional and global levels
- To strengthen the ability of NARS to conduct research and development activities on bananas and plantains
- To coordinate, facilitate and support the production, collection and exchange of information and documentation related to banana and plantain.

INIBAP is a programme of the International Plant Genetic Resources Institute (IPGRI), a Future Harvest Centre.

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CONTENTS

Economic benefits of IPM in Ghana

IITA researchers have been introducing the corm-paring technique as a method of nematode/weevil control to farmers in Ghana. Since the introduction of the technique in 1993, 40% of farmers have adopted it. It was found that the adoption of clean planting material together with improved management practices was profitable over a 3-year period, resulting in returns of US$1300 per hectare, equivalent to US$475 increase when compared to farmers' traditional practices.

Source: IITA Annual Report, 1998.

Latin America and the Caribbean

Black Sigatoka spreads to Haiti

Following the report in INFO*MUSA* 8(2) that black Sigatoka posed a threat to banana production in Haiti, the disease has now been identified there (FruiTrop 67). CIRAD-FLHOR researchers are expecting very soon to confirm the identification of the disease, which appears to have crossed the northern border of Haiti following a marked rainy season at the end of 1999.

For more information, contact: Thierry Lescot, thierry.lescot@cirad.fr

Effect of liquid humus produced by earthworms (*Eisenia foetida*) on the growth of 'Pineo gigante' banana stumps (*Musa* AAA)

The establishment of the initial population of a crop is a most important step which will determine good yields. It is essential to select good quality seed and make sure that the availability of water and nutriments in the soil is adequate to allow a fast and uniform initial growth of the plants (Roberts 1997).

Soil fertility may be preserved through different mechanisms linked to organic matter and through which microorganisms (fungi, bacteria, protozoa, algae, etc.) play an important role in the nutriments' mineralization and stabilisation processes. These microorganisms may themselves, in certain conditions, function as reservoirs which will avoid loss of nutriments due to leaching, volatilisation and/or fixation on humic or inorganic compounds.

These multiple biological processes, in which roots, microorganisms and soil components interact, make inorganic (ionic) compounds available to plants. Incorporation of organic compounds in the soil increases the quantity and activity of soil microorganisms; this suggests managing organic and inorganic fertilisation in commercial plantations as a relatively ecological and economical alternative (Pineda 1996, Sikora cited by Fernández *et al.* 1998). Moreover, the use of inorganic fertilisers leads to a transitory destruction of the soil microbial population, which can be restored by the use of organic fertilisers (Pineda 1996). It is very important to make use of the available knowledge related to soil biological processes and mineralization of labile organic compounds. These play an essential role in the development of a profitable and environment-friendly agriculture, in which the inoculation of microorganisms active at rhizosphere level takes on vital importance (Reyes *et al.* 1995).

However, organic sources are mostly used as soil and/or foliage fertiliser for plants which are already established rather than as a pre-planting treatment. Stumps of the 'Pineo gigante' banana were planted after immersion in a solution of liquid humus produced by the earthworm *Eisenia foetida*, for different concentrations and immersion times.

Liquid humus has a positive effect on precocious budding and on the growth rate of the stumps. The planting material obtained with this pre-planting treatment is more homogeneous and stronger than non-treated stumps. Indeed, this treatment allows faster establishment of the plant and enables it to better exploit the nutriments present in the soil solution. Its type of action is not clearly explained yet but it can already be inferred that in a way or another, it activates physiological mechanisms which have a notable and direct influence on banana's development and growth, as is expressed by plant vigour. It is important to conduct further research on this subject and to study physiological aspects more closely.

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Preliminary results provided by Gustavo Martínez, Omar Tremont, Rafael Pargas and Edwuar Manzanilla, FONAIAP/CENIAP, Apartado postal 4663, Maracay 2101, Venezuela.

Eastern and Southern Africa

Spread of black Sigatoka in the Indian Ocean region

During the 1990s black Sigatoka spread from East Africa to the Comoros archipelago, being confirmed in Mayotte in 1995. The disease has since spread to all the plantations on these islands. The presence of the disease is suspected in Madagascar and samples are presently being analysed by CIRAD-FLHOR for confirmation.

Source FruiTrop 67, March 2000.

Banana streak disease is present in Réunion

Banana was introduced in the island of Réunion in about 1668 by Dutch seafarers (Rivals 1960). No indigenous varieties have been listed but several cultivars have been introduced since then. They belong to the Sucrier, Cavendish, Silk, Pome and Bluggoe subgroups. 'Figue Rose' (Red sub-group), a few plantain varieties and a number of ornamental bananas (*Ensete* sp., *M. balbisiana*, *M. ornata, M. zebrina* and *M. velutina*) are also grown in family gardens.

The most commonly cultivated clones belong to the Cavendish subgroup ('Valéry' and 'Petite Naine' and, more recently, 'Grande Naine' and 'Williams'). Bananas belonging to the Silk and Pome subgroups are usually planted at the edge of sugar cane fields and generate additional income for households when the other varieties are not available on the market. Semi-intensive fields are found mainly on the north-east coast and in the south, where there is more rainfall (Anon. 1998). Average farm area does not exceed 2 to 3 hectares and a total of some 200 hectares is under banana (Figure 1), on an island with a population of 750 000 inhabitants. It is estimated that Réunion has a total of 500 hectares under banana, when isolated micro-fields are included (Agreste 1998).

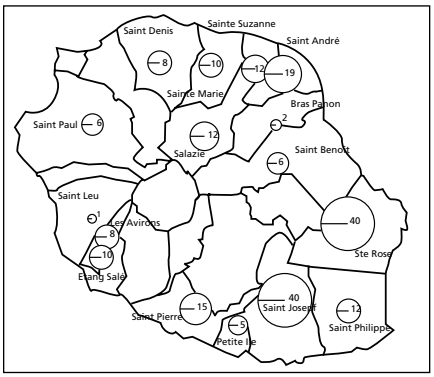

***Figure 1**. Geographical distribution and hectareage of cultivated bananas.*

Yields vary from 10 to 30 tonnes per hectare. Production is reserved for local consumption only.

The banana borer (*Cosmopolites sordidus*) is the main pest. Yellow and black Sigatoka have not been observed. Attacks by *Fusarium* sp. have been observed on plants belonging to the Silk subgroup.

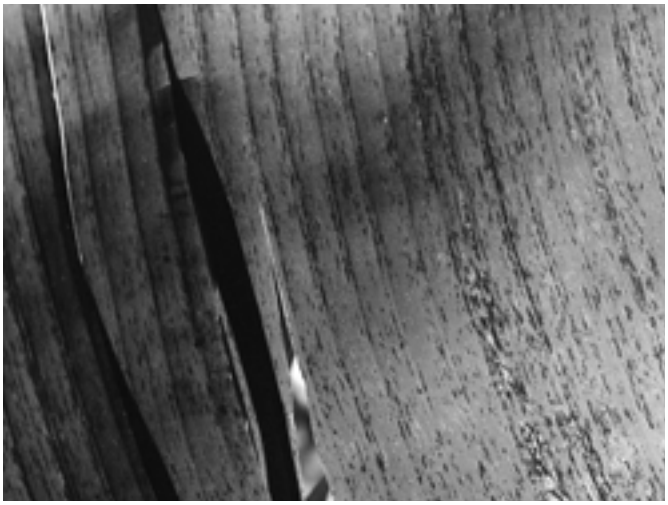

Figure 2. *Symptoms fo BSV on a banana leaf.*

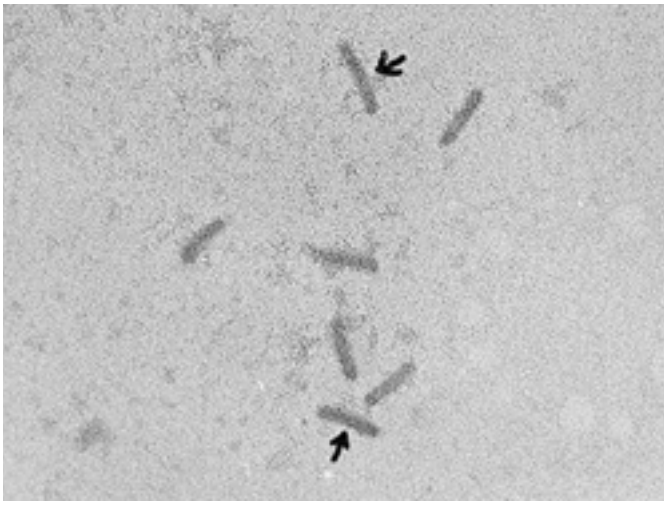

Figure 3. *Bacilliform particles of BSV (x 29 000).*

Only 'Petite Naine' plants display symptoms of banana streak disease, with the crinkling of portions of leaf and subsequent rosetting of the plant (Figure 2). Bunches are deformed and small. Other Cavendish subgroup bananas planted in the same fields do not display symptoms.

This cultivar, whose local name is 'Gabou', is rarely grown intensively, although its potential yield is satisfactory in the climatic conditions of Réunion. In contrast, it is often planted in fruit gardens.

A leaf sample was indexed at the CIRAD virology laboratory. Observation using immuno-electron microscopy with the polyvalent serum developed by Lockhart against banana streak virus (BSV) revealed bacilliform particles (Figure 3). The banana plants concerned are therefore infected by BSV.

This viral disease was first described in Morocco (Lockhart 1986) and then in numerous banana production zones and in the Indian Ocean area: Mauritius, Madagascar, East and southern Africa and Australia (Caruana 1993). Banana plants displaying these symptoms were inventoried in all the cultivation areas in Réunion (see map). Most growers had observed these symptoms «for a very long time» without relating them to the presence of a disease. Indeed, the diseased plants do not display any more visible symptoms such as necrosis or wilt.

The proportion of diseased plants in the infected fields varies from 20 to 50%. Spread of the disease does not seem to be related to an animal vector. No scales are observed on the plants. As banana streak virus is not spread by tools, it would seem that the only way in which it can spread is via the planting of infected suckers.

In collaboration with the Réunion Plant Protection Service (*Service de la Protection des Végétaux*), farmers are being informed of this manner of spread of the disease, are trained in the identification of infected plants and are being asked not to use diseased suckers for replanting and at best to destroy diseased mats by application of a systemic insecticide. The use of plants grown by tissue culture and indexed for BSV is also a recommended method.

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Contact : C. Lavigne. CIRAD-FLHOR, Station de Bassin-Plat, BP 180, 97455 Saint-Pierre Cedex, Réunion.

Thesis

The interdependence of root and shoot development in banana (*Musa* spp.) under field conditions and the influence of different biophysical factors on this relationship

PhD Thesis submitted at KUL, Leuven, Belgium, February 2000.

Guy Blomme

Banana and plantain (*Musa* spp.) are important crops for the small-scale farmer in the humid and subhumid tropical regions of the world. Intensive breeding efforts are underway in this crop but all focus on the improvement of aboveground parameters. Yet the *Musa* root system is crucial for nutrient and water uptake, plant support and production of plant growth regulators. Past research on *Musa* root systems was limited to high value export dessert bananas and few investigations have been carried out on the root system of plantains, cooking bananas or *Musa* hybrids. Therefore, a comprehensive study of the *Musa* root system up to the first ratoon