Preliminary results of VAM effects on banana under field conditions.

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PRELIMINARY RESULTS OF VAM EFFECTS ON BANANA UNDER FIELD CONDITIONS.
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Fruits, Jan.-Feb. 1991, vol. 46, n° 1, p.19-22.

ABSTRACT - A field experiment under greenhouse conditions suggest a beneficial role of vesicular-arbuscular mycorrhizal (VAM) on banana development with differences between inoculated and non inoculated plants regarding mainly fresh root weight and percentage of radicular infection, particularly in favour of *Glomus fasciculatum*.

RESULTATS PRELIMINAIRES DES EFFETS DES MYCORHIZES A VESICULES ET ARBUSCULES (VAM) SUR BANANIERS EN CONDITIONS DE PLANTATIONS.
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RESUME - L'influence sur le comportement d'une bananeraie de la présence de champignons mycorhizogènes à vésicules-arbuscules a été étudiée en conditions de terrain sous serre ; on a enregistré l'augmentation du poids frais des racines ainsi que du pourcentage d'infestation racinaires chez des plants inoculés avec *Glomus fasciculatum*.

The effect of vesicular-arbuscular mycorrhizal (VAM) on plant nutrition and development has a great interest for crop nutrition. Despite the relatively few studies on VAM in bananas, results to date show that symbiosis with these fungi can benefit this species very much because the mycotrophic habit of this crop (Lin and Fox, 1987 ; Lin and Chang, 1987 ; Umesh *et al.* 1989). Available data on banana trials derive almost exclusively from highly-controlled laboratory conditions, but the effective ecologic limits of mycorrhizal association, as well as its potential under true field conditions, have yet to be established.

With the main objective of developing a field VAM inoculation an experiment was carried out to establish the corresponding biotechnology to study fungal influence and banana plants evolution under field conditions. *In vitro* produced plantlet of the local selection Johnson II (*Musa acuminata* Colla AAA, subgroup Cavendish) were rooted in sterile soil, under standard nursery conditions, and then inoculated with two VAM-forming fungal species, *Glomus mosseae* and *Glomus fasciculatum*, both obtained from alfalfa pot cultures ; inoculum consisted of spores, mycelia, and infected root fragments. Control plants were not inoculated.

A specific coloration technique (Philipps and Hayman, 1970) was used to confirm VA fungal presence on banana plant roots, wich reached an infection development level of 28% of the root system for *G. mosseae* and 38% for *G. fasciculatum* at six months after inoculation. All the plants were then transplanted to the field, under greenhouse (with black shade net) conditions, following a randomized block design with 3 replications per treatment and 3 plants for experimental unit. Throughout this phase, no phytosanitary products nor herbicides were used. Minimal fertilization was maintained applying 16 g/pl. NH_4NO_3 in the irrigation water every 15 days.

The field trial was finished when the majority of the plants had unfurled leaf number 27 (seven months after transplanting). The plot was completely flooded immediatly before uprooting the plants, to avoid roots damage (break-off). A number of parameters were evaluated, some of them are recorded in table 1.

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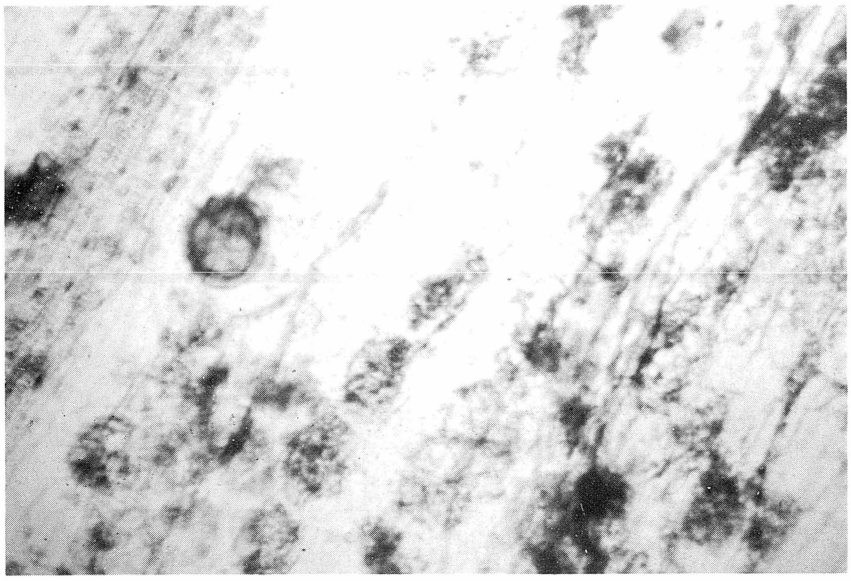

Photo 1 - Microscopy of a banana root infected with *Glomus fasciculatum* (x 100).

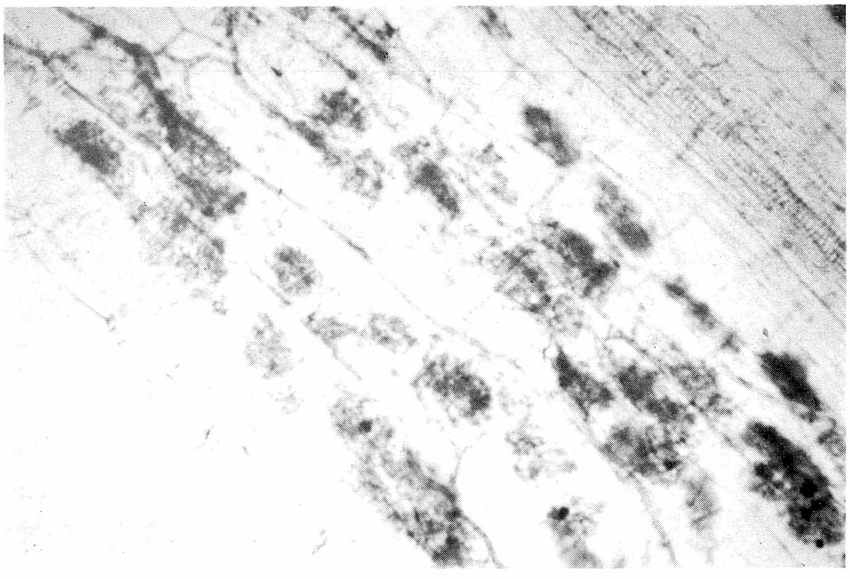

Photo 2 - Microscopy of a banana root infected with *Glomus mosseae* (x 100).

Photo 3 - Micropropagated plantlets recently inoculated, in greenhouse.

Photo 4 - Trial two months after transplanting.

Photo 5 - Trial immediately prior to conclusion.

TABLE 1 - Comparison of different parameters between VAM inoculated banana plants and control.

	Fresh weight (g)		N°	Roots	Roots	%
	Aerial	Root	Suckers emitted	>30 cm	> 60 cm	Radicular infection
G. fasciculatum	17.80a	2.82a	2.77ab	13.63a	0.77a	37.66a
G. mosseae	16.56a	2.31ab	3.21a	15.00a	0.97a	27.60ab
Control	17.00a	2.12b	2.11b	22.53a	1.88a	24.40b

Means followed by the same letter are not significantly different ($P \leqslant 0.05$) according to Duncan's Multiple Range Test.

Statistical analysis of the data show differences between inoculated and control plants regarding fresh root weight and percentage of radicular infection, which might suggest in the long run an increase in the plant's capacity to absorb nutrients. The mycorrhizal effect is probably exerted on the smaller trophic roots since the number of these longer than 30 cm (and 60 cm) was higher in the control plants though no significantly. Inoculated plants were also superior to controls in sucker emission, probably due to a better sanitary state of the inoculated plants.

These results suggest a beneficial role of VAM on banana development work is in progress to extent these results.

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EFECTO DE LAS MVA EN PLATANERA BAJO CONDICIONES DE CAMPO.
RESULTADOS PRELIMINARES

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Fruits, Jan.-Feb. 1991, vol. 46, nº 1, p.19-22.

RESUMEN - El efecto sobre el desarrollo de la platanera de la asociación con hongos formadores de micorrizas vesiculo-arbusculares (MVA), fué evaluado en condiciones de campo, bajo invernadero, registrándose incrementos en el peso fresco de raíces y en el porcentaje de infección radicular en las plantas inoculadas con *Glomus fasciculatum*.