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# RAPPORT DE LA SESSION TECHNIQUE INTITULEE « AGRONOMIE »

Yves-Marie CABIDOCHÉ

Les cinq exposés regroupés, dans cette session ont eu comme préoccupation commune la fertilisation des cultures vivrières.

L'exposé de Mademoiselle ORBAN a montré la difficulté de mieux définir l'utilisation des engrais dans les systèmes de culture paysans ; les essais qu'elle a effectués ont été largement assurés par les paysans, ce qui garantit la prise en compte par les agriculteurs et la compatibilité des résultats qui seront obtenus avec les itinéraires techniques paysans. Cependant, la forte variabilité des milieux, la faible différenciation des teneurs en azote des formules testées, et les nombreux accidents que ces essais ont connu, n'ont pas permis d'obtenir à ce jour de résultats significatifs.

Le deuxième groupe d'exposés a été consacré à l'analyse du rôle d'amendement et de fertilisant de différentes matières organiques. J'insiste sur le terme « différentes » car ces exposés ont permis de sortir du mythe « matière organique », pour entrer dans une meilleure connaissance analytique des rôles de différentes matières organiques, tant comme :

- amendement, au sens de constituant durable des sols modifiant leurs propriétés,
- que source d'éléments nutritifs majeurs.

Les produits cellulosiques et hémicellulosiques, dont le modèle étudié par CLAIRON est la bagasse corrélée de canne à sucre, a une durée de rémanence très courte, très liée à la pluviométrie. Sous trois mètres d'eau, la 1/2 vie de la bagasse est de seulement deux mois et demi. Il ne faut donc attendre de ces produits, ni un effet d'amendement durable, ni un effet fertilisant important vu leur pauvreté en nutriments.

En revanche, les corps microbiens issus du compostage ou de la digestion microbienne de produits organiques riches, comme les ordures ménagères, ou les floculats d'épuration des eaux urbaines, sont des matières organiques beaucoup plus durables, surtout si elles ont été préconditionnées par dessiccation en agrégats grossiers.

Ces composts d'ordures ménagères, et boues, des stations d'épuration, ont une valeur fertilisante tout à fait intéressante, principalement en N et P.

Les essais en pots ou au champ, réalisés par CLAIRON ont montré que ces éléments se trouvent durablement stockés dans les boues, tout en restant sous des formes disponibles pour la plante. Les études analytiques concernant la cinétique d'évolution des compartiments du phosphore réalisés par BROSSARD ont parfaitement étayé ces résultats.

Enfin, malgré des apports considérables de plus de 100 t/ha de matière sèche, aucun phénomène de toxicité n'a été constaté ; on se trouve encore à des doses dans une zone d'accroissement des rendements. Les résidus péri-urbains collectables dans les Petites Antilles sont essentiellement d'origine urbaine, et par là-même exempts de métaux lourds, ce qui fait la qualité des composts et boues qui en dérivent. Si le détail des conditions socio-économiques de leur utilisation n'est pas encore bien précisé, la multiplicité des produits organiques susceptibles d'être compostés permet d'envisager à moyen terme pour la Caraïbe, une fertilisation plus autonome, et dont les cinétiques d'efficacité sont mieux connues.

De nombreuses précisions ont été demandées, s'agissant en particulier du rôle hydrophysique, et du rôle phytosanitaire de ces apports organiques.

Ces sujets font partie des préoccupations prochaines des chercheurs présents dans cette session.

On ne peut que se réjouir des résultats acquis, ou prochainement disponibles, par la meilleure connaissance tant des produits organiques que de leurs effets au niveau des fonctionnements élémentaires dans la relation sol-plante.

# CANNE A SUCRE ET DIVERSIFICATION

## J.C. COMBRES RAPPORTEUR

Ma tâche sera aisée car il n'y a eu que quatre communications sur ce sujet pourtant très important pour la Caraïbe qui doit évoluer en douceur de la monoculture vers la polyculture-élevage sans casser son outil industriel.

M. SAGNE nous a présenté quelques axes importants de diversification de productions végétales développés en Guadeloupe. Il s'agit de cultures d'exportations dans la plupart des cas (Banane, Melon, Fleurs, Fruits) ou d'approvisionnement et de régularisation du marché local (Fruits, cultures sous abri).

On peut regretter comme le faisait remarquer le Dr COCHEREAU, qu'aucune communication n'ait porté sur les associations culturales (INTERCROPPING) : canne, cultures vivrières qui sont très développées dans d'autres parties du monde. Pourtant les cultures associées font partie de la culture créole.

On n'a pas parlé non plus, de systèmes agraires : canne - diversification - élevage. Ces deux sujets ne sont-ils pas des axes de recherche et de développement à privilégier ?

Comme le faisait très justement remarquer M. PAUL, la Canne à Sucre ne peut à elle seule procurer un revenu élevé si l'on se limite à quelques hectares. Les enquêtes ont montré qu'elle était perçue comme une assurance de revenu stable, la base d'une diversification dans des filières plus spéculatives.

La diminution des superficies plantées en canne pourrait ne pas poser trop de problèmes si elle n'est pas brutale et s'accompagne d'un gain de productivité.

L'installation de jeunes agriculteurs modifiera le tissu social agricole et conduira à une intensification de l'agriculture.

Comme le montrait M. DOUCHEZ, les rendements en cannes et en sucre/ha sont encore très faibles en Guadeloupe. Les variétés performantes sélectionnées par le CTCS, dont les qualités se confirment en

milieu réel, sont à même d'accroître de 40 à 50 % la production de sucre et de ce fait le revenu de l'agriculteur.

*Il n'y a donc pas lieu d'être pessimiste. La concurrence entre les cultures ne sera certainement pas un problème de superficie. Elle risque de se trouver au niveau du calendrier des travaux (disponibilité en main-d'oeuvre) et des flux de trésorerie au sein de l'exploitation, ou encore des besoins en irrigation.*

Des études sur ce thème au sein des systèmes de production ne devraient-elles pas être entreprises ?

Enfin la présence du CRITT pourrait être un moteur de diversification et permettre le développement de cultures essentiellement destinées à la transformation.

# PLANT BREEDING AND PROPAGATION

Olimpia GOMEZ

In plant breeding and propagation eleven papers were presented from Guadeloupe (5) Porto Rico (2) Cuba (2) Barbados (1) and Denmark (1).

There is a high trend to increase variety resistance in our caribbean countries in order to avoid the great problems we really have now. Some important papers were presented on yam, eggplant and green beans in relations with specific and dangerous tropical pathogens, through intra and interspecific ways of finding variability in our own germplasms. Cytological observations in *Xanthosomas* are used as a possible resource in resistance breeding also, this particular genotype might prove to be a real factor in a breeding program.

In vitro culture is now playing an increasing part in plant breeding. Very important papers were presented on yams, one of the most popular food crops in the region.

Interspecific breeding is also used in the genus *Pachyrhizus* in order to create new adapted cultivars to our climatic conditions, as well as traditional breeding to improve heat and humid conditions tolerance in tomatoes and peppers. Some important tropical varieties are now created to avoid the resistance of foreign temperate varieties.

At last other efforts are made to increase production in *Acerola* avoiding low fruit setting through an efficient pollination vector.

As you can see, there is a general wish and a real effort in the regional and national institutions through CFCS to increase yields and, of course, production in food crops in our caribbean countries.

We are sure that the exchanges of this meeting will be very useful for all these who work in these research sectors.

Thank you

## ATMOSPHERE - SOILS REPORT

G. WILSON

The combination of the two most important environmental factors !

One, the soil is readily modified, while atmosphere is not readily or inexpensively modified. The papers clearly demonstrated, this where one developed theoretical measurement of atmosphere exploitation in mixed cropping, while the other showed the effect of Ca on plant production, and methods for determining the amount of Ca to be applied.

The session had only three presentations due to the absence of other presenters.

The first paper presented by Nadya R.Sallabery demonstrated the positive effects of lime on certain Puerto Rican soil ; the two test crops were bean and pumpkin.

On an ultisol the bean responded positively to lime but all treatments ph 4.5 and lower were destroyed by *Macrophomyna* .

On the oxysol positive response were observed at all lime rates in the first season but only at higher rates on residue in the second season. These results indicate that lower rates were too low to support the crop for more than one season.

Pumpkin responded positively to lime on utilisol. Unfortunately no conclusion was possible on the oxisol as the entire planting was destroyed by a disease.

The paper presented by P. Cruz theorized on the use of leaf area measurements and dry matter yield to measure the efficiency of different crops in mixed cropping in the tropics. Other measurements would also evaluate competition between the crops. The theory would be tested with combinations of cereals and legumes.

# PLANT PHYSIOLOGY REPORT

L. WILSON

Faculty of Agriculture  
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When summarizing the session on plant physiology, one remarkable character shared by the papers presented becomes obvious, i.e, the fact that all the papers were on tuber/root crops : two papers on irish potatoes, one on yams and five on the relatively little known leguminous tuber crop : the yam bean. Note : none on cereals !

As was mentioned in one of the other sessions, the food production on a world basis will have to rely on the tropics to an increasing extent to meet the demand for basic food.

The root crops constitute a major source of starch and when including a leguminous root crop they also become a source of protein.

But the advantages of the root crops are numerous. The tuber/roots will increase in situ over a long period unlike the cereals where some 20 days out a growth season of 120 days are used for filling the grains.

However a number of queries remain to answered or rather studied before the root crops will be able to take over the position of rice and maize as the main source of starch in the tropics.

What could lead to this change in cultural practices may be if the rootcrops were to be propagated by seed ? This is possible in the potatoes, the possibility is being studied in yams although so far mainly for breeding purposes, but it has always been the case in the yam bean.

If they were multipurpose crops ? Well, some of them are : in sweet potatoes the vegetative parts can be used as vegetable like spinach, but there is of course the yam bean with aside from a tuber production can be used as a pasture legume, a source of high protein hay, the young pods can be eaten as a vegetable and the mature pods constitutes a potential source of the insecticide rotenone.

How can the plant physiologist facilitate the transition from cereals to tuber/ root crops ? Obviously through research carried out in order to elucidate the various processes governing tuberisation and especially through the inclusion in this research of as many species and cultivars as possible. Only through the mapping of the whole variation to be found within a specific genus can the foundation for future breeding become optimal.



# CONCLUSIONS ON COMPLEMENTARITY IN THE CARIBBEAN CONCERNING RESEARCH, EDUCATION AND DEVELOPMENT

Antonio M PINCHINAT

IICA

This topic, which was also the central theme of the 25th Annual Meeting of the CFCS and INRA's 40th Anniversary, covered three technical sessions and was programmed to be addressed through 17 papers. The sessions took place as scheduled and most of the papers were presented, albeit in an altered sequence. This report is based on the six presentations for which the typed paper was available for its preparation. Additionally it draws on my notes and several other documented papers which can be considered particularly relevant to the topic although they were presented in different technical sessions of the meeting.

The need for complementarity among research, education, and development programmes or projects is self evident. Research provides objective knowledge; education incorporates the knowledge into professional training; and developmental action puts bits of knowledge together to generate technology and validates this for transfer to and utilization by farmers. Unfortunately either within institutions in a given country or among institutions within the Caribbean region, strong operational linkages binding research, education and development have been glaringly missing. This in itself fully justifies the theme and called for its specific consideration throughout this Annual Meeting.

Principally, due to the broad range of issues that had to be addressed and the lack of previous consultations among the authors, as expected some overlapping in the papers was unavoidable. Furthermore, the shift introduced in the programmed sequence of presentations may have disrupted the progressive treatment of the topic.

Yet from what was presented and documented, the following conclusions can be reached to guide follow-up regional action.

An appreciable number of institutions in the Caribbean have been actively and often successfully dealing with research, education, development or some combination of the three. Classical examples are INRA and CARDI,

in research/development, or UWI and UFAG in formal (academic) education and research.

Mainly through personal initiatives or informal mechanisms they have attempted to materialize the complementarity of their individual efforts on a regional scale. The results have been on the whole mostly encouraging, but much more remains to be done in an organized scheme.

The lack of such a plan of action seems to be rooted inter alia in the absence of a clearly defined and agreed upon regional policy on agricultural technology; lack of consensus on priority setting for research/development planning at least at subregional levels, and the consequent lack of relevant training programmes. This in turn has hampered sound organization for effective networking for agricultural development.

In this context, through the presentations, the potential and major constraints of selected institutions have been highlighted regarding their role and complementarity in research, education and development in the region.

The scientific and technical capability of INRA, UFAG and other research development as well as higher education institutions in the French Antilles has been assessed and their cooperative support has been reconfirmed, especially to the Ministry of Agriculture in interested countries in the Caribbean.

A framework for networking around the comprehensive issue of farming systems research/extension for agricultural development has been unveiled by CARDI. And a conceptual basis for agricultural technology policy setting has been suggested by IICA. It includes due consideration to the material, institutional and political implications of recent and continuing advances in biotechnology in relation to farming system development in the Caribbean.

For technology transfer a look at the typical extension service has exposed major weaknesses for functional linkages among researchers, extension personnel and farmers. From that diagnosis, some very innovative ways were proposed to foster the effective and efficient adoption of technologies in the farming systems. These include the education/training of commercial (private) suppliers of technological inputs.

To streamline the institutional organization and management for technology generation and transfer, aimed at optimizing exploitation of farm resources, the need to link crop production and animal production was hinted. That holistic approach then brings to mind a matrix of horizontal institutional complementarity in research, education and development across vertical integrated efforts in crop/livestock production/marketing systems.

The implied suggestion seems to be, without changing our treasured and long standing acronym of CFCS, we should begin to think more as a Caribbean Food Commodities Society. This therefore justifies still more the urgent need to strengthen current regional cooperation to address the challenge.