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CENTRAL AMERICAN CORN PROGRAM

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Corn (maize) is the most important food crop in Latin America. It provides a large proportion of the calorie intake of the people in most of the countries of the area. The tortilla is the most widely used form of preparation, although fresh, or green, use is also common.

In order to improve production of this basic food, it is necessary to overcome a wide range of problems. Most of the really serious difficulties are those related to people rather than to the crop itself. Knowledge of improved production practices, development of higher yielding and better nutrional. Quality varieties, and the establishment in practice in the field of these factors are functions of the human element. The plant breeder knows how to develop better varieties, and the soil scientist determines how to cultivate and fertilize the crop. But, we also must combine these things in such a way that the producer has the information available to him on his farm in an economically advantageous package. If the producer cannot assure himself that thenew practices and or varieties are not economically very worth while, he will not generally apply them. The potential return must clearly outweigh the risks.

To achieve increased production on farms, then, it is obvious that the efforts of many people must be brought together in usable form on the farm land.

In an attempt to accomplish this with the corn crop in Central America, a cooperative program was initiated on a very modest scale in 1955. Two people working on corn research in each country were selected and brought together at a conference. These workers were asked to explain their goals and work programs. It became obvious that they had many problems in common.

The conference was established as an annual event and rotated in location from country to country. Costs of the trips to the delegates in the beginning were paid for by the Rockefeller Foundation. People other than delegates were encouraged to attend. Gradually interest increased and delegates were able to obtain their support from their respective countries.

In order to provide common threads of interest and work, a program of uniform trials were established. Most of these uniform trials were variety tests but fertilizer and insecticide treatments were also begun.

Variety trials have become more or less a routine procedure in three separate phases. The first phase is an unreplicated observation planting of those materials locally avoilable in each country. By combining materials from the six countries and

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Summary

Growing in Guadeloupe a maize hybrid bred for Europe (I. N. R. A. 420) allows to see what is needed as physiological adaptation and disease tolerance for maize varieties grown in West Indies.

1° *Physiological adaptation*

Earliness in maize is enhanced by short photo periods (12 h or less) and temperatures near 20° C. Earliness will be therefore maximum with maize sown in october-november. With I. N. R. A. 420 anthesis is obtained 65-70 days after sowing during summer in Europe, 50 days in Guadeloupe after sowing in march, 40 days after sowing on october 15 th. This increased earliness is linked with a severe reduction of plant size.

2° *Disease occurrence*

On I. N. R. A. 420 sown in october was observed on plants 20 days old a severe attack of a virus disease (probably maize mosaic virus, described in Cuba, Trinidad, Puerto Rico, not transmissible by sap-inoculation) on 80 % of the plants. Virus infested plants yield no ears. On virus free plants a strong contamination by tropical corn rust (*Puccinia polysora*) dried the leaves before maturation of the ears.

When sown in March, only 20 % of the plants were virus diseased, rust infestation was later and less severe. But we have observed on the leaves two kinds of spots, caused by *Helminthosporium turcicum* and *Helminthosporium maydis*.

3° *Compared behavior of I. N. R. A 420 and of maize varieties better adapted to Caribbean climate*

Sown during march we have compared I. N. R. A. 420 to Mayorbela (population) and Pioneer hybrids X 302, X 304, X 306. These varieties were later than I. N. R. A. 420 (58 days from sowing to anthesis for Mayorbela, 60 days for X 302, 65 days for X 304, 70 days for X 306). Plant size was normal, without any virus symptom, and only slight attacks by rust, and *Helminthosporium*.

A *Sorghum vulgare* variety (Silo King-Asgrow) compared with I. N. R. A. 420 in october and march sowing was able to produce seeds when sown in October. It was virus-free, and Sorghum rust (*Puccinia purpurea*) appeared later and less severely than maize rust (*P. polysora*). Growing Sorghum for seed or forage ought probably to be compared with maize growing for the same purpose.

yielded 2.5 times more than the Surinam corn population on a calculated yield basis of 3.9 tons to 1.5 tons per hectare.

The testing programme will be expanded with tropical hybrids and synthetic varieties from Mexico, Columbia, Ecuador and Peru.

In 1964 inbreeding was started for a synthetic variety. The Surinam corn population in now in the 8th generation. Unfortunately the parent material from the U. S. A. namely Texas 34 and Golden Prolific were discarded because their high susceptibility to rust caused by *Puccinia sorghi* and seed shrinkage defect. Inbreeding with four (4) Central-American varieties was started then with the varieties Compuesto Intervarietal, Compuesto Caribe Amarillo, Compuesto Amarillo Salvadireno and P D (M S) 6. These varieties are already in the 4th generation.

It is clear from the extensive method of cultivation and the variety used, thus far no fertilizer experiments have been necessary nor have been carried out. The corn programme therefore need to be expanded with fertilizer trials to secure a yield of 5 tons per hectare. To reduce the cost of production several machines and implements need to be tested.

Several pests are known to attack corn in Surinam. *Laphygma frugiperda* (J. E. SMITH), *Scapteriscus didactylus* (Latr.), *Peregrinus maidis* (Ashm.), *Rhopalosiphum maidis* (Fitch.), *Dysmicoccus boninsis* (Kuw.), *Diatraea saccharalis* (F.), *Zeadiatraea lineolata* (Wlk.), *Heliothis zea* (Boddie), *Atta cephalotes* (L.) and *Atta sexdens* (L.).

Laphygma frugiperda

The larvae feed on the leaves and penetrate into the top of the plants. When abundant they almost completely defoliate their foodplants.

Several wasp species belonging to the *Polybiidae* and *Polistidae* have been observed preying on the caterpillars. *Apanteles marginiventris* (Cress.), *Meteorus laphygmae* and *Archytas marmoratus* were found endoparasitic on the larvae. The caterpillars can be controlled by a 0.1 % spray of dipterex SP 80.

Scapteriscus didactylus (LATR.)

In Suriname mole crickets, or « Koti-koties », are most abundant in the sandy ridges of the cultivated parts of the coastal plain. They feed underground on young maize plants. The application of 100 grammes of chlordane, or 25-50 grammes of aldrin per 100 m^2 gives adequate control. If mole cricket activity is observed, the insecticide should be applied as soon as the seedlings emerge or shortly after transplanting.

Peregrinus maidis (ASHM.)

In 1953, colonies of this delphacid were noticed on maize stalks at the Experimental Station at Paramaribo. No injury could be observed. Outside Surinam, this insect is known as a vector of corn mosaic virus (mais stripe virus, Zea virus 1).

Rhopalosiphum maidis (FITCH)

Common on maize in Surinam ; injury of importance has however, not been observed. It is reported as a vector of several viruses e. g. sugarcane mosaic.

Dysmicoccus boninsis (KUW.)

Small numbers of this mealybug were once observed on maize stalks at the Experiment Station at Paramaribo. Another species (*D. brevipes*) was also detected on maize where it lives more or less protected in the leaf axils.

Diatraea saccharalis (F.)

The young larvae at first feed on the leaves. Afterwards the larvae bore into the stalks. When the plant is attacked in an early stage, the larvae often destroy the growing tip, producing the symptoms of « deadheart ».

Parasites : *Agathis stigmaterus, Leskiopalpus diadema, Megaselia sp.* and *Metagonistilum minense.*

Chemical control of this borer is very difficult. Biological control is attempted.

Zeadiatraea lineolata (WLK.)

See *D. saccharalis.* To reduce the damage, larvae and pupae present in the stubble should be destroyed by burning.

Heliothis zea (BODDIE)

This Noctuid species causes serious damage to maize ears in Surinam. The caterpillars feed especially on the young leaves in the centre of the plant. Control of this pest is a difficult matter.

Atta cephalotes (L.) *and A. sexdens* (L.)

The leaf cutting ants are among the most notorious agricultural pests. Control by means of a Swingfog-apparatus with aldrin emulsion at 2 1/2 % in gas oil. Mirex ant-bait proved to be next best method for controlling *Atta* spp.

With regards to diseases not much damage is being done to corn in Surinam. The diseases most prevalent are caused by *Puccinia sorghi, Ustilago maydis, Sclerotium rolfsii, Gibberella zeae, Cochliobolus heterostrophus.*

Of these diseases *Puccinia sorghi,* rust, is in certain cases occuring to some extend as mentioned before in the case of the varieties Golden Prolific and Texas 34. Otherwise it is of minor importance occuring on leaves as yellow to orange postules.

Corn smut caused by *Ustilago maydis* is a disease that is very clearly visible. Vegetative parts of the corn plant are attacked and large galls are being formed. Luckily this disease does not occur on a large scale in Surinam.

Of the leaf blights the one caused by *Cochliobolus heterostrophus* is most commonly found.

One earrot the so-calles pink earrot is sometimes found in the rainy season. However not to a large extend. This disease is caused by the fungus *Gibberella zeae.*

Sometimes young corn plants are being attacked by *Sclerotium rolfsii.*

No study was made of virus diseases of corn in Surinam and it is believed that no bacterial diseases of this crop are present.