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CORN GROWING IN SURINAM

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Surinam has a yearly rainfall of about 2 000 mm and a temperature of ± 25° C
From the coast to the southern border Surinam can roughly be divided into :

	Demerara formation
Young sediments	Coropina formation
	Zanderij formation

Old cristalline basement.

Until recently the main agricultural activities took place on the clay soils, and in particular on the heavy clay soils of the Demerara formation.

The heavy clay soils have a high chemical level, but water management problems limit optimum yields. Mechanized farm practices are also difficult to realize on these poorly drained soils.

In Surinam up to now corn has been grown as a catchcrop after clearing of the land. At the moment, however, there is an increasing interest in commercial corn growing in mono-culture and agri-silviculture (intercrop in young Pinus trees) on the nonbleached cover soils of the Zanderij formation.

These soils (total acreage about 1 000 000 acres) are chemically poor, but have excellent physical properties. Consequently mechanized farm operations can be fully introduced. This is of fundamental importance in a country with a small population and with high labour costs.

It is estimated that about 5 000 tons of corn are imported annually to supply the increasing demand for corn in feeding ratios for local consumption.

It was realized that to make corn growing an economic proposition one should stop planting the old reliable Surinam corn population and use tropical corn hybrids suitable for low land conditions to increase the yield from 1.5 to 5 tons per hectare. The alternative would be to breed a synthetic variety using the Surinam corn population, since the production of local hybrids for 2 000 ha is clearly, too expensive.

As a result of the 6th Annual Meeting of C. F. C. S. it was decided to test some tropical hybrids of the Pioneer Hi-bred Company, Jamaica branch.

The hybrids tested were X302, X304, X306, X332A and X336.

It was seen from this non-replicated trial of 300 plants per variety that X332A

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RÉFÉRENCES

1. BROWN (W. L.). — *Trop. Agri.*, VXXX, No. 7-9.
2. Annual Report (unpublished) Economic Botany. — Central Experiment Station 59-62.
3. CROSS, LAWRENCE. — Maize-Texaco Food Crop Demonstration. *Farm. Bulletin* No. 6.
4. SARJEANT (V.). — Regional Field Experimental Programme. Proceedings of Caribbean Food Crop Society 1968, Vol. 6.
5. SEGAL (S. M.) and BROWN (W. L.). — Proceeding of the Caribbean Food Crop Society, 1968, Vol. 6.

TABLE 1

Imports of poultry and maize into Trinidad and tobago for the period 1960-67

Year	Poultry Imports lbs	Total Cost $	Cost per lb	Corn Imports	Total Cost $	Cost per lb	Total Cost of Poultry & Corn
1960	4 662 669	2 482 944	.53	16 068 937	967 077	.06	3 450 021
1961	6 053 952	3 062 892	.51	18 470 517	1 067 854	.06	4 130 746
1962	6 786 357	3 270 145	.48	21 205 037	1 420 168	.07	4 690 313
1963	6 648 059	3 306 206	.50	28 533 645	2 083 566	.07	5 389 772
1964	4 457 484	2 059 347	.46	43 427 731	3 041 172	.07	5 100 519
1965	1 260 435	583 073	.46	57 760 418	4 319 616	.07	4 902 689
1966	717 070	320 507	.47	66 654 762	3 946 120	.06	4 266 626
1967*	29 449	93 899	3.19	75 869 667	4 086 909	.05	4 180 808

TABLE 2

Summary of production, cost and returns per acre of maize

T. F. C. D. F., 1965-68

Year	Crop	(1) Total Yield		(2) Cross Value	(3) Total Variable Cost	(4) Cross Margin	(5) Return per labour hour
		Green Corn	Shelled Dry Corn				
		Ears per acre	Lbs per acre	Dollars			
1965	I	80	1 645	119.95	121.99	— 2.02	.67
1965-66	II	328	2 374	185.86	147.87	37.99	.85
1966	III	1 452	838	145.78	127.28	18.50	.66
1967	IV	999	3 652	261.58	166.59	94.99	1.07
1968	V		3 408	217.94	236.76	— 18.82	0.78

selections has notentirely been ruled out. The possibility also exist of obtaining in the future hybrids with better performance under local conditions.

Yield per acre is dependent upon yield per plant and the number of plants per acre. The plant population is more important for mechanized maize production than a consideration of spacing. Row width is selected to suite the machinery to be used for planting and harvesting and then the seed spacing is chosen that will give the required stand. Segal for Jamaica recommends a maximum population of 16 500. At the Texaco Food Crops Farm the population used has been between 16 500 and 20 000 plants per acre.

Pest and Disease control

Laphigma or the Fall Army Worm is the only serious pest so far noticed on corn in Trinidad and Tobago. The corn Earworm is relatively unimportant as a pest of grain corn in Trinidad. It will assume greater importance when crops are grown for canning. Control measures should be started as soon as damage is observed in the field. Sevin and/or Dipterex sprayed directly into the spiralled leaf whirl usually produces good control and this operation is repeated as often as necessary. Usually three or four sprays are required throughout the life history of the crop.

Leaf blights and viruses are important diseases of corn but so far have not been observed on local crops.

Harvesting

Harvesting is usually timed to occur in the dry season or during the « Petite Careme ». The main objective is to be able to get into the field with light machinery and also to ensure that the moisture content is reduced to a minimum. Grain at harvest vary between 22-28 moisture. The crop must be harvested as soon as possible and dried to a moisture content of 14-15 1/2 %. Particularly during the rainy season this necessitates the use of drying equipment. At present the corn crop at Texaco Food Crop Demonstration Farm is hand-harvested and shelled by a small husker-sheller. The wet corn after shelling and even on the cob have become mouldy at times and ferment due to inadequate facilities for drying and storing.

Our research so far has led to the conclusion that for maize to be profitably grown in Trinidad and Tobago it will require a high degree of mechanization. It will have to be grown on relatively flat lands (0-5 %). Although work on the feasibility of large-scale production of maize is being pursued with ever-increasing vigour, nevertheless the alternatives for cheap production of starch material for animal fields, e. g. tropical root crops are also being examined.

Summary

The need for growing large quantities of maize for animal feeds is outlined.

The present methods of growing the crop is examined and the economics of more of the crops grown at the Texaco Food Crop Demonstration Farm is presented.

Government's efforts to convince farmers of the need to grow the crop and to use improved techniques for greater efficiency are discussed.

Fertilizers

Soil test should be used to determine the amount and kind of fertilizers that should be applied. Maize however have been used widely as a nutrient test crop. At present a series of fertilizer trails with corn on several soil types in Trinidad and Tobago is being run by the Field Experimental Program of the University of the West Indies and Mr. D. MAHABIR, Soil Survey Officer of the Ministry of Agriculture. It is expected that shortly we would have more detailed information on the fertilizer requirements of maize under local conditions. In Nigeria the results of a four year study showed that split applications of nitrogen fertilizer significantly increased maize grain yields by 35 when two equal doses were given one month and two months after planting. Locally we have noticed that by delaying fertilization by as much as one month can cause several deficiency symptoms to appear and seriously reduce yield.

In Jamaica Segal and Brown (5) has recommended the use of a minimum of 120 lbs N, 60 lb P and 60 lb K in three applications, one broadcast before ploughing, one at seeding time and the third when the plants are about 2 feet tall. The third application may be difficult in a mechanized form under local high rainfall conditions. At present in Trinidad a 20.10.10 mixture at the rate of 5 cwt to the acre is recommended as a broad base. This may be applied before rotavating or as a double application — 2/3 before rotavating and 1/3 at planting time three inches to one side and three inches below the seed.

Weed Control

Planting should be done immediately after the last rotavating operation to prevent the regrowth of weeds before the corn has a chance to germinate. Pre-emergence weedicides are applied immediately after seeding. In this way weed competition is prevented for at least the first six weeks of the plant's life. In fact the plant will after this period cover the ground and reduce if not eliminate further weed growth. So far one chemical has been used entirely for weed control in corn. Atrazine or gesaprin at the rate of 3-4 lbs per acre have at times given excellent control. Care has to be taken to ensure that the conditions are ideal for the application of the weedicide. The soil should contain some moisture for the chemical to be effective and the chemical should be applied no more than 48 hours after seeding when the seeds have begun to emerge. Atrazine has the disadvantage of a long residual effect which could be detrimental to broad-leaved crops which may be planted after a crop of corn.

Planting Material

The growing of corn at Texaco Farm began in 1965 with a local selection — St-Augustine selection. Later in 1966 a hybrid, known as Corneilli 54 was tried and this was replaced in 1967 and 1968 by the hybrids X304 from the Pioneer Seed Company in Jamaica and Pt 66 from the Poey Seed Company. The improvement in yield scannot be entirely attributed to the change in the varieties used, but is due to a combination of variety and improved techniques. The use of improved local

Recent introductions

With the advent of Tropical hybrids emphasis has shifted from the improvement of Local varieties to the evaluation under our conditions of the various tropical hybrids produced by seed companies. This has increased the yield of corn locally from 2 500 lbs/acre dry shelled to over 3 800 lbs/acre to date (3).

Agronomy

Traditionally corn in Trinidad and Tobago is grown on burnt hillsides or small plots as a mixed crop with pigeon peas, cassava and other root crops. Acceptance by the farmer of pure stands at close spacing with one plant per hill is a slow process. Farmers are unaccus tomed even to the use of fertilizers. The Ministry of Agriculture have embarked on a program of demonstrating to the farmer the techniques which should be used in the production of maize in the hope that there may be soon widespread interest in the production of the crop. Fertilizer subsidies are also being given to maize farmers. Demonstration plots are being grown throughout the country and a commercial plot of 10 acres is being grown each season, not only to demonstrate the successful production of the crop but to try and improve its profitability. Table (2) shows the cost of production of the maize crops grown at the Texaco Food Crop Demonstration Farm over the last four years. The yields have been improving steadily but the cost of production is still too high.

System of production

Some idea of the system of production presently being employed is necessary for an insight into the seasons for such a high cost of production.

Land Preparation and Drainage

Corn will grow on almost any soil type in Trinidad and Tobago. High yields have been obtained on as heavy a clay as Cunupia clay at El Carmen in Central Trinidad as well as on some of the more fertile soils of the St-Augustine area. For maximum yields good drainage in the season of high rainfall and good water holding capacity during dry weather are needed.

Proper seedbed preparation entails ploughing with either a disc or mold-board plough to a depth of at least 6 inches followed by harrowing or rotovating to chop up clumps and close air spaces. Cambered beds are unsatisfactory for corn since they do not afford enough drainage. Uneven growth results, the corn in the furrow being stunted and yellow in colour. Wide flat-top beds with box drains or internal tile drains are better for the growth of corn. Levelling the field with a float is desirable to prevent « puddling » on heavy soils or for furrow irrigation. The soil type on the Texaco Food Crops Demonstration farm where commercial acreages are Texaco Food Crops Demonstration farm where commercial acreages are grown is River Estate Loan (class 1 soil).