CASSAVA CULTURAL PRACTICES

Proceedings of a workshop held in Salvador, Bahia, Brazil, 18-21 March 1980

Editors:
Edward J. Weber, Julio Cesar Toro M., and Michael Graham

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Mechanical Planting and Other Cassava Cultural Practices in Cuba

Adolfo Rodríguez Nodals

Cassava production practices in Cuba are described with emphasis on mechanical planting and harvesting, and other cultural practices aimed at obtaining greater productivity. Mechanization is of great importance in Cuba due to a scarcity of agricultural labour. The main cultural practices in Cuba include: planting new high-yielding, well-adapted cultivars; selection of lignified 25–30 cm stakes from mature healthy plants; treating the stakes with fungicide; planting the stakes at an inclination of 45° on top of high (40 cm) ridges; application of fertilizer; irrigation as needed; and good weed control. The results and experience obtained with two mechanical planters and three mechanical harvesters are described.

Cassava is one of the most popular food crops in Cuba although it is not the most profusely cultivated. In 1977, cassava production reached approximately 90 200 t, which is a 182% increase over the level in 1967 (Table 1). However, the national average yields are very low (4–5 t/ha), and are in contrast with the high potential of the clones studied in the experimental stations of the country. Cassava has developed greatly in Cuba since 1978, when a series of agronomic surveys showed that with some changes in cultural practices and with the use of high potential clones, productivity greater than 45 t/ha could be obtained on a large scale.

Mechanization is of great importance in Cuba because of the scarcity of labour for agriculture and the need for yield increases. Consequently, cassava development requires the following: clones that produce roots on the surface and in groups; the use of mechanically built ridges; mechanized planting; the use of herbicides; and propagation material free of disease. The cultural practices presently used in Cuba are being studied to look for possible ways to increase yields (to more than 45 t/ha) and at the same time obtain maximum savings in labour.

### Cultural Practices

#### Use of Ridges

Maximum yields have been obtained when cassava is planted on ridges of a minimum height of 40 cm. It has been shown that the clones Señorita, Pinera, and CMC–40 are more productive when they are grown on top of the ridges, provided the stakes (25 cm long) are buried almost completely at an inclination of about 45°.

Experimental ‘‘records’’ for yields in Cuba of 104 t/ha/year for CMC–40 and 98 t/ha/year for Señorita have been established. The ridges are spaced at 1.2 m from the furrows to make earth placement easier. The greatest yields obtained with planting on flat lands with the same clones were no greater than 45 t/ha/year.

### Table 1. Yields, planted area, and cassava production in Cuba in 1976 and 1977 as compared to 1967

<table>
<thead>
<tr>
<th>Year</th>
<th>Planted area (ha)</th>
<th>Production (t)</th>
<th>Yields t/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>23 927</td>
<td>49 520</td>
<td>2.7</td>
</tr>
<tr>
<td>1976</td>
<td>19 284</td>
<td>92 092</td>
<td>3.8</td>
</tr>
<tr>
<td>1977</td>
<td>19 110</td>
<td>90 202</td>
<td>4.0</td>
</tr>
</tbody>
</table>

*Source: Report to the Third National Technical Meeting on Tropical Starchy Crops. Division of Crops, Ministry of Agriculture, Cuba.

*Production does not correspond to the planted area in the same year due to the crop cycle (1–12 months in Cuba). The numbers represent the planted area during the whole year and root production in tonnes from January to December of each year.

*1Centro de Mejoramiento de Semillas Agamicas (CEMSA), Santo Domingo, Villa Clara, Cuba.
Planting Space

A spacing of 1.2 m between furrows means that a spacing of 0.7 m is required between the plants to maintain populations at approximately 12 000 plants/ha. Until 1979, the most commonly used planting space in Cuba was 90 x 90 cm (a little more than 12 000 plants/ha).

Planting

With planters able to plant stakes on top of the ridges at an inclination of 45°, mechanical planting is used more and more.

Two machines are used at present: one of them is in the experimental stage.

1. TR-4 Transplanter. This Bulgarian manufactured machine can plant 3-5 units per planting and can be used with 28-48 h.p. tractors. It can be used for tobacco transplanting and has given good results when used as a cassava stake planter. The three-unit model can plant 1 ha in 8 h; the five-unit model can plant 1.6 ha in 8 h. According to the expertise of the workers, planting at 45° or any other angle of inclination can be obtained with this machine.

2. Planting "Batabano". This type of machine is in the experimental stage. It has four units and can cut the stakes, open the furrows, add fertilizer, treat the stakes, and plant the stakes with the desired inclination. With this machine, 14 ha can be planted in 8 h.

Use of Herbicides

Diuron, used as a preemergent herbicide at a rate of approximately 1 kg a.i./ha, has shown the best results. Paraquat, as a postemergent, has been used with a protective shield in doses of about 0.75-1 kg of the product per hectare.

Harvest

Harvest requires a great number of man-days if manually done. Efforts are being made to harvest cassava semimechanically. In this respect, planting in ridges and the use of varieties that produce roots close to the stem have been very useful.

Three systems are used in harvesting:

1. A Remover. This is a conveniently modified subsoiler, which has horizontal wings and is coupled to a 48-60 h.p. tractor. This machine harvests one ridge, working under the roots, removing the stalks, and forcing the roots up. It is only necessary to cut the roots to separate them from the stalk. Average yield is 3.6 ha/8 h and the tractor usually works at a speed of 5 km/h.

2. U.C. Harvester. This harvester was designed at the Universidad Central de Villaclara, Cuba. It is a combine and harvests 18 plants simultaneously. However, it is necessary to link each plant to the device to harvest the plants. This results in yield losses and makes harvesting somewhat complex.

A 48 h.p. tractor is needed and the yield is 1 ha/8 h. It is necessary to previously cut the stalks and leave a 20 cm stump.

3. "Batano" Harvester. This harvester is in an experimental stage. It can harvest plants without previously collecting the stalks. This machine separates stalks from roots, which fall onto different conveyors. Thus rows of cut stalks and roots are separately left behind the machine. Yield is approximately 10 ha/8 h with a tractor of a minimum size of 48 h.p.

Conclusions

1. During the last few years cassava has assumed greater importance in Cuba as a food crop because of its great production potential and the introduction of a wide range of more advanced cultural practices.

2. Mechanization is highly stressed especially for planting and harvesting and some new planting and harvesting models are promising.

3. Planting in ridges is rapidly replacing planting on the flat. Clones of a higher yield potential have doubled yields when used in combination with a system of ridges.