

Characterisation and classification of four plantain varieties in the Windward Islands.

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CARACTERISATION ET CLASSIFICATION DE QUATRE VARIETES DE PLANTAIN DANS LES WINDWARD ISLANDS.

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Fruits, Apr. 1985, vol. 40, n° 4, p. 243-247.

RESUME - La collection, la caractérisation et la classification de variétés de plantain dans les Windward Islands ont commencé en 1979. Quatre variétés distinctes ont été identifiées : 'Horn', 'Dwarf', 'Ordinary' et 'Dominique'. Les deux premières ont été classées comme plantain de type 'Horn' à cause de l'absence d'axe mâle et de la présence de peu de fruits sur des mains peu serrées. Les deux dernières variétés sont des plantains de type 'French', étant donné la présence persistante d'un axe mâle avec des vestiges de fleurs mâles et de bractées, et la production de grands régimes comportant de plus petits fruits.

The Windward Islands comprise of the lesser Antilles Islands of Dominica, St. Lucia, St. Vincent and Grenada lying between latitude 12° - 16° north and longitude 61° - 62° west. In all these Islands, plantains (*Musa* AAB Group) constitute an important staple food of the local population. They are usually grown mixed with banana (*Musa* AAA Group), dasheen (*Colocasia antiquorum*), tannia (*Xanthosoma sagittifolium*), eddoe (*Colocasia esculenta*), maize (*Zea mays*), pigeon peas (*Cajanus cajan*), cassava (*Manihot utilissima*) and other permanent tree crops like coconut (*Cocos nucifera*), citrus (*Citrus* spp) and mango (*Mangifera indica*). However, in large estates, sole plantain cultivation is also common and in the majority of holdings, they form an essential component of the farming system.

Though there is a good demand for plantain locally and regionally, its production has remained almost static over the years. Farmers usually complain that under field condi-

tions, rapid yield decline occurs after the first or second harvest even where adequate nutrient levels are maintained. BRAIDE and WILSON (1980) attributed that this decline is, besides the intrinsic behaviour of the species, due to (a) build up of nematode and insect pests (b) adverse changes in soil physical and chemical properties (c) 'high mat' and (d) intrinsic suckering behaviour.

In spite of low yield per hectare due to the aforesaid factors, farmers still continue to grow plantains because (a) They meet part of the family food requirements and (b) Earn immediate cash in the local market.

In the Windward Islands, it is quite common that plantains of apparently the same characteristics are known by different names in different localities, thereby creating some problems to research workers. Characterisation of Windward Island varieties was never undertaken and if any literature is available, it is mostly in non-conventional form such as mimeographed reports, circulars, newsletters or leaflets.

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In 1978, WINBAN, in agreement with the International Development Research Centre (IDRC) embarked upon a cropping systems project which include characterisation and classification of plantain varieties together with aiming at improving plantain based cropping patterns. In 1979, existing varieties in St. Lucia were collected and established at WINBAN Research farm and characterised in the course of 1981-82. In describing morphological characteristics, the terminology used by SIMMONDS (1966) was followed.

The morphological characteristics of plantain varieties are presented in Table 1 and general varietal features in Fig 1-4. The pseudostem colour, ovules (Fig 5), bract shoulder, persistence of bracts and male flowers and arrangement of fingers on the bunch are the most distinguishing morphological characteristics among different varieties.

'Dominique' plantain ('Banana Salive') is the tallest (372 cm) and registered the greatest girth (Table 2). It took a longer time to shoot (385 days). However, it produced a heavier bunch (27.25 kg) with maximum hands and fingers (9.29 and 147.4, respectively). Nevertheless, this variety recorded almost similar leaf area index compared to 'Ordinary' plantain. This variety, besides having a greater dominance, is also characterised by the presence of a phenomenon called 'high mat' (STOVER, 1972) which is the tendency of the rhizome of ratoons to rise above the soil surface level exposing portions of the root producing zone, which subsequently become inactive and remain devoid



Fig. 'Horn' plantain.

TABLE 1 - Morphological characteristics of four plantain varieties.

Character	Dwarf	Horn	Ordinary	Dominique
Pseudostem colour	Purplish green	Yellowish green	Purple	Brownish purple
Ovules	Three regular rows in each loculus	Two regular rows in each loculus	Two regular rows in each loculus	Two regular rows in each loculus
Bract shoulder	Usually low (ratio > 0.22)	Usually low (ratio > 0.22)	Usually high (ratio < 0.30)	Usually high (ratio < 0.30)
Bract curling	Bracts lift but do not roll	Bracts lift but do not roll	Bracts reflex and roll back after opening	Bracts reflex and roll back after opening
Bract shape	Narrowly ovate, tapering gradually towards apex	Slightly ovate, tapering gradually towards apex	Broadly ovate, not tapering sharply towards apex	Broadly ovate not tapering sharply towards apex
Bract apex	Acute	Acute	Obtuse, with inverted v-shape split	Obtuse, with inverted v-shape split
Persistence of bracts	Slightly persistent	Slightly persistent	Moderately persistent	Moderately persistent
Persistence of male flowers	Slightly persistent	Slightly persistent	Highly persistent	Highly persistent
Arrangement of female flowers	Few fruits on less compact hands	Few fruits on less compact hands	More fruits on compact hands	More fruits on compact hands
Number and growth of followers	Several and vigorous	Several and vigorous	Several and vigorous	Few and less vigorous
Susceptibility to wind damage	Less	Moderate	Moderate	Very high

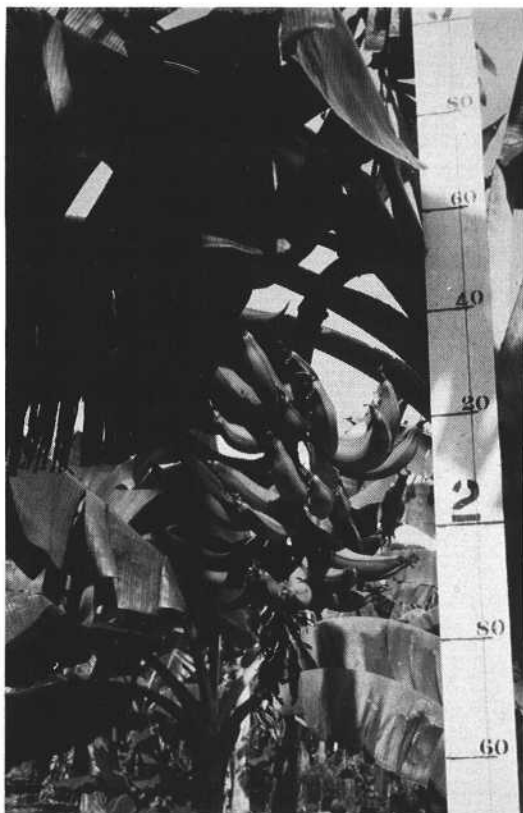


Fig. 2. 'Dwarf' plantain.

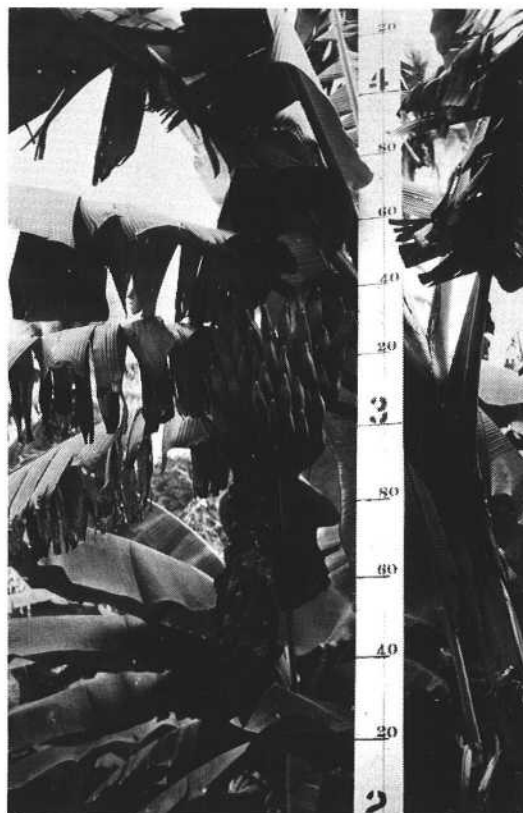


Fig. 3. 'Ordinary' plantain.

TABLE 2 - Mean agronomic characteristics of four plantain varieties.

Character	Dwarf	Horn	Ordinary	Dominique
Girth (cm) of pseudostem at shooting 15 cm above ground level	71.8	79.5	75.7	90.0
Plant height (cm) at shooting (*)	240	341	341	372
No. of green leaves at shooting	14.6	14.4	14.0	10.3
No. of green leaves at harvest	8.1	7.1	5.9	6.0
Leaf length (L) (cm) (**)	162.0	197.9	198.9	245.8
Leaf width (W) (cm)	74.8	70.0	77.2	77.0
Leaf index (L/W)	2.19	2.82	2.57	3.21
Leaf Area Index	2.70	3.03	3.26	3.21
Petiole length (cm)	35.4	40.1	38.1	51.0
Days taken from planting to shooting	256	266	261	385
Days taken from planting to maturity	361	366	367	516
Days taken from shooting to maturity	105	100	106	131
No. of hands per bunch	8.44	7.55	6.71	9.29
No. of fingers per bunch	45.0	35.7	87.6	147.4
No. of fingers per hand	5.3	4.7	13.0	15.8
Average bunch weight (kg)	14.12	13.46	17.26	27.25
Average finger weight (g)	313	377	197	185

* - Plant height was measured from ground level to the point where the base of top two leaves intersect.

** - All leaf measurements were taken at shooting. Leaf Area Index (LAI) was calculated based on 1682 production units ha^{-1} . A production unit consists of the mother plant and the daughter sucker. All foliage on each production unit was measured. Leaf area was determined by multiplying leaf length (L) with width (W) with 0.8 (TURNER, 1972).

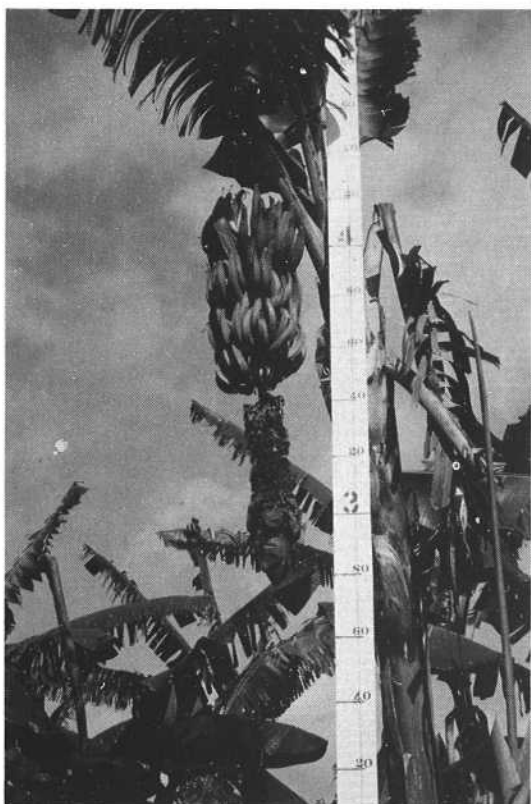


Fig. 4. 'Dominique' plantain.

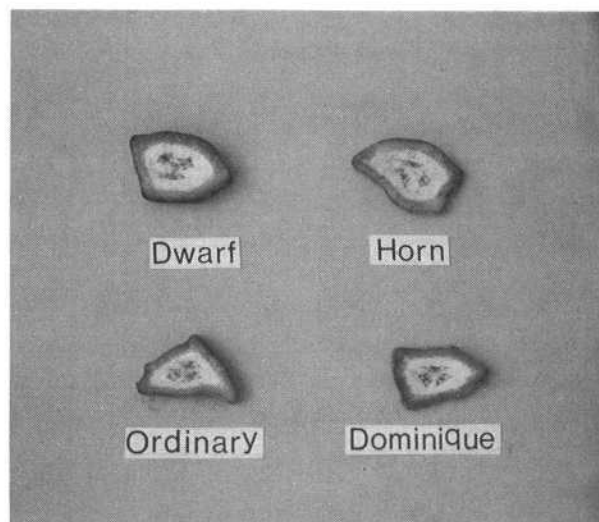


Fig. 5. Plantain varieties differing in the number of ovules per loculus.



Fig. 6. 'High mat' characteristic of 'Dominique' plantain.



Fig. 7. Toppling of 'Dominique' plantain due to its giant size and 'High mat'.

of roots (Fig. 6). The root number reduction restricts the exploitable soil volume. Consequently, nutrient absorption and plant-soil anchorage is reduced. Its giant size coupled with this character make this variety susceptible to toppling even under moderate winds (Fig. 7).

'Horn' plantain ('Horse' plantain or Banana 'Corn') and 'Ordinary' plantain (Banana 'Ordinaire') are similar in plant stature and production cycle. However, the latter variety has twice the number of fingers per bunch, consequently it recorded a greater bunch weight (17.26 kg). But the average finger weight was considerably higher (377 g) in the former variety as compared to the latter. Both these varieties are moderately prone to snapping and toppling owing to their relatively greater height.

'Dwarf' plantain is about 132 cm and 101 cm shorter than 'Dominique' plantain and 'Horn' or 'Ordinary' plantains, respectively. Its production cycle is similar to that of the latter two but the bunch characteristics are very similar to 'Horn' plantain. 'Dwarf' plantain, because of its shorter stature, is less vulnerable to uprooting by wind and owing to its lower leaf area index (2.70) productivity of this variety could be improved by increasing plant density per unit land area.

SIMMONDS (1966) classified the 'plantain' subgroup

into 'French plantain' types and 'Horn plantain' types. The former class is characterised by the presence of persistent male axis which is usually clothed with persistent relicts of male flowers and bracts. They produce larger bunches with smaller fruits and shorter bunch internodes and the latter types are characterised by the absence of male axis or early degeneration of the same with fewer but larger fruits.

Based upon morphological and bunch characteristics, 'Ordinary' and 'Dominique' plantains can conveniently be included under 'French plantain' types whereas 'Dwarf' and 'Horn' plantains be grouped under 'Horn plantain' types.

Varieties of plantains from St. Vincent and Grenada are being collected and established for eventual characterisation and classification.

ACKNOWLEDGEMENTS

The authors are thankful to the International Development Research Centre of Canada for providing financial assistance, Messrs C. FLAVIUS and H. GEORGE for field assistance and to all those who extended their helping hands in completion of this paper.

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