



Agronomy of Castor Beans

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Introduction

- ▶ Scientific Name: *Ricinus communis*
- ▶ General description: tall, branched shrub, 6 to 15 feet in height. The fruit is dry, three-celled, three seeded, ovoid and thorny, capsule about 3.4 cm long;
- ▶ Climatic Conditions: Castor can grow reasonably well in a variety of climate types and conditions.
- ▶ Soil type: The most suitable soils for castor are deep, moderately fertile, with slightly acidic conditions, well drained, sandy loams. While castor prefers deep sandy loam soil with a pH of around 6, it can be cultivated on soils with pH range of 5 - 8.



Nursery Operations

- ▶ Castor bean seeds are about 8 to 15mm long, 6 to 9 mm wide and 4 to 8 mm thick.
- ▶ Seeds for planting should be of high quality, good germination rate and ideal moisture content.
 - ▶ The preferred rates are:
 - ▶ Germination: 72%
 - ▶ Soil moisture: 7%
 - ▶ Age: 6 months or less
- ▶ Seeds can be sown in trays or potting bags and then transplanted or they can be direct seeded.
 - ▶ Transplanting from trays or potting bags under a proper irrigation regime is more efficient.
 - ▶ If direct seeding It is best to coincide with the rainy season so as to minimize irrigation operations



Land Preparation

- ▶ Land is best if it is ploughed, harrowed and furrowed (bed shaped).
- ▶ If direct seeding, sow castor to coincide with the rainy season. This will minimize the need for irrigation.
- ▶ Dig holes to sow seeds.
- ▶ There is one disadvantage with direct seeding during the rainy season; regular re-sowing (supplying) will have to take place, especially with the smaller varieties (Zibo #5, Zibo #8 and Local small),
 - ▶ These seeds are very small and may be suppressed by eroded soils caused by heavy rain (sheet erosion).



Crop Establishment

- ▶ A spacing of 3 m between rows and 2 m between plants can be applied.
- ▶ This will give a plant population of approximately 675 plants to the acre (ac) or 1665 plants to the hectare (ha)
- ▶ A seed rate of one (1) pound to the acre is applicable. Some sources suggest seed rates as high as 12kg to the hectare.



Crop Care – Nutrient Management

- ▶ Fertilizer applications are best done based on the recommendations from a soil test.
- ▶ A general fertilizing technique is to add manure (organic fertilizer) to individual plant holes before sowing seeds.
- ▶ Manure will help in new root formation which will help to promote better anchorage. Manure also helps to hold soil moisture which is highly beneficial to the plant especially during the dry season.



Crop Care – Nutrient Management

- ▶ General nutrient needs for Castor bean are:
 - ▶ 40 N-40 P-20 K kg/ha.
 - ▶ Half of the N and all of the P and K are applied as a basal application; the remaining N is applied one (1) month after planting
- ▶ Castor bean needs a lot of nitrogen especially during its early development. Unbalanced nitrogen application encourages growth of foliage at the expense of flower and seed formation.



Crop Care – Irrigation Management

- ▶ Surface irrigation (eg. Drip irrigation) should be implemented if needed.
- ▶ If irrigated this should be done twice weekly or to supply 20.6 to 24.7 cm/ha of water annually
- ▶ High temperatures and high winds during the peak growing and fruiting periods may cause the plants to need more frequent irrigation.



Crop Care – Weed Management

- ▶ Manual and chemical weed control methods can be utilized.
- ▶ Inter-cropping castor plants with leguminous plants is recommended for weed control and ground cover protection.
- ▶ The use of ruminants (goats) to graze weeds in castor plantations is not recommended. De-barking of castor plants by goats has been observed in local experiments.



Crop Care – Pest & Disease Management

- ▶ The gray mould is the most serious fungal threat to castor plants in Jamaica especially in the cold mountainous areas.
- ▶ Fungicides such as Ridomil, Botran, Benlate, Captan, Ferbam, Bravo are recommended.
- ▶ These fungicides should be rotated and applied based on the severity of the problem. Chemicals should be applied after carefully removing and burning the infected portion of plant.



Crop Care – Pest & Disease Management

- ▶ Castor pests such as the Castor semi-looper and the capsule-borer reported elsewhere do not seem to be a problem in Jamaica.
- ▶ The Sowing of the crop in low-lying and water-logged areas should be avoided to prevent the incidence of seedling blight and Alternaria blight.



Crop Care – Pest & Disease Management



Caterpillar on leaf of castor



Beetle on leaf of castor



Grey mould on the developing fruits of Castor



Botrytis cinerea



Harvesting

- ▶ The maturity of the crop depends on the variety
- ▶ Most improved varieties mature in 140 to 180 days
- ▶ It is best to harvest ripe fruits. These are then dried in the sun for a few days and then threshed.
- ▶ Some varieties lend themselves to mechanical harvesting





Performance of Varieties

- ▶ R&D has collaborated with PCJ in the assessment of select Castor Bean varieties namely Nordestina, Zibo 8, Zibo 5 and Local Large
- ▶ The varieties Nordestina and Zibo 8 indicate good commercial potential
- ▶ The Nordestina is recommended for general use while the Zibo varieties are recommended for lower elevations and warmer temperatures.



Performance of Varieties

- A Summary of the performance of the varieties is shown:

Varieties	Mean yield/plant (g)	Mean oil yield/%	Avg. yield/ha (kg)
Local Large	409	43.17	818
Zibo 5	549	43.16	1098
Zibo 8	991	43.16	1982
Nordestina	848	43.58	1696



Castor Varieties

- ▶ Current work by R&D includes:
 - ▶ Purification of existing lines by Identifying ideotypes
 - ▶ Establishing seed production plots of pure lines

