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**Short Communication**

# EVALUATION OF CASTOR GENOTYPES (*RICINUS COMMUNIS* L.) SUITABLE FOR DRY ZONE OF SRILANKA

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## INTRODUCTION

Castor (*Ricinus communis* L.) is a highly cross pollinated, important non-edible oilseed crop (Webster, 1994). Besides, castor bean has been traditionally cultivated for the production of lubricants and paints (Berman *et al.*, 2011). It is a suitable crop for areas with higher farming limitations (Ogunniyi, 2006). The biodiesel derived from castor oil has several advantages over other vegetable oils due to the presence of 5% more oxygen, low levels of residual phosphorus and carbon, high cetan number, solubility in alcohol and absence of aromatic hydrocarbons (Ogunniyi, 2006). Annual cultivated varieties reach a height of 0.9-1.5 m whilst natural perennial varieties can grow as tall as 6 m. The castor bean contains 50-55% oil. The oil itself contains a number of fatty acids similar to those in cooking oils, such as oleic acid, linoleic acid, stearic acid and palmitic acid. However, among vegetable oils, castor oil is distinguished by its high content (over 85%) of ricinoleic acid. No other vegetable oil contains so high a proportion of fatty hydroxyacids. Castor oils unsaturated bond, high molecular weight (298), low melting point (5 °C) and very low solidification point (-12 to -18 °C) make it industrially useful, most of all for the highest and most stable viscosity of any vegetable oil. Being a hardy perennial, castor can tolerate extreme water stresses, ideal for abandoned lands in north and east parts in our country. It is a neglected species and not grown as a crop. Therefore, the objective of this study was to evaluate castor genotypes in Sri Lanka.

## MATERIALS AND METHODS

Castor yield evaluation experiment was conducted in *Maha* 2012/13 and in *Yala* 2013 seasons at the Regional Agricultural Research and Development Centre, Killinochchi. Seed material of eight genotypes, six received from Directorate of Oil Seeds, India through Japanese International Corporation Agency (JAICA) representatives and two from the collection available at Regional Agriculture Research and Development Centre (RARDC), Killinochchi (Table 1), were used in this study. Land preparation was carried out by making holes with addition of farm yard manure at the rate of 7 t/ha to these holes. Seeds were treated with Thiram at the rate of 3 g/kg of seeds. Treated seeds were sown in plots having dimension of 4 m x 5 m in two different spacing *viz.*50 cm x 30 cm and 90 cm x 60 cm between and within the rows. As two of these genotypes were branching type literally two different spacing were used to generalize the results with other non branching genotypes. Randomized complete design was used with four replicates in both seasons.

**Table 1. Castor genotypes used for yield evaluation at RARDC, Killinochchi during *Maha* 2012/13 and *Yala* 2013.**

| Entry | Source | Remarks |
|---|---|---|
| AGF 6 | Directorate of oil seeds, India | F1 hybrid, Non branching |
| AGF – M | Directorate of oil seeds, India | F1 hybrid, Non branching |
| AGF - V | Directorate of oil seeds, India | F1 hybrid, branching |
| AGF - 27 | Directorate of oil seeds, India | F1hybrid, branching |
| Local waxy red | JAICA, Sri Lanka | Cultivar, Non branching |
| Local waxy green | JAICA, Sri Lanka | Cultivar, Non branching |
| Wild type | Local collection | Germplasm. Non branching |
| Wild red | Local collection | Germplasm, Non branching |

Fertilizers were applied at the rate of 100 kg: 75 kg: 37.5 kg (N: P: K)/ha. Urea was applied as basal and in to two other splits as on 40 days after

sowing and on 65 days after sowing respectively while superphosphate and muriate of potash were applied as basal and with the first split of urea. Dimethoate 0.03% was sprayed at flowering stage to manage the damage by castor shoot borer (*Dichocrosis punctiferalis*). Profenophos was sprayed to control semi-looper (*Acaea janata*). Matured pods/capsules were harvested manually as clusters as and when they mature and considered as one pick. This bulk was sundried and shelled by using a hand winnower to get the seed. Weight of the separated seeds of each net plot was measured. Data was analyzed statically using Dunken Multiple Rating Test (DMRT) using SAS package.

## RESULTS AND DISCUSSION

Yield data of eight castor genotypes tested at Killinochchi in two seasons are given in Table 2. The first commercial castor hybrid in the world GCH-3 was released in India in 1968, while research level attempts are scanty in Sri Lanka. However, Grain Legumes and Oil Seed Crops Research and Development Centre, Ankunukollapalssa started research on two hybrids AGF 6, AFF- M and other two local names genotypes in 2011 but failed. Castor is an important oil seed crop and the plant has a substantial tap root with many lateral branches which can reach a great depth.

Four harvesting were done in each season. Yields of all genotypes varied with their population size based on the spacing adapted in this study. All genotypes showed the same trend as their yields were high in *Yala* season than that of *Maha* with the mean yield of 610 and 430 kg/ha, respectively under the closer spacing of 50 cm x30 cm. The average yield was low in *Maha* season than that of *Yala* season. This may be attributed to the nature of caster which loves more temperature for their growth and yielding abilities. Local genotypes had very low yield in comparison with hybrid and yield different among these entries were highly significant with their mean yield of lesser than 400 kg/ha. An exotic hybrid AGEF-M had the highest yield in both under closer spacing and wider spacing except in *Maha* 2012/13. This experiment has revealed that the exotic castor hybrids derived from India are well adapted under the Dry zone condition at Killinochchi than that of indigenous collections.

**Table 2: Yield of eight caster genotypes with two different spacing during 2012/2013 *Maha* and 2013 *Yala* at RARDC, Kilinochchi.**

| *Entries* | *Seed yield (kg/ha)* | | | |
|---|---|---|---|---|
| | *spacing of 50 x 30 cm* | | *Spacing of 90cm x 40cm* | |
| | *Maha 2012/2013* | *Yala 2013* | *Maha 2012/2013* | *Yala 2013* |
| AGF 6 | $669.7^{ba}$ | $659.8^{b}$ | $183.6^{bac}$ | $513.6^{ba}$ |
| AGF – M | $934.2^{a}$ | $992.5^{a}$ | $147.8^{bdc}$ | $639.0^{a}$ |
| AGF – V | $590.7^{b}$ | $593.2^{b}$ | $280.4^{a}$ | $418.2^{ba}$ |
| AGF – 27 | $772.8^{ba}$ | $710.0^{ba}$ | $248.7^{ba}$ | $390.3^{b}$ |
| Local waxy red | $63.6^{c}$ | $507.6^{b}$ | $54.4^{d}$ | $349.8^{b}$ |
| Local waxy green | $158.6^{c}$ | $636.3^{b}$ | $84.1^{dc}$ | $488.5^{a}$ |
| Wild type | $83.3^{c}$ | $653.1^{b}$ | $83.3^{dc}$ | $551.3^{ba}$ |
| Wild red | $170.0^{c}$ | $124.1^{c}$ | $87.9^{dc}$ | $50.6^{c}$ |
| Mean | 430.4 | 609.6 | 146.3 | 425.2 |

Note: values with same letters are not significantly different at 5% significant

## CONCLUSIONS

Eight castor genotypes were evaluated for their yield potential under the Dry zone condition in two different spacing. Four hybrids performed well both in *Yala* and *Maha* seasons with closer spacing than that of wider spacing. While local collections showed poor performances with significantly lower seed yield in both spacing. Among the four hybrids three of them namely AGF-6, AGF-27 and AGF-M can be successfully cultivated under the Dry zone conditions.

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