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Assessment of suitable castor hybrid for higher yield and yield characteristics in rainfed region of Theni district

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Abstract

The on farm testing (OFT) experiment was conducted at farmer field of Srengapuram village, Theni, Tamil Nadu during Kharif 2018 -2019. The experiment trail was conducted to assess the performance of high yielding Castor hybrids for rainfed region of Theni district. The experiment was laid out in a randomized block design and replicated thrice with following four treatments; T₁ - Farmers practice (Local nettai), T₂ - YRCH 2, T₃ - DCH 177, T₄ - DCH 519. There are three hybrids namely, YRCH 2, DCH 177 and DCH 519 was used in this experiment trail. The recommended doses of fertilizer (RDF) were applied at the time of field preparation as a basal dose. The yield and yield attributes viz., number of spikes per plant, number of capsules per spikes and yield (kg ha⁻¹) was recorded. In economics aspect the cost of cultivation (Rs.), Gross income (Rs.), Net income (Rs.) and B: C ratio were analyzed. Among the different treatments YRCH 2 resulted higher number of spikes per plant (39.6), number of capsule per plant (44.0), yield (1867 kg ha⁻¹). Based on the experimental results, it could be concluded that YRCH 2 Hybrid could be considered as a better option for achieving higher productivity and profitability and improved quality of Castor under the rainfed region of Theni District.

Keywords: Castor, hybrid, yield, yield attributes, capsules, B:C ratio

Introduction

Castor (*Ricinus Cummunis*) is also known as the "Palm of Christ". It belongs to the *Euphorbiaceae* family and is indigenous to the south-eastern Mediterranean Basin, Eastern Africa and India. The crop is cultivated around the world for its non-edible oilseed. Castor is a perennial crop but is grown as an annual for economic purpose. It is monotypic and is the only species with most polymorphic forms (Weiss, 2000) [6] It is cultivated mostly in the arid and semi- arid regions of the world. In India, it is sown in July/August and harvesting commences around December /January. The presence of hydroxyl fatty acid known as ricinoleic acid makes castor oil unique among other seed oils. Castor oil is also distinguished from other vegetable oils by its high specific gravity and thickness thus making it amenable for a number of uses. Castor oil and its derivatives have applications in the manufacturing of soaps, lubricants, hydraulic and brake fluids, paints, dyes, coatings, inks, cold resistant plastics, waxes and polishes, nylon, pharmaceuticals and perfumes. Castor meal, the byproduct of the oil extraction process is mainly used as fertiliser. The castor cultivated area occupies nearly 1,525,000 ha falling in 30 countries with a production of 1,581,000 MT of seeds per annum (Damodaram and Hegde, 2010) [1] Production In 2009, total global area and production of castor oil seed stood at 1.47 million hectare (mh) and 1.5 million tonnes (mt) respectively, of which India alone contributed approximately 73 per cent of total global production. Other major producers include China, Brazil and Mozambique. India is the largest exporter of castor oil and exported 3.45 lakh mt in the year 2009-10. India is a major contributor in global castor oil seed production with total production of 1.1 million mt cultivated across an area of 0.84 m h (in 2009). The average domestic productivity is 1.3 million tonnes a hectare (mt/ha), which is approximately 30 per cent higher than the global productivity level (1 mt/ha).

The ICAR introduced on farm testing (OFT) for evaluation of suitable varieties for specific localities to enhance the yield and income of the famers. The main objective of the trail is evaluating the newly released varieties, technologies and management practices at farmers fields under the real farming situation under different agro climatic regions. The present study has been undertaken to study the performance of different hybrids of castor.

Material and methods

The on farm testing (OFT) experiment was conducted at farmer field of Srengapuram village of Theni District during Kharif 2018 -2019. The experiment trail was conducted to assess the

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performance of high yielding Castor hybrids for rainfed region of Theni district. The soil type of the trail plots is sandy clay loam in texture with low organic carbon (0.25 - 0.31 %), available nitrogen (264 - 275 kg ha⁻¹), available phosphorous (9.71-11.21 kg ha⁻¹) and available potassium (147 - 171 kg ha⁻¹). The experiment was laid out in a randomized block design and replicated thrice with following four treatments; T₁ - Farmers practice (Local nettai), T₂ - YRCH 2, T₃ - DCH 177, T₄ - DCH 519. There are three hybrids namely, YRCH 2, DCH 177 and DCH 519 was used in this experiment trail. The recommended doses of fertilizer

were applied at the time of field preparation as a basal dose. Each trail plot was conducted in 0.4 ha. The primary data collected from the farmers with help of the interview schedule and direct field measurement.

Under the OFT, the testing hybrids viz., YRCH 1, DCH 177 and DCH 519 at the rate of 5 kg ha⁻¹ was taken. Appropriate need based plant protection measures were taken up to control the pest and diseases following the recommended package of practices as per the Crop Production Guide (Anonymous, 2012).

Table 1: Difference between testing packages and farmers practices

S. No	Particulars	Hybrid	Seed treatment	Characters
1	T ₁ - Farmers practice (Local nettai)	Local nettai	Not applied	Local variety with yield of 700 kg ha ⁻¹
2	T ₂ - YRCH 2	YRCH 2	Trichoderma 4 g ha ⁻¹ of seeds	Triple bloom, non-lodging, non-shattering and wilt resistant, yield : 2089 kg ha ⁻¹
3	T ₃ - DCH 177	DCH 177	Trichoderma 4 g ha ⁻¹ of seeds	Resistant to fusarium wilt, yield: 2130 kg ha ⁻¹
4	T ₄ - DCH 519	DCH 519	Trichoderma 4 g ha ⁻¹ of seeds	Resistant to fusarium wilt, yield: 2130 kg ha ⁻¹

Results and discussion

Yield attributes

Number of spikes per plant

The highest number of spikes per plant of 39.6 was recorded in the treatment that received YRCH 2 (T₂) followed by the hybrid DCH 519 (35.0). The lowest number of spikes per plant of 17.8 was recorded in farmer practice (T₁). The increase in number of spikes per plant might be due to higher number of branching in nature, adoption of good agricultural practices and application of micronutrient mixture (Heba Mohamed Noman *et al.*, 2015)^[2].

Table 2: Yield and yield parameters of different Castor hybrids

Treatments	No. of Spikes/plant	No. of capsules/spike	Yield (kg/ha)
T ₁ - Farmers practice (Local nettai)	17.8	26.3	1165
T ₂ - YRCH 2	39.6	44.0	1867
T ₃ - DCH 177	35.0	35.0	1300
T ₄ - DCH 519	32.3	32.0	1450
S Ed	0.56	0.89	19.40
CD (P=0.05)	1.16	1.86	40.5

Number of capsules per plant

The highest number of capsules per plant of 44.0 was recorded in the treatment that received YRCH 2 (T₂) followed by the hybrid DCH 519 (35.0). The lowest number of capsules per plant of 26.3 was recorded in Farmer practice (T₁). The increase in number of capsules per plant might be due to application of along with NPK enhanced the dry matter accumulation which subsequently improved the number of spikes per plant (Nayak *et al.*, 2009)^[4].

Yield

The highest yield of 1867 kg ha⁻¹ was recorded in the treatment that received YRCH 2 (T₂) followed by the hybrid DCH 519 (1300 kg ha⁻¹). The lowest yield of 1165 kg ha⁻¹ was recorded in Farmer practice (T₁). This might be due to application of micronutrients as basal were reduce the capsule breaking and shedding which results yield increased. The adoption of good agricultural practices with high yielding hybrids increased the yield and yield attributes of castor (Mohapatra and Dixit, 2010)^[3].

Economics of raising a particular crop plays a vital role in making recommendations for adoption of a technology to the farmers. The data pertaining to gross returns, net returns and B: C ratios are presented in Table 2. and depicted in Figure 1. The highest gross return and net return were recorded in the treatment that received YRCH 2 (T₂). The highest B: C ratio (3.49) was recorded in the YRCH 2 hybrid (T₂).

Table 3: Economic parameters of different Castor hybrids

Treatments	Cost of cultivation (Rs ha ⁻¹)	Gross income (Rs ha ⁻¹)	Net income (Rs ha ⁻¹)	B:C ratio
T ₁ - Farmers practice (Local nettai)	24500	63250	38750	2.58
T ₂ - YRCH 2	28650	100100	71450	3.49
T ₃ - DCH 177	28350	74350	45900	2.62
T ₄ - DCH 519	28350	77000	48650	2.71

Data statistically not analysed

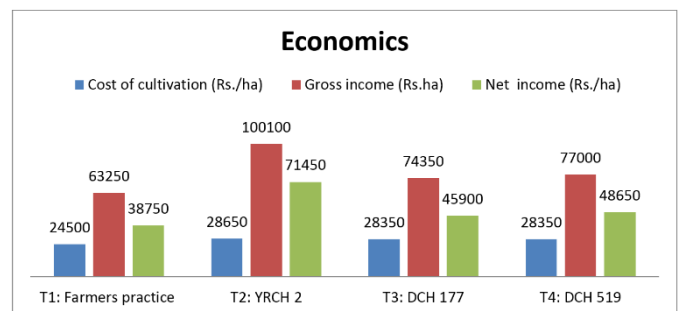


Fig 1: Economic parameters of different Castor hybrids

Conclusion

Based on the results of the above study it is concluded that, YRCH 2 Hybrid could be considered as a better option for achieving higher productivity and profitability and improved quality of Castor under the rainfed region of Theni District.

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