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DIFFERENTIAL PERFORMANCE OF CASTOR GENOTYPES ON SEED YIELD AND ERI COCOON PRODUCTION AND THEIR ECONOMIC ANALYSIS UNDER RAINFED CONDITION

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Abstract

Study was conducted to work out the economics of both castor seed and eri cocoon production using ten castor genotypes raised under rainfed condition at Sericulture College campus, Chintamani. Economic analysis revealed that the hybrid castor JI-226 cultivated with recommended practices at 25% defoliation recorded higher gross return (Rs. 38,379/ha), net return (Rs. 27,079) and B:C ratio (2.396:1) both for seed production and eri culture followed by DCS-85 genotype (Rs.38,362/ha, Rs.26,806 and Rs.2.320:1, respectively). Hence, these two castor genotypes are promising and could be used with cost effectiveness for dual purpose of castor seed and eri cocoon production under rainfed conditions.

Key words: Castor genotype, Leaf yield, Gross return, Net return, B: C ratio**.**

Introduction

Castor (*Ricinus communis* L.) is the primary food plant of eri silkworm, *Samia cynthia ricini* and also plays an important role in country's vegetable oil economy as India is one of the world's principal producers of castor. It is reported that 25 per cent of the total leaf yield can be harvested and used for eri cocoon production without affecting the castor seed yield (Devaiah *et al.,* 1984 and Siddiqui *et al*., 1983). Similarly, the research findings of Directorate of Oil seeds Research, Hyderabad revealed that defoliation to an extent of 25-30 per cent does not affect the yield of castor as it has tremendous regenerating capacity (Teotia *et al*., 2003). According to Suryanarayana *et al.* (2003), Gujarat, Andhra Pradesh, Rajastan, Tamil Nadu, Orissa, Karnataka and Maharastra state have been cultivating castor on large scale for production of seed to extract oil. These states can successfully utilize 30-40 per cent of castor leaves for obtaining additional income through eri silkworm rearing without impairing castor seed yield. However, there is an emerging need to identify the promising castor genotypes for castor seed and eri cocoon production in rainfed areas.

Materials and Methods

Ten castor genotypes were evaluated under rainfed condition for seed and eri cocoon production. The study was conducted at Sericulture College campus, Chintamani under eastern dry zone of Karnataka. The experiment was laid out in a randomized complete block design with three replications for each genotype. The leaves obtained from different genotypes were separately fed to eri silkworms (White- Plain breed) from brushing to ripening. Two hundred worms were maintained in each treatment and replicated thrice. The cost of production of castor genotypes was worked out by taking observations on leaf yield, seed yield, cocoon and shell yield and returns were computed based on prevailing market prices of inputs and out puts as per the methodology outlined by Dayashankar (1982). The data was analyzed as per Sundararaj *et al*. (1972).

Results and Discussion

The results of the experiment on economics of castor-cum-eri cocoon production as influenced by castor genotypes are presented in table 1 and 2 and discussed in the light of earlier work.

Cost of castor and eri cocoon production

The total cost of castor cultivation under the recommended package of practice was Rs. 9920/ha for all the genotypes under rainfed situation (Table 1). The leaf yield was significantly influenced by the castor genotypes which was highest in DCS-85 (4910 kg/ha) and lowest in local (3423 kg/ha). Further, the number of eri DFLs reared per hectare using the leaf available @ 25% defoliation was more with DCS-85 (409) and less in local genotype (285). Similarly, the cost incurred towards rearing of eri DFLs and total cost of production of seed and eri cocoons were higher with DCS-85 (Rs.1636 and Rs. 11,556). On the other hand, the same was lower with local castor genotype (Rs. 1140 and Rs. 11,060).

Gross and net returns

Castor seed yield was significantly higher in JI-226 (2207 kg/ha) and lower in local castor (926 kg/ha) where as the eri cocoon shell yield was more in DCS-85 (37.91kg/ha) and less in GCH-4 (25.64 kg/ha). Gross return and net profit realized with JI-226 genotype were more (Rs. 38,379/ha and Rs. 27,079/ha) followed DCS-85 (Rs. 38,362/ha and Rs. 26,806/ha), while the same were less with local castor genotype (Rs.19,514/ha and Rs. 8,454/ha). Higher B: C ratio was realized when JI-226 genotype (2.396:1) was used for both castor seed and eri cocoon production followed by DCS-85 genotype (2.320:1). However, the least B: C ratio (0.764:1) was obtained with local genotype raised for dual purpose (Table 2).

The present findings are in conformity with the findings of Govindan *et al*. (2002) who reported that total cost of production of castor and eri cocoons to be Rs. 14,704 under Bangalore condition with a combined return of Rs. 31,282/ha and net return of Rs. 16,577/ha under rainfed situation with DCH-177 genotype. Similarly, Isa *et al*. (1994) and Sannappa *et al*. (2002) opined that castor plant can be defoliated upto 25 per cent and in turn these leaves can be utilized for eri silkworm rearing. Dookia and Misra (1979a, 1979b) observed variation in leaf and seed yield under varied per cent of defoliation in castor. Jayaramaiah and Chinnaswamy (1998) estimated that 200 eri DFLs can be reared from one hectare of castor plantation @ 25% defoliation which accrues an additional income of Rs. 3000/ha. According to Misra (1999) an amount of Rs. 2345 per ha was obtained when castor was used only for seed production, while castor seed-cum-eri cocoon production gave a net profit of Rs. 5406/ha. Further, Misra (2001) reported 16% net profit when castor was used for seed production and it was 34% when used for eri cocoon production. Suryanarayana *et al*. (2003) obtained net income of Rs. 11,105 per acre per year through eri silkworm rearing. On the other hand, Pandey (2003) could get net income of Rs. 3000 per acre during first year from ericulture and it was Rs. 13,256 from second year onwards. The variation in economics of castor seed-cum-eri cocoon production could be attributed to the difference in input and out put prices, which vary from time to time.

The results of the experiments clearly indicated that there is differential response of castor genotypes in terms of seed production and in their capacity to supply leaf for eri silkworm rearing. The genotypes J-226 and DCS-85 were better suited for both castor seed as well as eri cocoon production under rainfed condition. These genotypes accrued higher gross return, net return and B: C ratio to the resource-poor castor growers in rainfed conditions of Karnataka.

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Table 1: Cost of production of castor seed and eri cocoons per hectare among some castor genotypes

Genotypes	Cost of castor cultivation (Rs.)	Leaf yield (kg)	No. of eri DFLs reared	Cost of eri silkworm rearing (Rs.)	Total cost (Rs.)
DCS-84	9920	4177	348	1392	11,312
DCS-85	9920	4910	409	1636	11,556
JI-226	9920	4134	345	1380	11,300
DCH-171	9920	4018	335	1340	11,260
GCH-4	9920	4009	334	1336	11,256
DCH-32	9920	4123	344	1376	11,296
DCH-177	9920	4323	360	1440	11,360
DCS-9	9920	4405	367	1468	11,388
48-1	9920	4526	377	1508	11,428
Local	9920	3423	285	1140	11,060
F-test	-	*	*	*	*
S. Em ±	-	21.66	1.095	7.079	50.40
C. D. at 5%	-	64.42	3.257	21.05	149.90

* Significant at 5% level

Table 2: Returns from castor seed and eri cocoon production per hectare among some castor genotypes

Genotypes	Seed yield (kg)*	Eri shell yield (kg)**	Gross returns (Rs.)	Net profit (Rs.)	B: C ratio
DCS-84	1744	29.27	32,014	20,702	1.830:1
DCS-85	2052	37.91	38,362	26,806	2.320:1
JI-226	2207	26.37	38,379	27,079	2.396:1
DCH-171	1667	26.90	30,385	19,125	1.698:1
GCH-4	1157	25.64	22,483	11,227	0.997:1
DCH-32	1259	29.25	24,068	13,439	1.190:1
DCH-177	1285	27.90	24,851	13,495	1.188:1
DCS-9	1303	29.32	25,409	14,021	1.231:1
48-1	1480	29.85	28,170	16,742	1.465:1
Local	926	28.12	19,514	8,454	0.764:1
F-test	*	*	*	*	*
S. Em ±	36.55	0.085	246.09	129.60	0.061
C. D. at 5%	108.70	0.252	731.88	385.45	0.180

* = Price of castor seed – Rs. 15 / kg; ** = Price of eri cocoon shell – Rs. 200 / kg