Response of castor genotypes to different sowing dates under rainfed conditions of Karnataka

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Abstract: Experiments were carried out to evaluate the response of two castor hybrids viz. DCH-32 and GCH-4 and two castor varieties viz. 48-1 and DCS-9 to four different sowing dates during 1998, 1999 and 2000 under rainfed conditions of northern Karnataka. GCH-4 hybrid recorded the highest yield (2988 kg ha-1) over three years under July 1st fortnight sowing. But, under delayed sowing DCH-32 recorded slightly higher yield over check GCH-4 mainly due to early maturity nature. July first fortnight was found to be ideal for sowing of castor to get higher yields in northern dry zone of Karnataka.

Key words: Castor, Genotypes, Date of sowing, Rainfed and Yield.

Introduction

Castor is one of the important oilseed crop having high plasticity suiting to wide range of soil environments and capacity to adjust its growth according to moisture availability conditions of the soil. Once, the soil moisture increase after prolonged drought, castor rejuvenates quickly and puts up its growth at faster rate as compared to other oilseed crops. The chances of multiple harvests of beans is more and it may bring assured income to the farmers even under remnant moisture conditions. In the last 3-4 years, sunflower crop faced problems due to necrosis and abiotic stresses in northern dry zone of Karnataka and the yields were poor. Hence, there is a need to popularize contingent oilseed crop such as castor in this zone. Though castor is a known crop to this area, it needs to be exploited better, both agronomically and genetically, for its suitability for intercropping, high yielding nature and high oil content. Hence, a study was undertaken to standardize the date of sowing of castor and suitability of castor genotypes to this region. Such works conducted by scientists elsewhere have brought out the best season for castor crop to be sown in their respective regions for realizing higher yield (Dhoble et al. 1987 (15th June - Maharashtra); Sukhadia et al. 1992 (May-Gujarat); Sawarkar and Thakur, 1999 (30th June - Madhya Pradesh).

Materials and Methods

Experiments were conducted at Regional Research Station, Bijapur during 1998-99, 1999-

2000 and 2000-2001 under rainfed condition following split-plot design with dates of sowing as main plot treatments and genotypes as subplot treatments. The sub-plot treatments were found castor genotypes including two hybrids viz. GCH-4 (a national check) and DCH-32 (a recently released hybrid from DOR, Hyderabad) and two varieties viz. 48-1 (a high yielding variety) and DCS-9 (a national check variety). Four dates of sowing were considered as main treatments. First date of sowing commenced with onset of monsoon and subsequent sowing dates coincided with occurrence of sufficient rainfall at Bijapur, with an approximate interval of fifteen days. Each year the castor genotypes were sown in four different dates of sowing (during 1998-99-11.07.1998, 22.07.1998, 07.08.1998, 29.08.1998; 1999-2000-13.07.1999, 04.08.1999, 18.08.1999, 10.09.1999 and 2000-01-14.07.2000, 08.08.2000, 23.08.2000, 19.09. 2000). The seeds were manually dibbled by following the spacing of 90 cm between the rows and 45 cm within the row. Other practices were followed as per the recommended package of practices under Northern dry zone of Karnataka. The observations were recorded for the characters viz. days to 50% flowering, plant height, number of nodes per plant, number of effective spikes per plant, hundred seed weight and also total bean yield harvested from 2-3 pickings. The estimation of oil percentage was done by NMR method.

Table 1. Effect of sowing dates and castor genotypes on ancillary characters and oil percentage

	Charles	2	SOLO MONOTON							9			-
	1998	1999	2000	Mean	1998-	1999	2000	Mean	1998		1999	2000	Mean
Sowing date							3				8	00 01	1.1.2.1
1# date	54.50	55.67	57.58	55.98	65.56		75.23	80.68	12.3		8.5	12.00	10.51
	20.00	53.83	61 58	58 13	62.38		69.83	81.12	11.4		8	12.70	13.00
	35.60	50.05	68.33	63.94	57 98		75.23	77.54	12.1		.43	13.55	13.05
3" date	03.73	27.75	20.55	78.22	37.43		41.92	50.75	10.4	à	.03	8.75	10.06
4° date CD (P=0.05)	1.19	1.11	4.53	70.01	11.86	14.25	21.32		1.68		98.0	1.70	
Variety					- Carrieron			00	,		5	12.33	25.51
48-1	70 50	63.50	72.75	68.91	66.50		78.40	83.80	13,13		77.	17.01	13.55
0 304	66.50	60 33	65.25	64.02	48.13		59.62	67.59	10.85		5.5	11.85	17.41
	68.25	62 67	65.83	65.83	65.58		95.62	67.37	73.8		1.73	3.32	12.03
155	000	55.50	57.58	57.69	50.32	87.90	56.83	65.01	10.70		4.97	10.08	11.71
CD (P=0.05)	1.43	0.83	3.79		7.56		5.17		1.30		0.81	16.0	
Treatment	No.	or effective spikes	e spikes	piant		TO THINK I	3	0	6			1000000	
	1998	1999	2000		Mean	1999	2000	4	Mean	1999		2000	Mean
Sowing date			æ							1		46.30	16.00
	5.40	- 11 33	5.10	7.	27	24.59	25.52		5.05	87.7		47.17	40.04
•	-	11 30	287	9	8	25.53	23.79		24.65	46.46		45.17	45.81
	4.11	11.00	200	v	561	24 91	21.30		23.10	45.77		44.97	45.37
3" date	70.0	0.00	1 43	1 11		23.20	22 47		72.83	43.31		39.33	41.42
4th date	2 2	78.0	0.45		70.	2.46	1.79			1.46		2.89	
CD (F=0.03)	6.1	000	3	83	5	5					14	4	S4 80
Variety	21 31			-		01.90	22 50		73.84	42.99	20	41.02	42.00
48-I	3.88	12.08	2,13		36	22.10	22.00	**	39 00	44 83	6 '	43.65	44.24
DCS-9	3.10	10.73	3.03		79.	15.52	20.77		25.61	27.75	19	45.85	46.55
GCH4	3.97	10.25	3.12	2	5.78	25.50	22.22		22.54	47.38		44.32	45.85
DCH-32	3.42	9.42	7.17		.13	62.53	63.13					;	

Table 2 Effect of sowing dates and venolynes on the vield (kg ha-1) of castor at Rijamir

			×	Varieties	y)	[*]	9	1	N.	5		Hyb	Hybrids		ri ^X	1	Overall
Treatment	101	48-1				DCS-9	6-1		1 19	GCH-4	4	-5	EEE!	. X	DCH-32		(3 yrs)
	1998	1999	2000	Mean	1998	1999	2000	Mean	1998	1999	2000	Mean	1998	1999		2000 Mean	gr.
D,	1127	3029	2135	2097	1192	2560	1457	1736	2650	3763	2551	2988	1434	2995	2423	2284	2276
Ď,	1009	1885	1063	1319	8	1331	518	83	1948	1884	£	1592	1212	2543	1170	1642	1351
Ď,	837	1425	919	928	282	80	\$3	807	1556	1322	109	1160	1514	1519	719	1251	104
Ď,	384	512	113	336	35	324	12	217	8	307	216	408	60	682	241	4	351
Mean	838	1712	82		180	1280	89	100	1714	6181	1078		1143	1935	1138		
CD at 5%				ũ													
Between two dates of sowing	712.4	244.4	107.3														
Between two entries means	290.1	168.6	73.0														

Results and Discussion

Effects of sowing dates

As the four dates of sowing of castor were postponed after July, the days to 50% flowering increased gradually. while plant height, number of nodes per plant, number of effective spikes per plant and 100 hundred seed weight decreased gradually irrespective of genotypes including hybrids and varieties (Table 1). However, the effect of sowing dates on bean yield from first sowing date onwards was drastic with reduction in yield observed in all the genotypes (Table 2). The same trend was observed by Sarma (1985); Dhoble et al. (1990); Sukhadia and Dhoble (1992) and Nirmal et al. (1995). The July first fortnight sowing was ideal for sowing of castor in all the three years with the mean yield of 2276 kg ha-1. The gradual decrease in yield with subsequent delay in sowing might be due to prevailing low temperature and less remnant moisture in the soil and other environmental factors at vegetative growth phase period which in turn adversely affected the overall development of the plant. Similar findings were reported by Singh and Singh (1991) and Dudhade et al. (1996). The bean yield in general was low under first sowing date in 1998 as compared to other years except in case of GCH-4 hybrid. This might be due to heavy rainfall occurred during August and September which resulted in water logging conditions in the field and severe infestation of grey rot disease. GCH-4 has shown tolerance to water logged condition by not showing stunted growth inspite of first picking was susceptible to grey rot. In the year 2000, delayed sowings from second date of sowing onwards have shown general bean yield reduction irrespective of genotypes which was due to aberrant rainfall experienced by the crop from September onwards. The results clearly showed that sowing of castor crop at Bijapur upto August first fortnight (first and second dates of sowing) has shown best results.

Marginal reduction in oil content was observed as sowing was delayed (Table 1). This is in contrast to findings of Sarma (1985), wherein a reverse trend was observed.

Response of cultivars to varied dates of sowing

When the performance of four genotypes over four different sowing dates and over three years was considered, GCH-4 has recorded the highest yield (2988 kg ha-1), 48-1 (2097 kg ha-1) and DCS-9 (1736 kg ha-1). But, from second sowing date onwards, (i.e. August, September sowings) DCH-32 recorded slightly higher yield over check GCH-4 (Table 2). This can be attributed to shorter plant height (65.01 cm), less number of nodes per plant (11.91), early and uniform maturity of spikes (58 days to 50% flowering) nature of DCH-32 (Table 2). This is coupled with compact spike and erect plant type which fits the genotype well to all the situations and especially, it completes its life cycle before acute drought commences under late sowing situations. The study has also brought out that hybrids (GCH-4, DCH-32) are superior over the varieties (48-1, DCS-(9 for all the sown situations at Bijapur due to expression of high heterosis for yield. However, when the performance of varieties was taken alone, 48-1 was high yielding over DCS-9 in all the sown situations. In general, the bean yield was better in 1999 in all the genotypes as compared to other years probably due to high remnant moisture in soil with favourable weather conditions existed in season. In overall GCH-4 hybrid had possessed high oil content (46.55%) as compared to DCH-32 (45.85%), DCS-9 (44.24%) and 48-1 (42.00%).

Further, it may be concluded that July first fortnight is the best season for sowing of castor crop in order to harvest maximum bean yield. GCH-4, a national check hybrid is high yielder under July first fortnight sown situation and for late sown situations the hybrid DCH-32 and the variety 48-1 are more suitable.

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