

Planting pattern in *gobhi sarson* (*Brassica napus*) and winter fodder intercropping under rainfed conditions of Jammu

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ABSTRACT

A field experiment was conducted during 1994–95 to 1996–97 with intercropping of winter fodders, viz. oat (*Avena sativa* L.), barley (*Hordeum vulgare* L.) and berseem (*Trifolium alexandrinum* L.) in *gobhi sarson* (*Brassica napus* L.) with different planting patterns at Rakh Dhiansar, Bari-Brahamana, Jammu. *Gobhi sarson* variety 'GLS 1' planted in rows 45 cm apart + rows of oat 25 cm apart cross-wise recorded the highest mean net returns of Rs 14, 553/ha and proved statistically superior to all other treatments.

Key words : Planting pattern, Intercropping, net return, Green fodder, Monetary gain.

Due to small size of holdings in the rainfed areas of Jammu, the farmers give priority to the raising of grain crops over fodder crops. This practice results in an acute shortage of green fodder during the winter (*rabi*) season in this region. Generally, the farmers do not perform any weeding operation in the winter crops and the weeds growing in wheat, mustard etc. are collected and used as green fodder. But this practice does not meet the green fodder requirements of milch and other cattle adequately. Intercropping provides insurance against adverse conditions and helps in achieving higher production through efficient use of land, light and water. Therefore, it is essential to find out the most

appropriate planting pattern of grain crops and winter fodder to achieve maximum monetary gain.

MATERIALS AND METHODS

The experiment was conducted during the winter season of 1994–95, 1995–96 and 1996–97 at Sher-e-Kashmir University of Agricultural Sciences and Technology, Dry land Research Sub-Station, Rakh Dhiansar, Bari-Brahamana, Jammu. The soil was sandy loam having pH 6.5, electrical conductivity 0.05 mmhos/cm at 25°C, organic carbon 0.30% and available nitrogen, P_2O_5 and K_2O 155, 19 and 121 kg/ha respectively. The total seasonal rainfall of 295.8, 130.3 and 208.1 mm in 31, 22 and 26 rainy

days was received during 1994–95, 1995–96 and 1996–97 respectively.

The crops were raised under rainfed conditions. The experiment was laid out in randomized block design with 3 replications. The treatments consisted of oat alone (T_1); *gobhi sarson* $\frac{1}{2}$ + oat $\frac{1}{2}$ (seed ratio) (T_2); *gobhi sarson* $\frac{1}{3}$ + oat $\frac{1}{3}$ + barley $\frac{1}{3}$ (seed ratio) (T_3); *gobhi sarson* $\frac{1}{4}$ + oat $\frac{1}{4}$ + barley $\frac{1}{4}$ + berseem $\frac{1}{4}$ (seed ratio) (T_4); *gobhi sarson* in lines 45 cm apart + $\frac{1}{2}$ oat (broadcast) (T_5); *gobhi sarson* in lines 90 cm apart + oat $\frac{1}{3}$ + barley $\frac{1}{3}$ (broadcast) (T_6); *gobhi sarson* in lines 135 cm apart + oats $\frac{1}{4}$ + barley $\frac{1}{4}$ + berseem $\frac{1}{4}$ (broadcast) (T_7); *gobhi sarson* in lines 45 cm apart + rows of oat 25 cm apart cross-wise (T_8); *gobhi sarson* in lines 90 cm apart + 2 lines each of oat and barley 22.5 cm apart (T_9); and *gobhi sarson* in lines 135 cm apart + 2 lines each of oat, barley and berseem 22.5 cm apart (T_{10}).

A basal dose of nitrogen and phosphorus each at 40 kg/ha was applied uniformly in all treatments. *Gobhi sarson* 'GSL 1', oat 'Kent', barley 'Local', and berseem tetraploid were planted in different planting patterns. Crops were sown on 6 October, 22 September and 10 October during the respective years.

RESULTS AND DISCUSSION

The highest oilseed yield during all the years was recorded when *gobhi sarson* was planted in lines 45 cm apart + rows of oat 25 cm apart cross-wise, followed by *gobhi sarson* $\frac{1}{3}$ + oat $\frac{1}{3}$ + barley $\frac{1}{3}$ (seed ratio), *gobhi sarson* in lines 90 cm apart + 2 lines each of oat and barley 22.5 cm apart. All other treatments having *gobhi sarson* were

at par with each other with respect to oilseed yield.

The highest green fodder yield in the individual crop season as well as in the pooled mean was recorded with oat alone, followed by *gobhi sarson* $\frac{1}{3}$ + oat $\frac{1}{3}$ + barley $\frac{1}{3}$ and *gobhi sarson* in lines 135 cm apart + oat $\frac{1}{4}$ + barley $\frac{1}{4}$ + berseem $\frac{1}{4}$ (broadcast).

The net returns/ha were also the highest in case of *gobhi sarson* in lines 45 cm apart plus rows of oat 25 cm apart cross-wise during all the 3 crop seasons as well as in the pooled means. The second best treatment with respect to net returns/ha was *gobhi sarson* $\frac{1}{3}$ + oat $\frac{1}{3}$ + barley $\frac{1}{3}$ (seed ratio) as higher yield of *gobhi sarson* was recorded in this treatment and the market value of *gobhi sarson* being higher than the green fodder, high returns were recorded under this treatment. All other treatments except oat alone (T_1) were at par with each other with respect to net returns/unit area. The lowest net return of (Rs 8,347/ha) was recorded in case of oat alone. Dwivedi and Namdeo (1992) reported higher returns from intercropped wheat and mustard and Singh and Yadav (1990) over the sole cropping of cereals and oilseed.

The yearly variation in yield of *gobhi sarson* and green fodder was mainly due to variation in soil-moisture status at different stages of crop growth which is governed by the amount and distribution of winter rainfall. The present findings indicate that the intercropping of winter fodder in *gobhi sarson* by adopting the planting pattern of *gobhi sarson* in lines 45 cm apart + rows of oat at 25 cm apart cross-wise may be used in the rainfed areas of Jammu for getting

Table 1. Oilseed and green fodder yield and net returns from different planting patterns of *gobhi sarson* and winter fodder intercropping

Intercropping system	Oilseed or green fodder yield (q/ha)								Net returns (Rs/ha)			
	1994-95		1995-96		1996-97		Pooled mean		1994-95	1995-96	1996-97	Pooled
	Oil - seed	Green fodder	Oil - seed	Green fodder	Oil - seed	Green fodder	Oil - seed	Green fodder				
T ₁		288.94		210.50		273.51		254.65	7,639	6,929	10,472	8,347
T ₂	5.59	109.51	4.83	91.52	8.45	156.28	6.29	119.10	7,370	7,410	14,939	9,906
T ₃	10.55	134.87	11.66	107.97	9.13	153.20	10.44	132.01	11,177	11,665	15,169	12,670
T ₄	8.45	86.56	7.34	63.75	4.07	167.57	6.62	105.96	9,118	8,266	10,777	9,387
T ₅	7.15	65.40	7.23	58.61	5.61	205.64	6.66	109.88	7,144	8,020	14,318	9,827
T ₆	9.0	90.45	8.79	69.72	6.10	153.20	7.96	104.46	11,043	9330	11,828	10,900
T ₇	5.92	123.58	6.66	95.63	2.32	308.50	4.96	175.90	8,325	9,435	16,100	11,286
T ₈	12.71	46.27	13.43	49.36	13.45	150.11	13.19	81.91	11,139	13,071	19,450	14,553
T ₉	8.20	85.51	8.68	65.81	6.60	144.99	7.82	98.77	8,941	9,768	12,474	10,394
T ₁₀	8.39	104.24	7.30	69.92	1.85	197.74	5.84	123.96	9,861	8,732	10,115	9,569
CD (P=0.05)	2.18	15.30	2.92	14.23	3.50	16.11	3.55	15.32	1,906.6	1,154.2	1,801.9	1,754.2

Treatment details are given in the Materials and Methods

higher monetary returns/unit area. This planting pattern may also prove useful in meeting the green fodder needs of these areas during the winter months to some extent.

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