Indian J. Hort. 67(Special Issue), November 2010: 314-316

Intercropping trial in cauliflower cv. Snowball-16

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ABSTRACT

The present experiment on intercropping trial in Cauliflower (*Brassica oleracea* L. var. *botrytis*) cv. Snowbll-16 was carried out with the aim to find out the best intercropping system with better growth, yield and economic potential. Cauliflower intercropped with black cumin, Ajowan, Fenugreek and Marigold. Growth parameters very well showed that at the preliminary stages of growth, different intercropping treatments remained insignificant in all the growth parameters where as at later stages of growth i.e. at 45 and 60 DAT, All intercrops tried were significantly influenced and enhanced the growth parameters which led to luxurious growth of cauliflower and intercrops simultaneously. At harvest maximum yield was achieved with T3 (cauliflower + Fenugreek) 16.58 t/ha followed by 14.80t/ha with T4 (Cauliflower +Marigold).

Key word: Cauliflower, yield, biomass, cost economics.

INTRODUCTION

The efficiency of agricultural production depends upon the maximum utilization of sunshine received on land area occupied by the crop. The amount of light that penetrates a crop canopy is affected by the size, shape and arrangement of leaves and also by structure of the leaves. During its early stages of growth, a crop dose not has enough leaf area to use most of the solar radiation falling on the field. Maximum use of solar radiation usually occurs at a certain leaf area index, the duration of which is usually relatively brief in short duration crop. Where the crops takes a long time to fill out the area due to wide spacing between its rows and plants, much sunshine is wasted there. One way of reducing the loss is to use intercrops, which is another method of increasing the productive of farm through increased light of space utilization. Intercropping is a traditional system practiced by most peasant farmers in the tropics and the most important advantage of intercropping is that it is more efficient and productive than sole cropping due to its higher combined yield (Brown, 9).Intercropping refers to growing two or more dissimilar crops, simultaneously on the same piece of land, crop intensification is in both time and space dimensions. Intercrops mostly used are marigold, black cumin, ajowan and fenugreek

MATERIALS METHODS

The present experiment was conducted during winter season (2003-2004) at Department of Horticulture, Allahabad Agricultural Institute-Deemed University. Allahabad. The Experiment was carried out in Randomized Block Design with five treatments. The treatments were replicated four times. Details of the treatments are T0-Control Cauliflower (as monocrop), T1 - Cauliflower + Kala zira, T2 - Cauliflower + Ajowan, T3 - Cauliflower + Fenugreek, T4 - Cauliflower+ marigold. The experimental field was prepared by ploughing with a tractor drawn disc plough following two cross harrowing and planking. The field was thoroughly leveled by a leveler before it was laid out. Cauliflower variety snowball -16 seedlings were transplanted at required spacing in the evening in the experimental field and then irrigated. Simultaneously inter crops were sown/transplanted on same day in between the cauliflower rows. Observation on growth and yield were recorded to make a critical analysis of performance as affected by treatments.

RESULTS AND DISCUSSION

Pertaining to the data on plant height, it can be well understood that Cauliflower intercropped with Fenugreek (T3), achieved the maximum plant height, compared to other treatments as well as the control. The plant height at different treatment at 60 DAT is T3 - 44.08cm, T4 – 43.54cm, T2- 39.38cm, T1- 39.38cm and T0-37.41cm. At the preliminary stages of growth i.e. at 15 and 30 DAT.Plant height is influenced by different intercrops remain insignificant. However at later stages of growth i.e. at 45 and 60 DAT, intercrops, significantly influenced the plant height .During the earlier stages of plant growth (Height), the insignificant result obtained due to different

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Table 1. Effect of plant height, plant spread in cm of cauliflower (Snowball-16) as influenced by different Inter crops.

Treatments	15DAT	20 DAT	45 DAT	60 DAT	15DAT	20 DAT	45 DAT	60 DAT
T0-Mono Crop-Cauliflower	11.70	12.61	21.16	37.41	9.65	13.63	36.62	58.08
T1-Cauliflower+ Black cumin	12.39	13.61	21.62	39.38	10.16	14.72	36.73	58.73
T2- Cauliflower+Ajowan	12.87	13.79	21.71	40.54	10.83	16.27	39.06	63.33
T3-Cauliflower+Fenugreek	13.17	14.11	24.25	44.08	12.,72	16.31	42.55	64.00
T4-Cauliflower+Marigold	12.92	13.91	23.21	43.54	10.94	16.27	40.66	63.54
Mean	12.61	13.6	2.39	40.99	10.86	15.44	39.00	61.46
Result	Ns	NS	S	S	Ns	NS	S	S
CD (p=0.05%)	2.0046	2.309	0.39	0.87	3.159	3.2467	0.96	0.31

treatments may be attributed to delayed root establishment of the main crop. Because cauliflowers are susceptible to transplanting stocks and hence delayed establishment as well as delayed and interrupted supply of nutrients to the seedlings. However, at later stages the significant variation in plant height among different treatments may be attributed to better and early root establishment and regular, unintesified supply of essential nutrients in right time and in appropriate quantities. Similar result have been reported by Alam *et al.* (4), Ahuja (3) and Bhati, (7) (Table 1).

A similar trend was noticed in plant spread where intercropping treatments remained insignificant at initial stages of growth i.e. at 15 and 30 DAT .Whereas significant influence were found at 45 and 60 DAT.However at all the stages of growthT3 (Cauliflower+ fenugreek) recorded the maximum plant spread (64cm) and the minimum (58.08cm) remained with cauliflower (T0). As it has been discussed earlier, early establishment of seedling and letter supply of nutrients at right time and in appropriate amount might have helped the plants. Similar results were reported by Adeniyl (1), and Ahuja, and Muchopadhaya (3).

At harvest maximum yield remained with T3 (Cauliflower fenugreek) i.e. (16.58 t/ha) followed by 14.80 t/ha with T4 (Cauliflower + Marigold) with T2 (Cauliflower+Ajowan), 14.27 t/ha with T1 (Cauliflower + Black cumin) and the minimum 14.22 t/ha with T0 (cauliflower) i.e. control. Almost similar results were also reported by Ahmad (2), Kanwar and Chopra (10).

Intercrops tried in this experiment showed complimentary and helping attitude towards the main crop in achieving higher productivity per unit area. At the same time interspaces between the main crops were covered by intercrops might have played a productive role in reducing the weed population as well as better conservation, accumulation and supply of available soil moisture through the end period.

The maximum biomass yield per plant 1.26 (kg) was found with T3 (cauliflower + Fenugreek) followed by 1.23 kg with T4 (cauliflower + Marigold), 1.20 kg with T2 (cauliflower + Ajown),1.19 kg with T1 (cauliflower + Black cumin) (Table 2).

Gross return is highest in T3 (Cauliflower +Fenugreek) i.e. 83,877 / ha followed by T2 (Cauliflower + Ajowan) Rs 78,244/ ha and minimum in T0 (Cauliflower)Rs 74,205 / ha.The total cost of cultivation is also highest in T3 i.e. (Rs22, 867) followed by T2 (Rs 22,789) and minimum in T0 (Rs 22,507) per hectare .Net return also highest in T3 i.e.(Rs 61,010) followed by T2 (Rs 55,455) T4 (Rs 53,866) T1 (Rs 53,056) and T0 (Rs 51,698) per hectare in (Table 4). As far as economic feasibility of different intercrops are concerned, intercrops significantly helped to achieve high net returns/unit area compared to the control. Among all the treatments T3 (Cauliflower +Fenugreek) remained significantly superior i.e. 1: 2.66 followed by 1: 2.43 With T2 (cauliflower

Table 2. Effect of curd yield/plot, curd yield/ha, biomass yield/plant of cauliflower (Snowball-16) as influenced by different Inter crops

Treatments	Curd yield /plot (kg/ha)	Curd yield (t/ha)	Biomass yield/ plant (kg)
T0-Mono Crop-Cauliflower	4.03	14.22	1.17
T1-Cauliflower+ Black cumin	4.04	14.27	1.19
T2- Cauliflower+Ajowan	4.16	14.66	1.20
T3-Cauliflower+Fenugreek	4.69	16.58	1.26
T4-Cauliflower+Marigold	4.17	14.80	1.23
Mean	4.21	14.91	1.21
Result	S	S	S
CD (P=0.05%)	0.02	0.11	0.06

Table 3. Cost Economics of different treatments.

Treatments	Return from main crop (Rs/ha)	Return from intercrop (Rs/ha)	Gross return (Rs/ha)	Total cost of cultivation (Rs/ha)	Net return (Rs/ha)	Benefit cost ratio
T0-Mono Crop-Cauliflower	74,205	-	74,205	22,507	51,698	1: 2.29
T1-Cauliflower+ Black cumin	-	1,628	75,833	22,777	53,056	1: 2.32
T2- Cauliflower+Ajowan	-	4,039	78,244	22,789	55,456	1 :2.43
T3-Cauliflower+Fenugreek	-	9,672	83,877	22,867	61,010	1 : 2.43
T4-Cauliflower+Marigold	-	2,418	76,623	22,757	53,866	1 : 2.36

+Ajowan), 1: 2.36 with T4 (Cauliflower+ Marigold), 1: 2.32 with T1 (Cauliflower +Black cumin). All the intercropping treatments obtained higher net return than the control (cauliflower) along which registered cost benefit ratio 1: 2.29.Similar results were also reported by Benjamin and Aikman (6), Anon. (5) Table 3.

From this study it was concluded that significantly highest yield has been obtained in T3 treatments (Cauliflower + Fenugreek) (14.80 t/ha) .T3 remained superior among all the treatments as far as economic feasibility concerned, followed by T2, T4, T1and control. Same trend also observed in biomass production. In growth parameter like plant height and plant spread T3 shows maximum result followed by other treatments. At later stages of growth the treatment are remained significant.

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Received: May, 2008; Revised: June, 2010
Accepted: July, 2010