

Evaluation of garlic based seed spices intercropping system in Baran District of Rajasthan

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Abstract

The experiment was conducted at Krishi Vigyan Kendra, Anta & Baran, (Rajasthan), during the year 2017-18 under RKVY garlic excellence centre project. The plant growth attributes of garlic like plant height, number of leaves, bulb weight, bulb diameter and number of cloves per bulb significantly decreased in coriander, ajwain and nigella seed spices intercropping. Significant increase in plant growth attributes and yield were recorded with fenugreek intercropping. Garlic cultivation with the intercropping of coriander was found to have lowest yield (81.61 q ha⁻¹). Highest net return (₹ 1.69 lakh ha⁻¹) was recorded with nigella intercropping. The intercropping of coriander yield minimum value of gross return, net return and lowest cost benefit ratio of 2.75. The market price of garlic was lower during the year 2017-18, so farmers are advised to practice intercropping of nigella or fenugreek with garlic for better profit appreciation.

Key words : Ajwain, coriander, fenugreek, Garlic, intercropping, nigella.

Introduction

Garlic (*Allium sativum* L.) is one of the popular spices in the world as well as in our country and the edible underground stem is composite bulb, made up of numerous smaller bulbs called cloves. These cloves are surrounded with few dry white membranous scales. It is also an important foreign exchange earner for India. In *Haroti region* (Baran, Jhalawar, Kota and Bundi) of Rajasthan, among different spices grown, garlic holds prime position in area and production. Nowadays processed garlic products like pastes, powder, flakes, garlic capsules are catching fast in the market. Many players in the form of cottage processors are in the field of garlic processed products. Processed products quality depends on the bulb quality of garlic and there are some agro techniques to improve or maintain the quality parameter of bulb. The production of garlic is high in friable sandy loam or silt loam soils which are fertile and have good water holding capacity. Cultural practice is most important factor affecting the production of garlic crop. The seed of garlic is sown in rabi season by garlic planter with proper spacing resulting in ridge formation on both side of planter which remains unutilized. Intercropping is one of the approaches to minimize the risk of market fluctuation, natural hazards, pest and diseases outbreak etc. The advantages of intercropping are risk minimization, effective use of available resources, labour, increased crop productivity,

erosion control and food security (Thapa, A., 2015). Hence, the present investigation was carried out to study generation of more income to farmer through increased production per unit area by intercropping with seed spice crops in one season of a year.

Materials and methods

The experiment was conducted at Krishi Vigyan Kendra, Anta and Baran, (Rajasthan), during the year 2017-18 under RKVY garlic excellence centre project. The district Baran comes under zone V (Humid South Eastern Plain) of Rajasthan which covers a geographical area of about 2.7million hectare. The average rainfall varies from 650 – 1000 mm. The maximum mean daily temperature ranges from 24.5°C in the month of January and 42.6°C in May and minimum 10°C in January & 19.7°C in month of May. The soil of experimental sites was black, alluvial in origin with good drainage system and soil pH varied from 7.42-8.55 and EC 0.543-0.892 dSm⁻¹. Soils were low in nitrogen, medium in phosphorus and high in potassium content. The different seed spices namely coriander variety ACr-1, fenugreek variety AM-3, nigella variety AN-1, and ajwain variety AA-1 were sown manually as intercrop on 20th October 2017 in garlic cropping system in north to south direction at 2.10 meter distance on ridges formed by garlic planter and compared with garlic sole crop. The treatments were laid out in randomized block design with four replications. Recommended cultural operations

and plant protection measures were followed to raise a healthy crop (Anonymous, 2005). The observations were recorded on 10 randomly selected plants for plant height (cm), number of leaves/plant, bulb weight (g), bulb diameter (cm), number of cloves per bulb and yield per hectare (q). Ten plants were selected randomly from each treatment for record of morphological and yield contributing characters. Economics of the crops were calculated on the local market price. The data was analyzed as per statistical procedure.

Results and discussion

The results indicated that most of the growth and yield attributes were significantly influenced due to intercropping (Table 1). The plant growth attributes of garlic like plant height, number of leaves, bulb weight, bulb diameter and number of cloves per bulb was significantly decreased in coriander, ajwain and nigella seed spices intercropping. Highest plant growth attributes and yield were recorded in fenugreek intercropping system. The cultivation of garlic with the intercropping of coriander gave lowest yield

(81.61 q^{ha}). Intercropping of turmeric in guava orchards also increased the income of farmers of Baran district of Rajasthan (Singh *et al.*, 2014). Sowing of garlic as sole crop recorded the yield of 84.89q ha⁻¹ higher than nigella and ajwain intercropping. The increase of garlic yield in fenugreek intercropping system was due to root nodulation, small plant height and better radiation effect on plant canopy confirming the result of sowing direction by Singh *et al.*, 2012 in coriander.

The economic parameter of seed spices intercropping is depicted in table 2. Highest (₹ 2.98 lakh ha⁻¹) gross return was recorded in nigella intercropping followed by ajwain , fenugreek and coriander. Similarly highest net return (₹ 1.69 lakh ha⁻¹) was recorded in nigella intercropping. The intercropping of coriander yielded minimum value of gross return, net return and lowest cost benefit ratio i.e. 2.75. Better quality of garlic was obtained by the application of potassic fertilizes (Bajpai *et al.*, 2014). The gross return was found higher in garlic cultivation but the net return was lower due to the high cost of cultivation. The market

Table 1. Response of different seed spices on growth and yield of garlic var. G-282.

Treatments	Plant height (cm)	No. of leaves plant ⁻¹ (30 DAS)	Bulb wt. (g)	Bulb diameter (cm)	No. of cloves bulb ⁻¹	Yield (q ha ⁻¹)	
						Garlic	Intercrop
Garlic (sole)	28.64	5.85	47.13	4.87	27.25	84.89	00
Garlic + coriander	21.01	5.05	45.93	4.35	26.25	81.61	4.33
Garlic+ fenugreek	28.54	5.87	47.19	4.88	27.75	85.02	4.91
Garlic+ nigella	27.89	5.78	46.91	4.42	26.91	83.53	2.81
Garlic+ ajwain	22.13	5.36	46.15	4.38	26.72	81.94	2.35
CD (P = 0.05)	1.031	1.411	2.013	0.889	2.321	NS	NS

Table 2. Response of different seed spices intercropping on economic performance of garlic var. G-282.

Treatment	Cost of cultivation* (lakh ha ⁻¹)			Gross Return** (lakh ha ⁻¹)			Net Return (lakh ha ⁻¹)			Benefit cost ratio	
	Garlic	Intercrop	Total	Garlic	Intercrop	Total	Garlic	Intercrop	Total	Garlic	Intercrop
Garlic (sole)	1.21	00	1.21	2.72	00	2.72	1.51	00	1.51	2.24	00
Garlic + coriander	1.21	0.08	1.29	2.61	0.22	2.83	1.41	0.17	1.58	2.15	2.75
Garlic+ fenugreek	1.21	0.05	1.26	2.72	0.17	2.89	1.51	0.12	1.63	2.25	3.40
Garlic+ nigella	1.21	0.08	1.29	2.67	0.31	2.98	1.46	0.23	1.69	2.21	3.87
Garlic+ ajwain	1.21	0.09	1.30	2.62	0.28	2.90	1.41	0.19	1.60	2.16	3.11
CD (P = 0.05)	0.031	0.11		0.013	0.089		0.032	0.02		0.03	0.01

*Total variable cost (includes cost of ploughing, pesticide, seed, fertilizer, irrigation and labour cost)

**Market price of garlic was ₹ 32 kg⁻¹, ajwain ₹ 120 kg⁻¹, nigella ₹ 110 kg⁻¹, fenugreek ₹ 30 kg⁻¹ and coriander ₹ 50 kg⁻¹.

price of garlic was lower during the year 2017-18 so farmers are advised to grow nigella or fenugreek intercropping for more profit because the market price of crops are fluctuating in every year (Table 2).

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