

Original Research Article

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## Effect of Date of Sowing on Productivity of Black Cumin

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### ABSTRACT

#### Keywords

Black cumin, Date of sowing, Nigella, Spices plant, Sowing time

#### Article Info

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The experiment was carried out during rabi season during 2016-2017 at Malda District of West Bengal ascertain the best sowing date to get high yield and quality in nigella. The study consisted of four different sowing dates like T1 -Cultivation of Black Cumin in mid-September, T2-Cultivation of Black Cumin in end of September, T3 -Cultivation of Black Cumin in mid. October, T4-Cultivation of Black Cumin in early November, T5: Farmers practice (October- November). The different dates of sowing had significant influence on the morphological, growth, yield and quality attributes of the crop.

### Introduction

Nigella (*Nigella sativa* L.) is a spice crop that belongs to *Ranunculaceae*, the butter cup family. The seeds or grains resembling onion seed, are used both as spice and medicine.

The crop is known by many common names viz. black-caraway, black-cumin, fennel-flower, nigella, nutmeg-flower and roman-coriander. It is believed to have originated in the Mediterranean region and subsequently spread to Europe, Asia and Africa. Seeds of

this plant were used both as spice and medicine since a very long time. The seeds are bitter in taste and consumption of whole seed even in small quantity gives a feeling of constriction of throat. It is appropriately known as *seed of blessing (habbatul barakah)* (Srivastava, 2014). The spice was attributed with numerous medicinal properties and is widely used in unani, ayurveda, siddha and other ethnomedicine systems across the world (Padmaa, 2010). The medicinal value of the spice is immense and numerous workers appreciated its unique, varied and powerful

pharmacological traits. The popularity of the plant was highly enhanced by the ideological belief in the herb as a cure for multiple diseases. likes anti-tumour anti-diabetic, cardioprotective, gastroprotective), anti-asthmatic, nephroprotective, hepato-protective, antiinflammatory, immuno-modulatory, neuroprotective, anticonvulsant, anxiolytic, antioxidant, antinociceptive, antioxytotic, contraceptive, antibacterial antifungal, and anthelmintic activities were immensely appreciated. The major medicinal components are *thymoquinone* and *nigellone* (a dimer of thymoquinone). These were attributed to impart anti-tumour, anti-inflammatory and anti-diabetic properties (Woo *et al.*, 2012).

The crop is presently cultivated in parts of Asia, Africa, Europe and Americas of the globe. The major producing countries are India, Sri Lanka, Bangladesh, Afghanistan, Pakistan, Egypt, Iran, Iraq, Syria, Turkey and Ethiopia. In India, it is grown in many parts, particularly in Madhya Pradesh, Bihar, Punjab, Assam, Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, Rajasthan, West Bengal and Tamil Nadu. Among the countries that export black cumin, the major ones are India, Syria, Ethiopia and Turkey. The major seed spices grown in West Bengal are coriander, fenugreek, cumin, black cumin and Fennel.

*Nigella* though found suitable as *rabi* crop for West Bengal, there is lack of information on agro-management practices due to weather variation. So Proper time of seed sowing and improve crop management are the crucial in the success of the crop. Further, optimal crop stand and its interaction with season influences yield attributes and yield. So keeping all the point in mind, an experiment was carried out that the effect of sowing time on growth, yield and quality of black cumin in Malda district of West Bengal.

## Materials and Methods

The experiment was conducted in farmer's field of Malda district, West Bengal, India, during the year 2016-17 with high yielding black cumin variety). Geographically, experimental site situated at 23.5° North latitude, 89° East longitude having an average altitude of 9.75 m above mean sea level. The experimental site was located in sub-tropical humid climate with gangetic old alluvial soil, sandy clay loam texture, good water holding capacity, well drained, and with acidic to neutral reaction and moderate fertility status. The experiment Design was randomized block design (RBD) with four (5) treatments and seven (7) replications.

The treatments were: T1 -Cultivation of Black Cumin in mid-September, T 2- Cultivation of Black Cumin in end of September, T3- Cultivation of Black Cumin in mid. October, T4-Cultivation of Black Cumin in early November, T5: Farmers practice (October-November)

The experiment land was plowed, cultivated and then prepared for seed sowing through broadcasting method. For the experiment on different dates of sowing well rotten farm yard manure was applied as a basal dose at the rate of 20 quintal per hectare.

The crop was fertilized with nitrogen, phosphorus and potassium @ 40-20-20 kg ha<sup>-1</sup> in the form of urea, single super phosphate and muriate of potash, respectively. Two days prior to sowing, half the dose of N and full dose of phosphorus and potassium were applied as basal application and was properly mixed with the soil. Remaining half dose of nitrogen was applied as top dressing at 30 days after sowing (DAS). Seeds were start sown by hand in third week of September in the ratio of 15 kg ha<sup>-1</sup>. The distance between rows was 20 cm and within the rows were 5

cm. Seeds were sowed at 1-2 cm depths soil. The crop was irrigated immediately after sowing for obtaining better and uniform germination. Subsequently the irrigations were given at 10 days interval depending upon the moisture condition of the experimental plot to maintain uniform soil moisture throughout the crop growth period. Immediately after the germination of the seeds, gap filling was taken up to maintain uniform plant population.

First thinning was taken up to maintain optimum plant population at 15 DAS and second thinning was taken up 10 days after the first thinning. The experimental plot was kept weed free throughout the crop growth period with supplementary hand weeding and plant protection was taken time to time. The crop was harvested at maturity when the capsules turned to brown colour and dried. Harvesting was done by pulling the plants. The border rows from each plot were harvested first leaving the net plot area. Later, net plot area was harvested after separating the plants designated for recording biometrical observations. The harvested plants were sundried for three days and threshing was done by beating with sticks. The seed was winnowed and cleaned subsequently for recording yield data

### **Observations on the crop**

Plant height was recorded from the ground level to the tip of the last leaf or flower at 30, 60, 90 days after sowing and at harvest. Average plant height was then expressed in cm. The branches from five randomly selected plants from each plot were counted at 30, 60, 90 DAS and at harvest. The average was computed and expressed as number of branches per plant. The capsules harvested from plants were threshed, winnowed carefully. The seed lots thus obtained were taken and weight was recorded using electronic balance.

## **Results and Discussion**

### **Physical parameters**

#### **Plant growth**

Hafez (1998) reported that the growth parameter like plant height, basal and lateral branches per plant, fresh weight of the plant were pronouncedly increased when black cumin seeds are sown during October month. Plant height was found maximum with mid-week of October sown crops (32.12cm) and similarly the same date was found superior in producing maximum number of leaf.

In case of dates of sowing, the maximum number of branches was recorded on mid-October sown crop (3 and 4 branches respectively). Datta *et al.*, (2008) also found an increase in plant height in black cumin with the advancement of sowing time upto 15th November and thereafter it decreased gradually.

He also found increasing trend in number of primary and secondary branches per plant in at early sown plants in black cumin. Gowda *et al.*, (2006) had recorded a similar kind of observation in fenugreek in relation with date of sowing (Table 1).

#### **Yield parameters**

Among the yield and yield attributing parameters shows highest yield on mid-October sowing crop (3.65 quintal/ hectare). Malhotra and Vashishtha (2008) reported that sowing during second fortnight of October was suitable for optimum growth and yield of nigella. Majumder *et al.*, (2012) studied the crop response to six dates of sowing and two spacings in Gangetic plains of West Bengal. They reported that sowing dates and spacings have significant effect on number of pods per plant, number of seeds per pod and seed yield.

**Table.1** Physical and yield attributing parameters

Treatments	Plant height (cm)	Branch no	Yield(quintal/ hectare)
T1	21.07	2.9	1.98q/ha
T2	24.37	3.1	2.40q/ha
T3	32.12	4.8	<b>3.65 q/ha</b>
T4	27.24	3.8	3.05 q/ha
T5	25.69	3.2	2.10qq/ha

**Table.2** Economic analysis

Treatments	Cost of cultivation (Rs./ha)	Gross return (Rs/ha) @ 300/kg	Net return (Rs./ha)	BC ratio
T1	55600	59400	3800	0.68
T2	55600	72000	16400	1.29
T3	<b>55600</b>	<b>109500</b>	<b>53900</b>	<b>1.96</b>
T4	55600	915000	35900	1.64
T5	55600	63000	7400	1.13



Meena *et al.*, (2011 and 2012) conducted a two year study during 2002-2004 to find out the response of nigella cv. AN-1 to combined effect of crop geometry and time of sowing under semi-arid conditions. They reported that highest yield among different dates of sowing was obtained with sowing on 15<sup>th</sup> October with a row spacing of 25 cm.

The economic assessment for the treatments was done on the basis of cost of cultivation, gross and net return, considering the cost of inputs and market price of the produce during the period of experimentation (Table 2).

It can be concluded that performance from the date of sowing of black cumin it may be concluded that the black cumin sown during mid-October recorded highest yield of 3.65 q/ha and the crop sown during early November recorded 3.05 q/ha, which are higher than the crop sown during the month of September (2.40 q/ha). The yield of Black Cumin sown in mid-October (B: C ratio 1.96) and sown during early Nov. (B: C ratio 1.64) are 73.8% and 45.2% higher than local check (2.10q/ha) particularly in the old alluvial zone of West Bengal.

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