Chapter - i
INTRODUCTION
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Oil seed crops have been the backbone of agricultural economy to India since the time immemorial. The role being played by oil seeds and oil in our national economy needs no renewed emphasis. It is utilized in human consumption throughout India as oils and medicines. It is also used for lubrication and other agricultural allieds. The importance of oil seeds are also being greatly becoming in India as it constitutes the major dietary part of vegetarian people to supplementary requirement of fat.

In oil seed crops, the rape seed and mustard seed is the most important for edible oil. The oil obtained is the main cooking media in Northern and Southern India and it can not be replaced by any other edible oil to supplement constitute to fat for vegetarian people. The mustard is utilized in India as oil, medicines, lubricants, preparation of pickles, curries, vegetables, softening leather and soap making etc. After extraction of oil, cakes is used as cattle feed and manures. The green leaves of young plants are used as vegetable for human which supply enough sulphur and minerals in our diet.

In terms of area and production, India ranks third largest vegetable oil economy in the world after U.S.A. and China. It occupies a premier position in global oil seed scenario accounting for 19% oil seeds area and 9% oil seeds production.
Though the oil seeds production increased from a mere 10.83 million tones to 27.45 million tones in the country was achieved during 2003-2004 (Hegde, 2005). The average productivity of oil seeds in India only 933Kg/ha as compared to world productivity of 1632 Kg/ha.

Among the nine oil seeds, rape seed and mustard group occupies the prominent position and stand next to ground nut and sharing 14% gross cropped area, 6% of gross national product and 10% of the agriculture product value in India (2003-2004). In India rape seed and mustard is cultivated on a about 5.06 million hectares and the production of 5.83 million tones with the productivity of 1152 Kg/ha (2003-2004). In Uttar Pradesh, rape seed and mustard is grown an area of 6.76 lakh hectares with the production 6.89 lakh tones having the productivity of 1020 Kg/ha (2003-2004).

The production of edible oils is a standing challenge to the country during last two decates, where as the population is also a problem challenge for increasing oil seeds production. The population has reduces the per capita availability of edible oil to about 8.04 Kg against the world average of 15.0 Kg while the per capita consumption of the developed countries is 26.0 Kg. The availability of oil and fat in our country is about 12 g./day/head against a minimum requirement of 18.0 g./day/head. recommended by F.A.O. The country demand for edible oils is expected to rise more than double form the current level in the next 12 years. In the base scenario of per capita growing by 4%
annually, an average India's yearly edible oil requirement is stated to rise from 9.81 Kg in 1999-2000 to 16.0 Kg by 2015. The per capita edible oil demand will go up to 20.60 Kg is twice the current level by 2014-15 if per capita income grows by 6% (Hegde, 2004).

In India, the gap in demand and supply of edible oil is continuous widering and causing a heavy drain on the foreign exchange reserves of the country, because the country has to import vegetable oils to the tune of more than Rs. 220 million. Therefore, oil seeds production has assumed great importance in India.

According to a recent assessment, the monopoly of mustard oil in the kitchen of the most country homes is gradually yielding place to the other nutrition cooking oil like refined, sunflower oil, rice bran oil, soybean oil and ground nut oil. In this situation, the production and productivity of rape seed and mustard both will be increases to fulfillment the domestic requirement. For fulfillment the demand of fat and oil in our country and state, it is essential to increases mustard production. Among the various factors, suitable sowing time, optimum plant population in relation to fertilization and efficient utilization of plant nutrients with suitable variety are most important. It is widely felt that most of the newly evolved mustard varieties have high yield potential but their tremendous potential is not being realized due to poor agronomic practices and their venerability to insect pests and deceases.
Mustard plant have more plasticity ranges per plant yield from 9.11 g depending upon area occupied and branching behaviour. Thus it is essential to find out the suitable sowing time and optimum plant population/unit area. For optimizing the economic yield of any crop/variety, the optimum sowing time and plant population is a prerequisite. The time of sowing crop depend upon the climatic conditions and resources of the tract. The 2nd fortnight of October is the suitable sowing time was reported by Yadav et al. (1996), Singh et al. (2001) and Panda et al. (2004). The optimum spacing between row to row and plant to plant varying from 30x20 cm (Singh et al., 1985), 60x45 cm (Satyanarayana et al. 1986), 30x10 cm (Gupta, 1988), 45x20 cm (Singh, 1994), 30x15 cm (Kumar et al. 1995) and 45x15 cm (Singh and Chauhan, 2000), depending upon the branching behaviour of the variety.

The Bundelkhand region is the subtropical tract of the state. The climatic conditions and soil types of this region differ from other part of the state. The 'Mar' and 'Paruwa' soils of this region are more suitable for the cultivation of oil seeds and pulses (Katiyar, 1989). The production and productivity of oil seeds especially rape seed and mustard is very low due to growing of local and un improved varieties, improper management of manures and fertilizers, irrigation without adopting plant protection measures. In other hand, oil seed crops are sown as un irrigated land as pure or as mixed crop with other rabi crops.
The above account adequately demonstrates the justification to balance the demand and supply of oil. We will adopt a technology for increasing the production of oil seeds especially mustard to fulfill its requirement. These points will be kept in mind, it is, therefore, to test different yield deciding factors viz. dates of sowing, planting geometry and varieties in a double field experiment under irrigated condition of Bundelkhand which is the main mustard growing tract of the state.

**OBJECTIVES:**

The study shall be aimed-

(1) To judge the suitable sowing date for mustard crop.

(2) To determine the suitable planting geometry (Plant population) for mustard crop.

(3) To judge suitable variety of mustard.

(4) To study the effect of sowing dates, planting geometry and varieties on yield and quality of mustard in irrigated condition in Bundelkhand.

(5) To workout the economics for different treatments.