Response of Oilseed Crops to Planting Methods and Spacing

Abstract: India is the leading producer of oilseeds in the world and oilseeds contribute significantly towards economy. Various agronomic interventions are imperative for escalating the production and productivity of crops, among these planting methods and spacing play noteworthy task in emergence of seedlings so finally affecting the growth and yield of crops. Planting methods not only determine the better crop establishment but also results in water saving, reduces weed competition, provides proper drainage when crops are sown on beds or ridges. Spacing helps to utilize the natural resources like light, water and nutrients efficiently. Therefore, it is crucial to manoeuvre the spacing among plants for getting higher productivity. The present study revealed the effect of different planting methods and spacing on growth and yield of oilseeds crops.

Keywords: Oil content, planting methods, spacing, yield.

INTRODUCTION
Oilseeds occupy a key place in the agricultural economy of India, constituting an important group of crops next to cereals. India accounts for 75% of area (5.50 m ha), contributing to about 75% (6.61 m ha) production with productivity of 1.182 kg/ha (Statistics, 2010). India has been cultivating almost all oilseed crops, mainly are groundnut soybean, rapeseed-mustard, sunflower, castor, sesame, safflower, niger and linseed. Among the 9 oilseeds crops in India, highest average area is under soybean (36%) followed by rapeseed-mustard (23%) and groundnut (22%), similarly total production of oilseeds is highest in soybean and followed by groundnut.

Effect of planting methods on oilseed crops
Selection of proper planting methods is significantly important to save water in arid and semi arid regions. Several approaches are proposed in this way to reduce water consumption and increase water use efficiency. Raised bed planting system is a water efficient technology for dryland areas where water is a top priority. In beds water is applied in furrows, small quantities of water can be applied over the large area and based on the soil type water saving ranges from 20 to 40% (Tripathi and Das, 2017). The raised bed planting is the practice that helps in reducing the water losses and utilizing more conserved soil moisture. This practice facilitates seed germination, proliferation of root growth, helps in reducing the mechanical resistance to the plant roots, encourages crop growth, prevents water stagnation after irrigation and reduces irrigation requirement of crops. Moreno et al.,(1993) reported that raised bed planting has higher water productivity, better utilization of solar radiation and weed competition efficiency. There is 35% saving in irrigation water and 31% Increase in water use efficiency in raised bed planting. During extreme rainfall conditions crops are affected by water logging problems due to improper drainage. Ridges help in conserves the rain water in furrows, provide proper aeration in the root zone, reduce the runoff and erosion of soil.
Malik et al., (2001) conducted a field experiment on different nitrogen levels and planting methods (single row flat sowing, paired row planting, ridge sowing and bed planting) in sesame crop. The results revealed that maximum yield and seed oil content was obtained in bed sowing. They also reported that sowing sesame on beds gave highest number of capsules per plant may be due to plants on beds utilized suitable spacing for light penetration by reduced competition among plants.

Ram et al., (2011) carried out a field experiment by different planting methods like raised bed planting (67.5cm wide, 2 rows), raised broad bed planting (135cm wide, 4 rows), ridge-furrow sowing (60 cm spacing) and flat sowing (45 cm spacing) in soybean. Highest PARI (Photosynthetic Active Radiation Interception) and net returns were recorded in raised bed planting. They also concluded that raised bed planting recorded maximum water productivity than flat and ridge sowing. Patil et al., 2007 compared the broad bed furrow, ridge and furrow and flat methods in groundnut cultivation and observed that broad bed furrows with 30x10cm had proved to be beneficial in getting higher productivity.

Jamil et al., (2017) studied the effect of different sowing methods (ridges, drill and broadcasting) in castor under salt affected areas. The maximum plant height, seed weight and seed yield were observed in ridge planting. Kambalkar et al., 2010 showed higher yield in safflower with broadbed furrow system with lesser operational cost than traditional method of sowing in Akola, Maharashtra.

Aslam et al., (2015) conducted a field experiment on different planting methods (flat sowing 45cm apart, ridge sowing 45 cm apart and bed sowing 60/30cm) in sesame. Highest grain yield was obtained in bed planting followed by ridges, lowest was seen in flat sowing. They concluded that maximum wilting in plants was under flat sowing, however the plants on beds and ridges successfully avoided the water logging conditions.

Shahid et al.,(2012) observed the influence of irrigation levels with different planting methods (60 cm apart single rows on flat and ridges) in sunflower. The results showed that planting methods and irrigation levels affected the productivity of sunflower. Sunflower on ridges has more plant height, number of achene per head thus seed yield than flat sowing method.

Dhakad et al.,(2014) observed higher yield in soybean crop under ridge and furrow system compared to normal flat sowing. Sathy et al.,(2020) studied the impact of different planting methods (flat bed, board bed and furrow, ridges and furrow, raised bed and furrow) and with organic mulch (paddy straw) and plastic mulch in groundnut. The results showed that maximum yield attributes were found in raised bed and furrow along with plastic mulch in rainfed conditions. Basediya et al., (2016) carried out a field experiment to study the effect of ridge and furrow system in soybean crop. The results revealed that plant height, plant population, root length and seed yield were maximum in ridge and furrow planting as compared to flat sowing.

Mvumi et al., (2018) observed that planting of groundnut on ridges had more number of leaves, pods plant-land grain yield as compared to flat sowing. Singh et al., (2019) conducted a field experiment on different planting methods, irrigation levels and mulching on growth and yield of yellow sarson and found higher plant height, water use efficiency, total dry matter, seed and stover yield in the raised bed planting.

Magagula et al., (2020) concluded that groundnuts at raised beds with low plant density yielded higher than those at ridges with high plant density.

**Effect of spacing on different oilseed crops**

Spacing determines the uniform distribution of plants in the field. It directly affects the interception of solar radiation by plants and indirectly affects WUE. Borger et al., (2010) reported that by manipulating the row spacing the crop canopy can be increased by reducing the light interception to weeds.

Ali et al.,(2007) conducted a field experiment on different row spacing (45cm, 60 cm,75cm) and plant spacings (10,20,30 cm) in sunflower. The results revealed that maximum achene yield and oil content was obtained at 60x20 cm spacing. They concluded that spacing also influenced the seed and oil content in sunflower.

Arif et al., (2012) carried out a field experiment on three different plant spacing (5,10 and 15 cm) and three different row spacing (10,20,30 cm) in white mustard. Results revealed that seed yield increased with the increasing number of pods per plant in 10x15cm spacing or 20x15 cm spacing . Malik et al.,(2001) carried out a field experiment on different row spacing (30,45,60 cm) and results revealed that maximum yield was obtained in 30cm row spacing. Mulvaney et al.,(2019) revealed that no effect of spacing and seed rate on oil concentration. Whereas, spacing affected the seed and oil yield. The highest yield was obtained in 36cm spacing followed by 18, 53 and 89 cm. They concluded that row spacing significantly influenced the seed and oil yield of *Brassica carinata*.

Kaur et al.,(2019) conducted a field experiment during rabi season at Ludhiana, Punjab to study the effect of N and four different spacings on different genotypes of Ethiopian mustard. The results
revealed that high seed and stover yield is obtained in 25x15cm spacing with more N content and protein content in seed. Tewari and Singh (2011) observed the effect of three different spacing and S levels on growth and yield of spring sunflower. The results revealed that maximum yield, oil content and oil yield are found in 45x30 cm spacing.

**CONCLUSION**

Planting methods resolve the issues of crop establishment, water saving, weed competition and proper drainage when crops are sown on beds or ridges. Seed yield and oil content of oil seed crops can be increased by choosing appropriate planting method and spacing. Spacing helps to utilize the natural resources in better and more efficient way. Therefore it is crucial to manoeuvre the methods of sowing and spacing among plants for getting higher productivity and economical use of precious resources.

**REFERENCES**


