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Effects of Seedling Density or Plant Population on Yield of Lentil

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Introduction

Lentil is a major grain legume crop in many developing countries in West Asia, North Africa and many other areas of the world. The seeds are rich in protein with average concentration of 26%. It is increasingly recognized that lentil offers most practical means of solving the protein malnutrition which has necessitated giving more efforts to improve and increase its production in the country. It can have a potential role in crop rotation, in particular in organic farms, allowing the biological equilibrium of agro ecosystems and soil fertility to be maintained as because of leguminous plants, special ability to live in symbiosis with rhizobia that fix free atmospheric nitrogen also needs to be stressed but seed rate have an major impact on production of lentil and also recommended seeding rates differ based on cultivar and seed size, location, soil moisture, and environmental conditions such as rainfall and temperature where too low and high plant population beyond a certain limit often adversely affects the crop yield also the number of plants per unit area influences plant size, yield components and ultimately the effect of yield.

Effect of seedling Density or plant population on yield of lentil

Seed rate is one of the main factors that have an important role on growth, yield and quality of lentil and also the plant density can affect canopy development, radiation interception, dry matter production, and evaporation of water from the soil under the crop - weed competition, the development of fungal and viral diseases, harvesting height, seed yield that was reported Lopez et al. (2005).An experiment was conducted by Ouji et al. (2012), reported that the highest plant height was obtained at (17 cm row spacing and120 seeds/m2combination) with the lowest plant height (23.7cm) was produced at (34cm row spacing and 80 seeds/m2 combination) also the lentil seed yield though in the case of a row spacing of 25 cm it was slightly higher by 6.1% than in the plots where lentil was sown at a spacing of 20 cm(karsker et al. 2019) which are consistent with the results of Habbasha et al. (1996) and Singh et al. (2003) who reported that increasing plant density increased plant height. He also reported that the number of pods/plant was affected significantly by different row spacing and seeding rate and their interaction which indicated that pod number per plant increased with the row spacing so the increase of row spacing from 17cm to 34cm increased pod number per plant by 35.5% and also revealed that the increase in plant density led to the loss of pod number per plant so that with the increase in population from 80 and 120 seeds/m2 ,pod number per plant increased by 48.6% but at plant density higher than optimal (160 seeds/m2) pod number per plant decrease due to the number of effective branches and pods per branch decreased and the similar trend also found by Momoh and Zhou (2001).

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Optimum plant population density is an important factor to realize the potential yields as it directly affects plant growth and development where the plants are widely spaced, biological yields tend to increase linearly with increase in plant density due to no or minimum competition between the adjoining plants and also the higher leaf area index and greater absorption of solar radiation. Generally, grain yield was tending to decreasing with increasing sowing rates. However, the higher sowing rate causes higher inter-plant competition and results in poor individual plant as reported by BİÇER (2014) where as the high plant density may lead to competition among plants and increase risk of disease and lodging of the crop, resulting in reduced grain yield and also the low plant populations are unable to utilize the resources efficiently and often produce low yields that is reported by selim (1999, 2012). Seed rate is one of the main factors that have an important role on growth, yield and quality of lentil also an optimum spacing can ensure proper growth of the aerial and underground parts of the plant through efficient utilization of solar radiation, nutrients, water, land as well as air spaces. Spacing for line sowing is recommended to maintain the required number of plant population and to undertake intercultural operations for harvesting a higher yield.

Yield of individual plants and community

The full yield potential of individual plants achieved when sown at wider spacing, when sown densely, competition among plants is more for growth factor resulting in reduction in size and yield of the plant .Yield per plant decrease gradually as plant population per unit area is increased however the unit area is increased due to efficient utilization of growth factors, maximum yield per unit area can therefore, be obtained when the individual plants are subjected to serve competition.

Plant population and growth

High plant density brings out certain modification in the growth of plants .plants height in increase in plant population due to competition for light sometime it may happen that moderate increase in plant population may not increase but decrease plant height due to competition for water and nutrient but not for light .leaf orientation is also alerted due to population pressure. The leaves are narrow, erect and are arranged at longer verticals intervals under high plant density.

Parabolic Response curve

Parabolic curve used to describe plant population and yield relationship when the economic yield is a fraction of the total dry matter in this case yield also increase in increase of plant population then reach maximum however unlike an asymmetric curve yield decrease with further increase in population.

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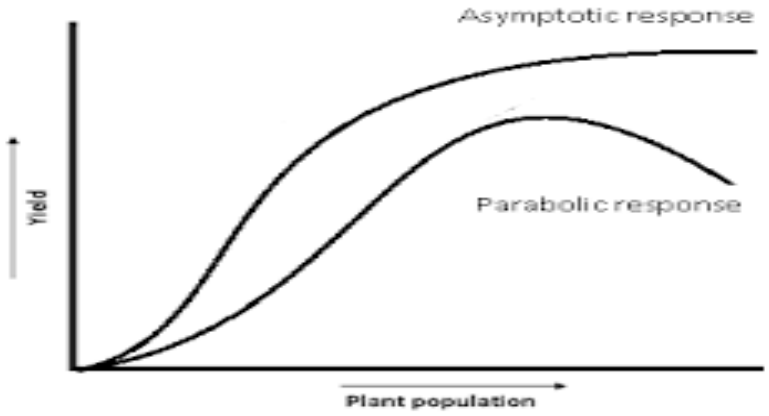

Conclusion

It is clearly conclude that the yield of lentil can be improved by planting of optimum density. The effect of plant row spacing, plant seeding rates and interaction between them is a significant on all measured parameters where as changing the row spacing had a greater influences on plant height at harvest which was increased by decreasing space between plants also the higher seed rates produced higher seed yields but the subsequent increases in yield was not so significant because of too low or too high plant population beyond a certain limit often adversely affects the crop yield that was depend on number of plants per unit area, plant size, yield components ultimately the seed yield there for the optimum plant population density is an important factor to realize the potential yields as it directly affects plant growth and development.

Reference

- BİÇER BT (2014) Some Agronomic Studies in Chickpea (*Cicer arietinum* L.) and Lentil (*Lens culinaris* Medik). Turkish J. of agricultural and Natural sciences. 1(1): 42–51, 2014
- Habbasha KM., Adam SM and Rizk FA (1996) Growth and yield of pea (*Pisum sativum*) plant affected by plant density and foliar potassium application. Egyptian J. Hort. 123(1): 33-51.
- Habibzadeh Y, Mameghani R, Kasani A, Mesgharbashi M (2006) Effect of density on yield and some vegetative and reproductive characters of 3 mungbean genotypes in Ahwaz area. Iran J Agric Sci. 37:277-335.
- Mahmoud E M (2014) Effect of intra-row spacing and seed size on yield and seed quality of faba bean (*Vicia faba* L.) Intl J Agri Crop Sci. Vol., 7 (10), 665-670
- Momoh EJJ, Zhou W (2001) Growth and yield responses to plant density and stage of transplanting in winter oilseed rape (Brassica napus L). J. Agron. Crop Sci., 186: 253–259.
- Ouji, A.; El-Bok, S.; Omri Ben Youssef, N.; Rouaissi, M.; Mouelhi, M.; Ben Younes, M.; Kharrat, M. Impact ofrow spacing and seeding rate on yield components of lentil (Lens culinaris L.). J. New Sci. Agric. Biotech. 2016,25, 1138–1144.

ISSN: 2582-6980

- Selim M M (1999, 2012) Response of lentil (*Lens culinaris* Medik) plants to sowing methods and seed rate grown under new reclaimed sandy soil conditions. Egyptian J. Agron. 20(1-2): 153-163
- Singh ON, Sharma M, Dash R (2003) Effect of seed rate, phosphorus and FYM application on growth and yield of bold seeded lentil. Indian J. pulses Res. 16(2): 116-128