

Effect of Nitrogen Level and Planting Density on Sugar Beet Yield and its Attributes

M. I. Masri

Agronomy Department, Faculty of Agric., Cairo Univ., Cairo, Egypt.

TWO FIELD experiments were carried out at EL-Fayoum Governorate, Egypt during 2006/2008 seasons to evaluate the effect of different plant populations (35000, 40000, 46000 plants fed⁻¹) and nitrogen levels (90, 120, 150 kg N fed⁻¹) on sugar yield and some of its attributes. Seeds of Kawemera variety were sown on 15th of October in both seasons. A split plot in a randomized complete block design with three replications was used. Main plots were devoted for N levels and sub plots were devoted for planting densities. Results showed that beet sugar yield and all of its attributes were significantly affected by N level in both seasons except number of plants at harvest. Root fresh weight and root yield were linearly increased with increasing N level. Application N at 120 kg N fed⁻¹ was recommended for sucrose content, purity, extractable sucrose and sugar yield in both seasons. Increasing planting density from 35000 to 40000 plants fed⁻¹ and from 40000 to 46000 plants fed⁻¹ significantly decreased individual root fresh weight by 16.35 and 16.09% in the first season and by 18.09 and 11.69% in the second season, respectively. The same trend was observed for root yield where it decreased by 2.8 and 3.6% in the first season with no significant difference between 35000 and 40000 plant, while in the second season, planting density had no effect on root yield. On the other hand, increasing plant density from 35000 to 40000 plants significantly increased sucrose content by 3.8 and 5.3%, purity by 6.0 and 5.4%, extractable sucrose by 20.9 and 22.8% and sugar yield by 18.2 and 24.3% in the first and second season, respectively. All quality measurements and sugar yield were decreased at planting density of 46000 plants compared with 40000 plants, but without significant differences except for sucrose content in the second season and sugar yield in the first season. At each plant density root yield was increased with each N increment but this increase was more pronounced under high than at low planting density. Application of 120 kg N fed⁻¹ with 40000 plants was recommended for sucrose content (22.03, 22.33%) and extractable sucrose (18.39, 17.70%) in the first and second season, respectively. Plant population of 40000 plants fed⁻¹ was recommended for sugar yield, but with 120 and 150 kg N fed⁻¹ in the first and second season, respectively. Over seasons, a maximum sugar yield of 4.85, 5.80, and 6.72 ton fed⁻¹ could be obtained at predictable N levels of 112, 141, and 228 kg N fed⁻¹ with plant densities of 35000, 40000, and 46000 plants fed⁻¹, respectively.

Keywords: Sugarbeet (*Beta vulgaris* L.), Predictable N levels, Plant population, Root yield, Quality measurements .