ABSTRACT

Potato productivity (*Solanum tuberosum* L) is generally influenced by several factors, including water and nitrogen (N), and potato requirement for these factors varies depending on the soil type and potato variety. This research aimed to determine the performance of apical rooted cuttings of potato grown in Mollic Andosols under different nitrogen fertilization and irrigation regimes. The treatments comprised 4 irrigation regimes of 100%, 85%, 75% and 50% of the crop evapotranspiration (ETC), where ETC100% was irrigated based on water depletion in the root zone two days after full irrigation, and 4 nitrogen rates of 0 (N0), 60 (N1), 90 (N2) and 130 $kg.ha^{-1}$ (N3) applied in splits at 10 (40%), 30 (40%) and 50 (20%) days after planting. The results revealed that the water demand for apical rooted cuttings of potato (ETa) was on average 201.4, 302.1, 342.4 and 402.8 mm under ETC50%, ETC75%, ETC85% and ETC100%, respectively. It was observed that plant height and number of branches significantly ($P < 0.001$) varied under different N rates with the highest plant height (92.67 cm) and number of branches per potato plant (17) achieved when applying N3. Potato grown under full irrigation (ETC100%) with N3 produced the highest total potato tuber yield (58.28 $t.ha^{-1}$) and marketable tuber yield (54.21 $t.ha^{-1}$). The number of tubers per plant statistically reduced as the N deficit increased, with the maximum tuber number, 23, achieved under N3. It was observed that a significant Pearson correlation ($r = 0.7***$) existed between tuber number and total tuber yield. The maximum harvest index (HI), 57.12 %, was obtained under ETC50% with N3, while the highest tuber dry matter, 30 %, was observed under N3. To achieve a high tuber yield from apical rooted cuttings of potato in Mollic Andosols, this study recommends an irrigation regime of ETC100% and a nitrogen rate of 130 $kg.ha^{-1}$.

Keywords

1. Water demand
2. Marketable tuber yield
3. Total tuber yield
4. Harvest index
5. Dry matter