



Comparison of Germination Sugar Beet (*Beta vulgaris* L.) Cultivars

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Introduction: Sugar Beet (*Beta vulgaris* L.), an important sugar crop, is particularly cultivated in humid regions to produce beet sugar, fulfilling about 25% of the world's sugar requirement (Tayyab et al., 2023). Seeds are the foundation of agroforestry, the beginning of plant growth and development, and also the key link in their life cycle (El-Maarouf-Bouteau et al., 2015). Seed germination is the process by which the metabolism of plant seeds is stimulated after hydration and the radicle breaks through the seed covering (Bewley et al., 2014). Suitable germination and crops establishment are one of the most significant and fundamental issues that overshadow the economic performance of the product (Sadeghzadeh Hemayati et al., 2023). Germination rate is important for seed selection and planting and quality (wang et al., 2023). The purpose of this experiment was to investigate the differences in percentage and mean germination rates of sugar beet cultivars.

Material and method: In experiment was conducted at the Plant Physiology Laboratory of Faculty of Agriculture and Natural Resources, Razi University, Kermanshah, Iran in 2020. The experiment in a completely randomized design with three replications. The treatments included the cultivars Rosegold, Ratna, Silota, Jera, Beaufort, Rozanab, Barossa, and Joncal. Seed germination was recorded daily up to 10 d after the start of the experiment. The mean germination rate (MGR) was calculated according to the following equation (Ellis & Roberts, 1980):

$$MGR = \sum n / \sum Dn$$

Moreover, seed germination percentage (SGP) was determined at the end of test. Data analyses were carried out using SAS software (SAS Institute 2003). The Means were separated using duncan test at the 5% level of probability.

Reference

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Results and Discussion: The germination results of different sugar beet cultivars showed that the Beaufort cultivar had the highest germination percentage at 91.66% among the investigated cultivars. The Rosagold cultivar also demonstrated acceptable germination with 90%, indicating its good potential for cultivation in various conditions. The Jera and Joncal cultivars exhibited similar and acceptable germination rates of 88.33%, which highlights their suitability for growth in diverse environments. In contrast, the Ratna cultivar showed an average germination percentage of 85%, necessitating more management under certain conditions. The Barossa variety, with 83.33%, and the Silota variety, with 81.66%, displayed relatively weaker germination compared to the superior varieties. Finally, the Rozanab cultivar had the lowest germination percentage at 80%. These results can assist farmers in selecting suitable cultivars for cultivation (Figure 1). The results of the mean germination rate of different cultivars showed that Beaufort variety had the highest mean germination rate (0.9). Also, the Rosagold variety showed a high mean germination rate (0.85). Silota cultivar showed a lower mean germination rate than other cultivars with a speed of 0.78 (Figure 2). The genetic characteristics of each variety play a key role in their ability to germinate. Different cultivars may have different genetic traits that affect the germination percentage (Saremi-Rad et al., 2023). Seed quality, including age, storage conditions and processing before sowing, can have a great effect on germination percentage. Higher quality seeds usually have higher germination power (Corbineau, 2024).

Conclusion: The results show that the Beaufort cultivar with the highest germination percentage of 91.66% and the mean germination rate of 0.9 is the best option for sugar beet cultivation. On the other hand, the Silota cultivar has the lowest efficiency with a germination percentage of 81.66% and a mean germination rate of 0.78. This information helps farmers to choose the right cultivars for growing conditions.

Keywords: sugar beet, germination, seed quality, seed vigor.

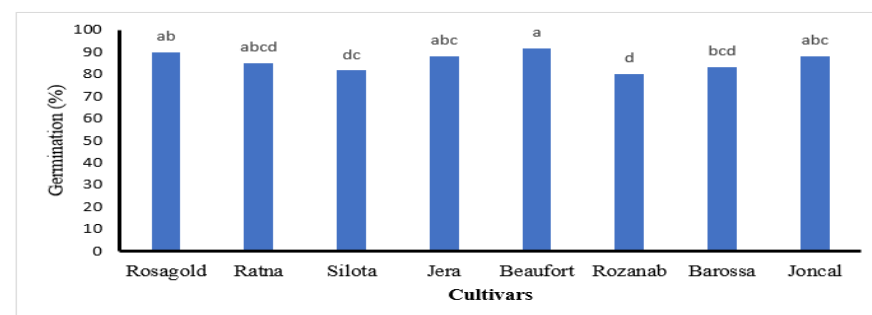


Figure 1. Comparison of the mean effect of cultivar on sugar beet germination percentage.

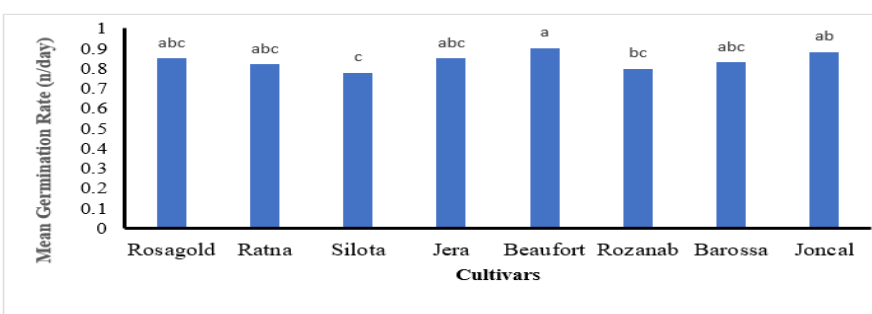


Figure 2. Comparison of mean germination rate of sugar beet cultivars.