

## DETERMINATION OF THE SUSTAINABILITY OF 24 SOYBEAN VARIETIES THROUGH COMPARING VIABLE SEEDS

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**Abstract:** Soybean is a crucial crop for human and animal consumption, and sustainable agriculture practices aim to improve its productivity while minimizing environmental impact. This study assessed the sustainability of 24 soybean varieties by analyzing seed viability, germination rate, seedling emergence, seedling vigor, yield, protein content, and oil content. The experiment, conducted with support from the Turda Agricultural Research and Development Station, revealed significant differences among varieties. Some had higher rates of viable seeds and better crop quality. Based on these findings, we recommend that farmers choose varieties with high seed viability and strong crop quality to enhance sustainability and productivity.

### • Introduction

Soybean (*Glycine max*) is a crucial crop worldwide, providing food and feed. Sustainable practices are needed to increase productivity, quality, and minimize environmental impact. Seed quality is key for sustainable soybean production.

Our study analyzed 24 soybean varieties for seed viability, germination, seedling emergence, vigor, yield, and quality. Aim: identify sustainable, productive varieties and understand seed quality and crop production factors.

### • Material and method

In February 2023, we conducted an experiment using specialized seed germination machinery to investigate the impact of varying water amounts on the germination of 24 different soybean varieties.

Over a seven-day period, three different water amounts (2 ml, 3 ml, and 4 ml) were administered to sets of ten seeds from each variety.

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### • Results and discussions

The experiment on soybean seeds showed that water availability is crucial for germination and development, with the optimal water quantity varying depending on the specific soybean variety and maturity group.

### • Conclusions

The experiment on soybean seeds of maturity group 00 and 000 concluded that water availability is crucial for germination and development. Seeds with maturity group 00 had better germination rates with optimal water. The Diamant variety showed varying germination rates based on water amount, indicating specific water requirements. Eugen, Caro TD, and Miruna TD had the weakest germination rates, while Onix TD, Felix TD, Ilinca TD, and Bia TD showed better rates.

Optimal water quantity may vary based on variety and maturity group. These findings provide guidance for optimizing soybean cultivation and improving yield and quality.