



USAMVB Timisoara  
**Multidisciplinary Conference on  
 Sustainable Development**  
 08-09 October 2020



# SEED GERMINATION SURVEY OF ROMANIAN TOMATO AND PEPPER VARIETIES

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**Abstract** Nowadays, people are more and more concerned with healthy food, hence the need for novel crop varieties with increased stress resistance in addition to other desirable organoleptic traits. Local Romanian varieties that are already proved to be adapted to local conditions can be used to develop new organic varieties with superior traits. Indicators of seed germination process, such as germination capacity, time, rate, and synchrony are taken into consideration by the plant breeders for the creation of a new crop variety. In the present study, nine Romanian tomato (*Solanum lycopersicum* L.) varieties and seven pepper (*Capsicum annuum* L.) varieties were compared during seed germination process. Significant differences were observed among the varieties in the end of the survey for all indicators assessed. These differences in the germination indicators can be correlated in future studies with genotype variation among the varieties and can be used as a basis for genotype-assisted breeding programs, by selecting for a desirable trait, such as synchronous germination, or short germination time, or against undesirable trait, such as low percentage of germination.

## • Introduction

Seed germination is an important plant physiological process that incorporates seed imbibition, activation, intra-seminal growth and embryo protrusion. The germination process can be characterized by several indicators such as germination capacity, time, rate, homogeneity, uncertainty and synchrony of germination. This survey is endeavoring to assess the differences among nine tomato varieties and seven pepper varieties at the seed level (seed size) and during germination process.

## • Materials and methods

### Plant materials

Tomato seeds from varieties Argeș 11, Argeș 20, Ștefănești 24 and Ștefănești 22 were received from I.N.C.D.B.H. Ștefănești-Argeș and tomato seeds from varieties Kristinica, Florina 44, Andrada, Buzău 1600, and Buzău 47 as well as pepper seeds from varieties Decebal, Vladimir, Galben Superior, Splendens, Cosmin, Roial, and Cantemir were received from S.C.D.L. Buzău.

### Seed germination measurements

Seeds were sterilized with 70% ethanol, then were placed on filter paper soaked with distilled water in glass Petri dishes. The dishes were kept at room temperature (21-22°C daytime/18-19°C nighttime) and natural light conditions. For each variety were used three replications, with 30 seeds in each replication

### Seed size measurements

The images were acquired with Leica S8 APO stereomicroscope, equipped with Leica DFC 295 camera. The length and width of the seed as well as the length and width of the opening where the radicle pierces the tegument were measured.

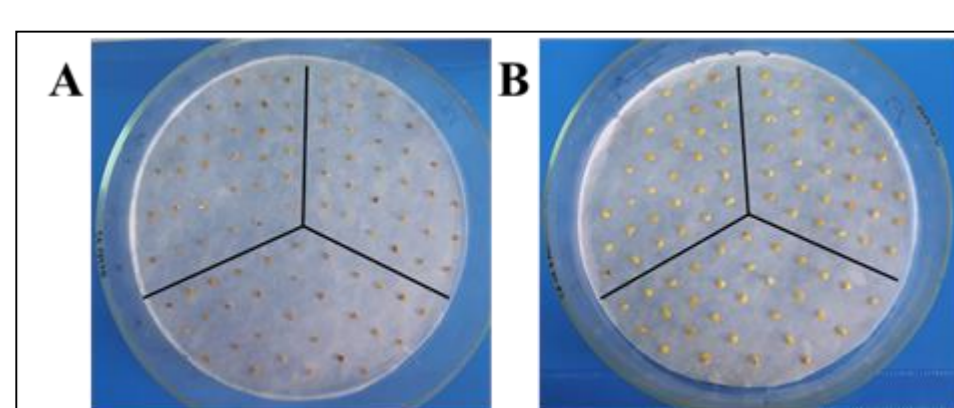


Figure 1. Glass Petri dishes with three replications, 30 seeds/replication. A. Tomato. B. Pepper

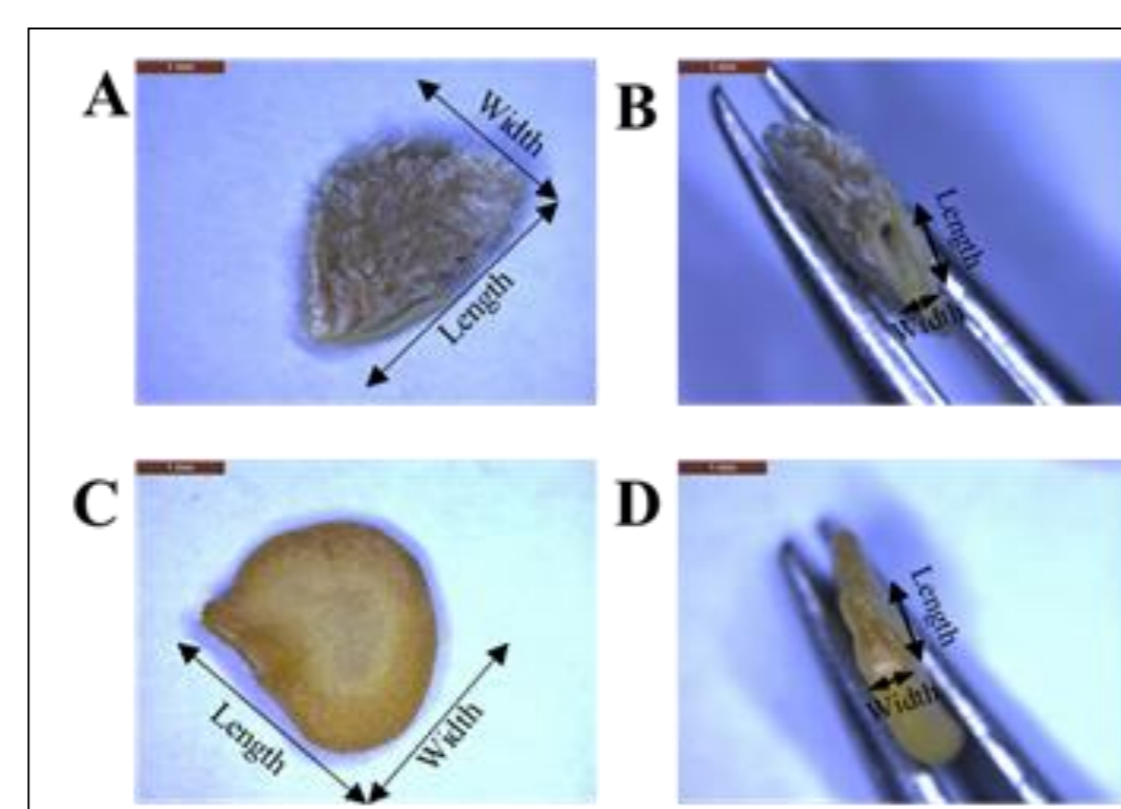


Figure 2. A. Tomato seed; B. Tomato seed opening; C. Pepper seed; D. Pepper seed opening. Dark bar in the upper left corner represents 1 mm.

## • Results and discussions

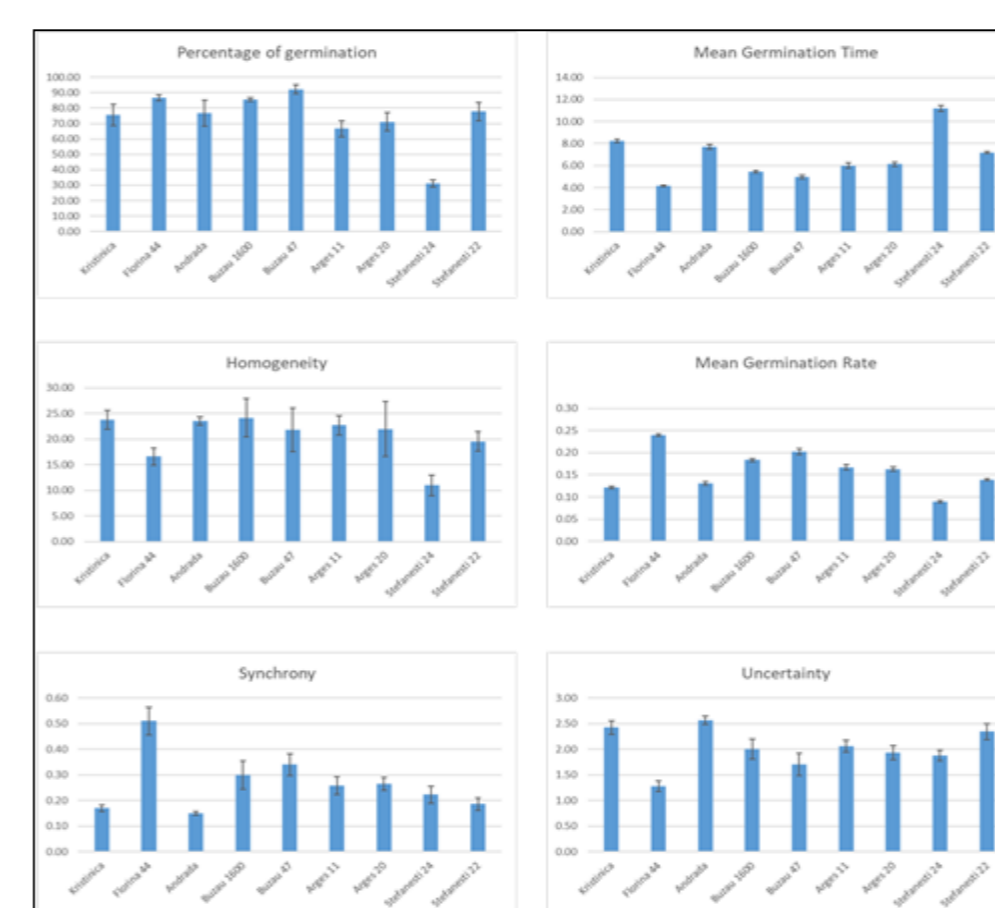


Figure 3. Seed germination indicators for the tomato varieties studied. Error bars represent standard error of the mean.

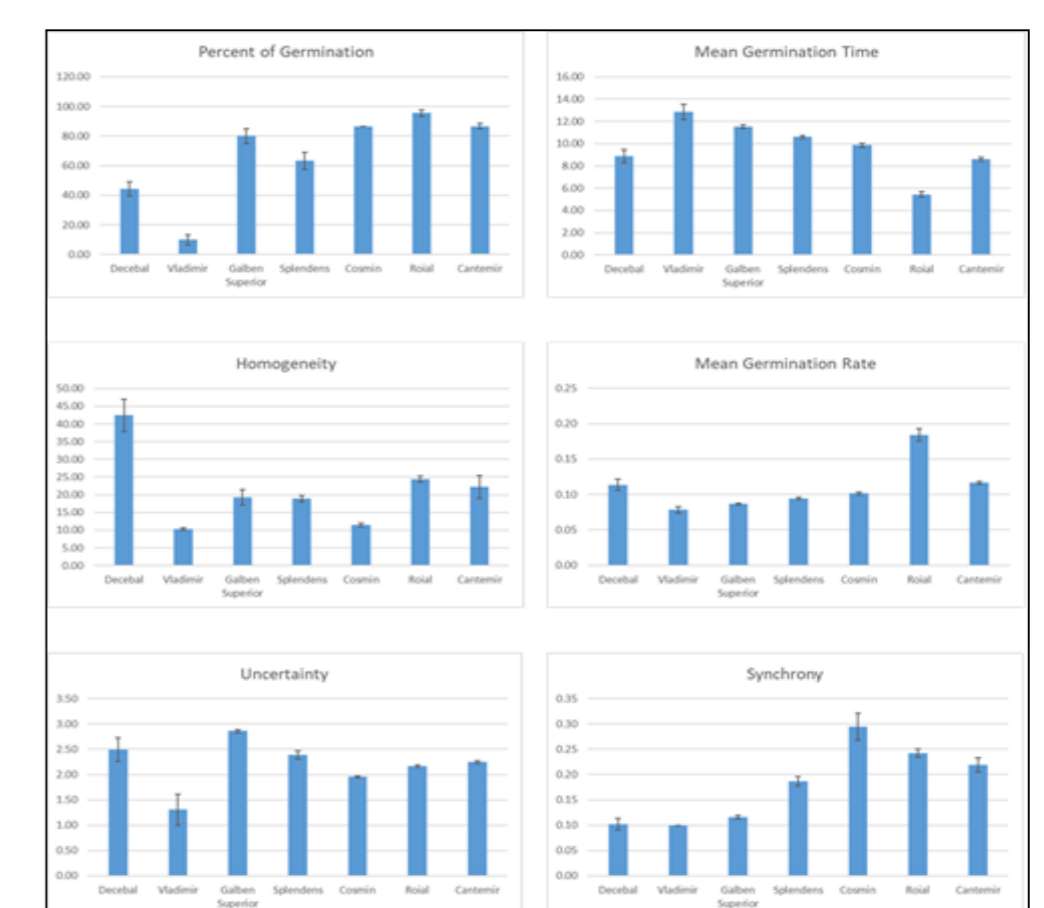


Figure 4. Seed germination indicators for the pepper varieties studied. Error bars represent standard error on the mean.

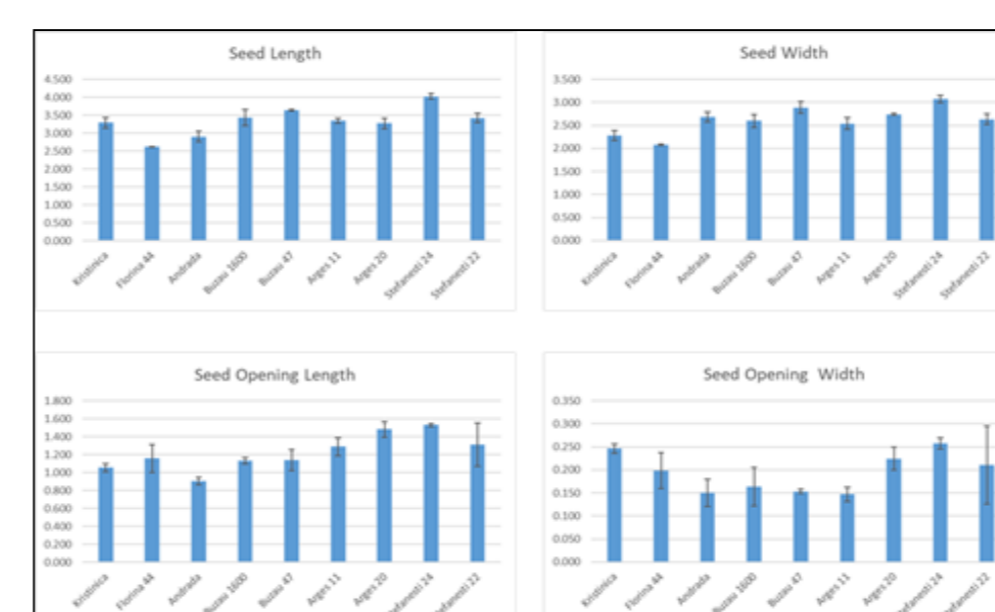


Figure 5. Tomato seed size indicators for the tomato varieties studied. Error bars represent standard error on the mean.

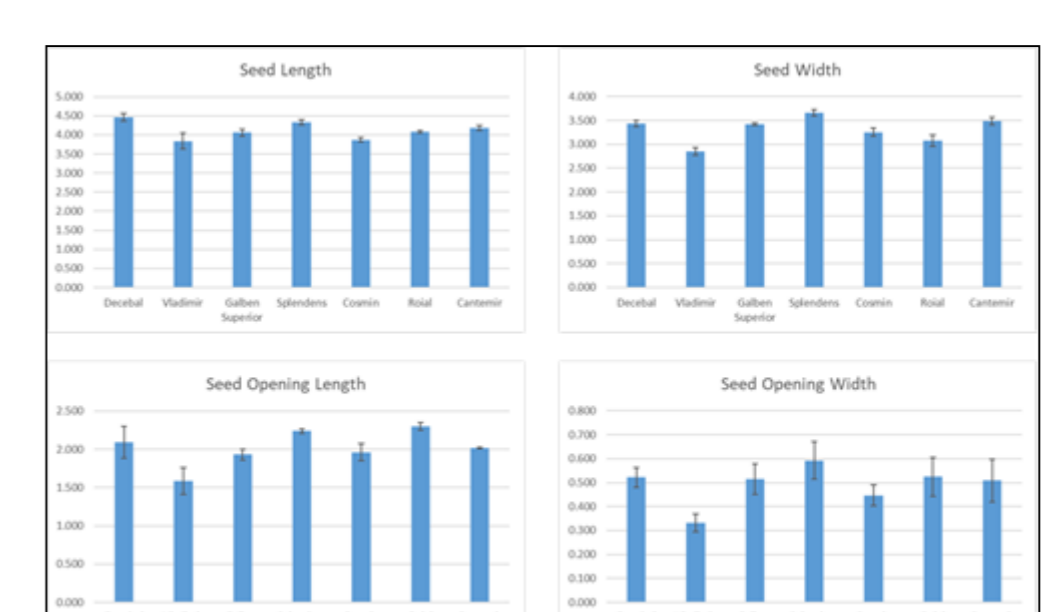


Figure 6. Pepper seed size indicators for the seven pepper varieties studied. Error bars represent standard error on the mean.

## • Conclusions

- Significant differences in the seed germination indicators and seed size measurements were observed among both the tomato and pepper varieties studied.
- The percentage of germination for tomato was above 70% for most varieties with the exception of the Ștefănești 24 variety
- Florina 44 showed the shortest mean germination time, highest mean germination rate, highest synchrony and lowest uncertainty of germination values.
- Ștefănești 24 has the biggest seeds and Florina 44 has the smallest seeds.
- Vladimir variety displays the lowest percent of germination, longest mean germination time, lowest homogeneity, lowest mean germination rate, uncertainty and synchrony of germination values.
- Roial variety displays the highest percent of germination, shortest mean germination time, and highest mean germination rate.
- Further genotyping studies are needed to correlate the phenotyping traits studied in this survey with DNA sequence differences, in order to select plants with multiple superior traits in genotype-assisted breeding programs.

**Acknowledgement:** This research work is supported by the Romanian Ministry of Agriculture and Rural Development (MADR-Bucharest), under the agricultural research and development program 2019-2022, ADER 7.2.6 project.