# Phenotypic variability of Tartary buckwheat germplasm cultivated under the Czech Republic conditions

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### Introduction

Tartary buckwheat (Fagopyrum tataricum (L.) Gaertn.), Polygonaceae



## **Results and discussion**

• The precipitation in 2020 was lower than in 2021. The temperature in 2020 reached its highest in August and while the highest temperature in 2021 was in June.



Figure 1 The Czech Republic weather conditions in average (1981-2010), 2020, and 2021





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Originated in China, and cultivated in few countries, mainly in Asia

Beneficial nutritive proprieties especially protein content and phenolic compound

### Objective

To evaluation of the genotypes for future breeding programs

#### Methods

The line graph shows the temperature, the bar chart shows the precipitation

- A significant difference in yield, main stem branching, protein content, total phenolic content, and scavenging activity were found between each genotype.
- Yield, protein content, total phenolic content, and scavenging activity were significantly different in 2020 and 2021.
- Only 3 genotypes, Peremoga, Lira, and No.2316, were able to maintain the yield and represented the high nutrition compounds.
- In 2020, the highest yield was achieved in Peremoga (111.55 g/m<sup>2</sup>), followed by No.2316 and Lira with 107.05 and 57.32 g/m<sup>2</sup>, while in 2021, No.2316 represented the highest yield with 223.35 g/m<sup>2</sup>.
- Only No.2316 showed higher TSW than average with 12.60 and 15.00 g in 2020 and 2021, while the average TSW was  $12.31\pm2.00$  g in 2020 and increase to  $14.10\pm2.08$  g in 2021.
- Lira showed the high protein content in 2020 and 2021 (13.34% and 11.17%), followed by Peremoga (12.67% and 11.14%) and No.2316 (12.10% and 11.02%).
- These 3 genotypes showed higher total phenolic content and scavenging activity than average in both years.

150 seeds of 20 genotypes were sown in 3 rows under the climate condition of the Czech Republic in 2020 and 2021.

Selected morphological and phenological traits were evaluated e.g. plant height, branching, inflorescence compactness, flower clusters, thousand seed weight (TSW), and yields. <sup>[1]</sup>

Seed nutrition including protein contents, total phenolic contents, and antioxidant activity was determined by Kjeldahl's method, Folin assay, and DPPH assay.<sup>[2]</sup>

Figure 2 The comparison between yield, protein content, total phenolic content, and scavenging activity of Tartary buckwheat in 2020 and 2021



- The lower yield in 2020 in comparison to 2021 might be caused by the abiotic stress from low precipitation and low temperature.
- The higher temperature can increase the phenolic content and scavenging activity while the water stress can cause a significant decrease in seed production.<sup>[3]</sup>

#### Conclusions

• The weather condition has a strong effect on the performance of Tartary buckwheat.

• In the Czech Republic condition, Peremoga, Lira, and No.2316 showed the stability of yields and nutrition composition in 2020 and 2021.

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