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Assessment of the Effects of Pests and Diseases on Three Tomato (*Solanum Lycopersicum*) Genotypes' Yield Under the Hedgerow System in the Organic Farm.

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SUMMARY

Tomato (*Solanum lycopersicum*) is a widely cultivated fruit crop belonging to the Solanaceae family. The cultivation of tomatoes in organic and agroforestry systems comes with the interference of pests and diseases. Agroforestry methods merge trees, shrubs, or other perennial plants with crops, while organic farmers employ natural inputs and stay away from synthetic fertilizers, pesticides, and genetically modified organisms. This study intends to evaluate how insect damage, fungal infection, and wild animals affect the yield of three different tomato *genotypes;* Szentlőrinckáta, ACE55 and *Roma* in a windy and protected cultivation side in an organic farming system. The experiment took place at the Department of Agroecology and Organic Farming Unit at the Hungarian University of Agriculture and Life Sciences, Soroksar Experimental and Research Farm.

The study investigated the effects of variety, side, and distance on insect damage, fungal damage, animal damage, and yield in tomato plants in the experiment. The results showed that variety had the most significant effect on potato beetle damage, with ACE55 being more resistant to potato beetle damage than Roma and Szentlőrinckáta. The side and distance had a significant impact on potato beetle damage, with more damage observed on the protected side at distance R1 and on the windy side at distance R2. On 23rd August 2022, the Szentlőrinckáta variety showed a higher susceptibility to *Helicoverpa armigera* damage compared to ACE55 and Roma varieties. However, on the same date, ACE55 showed more damage on the protected side. On 30th August 2022, the Roma variety showed more damage on the windy side, especially at shorter distances from the hedge and at larger distances from the protected side. There was no significant difference in resistance levels between ACE55 and Roma on this date. In terms of fungal damage, neither the variety nor the side or distance had a significant impact. The distance had a significant effect on wild animal damage, with the interaction between distance and side also being significant. The tomato variety did not have a significant effect on animal damage. The choice of tomato variety and the location of the plant significantly impacted fruit production, with ACE55 producing significantly fewer healthy green and healthy red fruits compared to Roma and Szentlőrinckáta. The protected side was found to be a more favourable location for producing healthy red and healthy green fruits, especially for varieties Roma and Szentlőrinckáta, despite being more favourable for insect damage.

In conclusion, the data for insect damage, in general, was higher on the protected side and lower on the windy side, as the results were mixed and varied depending on the specific insect and survey date. However, the study confirmed that the location of the plant significantly impacted healthy fruit production, with the protected side being more favourable for producing healthy red and healthy green fruits and agrees with the research by Nordey *et al*. (2017) on protected cultivation of vegetable crops in sub-Saharan Africa. Based on the results, the use of the protected side in the organic production of tomatoes is recommended for the production of more healthy, disease-free, and infection-free tomato fruits.