

## Abstract

# The Impact of Aphids' Herbivory on the Expression of Subtilisin-Like Protease Gene in Maize (*Zea mays* L.) Seedlings <sup>†</sup>

Hubert Sytykiewicz <sup>1,\*</sup>, Magdalena Ruszczynska <sup>1</sup>, Paweł Czerniewicz <sup>1</sup> and Monika Adamczyk <sup>2</sup>

<sup>1</sup> Institute of Biological Sciences, Faculty of Sciences, Siedlce University of Natural Sciences and Humanities, 14 Prusa St., 08-110 Siedlce, Poland; mr79004@stud.uph.edu.pl (M.R.); pawel.czerniewicz@uph.edu.pl (P.C.)

<sup>2</sup> Faculty of Medicine, Lazarski University, 43 Świeradowska St., 02-662 Warsaw, Poland; m.adamczyk@lazarski.edu.pl

\* Correspondence: hubert.sytykiewicz@uph.edu.pl

† Presented at the 2nd International Electronic Conference on Plant Sciences—10th Anniversary of Journal Plants, 1–15 December 2021; Available online: <https://iecps2021.sciforum.net/>.

**Abstract:** The study was aimed at evaluating the effect of the bird cherry-oat aphid (*Rhopalosiphum padi* L.) feeding on the expression of subtilisin-like protease gene (LOC100285183) in the maize (*Zea mays* L.) seedlings. The plant material included 14-day-old seedlings of two selected maize cultivars: Ambrozja and Tasty Sweet (relatively resistant and susceptible to the aphids, respectively). The maize plants were artificially infested with adult apterae females of *R. padi* (0, 30 and 60 aphids per plant) for 0, 3, 6, 24, 48, 72 and 96 h. Gene expression quantification was performed using the real-time qRT-PCR technique. The obtained results were normalized to the actin-2 gene, and the relative expression of the subtilisin-like protease gene was assessed by the comparative C<sub>t</sub> ( $\Delta\Delta C_t$ ) method. Overall, the aphid-relatively resistant (Ambrozja cv.) maize seedlings characterized with up to 2.5-fold higher upregulation of the examined gene compared with the aphid-susceptible (Tasty Sweet cv.) plants. In addition, the magnitude of the gene expression increases was dependent on the insect abundance and duration of infestation time. The performed survey unveiled the crucial involvement of subtilisin-like protease gene in perception of biotic stress signal linked to the bird cherry-oat aphids' feeding in tissues of maize host plants.

**Keywords:** maize; aphids; subtilisin-like protease; gene expression; biotic stress

**Citation:** Sytykiewicz, H.; Ruszczynska, M.; Czerniewicz, P.; Adamczyk, M. The Impact of Aphids' Herbivory on the Expression of Subtilisin-Like Protease Gene in Maize (*Zea mays* L.) Seedlings. **2021**, *1*, x. <https://doi.org/10.3390/xxxxx>

Academic Editor: Iker Aranjuelo

Published: 30 November 2021

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2021 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).