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Abstract

The Impact of Aphids' Herbivory on the Expression of Subtilisin-like Protease Gene in Maize (*Zea mays* L.) Seedlings †

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Abstract: The study was aimed at evaluating the effect of the bird cherry-oat aphid (*Rhopalosiphum padi* L.) feeding on the expression of the subtilisin-like protease gene (LOC100285183) in 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, 60 and 90 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_t ($\Delta\Delta C_t$) method. Overall, the relatively aphid-resistant (Ambrozja cv.) maize seedlings were 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 increase was dependent on insect abundance and duration of infestation time. The performed survey unveiled the crucial involvement of the subtilisin-like protease gene in perception of the biotic stress signal linked to the bird cherry-oat aphids' feeding on tissues of maize host plants.

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

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