MOLECULAR KEYS FOR THE IDENTIFICATION OF APHIS SPECIES ASSOCIATED WITH APPLE TREES IN BELARUS

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In Belarus *Aphis pomi* de Geer, *Aphis spiraecola* Patch (Foottit et al., 2009; Razmjou et al., 2014), *Dysaphis anthrisci* Börner, *Dysaphi splantaginea* Pass., *Dysaphis radicola* Mordvilko (Rakauskas, Bašilova & Bernotienė, 2015), *Eriosoma lanigerum* (Hausmann) (Holman, 2009) and *Rhopalosiphum insertum* (Walker) (Holman, 2009) are the major pests in appleorchards. These aphids often cause irreversible damage to leaves, branches, and bourgeons and are responsible for severe losses of yield. Despite the biological distinction and potential harmfulness, these species are difficult to separate using their morphological characters, which lead to the difficulties with correct diagnosis of the species. Using of molecular-genetic methods of the species identification allows to solve such problems (Valenzuela et al., 2007). PCR-RFLP identification is a precise and cheap method of the identification of morphologically similar species of aphids. In this regard, we have developed the PCR-RELP keys based on the COI gene sequence to identify 6 aphid species included in the list of apple pests of the fauna of Belarus.

Available sequences of the mitochondrial COI gene (137 of *A. pomi*, 212 of *A. spiraecola*, 1 of *D. anthrisci*, 22 of *D. plantaginea*, 9 of *D. radicola*, 26 of *E. lanigerum*, and 8 of *R. insertum*) were obtained from GenBank NCBI. To avoid any discrepancies when analyzing data, sequences were aligned by reference. The length of the fragment was 708 bp. The restriction maps that allowed distinguishing between all 6 species of aphids were constructed. The COI sequences of analyzed species of aphids possess sufficient conservatism at the intraspecific level that allows developing PCR-RFLP keys for their identification.

The maps included 11 unique restriction sites for *A. pomi*, for *A. spiraecola* it is 8, for *R. insertum* it is 8, for *E. lanigerum* it is 5, for *D. radicola* it is 10, for *D. plantaginea* it is 8, and for *D. anthrisci* it is 6. These endonucleases can be used for precise identification of aphid species by alternative feature. Developed PCR-RFLP keys can also be used to evaluate the frequency of occurrence of the specific species of aphids on apple trees.

References

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