

IN ZEA MAYS IN UKRAINE: THE FIRST REPORT

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Introduction. Maize viral diseases especially maize dwarf mosaic disease (MDMD), which is caused by potyviruses, lead to significant crop losses worldwide. The aim of this work was to identify the causal agent of mosaic symptoms, observed on maize plants during 2018 - 2020 in Kyiv region.

Methods. Enzyme-linked immunosorbent assay in the DAS-ELISA modification using commercial Loewe Biochemica test systems for *Maize dwarf mosaic virus* (MDMV), *Sugarcane mosaic virus* (SCMV), *Wheat streak mosaic virus* (WSMV) was applied to identify the causal agent of maize disease in collected samples. Transmission electron microscopy was used in order to direct viral particle visualisation.

Results. Plants with typical mosaic symptoms were observed in corn crops of the Kyiv region in early June 2018. The pathogen was transmitted by mechanical inoculation to maize and sweet maize plants with the manifestation of mosaic symptoms. Aphids, which are natural vectors of viruses, were found on diseased plants (Fig. 1).

Electron microscopy of the sap from diseased plants revealed the presence of flexible filamentous virions 750 nm long and 13 nm in diameter, typical of the genus *Potyvirus* (Fig. 2). In August, mosaic symptoms and aphids *Rhopalosiphum padi* were found on previously healthy plants in the same maize crop. In 2020, in the same sown area, maize plants were free of viral infection during inspection in June, but a re-inspection in September revealed mosaic symptoms on maize crop and the presence of aphids in the leaf axils (Fig. 3, 4). The presence of SCMV in maize samples collected in June and August/September 2018 and 2020, as well as in inoculated maize and sweet maize plants, was confirmed by ELISA using a commercial test system (Fig. 5).



Fig. 1. Symptoms of mosaic and aphid *Rhopalosiphum padi* on maize (2018)

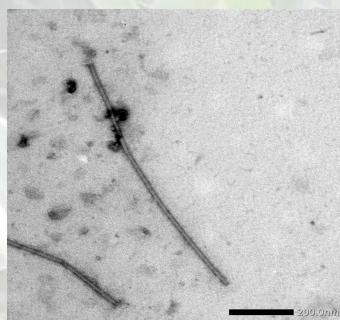


Fig. 2. Electron microscopic image of detected viral particles



Fig. 3. Symptoms of mosaic on maize plants (2020)

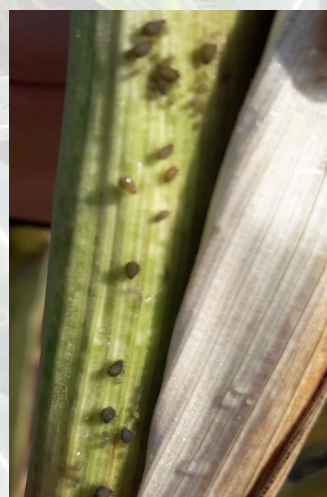


Fig. 4. *Rhopalosiphum padi* on maize (2020)

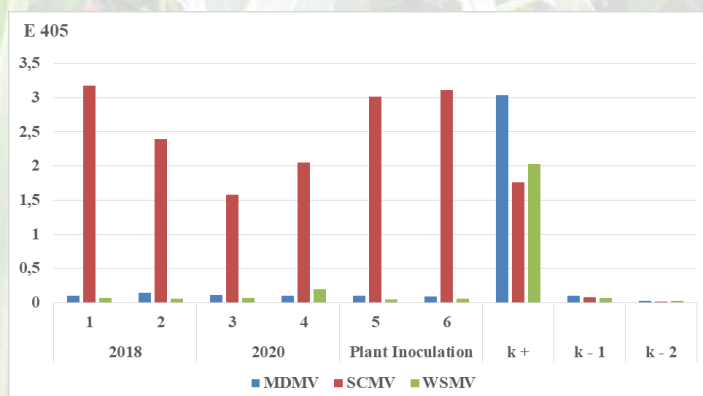


Fig. 5. The results of testing samples with DAS-ELISA:

- 1) maize plants with mosaic symptoms (June 2018);
 - 2) maize plants with symptoms of mosaic and aphids (August 2018);
 - 3) maize plants with symptoms of mosaic and aphids (September 2020);
 - 4) maize plants with symptoms of mosaic and growth retardation, and aphids (September 2020);
 - 5) maize plants of the "Mosquito" variety with symptoms inoculated with the sap of diseased plants;
 - 6) sweet maize plants of the "Brusnytsia" variety with symptoms inoculated with the sap of diseased plants.
- "k +" - positive control; "k - 1" and "k - 2" - negative controls.

Conclusions. This study presents the first report of *Sugarcane mosaic virus* (SCMV) in maize in Ukraine. The obtained data allow suggesting that *Rhopalosiphum padi* is a natural vector of SCMV in agroecosystems of Ukraine. It should be noted that co-infection with *Maize dwarf mosaic virus* (MDMV) and *Wheat streak mosaic virus* (WSMV) in the affected plants was not detected.