Turnip yellows virus in oilseed rape (*Brassica napus* L.) in Serbia

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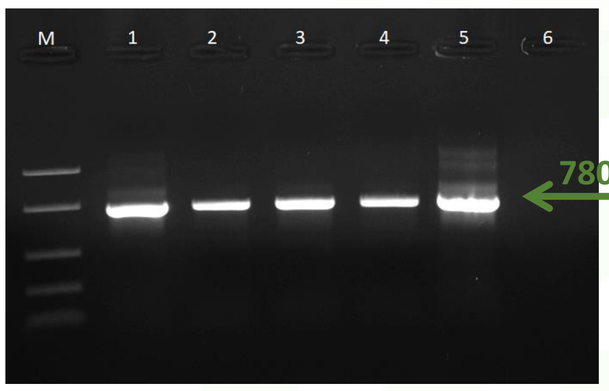
Oilseed rape (*Brasica napus*) is an important oilseed crop widely grown in many countries. After the first detection of *Turnip yellow virus* (TuYV) infected oilseed rape in 2014 in Serbia, TuYV is potentially a limiting factor for successful production of oilseed rape in Serbia, considering the increasing expansion of TuYV on various types of Brassicae family. Several viruses can infect canola, and among them TuYV is one of the most prevalent and important viruses, which can cause serious yield losses. It could be attributed to the abudance and movement of aphid vectors mainly *Myzus persicae*.

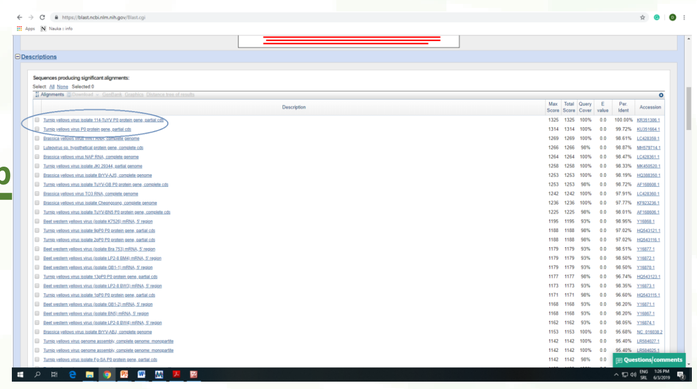
During the last few years we have conducted the visual inspection of oilseed rape fields in Serbia, when similar symptoms were observed in most inspected localities with disease incidence ranging from 20 to 60%. Oilseed rape plants showed virus-like symptoms, including reddening of leaf margins and interveinal yellowing.

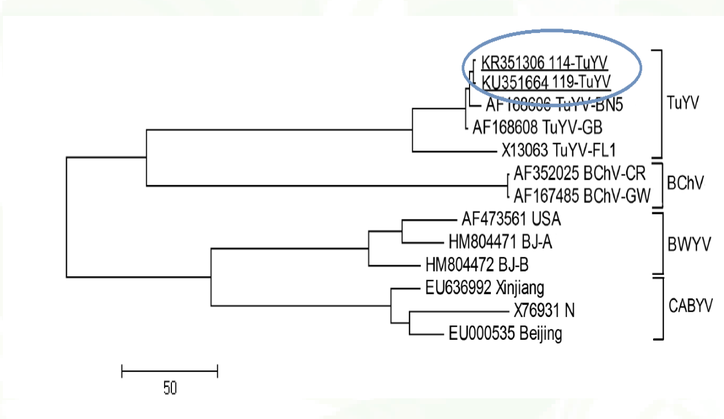
In order to assess the state of leaf infection in oilseed rape fields in growing season 2015-2018, samples were collected and analysed for the presence of TuYV, and possible presence of *Cauliflower mosaic virus* (CaMV) and *Turnip mosaic virus* (TuMV), utilizing commercial double-antibody sandwich (DAS)-ELISA kits. Serological analysis of oilseed rape samples revealed the highest incidence (40-70%) of TuYV in most localities, in all investigated years. All tested samples were negative for CaMV and TuMV.

The presence of TuYV in oilseed rape was further confirmed by the conventional reverse transcription (RT)-PCR with primers TuYVorf0F and TuYVorf0R amplifying the P0 gene and sequencing. With virus specific primers, we were able to amplify target cDNA fragments of predicted size and successfully detect the presence of viruses in all selected ELISA-positive samples. A comparison of the obtained sequences with those available in GenBank confirmed that the Serbian isolates belong to TuYV.



Detection of fragments of 780 bp using the primer sets PVYd/PVYc. Columns: M-MassRulerTMDNA ladder, Mix (Fermentas Life Sciences GmbH, Lithuania), 1-4: samples 5-positive control 6-negative control.





Maximum parsimony tree based on partial sequences of the P0 gene of *Turnip yellow virus*, *Beet western yellow virus*, *Beet chlorosis virus* and *Cucurbit aphid-borne yellow virus* isolates. The phylogram was generated with MEGA5 using bootstrap analysis with 1000 replicates and bootstrap values (>50%) are shown next to relevant branches. The Turnip yellow virus isolates from oilseed rape from Serbia are underlined.

Considering the high incidence and distribution of TuYV on various plant species in Serbia, it could become an impediment to the successful production of oilseed rape in our country. That is the reason for further research in order to detect inoculum sources in nature, as well as to determine the genetic relationship of Serbian oilseed rape TuYV isolates with those from other parts of the world.

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