New Disease Reports

First report of *Serratia marcescens* causing yellow wilt disease on sunflower in Russia

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In August-September 2011, sunflower (*Helianthus annuus*) plants with yellow, wilted leaves were found in commercial fields in the Republic of North Osetia-Alania (North Caucasus region of Russia). Approximately 20% of the plants in the fields exhibited yellowing and wilting. Cross sections of stems near the affected leaves revealed a brown discoloration in the phloem. Isolations were made from the stems of 24 symptom-bearing sunflower plants collected from four different fields. Small tissue pieces (2-4 mm^3) from the phloem were excised, surface sterilised, rinsed several times and ground. An aliquot of the slurry was plated onto yeast extract-dextrose-calcium carbonate (YDC) agar. Isolates from sunflower plants were consistent with *Serratia marcescens* in colony colour, morphology and biochemical properties, as described by Schaad *et al*. (2001).

To determine the genetic diversity, partial sequences of the 16S rRNA gene and *recA* gene were amplified using primer pairs 8F/1492R (Stackebrandt & Liesack, 1993) and ErecAF/ErecAR (Young & Park, 2007), respectively. Additionally, the bacterial isolates were tested by multiplex PCR with primers YV1/YV4, specific for *S. marcescens*, and a79F/R which amplifies only cucurbit yellow vine disease (CYVD)-causing strains (Zhang *et al*., 2005). The partial 16S rRNA gene sequences (GenBank Accession Nos. KT741016-KT741022) were 99% identical to *S. marcescens* strains MG1 (AY498856) and JASM1 (KF528829). The *recA* gene sequences (KT780423-KT780430) were 98% identical to *S. marcescens* (type strain ICMP 7617; DQ859889). PCR reactions using primer pairs YV1/YV4 and a79F/R were positive for all isolates tested.

Eight isolates were grown on YDC agar, suspended in sterile water at a concentration of 10^8 cells/ml and infiltrated into leaves of tobacco (*Nicotiana tabacum* cv. 'Xanthi'), and petioles of cotyledon leaves of three-week-old seedlings of sunflower (*H. annuus* cv. 'Flagman') and zucchini (*Cucurbita pepo*). Sterile water was applied as a negative control. All the inoculated tobacco leaves showed a hypersensitive reaction after 12 hours. The sunflower and zucchini plants were grown for 20 days in a glasshouse at 25/24°C (day/night). The plants were examined for wilting and a cross section was taken along the stem to observe the phloem. 84% of 65 inoculated sunflower and 30% of 27 zucchini plants developed wilting symptoms and phloem discoloration, while all the control plants remained free of symptoms.

CYVD caused by *S. marcescens* (Bruton *et al*., 2003) was first discovered in 1988 in the USA and is now spread throughout many states. The pathogen is vectored by the insect *Anasa tristis*. In the Russian Federation, plant diseases caused by bacteria of the genus *Serratia* have not been reported previously. This is the first report of the pathogen in the country and the first report of a new host plant, sunflower.

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