First report of *Xanthomonas campestris* pv. *campestris* as the causal agent of black rot disease on red cabbage in Turkey

Murat Ozturk¹ · Zeliha Eroglu¹ · Zafer Secgin²

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In november of 2018, v-shaped necrotic lesions with surrounding yellow halo and blackened veins were observed on the leaves of red cabbage plants (*Brassica oleracea* L. convar. *capitata* (L.) Alef. var. *rubra* DC) growing in Northern Turkey. Infected leaf tissue was macerated in sterile sodium chloride (0.85%) and extract was streaked on Nutrient agar medium. After incubation at 28 °C for 72 h, appearance of yellow, convex, mucoid colonies was monitored and pure cultures were transferred to Luria-Bertani agar (Himedia, India) for further identification tests. Representative isolates produced a single 619-bp PCR amplicon with DLH120/125 primers specific for *Xanthomonas campestris* pv. *campestris* (and some defined pathovars such as pv. *raphani*, *armoraciae* and *incanae*) (Berg et al. 2005). Isolates were Gram-negative, aerobic, non-fluorescent on King's medium B (King et al. 1954), oxidase negative, catalase positive, induced hypersensitive response on tobacco (cv. *benthamiana*) and able to hydrolyze gelatin and aesculin according to Schaad et al. (2001). Isolate Xc53 was subjected to blastn analysis with the partial 16S rDNA gene sequence (1,021 bp) (GenBank accession no. MK392490) and exhibited 100% identity with the *X. campestris* pv. *campestris* type strain ATCC 33913 (NR_074936). Identity of isolate Xc53 was ascertained with the gyrB gene sequence (815 bp) (MK392489) which showed

100% sequence similarity with *X. campestris* pv. *campestris* strain ICMP 6541 = LMG 8122 (EU499018.1) isolated from cauliflower in New Zealand in 1978 (Young et al. 2008). A bacterial suspensions of isolate Xc53 containing 10^8 CFU mL⁻¹ grown for 48 h on Nutrient agar medium at 28 °C was injected into leaves of three week old red cabbage (cv. Mohrenkopf) plants to fulfill Koch's postulates. Symptoms identical to those observed on naturally infected plants in the field appeared within 5–7 days after inoculation. Reisolated colonies from infected tissue of inoculated plants had identical characteristics with the original cultures. Negative control plants, inoculated with sterile water remained without symptoms. Based on these analyses the bacterium was identified as *X. campestris* pv. *campestris*. To our knowledge, this is the first report of black rot caused by *X. campestris* pv. *campestris* on red cabbage in Turkey.

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✉ Murat Ozturk
muratzm66@gmail.com

¹ Department of Plant Protection, Faculty of Agriculture, Yozgat Bozok University, Yozgat, Turkey

² Department of Agricultural Biotechnology, Faculty of Agriculture, Ondokuz Mayıs University, Samsun, Turkey