Disease Note

BACTERIAL SOFT ROT OF EGGPLANT CAUSED BY *PECTOBACTERIUM CAROTOVORUM* subsp. *CAROTOVORUM* IN CHINA

Y.F. Huang[1], C.Y. Liu[2], H. Wang[2], T.S. Guan[2] and L. Liu[2]

[1]*College of Plant Protection, Shenyang Agricultural University, Shenyang 110866, China*
[2]*Institute of Plant Protection, Liaoning Academy of Agricultural Sciences, Shenyang 110161, China*

In December 2016, soft rot lesions on the stem and fruit of eggplants cv. Green Beauty were noted in greenhouses in Anshan, Liaoning Province, China. Disease incidence was estimated at 5-10% and resulted in a substantial yield reduction. Symptoms appeared as soft, dark green stem lesions that progressively turned brown with vascular bundle necrosis appearing. Fruits of infected plants initially had small water-soaked lesions that rapidly enlarged with a watery ooze. Infected tissues from stems and fruits of eggplant were macerated in sterile water, streaked onto nutrient agar (NA) and incubated at 28ºC for 2 days. The resultant bacterial colonies were round, translucent, white, convex with smooth edges. All isolated bacteria were gram-negative rods, facultative anaerobes, non-fluorescent on King's B media, produced a positive pectolytic response on crystal violet pectate agar and gave a positive hypersensitive response in tobacco plants. All were negative for sucrose reduction, sensitive to erythromycin (50 µg/ml), indole, oxidase and could grow at 37°C. PCR amplification of the *pel* gene using Y1/Y2 primers (Darrasse *et al*., 1994) produced a 430 bp fragment. Amplification of the 16S-23SrRNA region by G_1 and L_1 primers (Toth *et al*., 2001) produced two main bands of 550 and 580 bp. 16S rRNA fragment of 1440 bp was amplified from bacterial isolates and the partial sequence deposited in GenBank (accession No. KY786125) showed 99% identity to the sequence of *Pectobacterium carotovorum* subsp. *carotovorum* strain Y57 (KP187518.1). No amplification products were produced for any isolate using *P. atrosepticum* and *P. carotovorum* subsp. *brasiliensis* specific primers (Eca1f/Eca2r and Br1f/L1r, respectively), whereas the *P. carotovorum* subsp. *carotovorum* primers EXPCCF/EXPCCR produced the expected 550 bp fragment (Kang *et al*., 2003). For pathogenicity testing, mature fruits and stems of Green Beauty were needle-stab inoculated with a 10 ml bacteria suspension (1×10^8 CFU/ml). Sterile water was used as a negative control. Inoculated plants were incubated at 28°C for 48 h, after which water-soaked and soft-rot symptoms were observed on all eggplant fruits and stems, but not on control plants. Bacteria with the same characteristics as those inoculated were re-isolated from diseased tissues. To our knowledge, this is the first report of *P. carotovorum* subsp. *carotovorum* on eggplant in China.

Darrasse A., Priou S., Kotoujanski A., Bertheau Y., 1994. PCR and restriction fragment length polymorphism of a *Pel* gene as a tool to identify *Erwinia carotovora* in relation to potato disease. *Applied and Environmental Microbiology* **60**: 1437-1443.

Kang H.W., Kwon S.W., Go S.J., 2003. PCR-based specific and sensitive detection of *Pectobacterium carotovorum* subsp. *carotovorum* by primers generated from a URP-PCR fingerprinting-derived polymorphic band. *Plant Pathology* **52**: 127-133.

Toth I.K., Avrova A.O., Hyman L.J., 2001. Rapid identification and differentiation of the soft rot *Erwinias* by 16S-23S intergenic transcribed spacer-PCR and restriction fragment length polymorphism analyses. *Applied Environmental Microbiology* **67**: 4070-4076.

Corresponding author: C.Y. Liu
E-mail: lcylns@163.com

Received June 20, 2017
Accepted July 14, 2017

Disease Note

FIRST REPORT OF *PECTOBACTERIUM CAROTOVORUM* subsp. *CAROTOVORUM* CAUSING SOFT ROT ON WHITE HEAD CABBAGE IN TURKEY

H.M. Aksoy, M. Ozturk and A. Aktas

Department of Plant Protection, Faculty of Agriculture, Ondokuz Mayis University, Samsun, Turkey

In October of 2016, soft rotted tissue on white head cabbage (*Brassica oleracea* L. var. *capitata* subvar. Alba) were observed in commercial fields of Samsun province. Infected tissue was macerated in Bioreba extraction bags and extract was plated on Crystal Violet Pectate (CVP) medium. Cavity forming strains on CVP were facultative anaerobic with pectinolytic ability on potato tuber slices, grew at 37°C, produced acid from α-methyl glucoside, were negative for producing indole and reducing substances from sucrose. The sequence of 1400 bp of 16S rDNA gene (Weisburg *et al*., 1991) of strain BTC2 (GenBank accession No. MF314823) showed 99% identity to *P. carotovorum* subsp. *carotovorum* strain ICMP 13550 (KY446059). Further confirmation of strain BTC2 was done with a 713 bp *rec*A gene sequence (Waleron *et al*., 2013) (MF314822), which showed 99% similarity to *P. carotovorum* subsp. *carotovorum* strains in GenBank. Phylogenetic analysis based on 16S rDNA and *rec*A sequences grouped our strain in the same cluster together with type strain ATCC 15713^T and respective *P. carotovorum* subsp. *carotovorum* strains derived from GenBank. Pathogenicity was performed on cabbage plants (cv. Beyaz Bursa) by inoculation of 10 µl of suspension (10^8 cfu ml^{-1}) using a syringe and hypodermic needle at the leaf axil. Inoculated plants were incubated in humid conditions at 28°C. Inky-black lesions and slimy decay developed within 72 h. To our knowledge, this is the first report of *P. carotovorum* subsp. *carotovorum* causing soft rot of white head cabbage in Turkey.

This work was supported by project grant from OMU-PYO.ZRT. 1901.15.011.

Waleron M., Waleron K., Lojkowska E., 2013. Occurrence of *Pectobacterium wasabiae* in potato field samples. *European Journal of Plant Pathology* **137**: 149-158.

Weisburg W.G., Barns S.M., Pelletier D.A., Lane D.J., 1991. 16S ribosomal DNA amplification for phylogenetic study. *Journal of Bacteriology* **173**: 697-703.

Corresponding author: H.M. Aksoy
E-mail: hmaksoy@omu.edu.tr

Received June 20, 2017
Accepted Juy 28, 2017