

## DISEASE NOTE

**FIRST REPORT OF LETTUCE SOFT ROT  
CAUSED BY *PECTOBACTERIUM  
CAROTOVORUM* subsp. *CAROTOVORUM*  
IN MALAYSIA**

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In 2010, a disease affecting lettuce (*Lactuca sativa* var. *romana*) was observed in several commercial fields throughout Malaysia. Plants with leaves showing chlorotic spots and light necrotic lesions and extensive water-soaked areas at the crown, suspected to be infected by *Pectobacterium carotovorum*, were collected and brought to the laboratory for identification. *P. carotovorum* (family *Enterobacteriaceae*) can cause a soft rot disease of lettuce at anytime during the year when the climatic conditions at the production site are humid and warm. Raffinose (RAF) and crystal violet pectate (CVP) media were used for pathogen isolation from diseases samples, yielding 15 bacterial isolates. Biochemical and physiological tests (Schaad and Jones, 2001) showed these bacteria to be Gram-negative, rod shaped, able to grow at 37°C, facultative anaerobic, oxidase negative, phosphatase negative, catalase positive, able to degrade pectate, erythromycin sensitive, Keto-methyl glucoside utilization negative, indole production negative, and able to reduce sugars from sucrose. Acid production was negative from sorbitol and arabitol, but positive from melibiose and citrate. For pathogenicity tests, lettuce slices were inoculated and incubated in a moist chamber at 80-90% relative humidity and 30°C. Rotting symptoms developed after 24 h. Based on biochemical and physiological characteristics and on the results PCR amplification of *pel* gene (Darrasse *et al.*, 1994), and analysis by ITS-PCR and ITS-RFLP (Toth and Hyman, 2001), all bacterial isolates were identified as *P. carotovorum* subsp. *carotovorum*. This pathogen has been recorded in different hosts from countries bordering with Malaysia, i.e Thailand, Indonesia and Singapore, To the best of our knowledge, this represents the first report of lettuce infections by *P. carotovorum* subsp. *carotovorum* from Malaysia.

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 diseases. *Applied and Environmental Microbiology* **60**:1437-1443.

Schaad N.W., Jones J.B., 2001. Laboratory Guide for Identification of Plant Pathogenic Bacteria. 3rd Ed. APS Press, St. Paul, MN, USA.

Toth I.K., Avrova 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 and Environmental Microbiology* **67**: 4070-4076.

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## DISEASE NOTE

**POWDERY MILDEW ON *SALVIA  
VERTICILLATA* subsp. *VERTICILLATA*  
IN TURKEY**

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During 2008-2010, a powdery mildew disease of *Salvia verticillata* L. subsp. *verticillata* (Lamiaceae) was observed throughout the experimental plots of the Agronomy Research Farm of Ankara University. The disease first appeared in May as white patches of the leaves that, by mid-July, expanded to the whole canopy which became entirely white. The teleomorph stage of the fungus was observed in the fall especially on dried leaves. Fungal propagules from leaves and stems showed the following morphometric features: conidia ellipsoid-ovoid to doliform, formed in chains, 23-38 x 13-26 µm in size; cleistothecia scattered to subgregarious, ca. 107 µm in diameter with mycelium-like appendages often forming a dense felt around them, peridial cells irregularly shaped measuring ca. 13 µm; asci stalked, 65-88 x 28-43 µm in size, some containing oil drops and two ellipsoid-ovoid ascospores 23-30 x 15-18 µm in size. Based on the above traits, the fungus was identified as *Erysiphe biocellata* Ehrenb. [= *Erysiphe salviae* (Jacz.) Blumer] (Braun, 1995). Pathogenicity tests were conducted in a greenhouse at 25±5°C using 2-year-old *S. verticillata* subsp. *verticillata* plants. Five heavily infected leaves were excised from field-grown plants and gently pressed three times on top of healthy plants. Alternatively, five diseased leaves were placed 5 cm above the healthy plants and shaken vigorously. Controls were inoculated with the same modality, using disease-free leaves. Powdery mildew symptoms appeared on all plants 13 days after inoculation. No disease developed on control plants. *E. biocellata* infections of *Salvia verticillata* have been reported from Austria, Bulgaria, Switzerland, former Czechoslovakia, Germany, France, Great Britain, Hungary, Poland, Romania, former Soviet Union and former Yugoslavia (Braun, 1995) but not from Turkey, where this represents the first record.

Braun U., 1995. The powdery mildews (Erysiphales) of Europe. Gustav Fischer, New York, NY, USA.

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