Disease Notes

Impatiens Necrotic Spot Virus in Woody Landscape Plants in Georgia. J. M. Ruter and R. D. Gitaitis, Departments of Horticulture and Plant Pathology, University of Georgia, Coastal Plain Experiment Station, Tifton 31793-0748. Plant Dis. 77:318, 1993. Accepted for publication 23 November 1992.

Asymptomatic container-grown plants from a commercial nursery in Grady County, Georgia, were randomly sampled in July 1991. Twenty-two of 139 samples from 49 species tested positive for impatiens necrotic spot virus (INSV). Infected plants were detected by enzyme-linked immunoabsorbent assay. Testing positive for INSV were: *Abelia* × *grandiflora* (André) Rehd. 'Edward Goucher' (Caprifoliaceae), *Calycanthus floridus* L. (Calycanthaceae), *Franklinia alatamaha* Marsh. (Theaceae), *Halesia carolina* L. (Styracaceae), *Hydrangea quercifolia* W. Bartram (Hydrangeaceae), *Ilex glabra* (L.) A. Gray 'Shamrock' (Aquifoliaceae), *Oxydendrum arboreum* (L.) DC. (Ericaceae), *Photinia* × *fraseri* Dress. (Rosaceae), and *Raphiolepis indica* (L.) Lindl. 'Clara' (Rosaceae). The only plant to test positive for both INSV and tomato spotted wilt virus (TSWV) was *Weigela florida* (Bunge) A. DC. 'Variegata Nana' (Caprifoliaceae). This is the first report of INSV and TSWV in woody landscape plants in Georgia and represents the addition of eight new plant families in which the virus has been detected.

First Report of Spinach Anthracnose Caused by *Colletotrichum dematium* in California. S. T. Koike, University of California Cooperative Extension, Salinas 93901, and J. C. Correll, Department of Plant Pathology, University of Arkansas, Fayetteville 72701. Plant Dis. 77:318, 1993. Accepted for publication 18 November 1992.

Foliar disease symptoms were observed on commercially produced spinach (*Spinacia oleracea* L.) in the Salinas Valley in Monterey County, California, in March 1992 following heavy rains. Initial symptoms were small, circular, water-soaked lesions on both young and old leaves. Lesions enlarged and became chlorotic and/or necrotic. Older lesions often turned tan, with the tissue becoming thin and papery. Lesions coalesced, giving the leaves a blighted appearance. Lesions also contained numerous acervuli having dark setae. A survey indicated that the disease was also present in two plantings adjacent to the field where it was first detected. The disease was severe in particular sections of all these locations, and the spinach was not harvested. *Colletotrichum dematium* (Pers.) Grove (= *C. spinaciae* Ellis & Halst.) was consistently isolated from symptomatic tissue. All isolates produced slightly curved, hyaline conidia averaging 25.2 × 3.4 μm when grown on green bean agar and were morphologically indistinguishable from other known spinach anthracnose isolates that were recovered from Arkansas (1). Five California isolates were used in a greenhouse inoculation test to satisfy Koch's postulates. Several of the known isolates and water were used as positive and negative controls, respectively. The cultivars FallGreen and Grandstand were inoculated, and typical anthracnose symptoms developed in 4–8 days. The pathogen was reisolated from lesions of test plants.

Reference: (1) U. Dechmani and M. J. Goode. Ark. Farm Res. 21:12, 1972.

First Report of *Sclerotinia minor* on Texas Bluebonnet. K. E. Woodard and J. S. Newman, Texas Agricultural Experiment Station, Stephenville 76401. Plant Dis. 77:318, 1993. Accepted for publication 3 November 1992.

On 18 March 1992, several Texas bluebonnets (*Lupinus texensis* Hook) were observed dying in an ornamental flower garden at the Texas Agricultural Experiment Station in Stephenville. In a 4.0-m^2 area, 18 of 25 plants showed symptoms of disease. First symptoms were wilt of leaves followed by water-soaked necrosis of infected outer stems. Infection of the main stem at ground level typically was followed by crown necrosis. A mass of white hyphae at the plant-soil junction and small, black, irregularly shaped sclerotia inside necrotic stem tissue were typical signs of the pathogen. Isolation from diseased tissue yielded *Sclerotinia minor* Jagger. Koch's postulates were completed with an isolate of *S. minor* from the diseased tissues. *L. texensis* is the most common and most widely grown of the six species of *Lupinus* officially designated as the state flower of Texas. Texas bluebonnet seed germinate in the fall, overwinter in a rosette, and bloom in late winter or early spring, at which time the plants are considered a major tourist attraction. *L. texensis* grows abundantly on roadsides and fallow fields in most areas where Sclerotinia blight of peanut (*Arachis hypogaea* L.), a disease of major importance in Texas, has been reported.

Occurrence of Bacterial Wilt Caused by *Pseudomonas solanacearum* on *Sesbania rostrata* in Malaysia. H. Abdullah, Department of Plant Protection, and W. M. W. Othman and J. Blom, Department of Agronomy and Horticulture, Universiti Pertanian Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia. Plant Dis. 77:318, 1993. Accepted for publication 25 August 1992.

Symptoms of bacterial wilt were observed on *Sesbania rostrata* Bremek, a fodder crop, grown in an experimental plot designed to test plant densities and cutting frequencies at the farm of the Universiti Pertanian Malaysia in early August 1991. Plants started to wilt at approximately 1 mo of age. By the second month, 14.7% of the plants had wilted and died. Plants continued to show infection, and only 27.5% were alive by the fourth month and only 2.8% by the seventh month. Severity of disease did not appear to be related to planting densities and/or cutting frequencies at any stage of plant growth. Bacterial streaming was observed when the cut ends of diseased stems were immersed in water. The pathogen was isolated and identified as *Pseudomonas solanacearum* (Smith) Smith by the Biolog Identification System. Greenhouse inoculation studies established the pathogenicity of the pathogen on *S. rostrata*. Isolates were pathogenic and caused typical bacterial wilt symptoms on tomato (*Lycopersicon esculentum* Mill.) and groundnut (*Arachis hypogaea* L.) Isolates were classified as biovar 4 on the basis of biochemical tests (2) and race 1 on the basis of reactions of inoculated plants (1). This is the first report of *P. solanacearum* on *S. rostrata* in Malaysia.

References: (1) I. W. Buddenhagen et al. (Abstr.) Phytopathology 52:726, 1962. (2) A. C. Hayward. J. Appl. Bacteriol. 27:265, 1964.

Susceptibility of Grapevine Cultivars to Tomato Spotted Wilt Virus in Southern Ontario, Canada. L. W. Stobbs and A. B. Broadbent, Agriculture Canada, Research Station, Box 6000, Vineland Station, Ontario L0R 2E0. Plant Dis. 77:318, 1993. Accepted for publication 22 September 1992.

Tomato spotted wilt virus (TSWV) is widespread in greenhouse ornamental crops (2) and has recently been described in several field vegetable crops in southern Ontario. Following a report of a TSWV-type virus in grapevine (1), and given the proximity of greenhouses to vineyards in southern Ontario, a study was made to examine the susceptibility of grapevine cultivars to TSWV. A minimum of 15 vines of each of 8 *Vitis vinifera* L. cultivars, 34 *Vitis* hybrids, 7 *V. labrusca* L. cultivars, and 3 *V. rupestris* Scheele cultivars were exposed to viruliferous western flower thrips (*Frankliniella occidentalis* (Pergande)) for 6 wk in growth rooms, then planted in the field. In the second year, plants were mechanically inoculated and maintained for an additional year. The lettuce strain (TSWV-L), prevalent throughout southern Ontario, was used for all inoculations. Foliage was assayed by ELISA, bioassayed on *Petunia* × *hybrida* Hort. Vilm.-Andr. 'Calypso', and checked by serologically specific electron microscopy over each of the three growing seasons. Virus transmission was not detected in any of the cultivars examined, although thrips feeding and reproduction occurred on the foliage of over 90% of the cultivars. TSWV was transmitted to petunia plants (controls) exposed to viruliferous thrips at the same time.

References: (1) H. Chen et al. Natl. Sci. Counc. Mon. 9:584, 1981. (2) J. A. Matteoni et al. Plant Dis. 72:801, 1988.

Insensitivity of *Sphaerotheca fuliginea* to Triadimefon in a Commercial Pumpkin Field in Michigan. M. T. McGrath, Department of Plant Pathology, Long Island Horticultural Research Laboratory, Cornell University, Riverhead, NY 11901, and M. K. Hausbeck, Department of Botany and Plant Pathology, Michigan State University, East Lansing 48824. Plant Dis. 77:319, 1993. Accepted for publication 10 October 1992.

Powdery mildew, caused by *Sphaerotheca fuliginea* (Schlechtend.:Fr.) Pollacci, was observed at a low level in a commercial pumpkin (*Cucurbita pepo* L. 'Howden') field near Deerfield, Michigan, on 24 July 1991. Triadimefon (Bayleton 50 DF, 140 g a.i./ha) applications on 26 July and 6, 21, and 28 August did not appear to affect disease development. Twelve isolates were obtained from individual colonies on the abaxial and adaxial surfaces of six leaves collected on 6 September to assay for fungicide sensitivity. Inocula for the assays were increased on summer squash (*C. pepo* L. 'Seneca Prolific') leaf disks (9 mm diameter) on water agar. One transfer was made. Disks were incubated for 13 days at 23/19 C (day/night) with a 12-hr photoperiod. Seedlings of Seneca Prolific were dipped in fungicide solutions of 0, 12.5, 25, 37.5, 50, 100, and 200 ppm of triadimefon and 200 ppm of benomyl (Benlate 50 DF). All triadimefon solutions contained 200 ppm of inert ingredients of the Bayleton 50 DF formulation. Following air-drying overnight, disks were cut from the seedlings with a cork borer. Four disks treated with the same fungicide concentration were placed together on water agar in sectioned petri dishes. Approximately 25 conidia of each isolate were transferred to the center of each disk. Fungicide-sensitive and fungicide-insensitive reference strains of *S. fuliginea* were included in the assay. The percentage of the leaf disk covered with mycelium was evaluated after incubation for 12 days. All 12 isolates from Michigan plus the insensitive reference strain grew and sporulated well on disks treated with all concentrations of triadimefon or with 200 ppm of benomyl. The sensitive reference strain germinated on fungicide-treated disks but developed only on 0 ppm disks. Shifts to decreased fungicide sensitivity of *S. fuliginea* populations have been documented in Europe (1,2). This is the first published report of a failure to control cucurbit powdery mildew associated with resistance to triadimefon in the United States.

References: (1) F. Huggenberger et al. Crop Prot. 3:137, 1984. (2) H. T. A. M. Schepers. Neth. J. Plant Pathol. 91:105, 1985.

First Detection of *Pseudomonas solanacearum* Race 2, Strain SFR, on *Heliconia* in Australia. E. Akiew and K. D. Hyde, Plant Protection Division, Queensland Department of Primary Industries, Mareeba, Queensland 4880, Australia. Plant Dis. 77:319, 1993. Accepted for publication 23 September 1992.

Recently, *Pseudomonas solanacearum* (Smith) Smith was isolated from diseased *Heliconia* plants in Cairns, Queensland. The rhizomes were imported from Oahu, Hawaii, and were undergoing postentry quarantine in a glasshouse. Diseased plants had chlorotic, necrotic, and wilted leaves; brownish necrotic lesions in the rhizome and vascular tissues; and creamy to grayish white droplets of bacterial ooze on cut surfaces of the pseudostem. Six strains of bacteria from 55 plants had low to no tyrosinase activity on tyrosine-supplemented medium; failed to utilize mannitol, sorbitol, and dulcitol; and failed to oxidize lactose, maltose, and cellubiose, indicating these were exotic (biovar I) musaceous strains of *P. solanacearum*. The imported plants were incinerated. Colonies were small, round, or near round, fluidal, and creamy white with a pink center on Kelman's tetrazolium medium. Two of the strains developed helical patterns of formazan pigmentation after 48 hr of growth. The strains caused severe wilt on *Musa acuminata* Colla 'Williams' (AAA), *M. acuminata* 'Sucrier' (AA), and *Heliconia* spp. but not on *Lycopersicon esculentum* Mill. 'Floradade' and *Solanum melongena* L. 'Blackbell' and were therefore considered race 2. Tests at the University of Wisconsin–Madison and the Biological and Chemical Research Institute, Rydalmere, Australia, confirmed the strains to be race 2 and in RFLP group 28, which contains the insect-transmitted SFR strain of race 2 (Moko) from Venezuela. The tests implied that the strains originated from South America. Subcultures of *P. solanacearum* from other *Heliconia* nurseries in North Queensland were in race 1 and not pathogenic to the *Musa* spp. *Heliconia* strains pathogenic to triploid banana are present in Hawaii (2), and Moko disease is present in the Philippines (1). Strain SFR is specific to Latin America (1) and is a threat to the banana industries in Asia and the Pacific region where wild and cultivated *Musa* spp. abound. Stringent plant quarantine and phytosanitary measures on movement of musaceous plants should be observed.

References: (1) I. W. Buddenhagen. Proc. Aust. Cent. Inst. Agric. Res. 21:95, 1987. (2) S. Ferreira et al. (Abstr.) Phytopathology 81:1159, 1991.

A New Bacterial Disease of Fennel in California. S. T. Koike, University of California Cooperative Extension, Salinas 93901, and R. L. Gilbertson and E. L. Little, Department of Plant Pathology, University of California, Davis 95616. Plant Dis. 77:319, 1993. Accepted for publication 4 December 1992.

In 1992, fennel (*Foeniculum vulgare* Mill.) transplants grown in a commercial greenhouse developed foliar disease symptoms. The tips and centers of the filiform leaves first became water-soaked, then rapidly turned necrotic. Microscopic examination of sections of leaf lesions revealed bacterial streaming. A fluorescent pseudomonad was consistently isolated from diseased leaves on King's medium B. Bacterial strains were negative for oxidase and arginine dihydrolase, positive for production of levan, and negative for potato rot and induced a hypersensitive reaction in tobacco (*Nicotiana tabacum* L. 'Havana'). The bacterium associated with the disease was identified as *Pseudomonas syringae* van Hall. Pathogenicity was demonstrated by producing inoculum in nutrient broth shake cultures for 24 hr, adding Carborundum, and rub-inoculating the bacterial suspension onto 4-wk-old fennel plants. Control plants were treated with nutrient broth amended with Carborundum. After 14 days in a greenhouse, inoculated plants developed water-soaked lesions that turned necrotic. *P. syringae* was reisolated from these lesions. Control plants did not develop symptoms. This is the first report of a bacterial disease of fennel caused by *P. syringae*. Although the disease was detected only at the one commercial operation, it caused a significant loss of transplant foliage and quality. *P. syringae* from fennel also was pathogenic on celery. Efforts are ongoing to determine the relationship of the fennel isolates to *P. s.* pv. *apii* (Jagger) Young et al. This relationship is of interest because of the extensive spread of celery bacterial blight in California transplant greenhouses since the first occurrence of the disease in California in 1990.

Pathogens of Leafy Spurge in Inner Mongolia, China. S.-M. Yang, USDA-ARS, Foreign Disease-Weed Science Research Unit, Fort Detrick, Frederick, MD 21702; J.-Y. Zhuang, Systemic Mycology & Lichenology Laboratory, Academia Sinica, Beijing, China; and W.-J. Liu, Biological Control Laboratory, CAAS, Beijing, China. Plant Dis. 77:319, 1993. Accepted for publication 18 November 1992.

Surveys of pathogens on leafy spurge (*Euphorbia esula* L.) in Inner Mongolia, China, were conducted in 1989 and 1990. Fungi other than a powdery mildew and rusts were isolated on potato-dextrose agar amended with penicillin G and streptomycin sulfate. Pathogenicity of isolated fungi was determined by placing an agar block with mycelium on intact leaves of *E. esula* or by placing wheat kernels infested with mycelium at the crown of greenhouse-grown *E. esula* and covering the kernels with soil. *Alternaria alternata* (Fr.:Fr.) Keissl., *Fusarium* sp., *Myrothecium verrucaria* (Albertini & Schwein.) Ditmar:Fr., and *Rhizoctonia* sp. were pathogenic to *E. esula*. Pathogenicity of *Erysiphe* sp. was confirmed by inoculating *E. esula* with conidia. *Melampsora euphorbiae* Castagne, *Uromyces kalmusii* Sacc., *U. striatellus* Tranz., and *U. striatus* Schröt. were found on *E. esula*. Pathogenicity of *U. striatus* was confirmed by infection of *Medicago* sp. with aeciospores found on leafy spurge, but pathogenicity of the other three rust pathogens has not been determined. This is the first report of *U. kalmusii* on *E. esula* in Inner Mongolia and of *U. striatellus* on *E. esula* in China.