Response of Selected *Camellia reticulata* Cultivars to *Glomerella cingulata*, Cause of Contagious Camellia Dieback and Canker

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ABSTRACT

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Seventeen clones of *Camellia reticulata* and three *C. reticulata* hybrids were susceptible to *Glomerella cingulata* isolate Bayshore II, the cause of contagious camellia dieback and canker. No resistance was detected.

In the Southeast, contagious camellia dieback and canker (caused by *Glomerella cingulata* (Stonem.) Spaulding and von Schrenk) is a serious disease of camellias, particularly *Camellia japonica, C. reticulata*, and *Camellia hybrids* when propagated by grafting and *C. sasanqua* cultivars (2,3,7). All *C. sasanqua* cultivars and seedlings tested are susceptible to *G. cingulata* when wound-inoculated (2,3,5). *C. sasanqua* plants are used as stock on which *C. japonica* cultivars and other *Camellia* spp. and hybrids are grafted because they are resistant to *Phytophthora cinnamomi* Rands, the cause of camellia root rot (6). Many, if not all, *C. japonica* cultivars are susceptible to *P. cinnamomi* (6).

Efforts to identify resistance in *C. sasanqua* cultivars and seedlings to *G. cingulata* have not been successful (3). Crosses between *C. japonica* and *C. sasanqua* are not successful, but crosses between *C. sasanqua* and *C. reticulata* are (1). Our objective was to identify resistance to *G. cingulata* in *C. reticulata* so that it could be transferred to *C. sasanqua*. There is also a need for such resistance to be incorporated in future *C. reticulata* cultivars.

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MATERIALS AND METHODS

Three plants each of 20 cultivars of *C. reticulata* (Butterfly Wings, Chang's Temple, Chrysànthemum Petal, Cornelian, Crimson Robe, Lila Naff, Mandalay Queen, Mouchang, Moutancha, Pagoda, Professor Tsai, Purple Gown, Shot Silk, Tali Queen, White Retic, William Hertrich, and Willow Wand) or *C. reticulata* hybrids (Buddha, Captain Rawes, and Confucius) were purchased from Nuccio's Nurseries, Altadena, CA.

The names of all camellia cultivars follow the listings in "Camellia Nomenclature 1981" (Southern California

Camellia Society, Inc., 1076 Via La Paz, San Pedro, CA 90732).

Buddha and Confucius are hybrids of *C. reticulata* × *C. pitardii* 'Yunnanica,' whereas Captain Rawes is a *C. reticulata* hybrid of unknown parentage. California-grown plants were used because contagious camellia dieback and canker does not occur there, and we were thus assured of plants free of this disease. *C. reticulata* plants are not widely grown outside in the Southeast.

All plants were grown in a substrate of equal volumes of sand, bark, peat, and soil in 2-gal Lerio containers in a greenhouse with minimum temperature maintained at 21 C (maximum variable). Plants were watered, sprayed, and fertilized as needed to maintain healthy, vigorous plants; however, the nitrogen level was kept relatively low so that the plants would not become overly sensitive to *G. cingulata* (7). One plant each of Butterfly Wings, Crimson Robe, Mandalay Queen, and Moutancha died immediately after transplanting.

G. cingulata isolate Bayshore II was grown on carrot juice agar (355 ml of Eveready carrot juice, 16 g of Difco agar, plus tap water to make 1 L) in 9-cm petri dishes at 21 C for 5 days. The cultures were dry-scraped (without water) with a scalpel and placed under intermittent fluorescent light (12-hr photoperiod) to enhance sporulation. One to 3 days later, cultures were dry-scraped again so that the spores, which formed in a ring around the colony margin, were uniformly dispersed over the surface. The cultures were then used as inoculum within 2–3 hr.

Inoculations were made 29 October 1981 by placing a circular plug of fungal culture, cut from the medium with a No. 6 cork borer (9 mm diameter), against a freshly prepared wound on the branch (one branch inoculated on each of two to three plants per cultivar). Branches were wounded by scraping the bark with a scalpel. The size of the inoculated branches varied from 3 to 9 mm. Moist, sterile, absorbent cotton was placed over the inoculum and held firmly to the wound by placing a wire around it. Data were taken 3 mo later. An equal number of branches was wounded by scraping and wrapped with moist, sterile, absorbent cotton to serve as controls.

RESULTS

All 20 cultivars of *C. reticulata* and *C. reticulata* hybrids were susceptible to *G. cingulata* isolate Bayshore II. Forty-eight of the 56 inoculated branches died within 90 days. Surviving branches were Mandalay Queen (2), Chang's Temple (1), Confucius (1), Lila Naff (1), Professor Tsai (1), Purple Gown (1), and Tali Queen (1). However, when the bark was scraped from the branches at the site of inoculation, lesions (25–50 mm in length) were evident. All remaining living branches had lesions (32–46 mm) at the point of inoculation. Wounded, uninoculated branches (controls) healed.

DISCUSSION

Our studies suggest there is as little resistance in *C. reticulata* as in *C. sasanqua*. There is need for camellia breeders to consider the response of new camellia cultivars to *G. cingulata*. *C. japonica* cultivars Governor Mouton and Professor Charles S. Sargent are resistant to *G. cingulata* (4), but seedlings of these two cultivars are unobtainable because seed pods do not set.

C. japonica crosses with *C. reticulata* (1), so it should be possible to incorporate resistance from resistant cultivars of the former into the latter. Although *C. japonica* will not cross with *C. sasanqua* (1), resistance could be transferred from *C. japonica* to *C. reticulata* to *C. sasanqua*. This type of cross is possible because the cross *C. japonica* 'Marie Bracey' × (*C. sasanqua* 'Narumi-Gata' × *C. reticulata* 'Buddha') was successful (1) and gave the camellia hybrid Betty Ridley. Practically all selections made from interspecific crosses have been for flower form and color. However, it is not unreasonable to expect that progress can be made in developing cultivars with resistance to *G. cingulata*.

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