

Cyanide in Magnolia

Some further Observations

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In 1971, Santamour and Treese* reported that, of more than 15 species and cultivars tested at the National Arboretum, *Magnolia sprengeri* Pampan. 'Diva' was the only magnolia that produced hydrocyanic acid (HCN). At that time, only a few interspecific hybrids of 'Diva' were available for study, but it was shown that cyanide production was a heritable trait. In recent years, some of the earlier putative hybrids have flowered and been verified, and new hybrids have also been tested. Therefore, we decided to extend our tests to this wider range of material in an effort to obtain a better understanding of the inheritance pattern of cyanide production and to determine the utility of this character as a marker in our breeding and selection program.

Methods

For those who may not have ready access to the earlier paper, the details of the cyanide test are repeated below, only slightly modified from the previous work.

Young leaves were collected in May from plants in the nursery or permanent plantings at the Arboretum. The leaf material was cut into small pieces, and about 1 g. was placed in a test tube fitted with a ground glass stopper. A strip of Whatman No. 1 filter paper was attached to the underside of the stopper with melted paraffin - (wax). Just before the test, the paper strip was dipped in a sodium picrate solution (25 g. sodium carbonate and 5 g. picric acid in 1 liter of distilled water), and allowed to dry for a few minutes.

Five to seven drops of chloroform were then added to the leaf material, the stopper (with the moist paper strip) was inserted, and the tube was placed in an incubator at 30 degrees C. Release of HCN from the leaves causes the yellow sodium picrate to turn red. In our work, development of the red-brown color within 24 hours was considered a positive test.

Results and Discussion

Species - A single specimen each of *M. sargentiana* Rehd. & Wils.

*Santamour, Frank S., Jr. and John S. Treese. 1971. Cyanide production in Magnolia. Univ. Penna. Morris Arb. Bull. 22: 58-59.

(NA 32036) and *M. dawsoniana* Rehd. & Wils. 'Chyverton' was tested, because the species are classified in the same section (Yulania) as 'Diva'. The tests were negative, as were earlier tests involving other Yulania species or hybrids.

Hybrids - 'Diva' is a hexaploid with a chromosome number of $2n=114$. We could assume that inheritance of a 'Diva' characteristic, such as HCN production, would be influenced by the chromosome number of the other parent in interspecific hybrid combinations. Therefore, the data presented in table 1, and the discussion of these results, follows the progression from diploid to tetraploid to hexaploid species in combination with 'Diva'.

Three putative hybrids, a single seedling from each of three crosses, came from crosses of 'Diva' with diploid species or hybrids of section *Buergeria*. Two of the diploid parents were *M. kobus* DC., and one was *M. X loebneri* Kache 'Spring Snow'. The two hybrids that gave a positive HCN test can be considered true hybrids, but the other plant must be studied further to verify its hybridity.

Nearly all of the 19 hybrids of the cross *M. liliflora* Desr. 'Nigra' X 'Diva' made in 1963 by W.F. Kosar, have now flowered and are good hybrids. However, in this combination of the hexaploid 'Diva' and the tetraploid *liliflora* ($2n=76$), about one-half of the hybrids did not give a positive HCN test. Immature putative hybrids of the tetraploid *M. acuminata* L. X 'Diva' were also tested, and at least two plants were true hybrids, with a positive HCN reaction. Some or all of the remainder of this progeny may also be hybrids, but the cyanide test did not differentiate them.

Flower of *M. sprengeri* cv. 'Diva', Photo by Pete Savage.

