



Disease and Insect Resistant Ornamental Plants

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CORNUS

Dogwood

Cornus is a genus of about 60 species of mostly shrubs and small trees commonly known as dogwoods. This genus includes many ornamentals, but the most popular is the flowering dogwood, *Cornus florida*. Native to the Eastern United States, these distinctive small trees are widely grown in Zones 5-9 and are known for their showy bracts, red fruit, horizontal branching habit and fall color.

The emergence of dogwood anthracnose in the 1970's and powdery mildew in the 1990's devastated *C. florida* in forest, landscape and nursery settings and they remain serious problems in many parts of the country. Host resistance is a key management strategy in areas where these diseases are prevalent.



DISEASES

Powdery Mildew is a disease of *Cornus* caused primarily by the fungus *Erysiphe pulchra*. During prolonged periods of warm days, cool nights and high humidity, the fungus forms whitish patches on leaves, stems and buds of susceptible plants. Repeated infections that begin early in the season can seriously damage trees and make them susceptible to other pests and problems. Trees in shady sites with poor air circulation are more likely to suffer damage.

Except for the Appalachian series from the University of Tennessee, most cultivars of *C. florida* are susceptible. *Cornus nuttallii* (Pacific dogwood), the West Coast equivalent of *C. florida*, is also susceptible. Cultivars of the kousa dogwood, *C. kousa*, are generally more resistant to powdery mildew than *C. florida*. There are also resistant hybrids developed by Dr. Elwin Orton at Rutgers University. These include the *C. florida* x *C. kousa* Stellar® Series and *C. florida* x *C. nuttallii* Jersey Star® Series.

| Powdery Mildew | | | | |
|--------------------|--------------|-----------|--------------|-------------|
| Species | Cultivar | Reference | | |
| | | Resistant | Intermediate | Susceptible |
| <i>Cornus alba</i> | | 13, 24 | | |
| <i>Cornus alba</i> | Bud's Yellow | 23 | | |
| | Ivory Halo | | | 23 |

| Powdery Mildew | | | | |
|----------------------------|---------------------------|-----------------|--------------|----------------|
| Species | Cultivar | Reference | | |
| | | Resistant | Intermediate | Susceptible |
| <i>Cornus alternifolia</i> | | 13, 15, 23, 24 | | |
| <i>Cornus controversa</i> | | 7, 13, 23 | | |
| <i>Cornus florida</i> | Appalachian Joy | 13, 20 | | |
| | Appalachian Spring | | | 5 |
| | Autumn Gold | | | 7, 24 |
| | Barton | | | 10, 15 |
| | Cherokee | | | 15 |
| | Cherokee Brave | 2, 6, 7, 24, 25 | 10, 15 | 4, 23 |
| | Cherokee Chief | 7 | | 10, 15 |
| | Cherokee Daybreak | | | 24 |
| | Cherokee Princess | | | 4, 15, 24 |
| | Cherokee Sunset | | | 15, 23, 24, 25 |
| | Cloud 9 | | | 4, 10, 15, 23 |
| | Dixie Colonnade | | | 5 |
| | Double Delight | | | 24 |
| | Dwarf Pink | 15 | | |
| | Dwarf White | | | 7 |
| | Emerald Star | 15 | | |
| | First Lady | | | 7 |
| | Fragrant Cloud | | 15 | |
| | Girard's Pink | | | 24 |
| | Gold Star | 15 | | |
| | Green Glow | | | 24 |
| | Head Quarters | | | 24 |
| | Hog 1 | | | 24 |
| | Hog 2 | | | 24 |
| | Jean's Appalachian Snow | 13, 25 | | |
| | Karen's Appalachian Blush | 13, 14, 18, 25 | | |
| | Kay's Appalachian Mist | 13, 25 | | |
| | Little Princess | | 15 | 5, 14 |
| | Northern Providence | | | 24 |
| | Ozark Spring | | | 15, 24 |
| | Plena | | | 5, 15 |
| | Pink Beauty | | 15 | 7 |
| Pink Flame | | | 7, 24 | |
| Poinsett | | | 24 | |
| Presidential | | | 24 | |
| Purple Glory | | | 7, 15 | |

| Powdery Mildew | | | | |
|-----------------------|-----------------------------------------------------|-----------------------|--------------|-------------|
| Species | Cultivar | Reference | | |
| | | Resistant | Intermediate | Susceptible |
| <i>Cornus florida</i> | Pygmy | | 15 | 24 |
| | Rainbow | | | 15, 24 |
| | Red Beauty | | | 15, 24 |
| | Red Pygmy | | | 5, 14 |
| | Rubra | | | 4, 14, 15 |
| | Rubra Pink | | | 7 |
| | Snow Princess | | | 24 |
| | Spring Time | | | 24 |
| | Sterling Silver | | | 15 |
| | Stokes Pink | | | 7 |
| | Sweet Water Red | | | 24 |
| | Weaver's White | 7 | | |
| | Welch's Bay Beauty | 7 | | |
| | Wonderberry | | | 15, 24 |
| | World's Fair | 14 | 15 | |
| <i>Cornus kousa</i> | | 13 | | |
| <i>Cornus kousa</i> | Agate | 15 | | |
| | Angustata | 24 | | |
| | Autumn Rose | 15, 24 | | |
| | Beni Fuji | 24 | | |
| | Big Apple | 5, 15, 18 | | |
| | Blue Shadow | 5, 14, 15, 18, 24 | | |
| | Bodent Form | 24 | | |
| | Bush's Pink | 24 | 15 | |
| | China Girl | 15, 18, 24 | | |
| | Doubloon | 24 | | |
| | Elizabeth Lustgarten | 24 | | |
| | Emerald Star | 15, 24 | | |
| | Empire | 21 | | |
| | Gay Head | 18 | | |
| | Greensleeves | 18 | | |
| | Japanese Cornel | 15 | | |
| | Julian | 15 | | |
| | Lustgarten Weeping | 5, 15 | | |
| | Milky Way (seed-produced cultivar; highly variable) | 7, 10, 14, 15, 18, 24 | | |
| | Milky Way Select | 7, 18, 24 | | |
| Moonbeam | 15, 24 | | | |

| Powdery Mildew | | | | |
|-------------------------------------------|---------------------------|----------------|--------------|-------------|
| Species | Cultivar | Reference | | |
| | | Resistant | Intermediate | Susceptible |
| <i>Cornus kousa</i> | National | 7, 10, 24 | | |
| | Pam's Mountain Bouquet | 21 | | |
| | Porlock | 24 | | |
| | Red Steeple | 21 | | |
| | Satomi | 7, 15, 24 | | |
| | Scarlet Fire® ('Rutpink') | 16 | | |
| | Snow Flake | 15 | | |
| | Spring Grove | | 15 | |
| | Square Dance | 15 | | 5 |
| | Temple Jewel | 18 | | |
| | Trinity Star | 15 | | |
| | Willamette | 24 | | |
| | Wolf Eyes | 15 | | |
| <i>Cornus kousa</i> var. <i>chinensis</i> | | 15 | | |
| <i>Cornus mas</i> | | 13 | | |
| <i>Cornus mas</i> | Aurea | 23 | | |
| | Golden Glory | 10, 15, 23, 24 | | |
| | Redstone | 15 | | |
| | Reston | 23 | | |
| <i>Cornus sericea</i> | | 13, 24 | | |
| <i>Cornus sericea</i> | Cardinal | 15 | | |
| | Isante | 15 | | |

| Powdery Mildew | | | | |
|---------------------------------------|-----------------------------------------------|-------------------------|--------------|---------------|
| <i>C. florida</i> x <i>C. kousa</i> | | | | |
| Hybrids | Stellar® Series | Reference | | |
| | | Resistant | Intermediate | Susceptible |
| <i>Cornus x rutgersensis</i> 'Rutban' | Aurora® | 4, 6, 7, 13, 14, 15, 18 | | |
| <i>Cornus x rutgersensis</i> 'Rutdan' | Celestial® (originally trademarked as Galaxy) | 4, 6, 7, 13, 14, 15, 18 | 10 | |
| <i>Cornus x rutgersensis</i> 'Rutcan' | Constellation® | 4, 6, 7, 13, 14, 15 | 10 | 18 |
| <i>Cornus x rutgersensis</i> 'Rutlan' | Ruth Ellen® | 6, 7 | 15 | 4, 13, 14, 18 |
| <i>Cornus x rutgersensis</i> 'Rutfan' | Stardust® | 7, 13 | 10 | 15, 18 |
| <i>Cornus x rutgersensis</i> 'Rutgan' | Stellar Pink® | 4, 6, 7, 13, 14, 15, 18 | | |

| Powdery Mildew | | | |
|-----------------------------------------|---------------------------------|-----------|-------------|
| <i>C. florida</i> x <i>C. nuttallii</i> | | | |
| Hybrids | Jersey Star [®] Series | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus</i> x 'KN4-43' | Starlight [®] | 5, 14 | |
| <i>Cornus</i> x 'KN30-8' | Venus [®] | 5, 14 | |

| Powdery Mildew | | | |
|-------------------------------------------------|----------------------|-----------|-------------|
| <i>C. florida</i> x <i>C. nuttallii</i> | | | |
| Hybrids | Cultivar | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus florida</i> x <i>Cornus nuttallii</i> | Eddie's White Wonder | | 7, 23, 24 |

Anthracnose is a disease of *Cornus* caused by the fungus *Discula destructiva*. Infection generally occurs during cool, moist conditions in spring and early summer and is more likely to be severe in shaded sites. Symptoms typically start as leaf lesions or blotches. The disease may spread from leaves to twigs and trunks causing dieback and cankers. In severe cases, cankers girdle the trunk and eventually kill the tree.

C. florida and *C. nuttallii* are the primary hosts (19). *C. kousa* is generally more resistant (2, 3, 9), but susceptibility in some cultivars has been reported.

| Anthracnose | | | |
|--------------------------|---------------------------------------|-----------|-------------|
| Species | Cultivar | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus canadensis</i> | | 3 | |
| <i>Cornus florida</i> | Appalachian Spring | 3, 19, 22 | |
| <i>Cornus kousa</i> | Autumn Rose | | 18 |
| | Elizabeth Lustgarten | 18 | |
| | Empire | 21 | |
| | Milky Way | 18, 19 | |
| | Moonbeam | | 18 |
| | Pam's Mountain Bouquet | 21 | |
| | Red Steeple | 21 | |
| | Scarlet Fire [®] ('Rutpink') | 16 | |
| | Steeple | 18, 19 | |
| Wolf Eyes | | 18 | |
| <i>Cornus mas</i> | | 3, 19 | |

| Anthracnose | | | |
|---------------------------------------|------------------------------------------------------------|-----------|-------------|
| <i>C. florida</i> x <i>C. kousa</i> | | | |
| Hybrids | Stellar [®] Series | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus x rutgersensis</i> 'Rutban' | Aurora [®] | 2 | |
| <i>Cornus x rutgersensis</i> 'Rutdan' | Celestial [®] (originally trade-marked as Galaxy) | 2, 18, 19 | |
| <i>Cornus x rutgersensis</i> 'Rutcan' | Constellation [®] | 2 | |
| <i>Cornus x rutgersensis</i> 'Rutlan' | Ruth Ellen [®] | 2 | |
| <i>Cornus x rutgersensis</i> 'Rutfan' | Stardust [®] | 2, 18, 19 | |
| <i>Cornus x rutgersensis</i> 'Rutgan' | Stellar Pink [®] | 2, 18, 19 | |

Spot Anthracnose is a common disease of *C. florida* caused by the fungus *Elsinoe corni*. Other species such as *C. kousa* and *C. mas* can also be affected, but it is usually not significant (19). The disease is favored by wet, humid weather and is worse on trees growing in full sun than in shade. Reddish-purple lesions with tan centers infect leaves, bracts and fruit. Repeated infections can weaken trees and cause sparse flowers and foliage.

| Spot Anthracnose | | | |
|---------------------------|--------------------|-----------|-------------|
| Species | Cultivar | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus controversa</i> | | 7 | |
| <i>Cornus florida</i> * | Barton White | | 7 |
| | Cherokee Brave | 4, 6, 7 | |
| | Cherokee Chief | 6 | |
| | Cherokee Princess | 19 | 6 |
| | Cherokee Sunset | | 15 |
| | Cloud 9 | | 6, 9 |
| | Dwarf White | | 7 |
| | First Lady | 19 | |
| | Fragrant Cloud | 19 | |
| | Little Princess | | 15 |
| | Ozark Spring | | 7 |
| | Plena | 19 | |
| | Purple Glory | 19 | |
| | Rainbow | | 7, 15 |
| | Rubra | | 6 |
| | Springtime | 19 | 7 |
| Weaver's White | 6 | | |
| Welch's Bay Beauty | 6 | | |
| <i>Cornus kousa</i> | Lustgarten Weeping | | 15 |
| | Milky Way | 7 | |

**C. florida* cultivars with pink bracts less often disfigured than those with white bracts (19).

| Spot Anthracnose | | | |
|---------------------|------------------|-----------|-------------|
| Species | Cultivar | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus kousa</i> | Milky Way Select | 7 | |
| | National | 7 | |
| | Satomi | 7 | 15 |
| | Wolf Eyes | | 15 |
| <i>Cornus mas</i> | Golden Glory | | 15 |

| Spot Anthracnose | | | |
|---------------------------------------|------------------------------------------------------------|-----------|-------------|
| <i>C. florida</i> x <i>C. kousa</i> | | | |
| Hybrids | Stellar [®] Series | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus x rutgersensis</i> 'Rutban' | Aurora [®] | 4, 6, 7 | |
| <i>Cornus x rutgersensis</i> 'Rutdan' | Celestial [®] (originally trade-marked as Galaxy) | 4, 6, 7 | |
| <i>Cornus x rutgersensis</i> 'Rutcan' | Constellation [®] | 4, 6, 7 | |
| <i>Cornus x rutgersensis</i> 'Rutfan' | Ruth Ellen [®] | 4, 6, 7 | |
| <i>Cornus x rutgersensis</i> 'Rutlan' | Stellar Pink [®] | 4, 6, 7 | |

| Spot Anthracnose | | | |
|-------------------------------------------------|----------------------|-----------|-------------|
| <i>C. florida</i> x <i>C. nuttallii</i> | | | |
| Hybrids | Cultivar | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus florida</i> x <i>Cornus nuttallii</i> | Eddie's White Wonder | | 7 |

Cercospora Leaf Spot is a disease of *C. florida* caused by the fungus *Cercospora cornicola*. Prevalent during and following wet spring weather, leaves develop brownish spots. Minor infections may diminish aesthetic value but will not cause lasting damage. However, severe infections that cause repeated defoliation over several years can reduce tree vigor.

| Cercospora Leaf Spot | | | | |
|-----------------------|-------------------|-----------|--------------|-------------|
| Species/Hybrids | Cultivar | Reference | | |
| | | Resistant | Intermediate | Susceptible |
| <i>Cornus florida</i> | Cherokee Brave | | 1 | 6 |
| | Cherokee Chief | | 1 | |
| | Cherokee Princess | | 1 | 6 |
| | Cloud 9 | | 1 | 6 |
| | Little Princess | | | 1 |
| | Pumpkin Patch | 1 | | |
| | Pygmy | 1 | | |
| | Red Pygmy | 1 | | |
| | Rubra | | | 6 |

| Cercospora Leaf Spot | | | |
|---------------------------------------|-----------------------------------------------------------|-----------|-------------|
| <i>C. florida</i> x <i>C. kousa</i> | | | |
| Hybrids | Stellar [®] Series | Reference | |
| | | Resistant | Susceptible |
| <i>Cornus x rutgersensis</i> 'Rutban' | Aurora [®] | 6 | |
| <i>Cornus x rutgersensis</i> 'Rutdan' | Celestial [®] (originally trademarked as Galaxy) | 6 | |
| <i>Cornus x rutgersensis</i> 'Rutcan' | Constellation [®] | 6 | |
| <i>Cornus x rutgersensis</i> 'Rutfan' | Ruth Ellen [®] | 6 | |
| <i>Cornus x rutgersensis</i> 'Rutlan' | Stellar Pink [®] | 6 | 1 |

INSECTS

Dogwood Borer, *Synanthedon scitula*, is the larval stage of a clearwing moth that resembles a wasp. It has multiple landscape plant hosts and is the most serious insect pest of *C. florida*. *C. kousa* is reported as resistant (11) but susceptibility of some cultivars has been observed (10).

Larval feeding in phloem and cambium tissue interferes with transport of water and nutrients. Weakened trees may die within in a couple of seasons. The best ways to reduce infestation are to maintain healthy trees and avoid wounding such as from lawn mowers. Any opening in the bark can provide access to larvae. A study at the University of Kentucky found trees planted in full sun had an increased probability of borer attack (17).

Dogwood Sawfly, *Macremphytus tarsatus*, is a native insect that relies on *Cornus* sp. for larval development. Feeding injury can skeletonize and defoliate infested trees. Gray dogwood, *C. racemosa*, is a primary host (11, 12). Tatarian dogwood, *C. alba* 'Sibirica', and redosier dogwood, *C. sericea* 'Flaviramea' have also been reported as preferred hosts – *C. florida*, *C. kousa* and *C. mas* appear to be resistant (12).

Japanese Beetle, *Popillia japonica*, is a common defoliator of many landscape plants. *C. florida* is reported to be resistant (8).

REFERENCES

1. Conner, K.N., and K.L. Bowen. 2006. Flowering dogwood cultivar resistance to Cercospora leaf spot. *Phytopathology* 96(6):S26.
2. Dirr, Michael A. 2011. *Dirr's Encyclopedia of Trees & Shrubs*. 1st Ed. Timber Press, Inc., Portland, OR.
3. Dreistadt, S.H., and J.K. Clark. 2016. *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*. 3rd Ed. University of California, Agriculture and Natural Resources, Oakland, CA.
4. Hagan, A.K., and J. Ducar. 2011. Stellar hybrid and flowering dogwood cultivar reaction to diseases compared, 2009. *Plant Disease Mngt. Reports* 5:OT003.
5. Hagan, A.K., and J. Ducar. 2011. Disease resistance of kousa, hybrid and flowering dogwood cultivar to diseases compared, 2009. *Plant Disease Mngt. Reports* 5:OT004.
6. Hagan, A.K., and J. Ducar. 2012. Disease resistance and adaptability of Stellar and flowering dogwoods compared in North Alabama. *Proc. Southern Nurs. Assoc. Res. Conf.* 57:239-245.
7. Hagan, A.K., B. Hardin, C.H. Gilliam, G.J. Keever, J.D. Williams, and J. Eakes. 1998. Susceptibility of cultivars of several dogwood taxa to powdery mildew and spot anthracnose. *J. Environ. Hort.* 16(3):147-151.

8. Held, D. W. 2004. Relative susceptibility of woody landscape plants to Japanese beetle. *J. Arboric.* 30(6):328-335.
9. Holmes, F.W., and C.R. Hibben. 1989. Field evidence confirms *Cornus kousa* dogwood's resistance to anthracnose. *J. Arboric.* 15(12):290-291.
10. Johnson, M.P., J.R. Hartman, R.E. McNeil, and W.M. Fountain. 2001. Evaluation of dogwood and birch species and cultivars for resistance to key insect pests and diseases. *J. Environ. Hort.* 19(2):73-78.
11. Johnson, W.T., and H.H. Lyon. 1991. *Insects that Feed on Trees and Shrubs*. 2nd Ed. Cornell Univ. Press, Ithaca, NY.
12. Klingeman, W., F. Chen, H.J. Kim, and P. Flanagan. 2007. Feeding preferences of dogwood sawfly larvae indicate resistance in *Cornus*. *J. Environ. Hort.* 25(3):134-138.
13. Li, Y.H., M.T. Mmbaga, A.S. Windham, M.T. Windham, and R.N. Trigiano. 2009. Powdery mildew of dogwoods: Current status and future prospects. *Plant Dis.* 93(11):1084-1092.
14. Li, Y.H., M.T. Windham, R.N. Trigiano, D.C. Fare, J.M. Spiers, and W.E. Copes. 2007. Evaluation for resistance to powdery mildew in *Cornus* species and hybrids using a leaf disk assay. *J. Environ. Hort.* 25(3):131-133.
15. Mmbaga, M.T., and R.J. Sauve. 2004. Multiple disease resistance in dogwoods (*Cornus spp.*) to foliar pathogens. *J. Arboric.* 30(2):101-107.
16. Molnar, T.J., and M. Muehlbauer. 2017. 'Rutpink' (Scarlet Fire[®]) kousa dogwood. *HortScience* 52(10):1438-1442. doi: [10.21273/HORTSCI12242-17](https://doi.org/10.21273/HORTSCI12242-17)
17. Potter, D.A., and G.M. Timmons. 1981. Factors affecting predisposition of flowering dogwood trees to attack by the dogwood borer. *HortScience* 16(5):677-679.
18. Ranney, T.G., L.F. Grand, and J.L. Knighten. 1995. Susceptibility of cultivars and hybrids of kousa dogwood to dogwood anthracnose and powdery mildew. *J. Arboric.* 21(1):11-16.
19. Sinclair, W., and H.H. Lyon. 2005. *Diseases of Trees and Shrubs*. 2nd Ed. Cornell Univ. Press, Ithaca, NY.
20. Trigiano, R.N., A.S. Windham, M.T. Windham, and P.A. Wadl. 2016. 'Appalachian Joy' is a super-numerary, white-bracted cultivar of flowering dogwood (*Cornus florida*) resistant to powdery mildew (*Erysiphe pulchra*). *HortScience* 51(5):592-594.
21. Wadl, P.A., and M.T. Windham. 2014. Three new cultivars of *Cornus kousa*: Empire, Pam's Mountain Bouquet, and Red Steeple. *HortScience* 49(9):1230-1233.
22. Windham, M.T., E.T. Graham, W.T. Witte, J.L. Knighten, and R.N. Trigiano. 1998. *Cornus florida* 'Appalachian Spring': a white flowering dogwood resistant to dogwood anthracnose. *HortScience* 33(7):1265-1267.
23. Windham, M.T., R.N. Trigiano, and A.S. Windham. 2005. Susceptibility of *Cornus* species to two genera of powdery mildew. *J. Environ. Hort.* 23(4):190-192.
24. Windham, M.T., W.T. Witte, R.N. Trigiano, S. Schlarbaum, and A.S. Windham. 1997. Reactions of *Cornus* species to powdery mildew. *Proc. Southern Nurs. Assoc. Res. Conf.* 42:227-231.
25. Windham, M.T., W.T. Witte, and R.N. Trigiano. 2003. Three white-bracted cultivars of *Cornus florida* resistant to powdery mildew. *HortScience* 38(6):1253-1255.

OTHER RESOURCES

Cappiello, P., and D. Shadow. 2005. Dogwoods. Timber Press, Portland, OR.

Dirr, Michael A. 2009. Manual of woody landscape plants: their identification, ornamental characteristics, culture, propagation and uses. 6th ed. Stipes Publishing L.L.C., Champaign, IL.

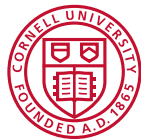
“Dogwood Tree Varieties.” Rutgers Licensing and Technology: Agricultural Products. Rutgers University. agproducts.rutgers.edu/dogwood/varieties.html

Fulcher, A.F., F.A. Hale, and A.S. Windham. 2012. Dogwood – *Cornus* spp., Chapter 7 in: IPM for Select Deciduous Trees in Southeastern US Nursery Production. A.F. Fulcher and S.A. White, eds. wiki.bugwood.org/IPM_book

Molnar, T.J., and J.M. Capik. 2013. The Rutgers University Woody Ornamentals Breeding Program: Past, Present, and Future. Acta Hort. 990, ISHS. doi: [10.17660/ActaHortic.2013.990.32](https://doi.org/10.17660/ActaHortic.2013.990.32)

Witte, W.T., M.T. Windham, A.S. Windham, F.A. Hale, D.C. Fare, W.K. Clatterbuck. 2000. Dogwoods for American Gardens. U. Tenn. Ag. Ext. Ser. PB1670. extension.tennessee.edu/publications/Documents/PB1670.pdf

“Woody Plants Database.” *Urban Horticulture Institute*, Cornell University. woodyplants.cals.cornell.edu/plant/search



Cornell Cooperative Extension

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