Celebrating *Cotoneaster*

Researchers evaluate selections from this sometimes underappreciated genus of landscape shrubs

Researchers did a replicated field evaluation of 46 *Cotoneaster* species at the Lewis-Brown Horticulture Research Farm in Corvallis, Ore.

By Joseph Rothleutner and Ryan Contreras

Challenging sites in the landscape can leave some people puzzled about which plant to choose.

If the problems are drought, pollution or a need for general robustness, a cotoneaster might be the right fit. Not many ornamentals can compete with the low maintenance and adaptability of this genus containing many four-season beauties.

People often overlook the lowly cotoneaster because they may think of it as an uninteresting utility plant. Driving along the highway, they are seen *en masse* stabilizing banks at the edge of the road, in parking lots, and adorning outdated apartment complexes that have seen better days.

These neglected sites are the habitats where cotoneasters shine. Resilient cotoneasters thrive in these adverse conditions where many plants shrivel and die or outgrow their welcome as foundation shrubs.

Cotoneasters may be recognized for the beauty they offer to the landscape if only they can shake the image of being a parking lot weed. The genus *Cotoneaster* contains more than 400 species, from tiny groundcovers to small trees. Many have desirable ornamental attributes coupled with toughness that is not available elsewhere.

Many species are covered with prolific, apple-like blossoms and summer foliage that is often glossy or otherwise unique. Autumn brings more attributes, with glossy foliage turning to a fiery red.

After leaf drop, a boney architecture

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Both of these *Cotoneaster* genotypes were inoculated with fire blight to test their susceptibility; locations are shown with an arrow. The one on the left was highly susceptible, while the one on the right proved to be resistant.

is exposed that can add garden interest when properly highlighted. But not all drop their leaves; some evergreen species maintain their leaves throughout the winter, providing a contrast to the brilliant and abundant red berries.

With all this diversity, there could be a cotoneaster for every landscape. Sadly, only about 10 of the more than 400 species can be found in the trade. Therefore we have begun screening more than 100 species at Oregon State University in an effort to develop the next notable cotoneaster to highlight the aforementioned attributes.

Everyone knows there is no perfect plant, and cotoneasters are no exception, but efforts are underway in Corvallis to develop superior cultivars. Currently, there are three specific areas in which we hope to improve cotoneasters.

First, we hope to identify selections with superior form and novel ornamental traits of interest through field evaluation of a large number of species. Second, we hope to identify sources of disease resistance through systematic evaluation of species' reaction to inoculation with fire blight. Finally, we are attempting to develop sterile forms, as invasive plants have become a heated topic and some cotoneasters have been identified as "misbehavers."

Landscape performance

Oregon State has assembled a germplasm collection that contains over 100 unique accessions. Most of these species are rare in cultivation and were collected as seed from gardens all over the world via the global germplasm network, Index Seminum. Others were

This *Cotoneaster* genotype was shown to be susceptible to fire blight, as seen from the leaf damage and characteristic shepherd's crook.

purchased from Oregon nurseries to get representatives of commonly grown selections. This approach allows us to compare the species that are rare in U.S. cultivation to those which are more familiar in the trade.

As of 2011, 46 lesser known species have been planted in the ground at the Lewis-Brown Horticulture Research Farm, Corvallis, Ore., in a replicated test alongside common cultivars. Here they will be established and undergo observation during a multiyear evaluation to determine potential as landscape plants.

They will be scored seasonally for characteristics including size, habit, leaf and flower color as well as ability to tolerate the long, dry summers that we have here in the valley. We will be withholding water after establishment.

Individuals that perform well in our landscape trial may be considered as potential parents in the breeding program; however, they have to exhibit disease resistance to make the cut.

Disease resistance

In addition to landscape evaluation, species are being screened for resistance to fire blight. Fire blight is a bacterial disease caused by the pathogen *Erwinia amylovora* (Burrill, Windslow et al.) that plagues the apple industry in the eastern United States, but can also be a problem in eastern U.S. nurseries and landscapes.

Fire blight is usually spread around bloom time by insects or water splash. Poor sanitation often compounds the issue, increasing the incidence of dis-

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Seeking sterile cultivars

Ploidy refers to the number of sets of chromosomes in a plant's cells.

Diploids are what we think of as "normal" plants; they have two sets of chromosomes.

Triploids have three sets and are often sterile as is the case with seedless watermelons.

Tetraploid plants have four sets of chromosomes. When a tetraploid is crossed with a diploid, the resulting progeny are often sterile triploids.

ease. Through summer, lesions appear on the infected stems; leaves and flowers brown and shrivel and fine twigs curl, giving the plant a singed appearance. The lesions can spread down into older wood where the pathogen overwinters in a canker that will ooze bacterial slime the next spring, providing inoculum for subsequent years.

To identify resistant genotypes for breeding, young plants are being inoculated under greenhouse conditions and scored based on percentage of shoot infection over an eight-week period. Our initial screen of 31 species showed a wide range of susceptibility in the genus, tolerance or resistance being observed in several species.

Twenty species yet to be evaluated will be inoculated during winter 2011. Furthermore, to confirm previous results, resistant genotypes will be rescreened to ensure they are resistant. When disease resistant forms are confirmed, they will be entered into the breeding program and used as parents to incorporate resistance.

Developing sterile cultivars

Breeding work is also aimed to reduce the fertility of future introductions. *Cotoneaster* has received attention for its potential to invade native ecosystems. Native plant groups, including The Emerald Chapter of the Native Plant Society of Oregon, have identified some species of *Cotoneaster* as potentially invasive.

Their group warns against planting any nonnative red-fruited ornamentals and, of course, the red berries of cotoneasters are among their most attractive features.

To keep cotoneasters from being regulated and continue their availability in the trade, development of sterile cultivars is important. Sterility can be achieved in many ways, but our breeding program plans to take advantage of naturally occurring polyploidy in the genus.

Tetraploid species will be crossed onto diploid species to produce triploid offspring. Triploids are commonly sterile, like seedless watermelons or bananas. This technique has been applied successfully to other ornamentals and we hope it will prove effective in cotoneasters.

In the case of seedless watermelon and bananas, the sterile triploid plants develop fruit without functional seed, a phenomenon called parthenocarpy. It is hoped that parthenocarpy will be observed into *Cotoneaster* so that the berries may still be enjoyed in the landscape but they will be seedless, such that they no longer have the potential to escape cultivation.

Our goal is that through bringing together disease resistance, sterility, and novel ornamental characters, we will make cotoneasters more competitive on the market. Cotoneaster has ornamental character and rugged adaptability that have made it stand out as a staple for difficult landscapes. Oregon State University is working to further improve this group of plants for continued use and broader application in future landscapes.

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