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Scientists Look for Clues Into How Tree Populations Become Invasive

by Stacy Kish, CSREES

By studying the Callery Pear tree, scientists have determined how nonthreatening plants have become invasive, as the trees are now dense and thorny and are expanding into urban locations they were never intended to grow in. >>

Ornamental plants, like the Callery Pear, were originally planted in the United States for their beauty and were not considered an invasive threat because they did not produce fruit. Over the past decade, the Callery Pear has evolved to become a significant invasive tree species. Besides producing fruit, which can be messy and cause the population to expand into inconvenient locations, the newly evolved trees are dense and thorny. Scientists are using the Callery Pear as a model for studying the factors

that contribute to the evolution of invasive traits in introduced plants.

Callery Pear trees were first introduced to the United States from China in the early 1900s and became one of the most popular ornamental tree species planted in urban areas. This species, which includes the Bradford, Aristocrat and Cleveland Select varieties, was chosen because it produces an impressive springtime flower display and vibrant fall foliage and is tolerant to drought and pollution.

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Above: This research was featured on the cover of Bioscience Volume 57, Number 11.

Credit: Reprinted with permission of Bioscience

Right: Callery pear trees are often used as ornamental trees for landscaping, as shown in this residential area in Cincinnati, OH.

Credit: Theresa Culley



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Above: Dr. Theresa Culley, Department of Biological Sciences at the University of Cincinnati in Ohio.

Credit: Photograph by Dottie Stover, University of Cincinnati



Above (top): Flowers of Callery pear are produced in early spring and exhibit a strong, malodorous scent that is highly attractive to insect pollinators.

Above (bottom): Flowers of the Callery pear are visited by a number of different insect pollinators.

Credit: Photograph by Theresa Culley

Within the last decade however, wild type Callery pear trees, *Pyrus calleryana*, have begun producing fruit, allowing them to multiply in natural areas, especially in disturbed sites along railroads, roads and park boundaries. Urban backyards are not immune to the tree expansion and the fruit is appearing in neighborhoods where it was not invited. The situation is aggravated by bird species, such as starlings, that disperse the tree fruit. In addition, the seedling plants differ from its cultivated parent, growing densely and producing impressive thorns that make controlling the new tree a challenge.

Theresa Culley and Nicole Hardiman at the University of Cincinnati published their findings in the December issue of the journal *Bioscience*.

The scientists determined that having multiple varieties planted in the same area can lead to the production of a new and invasive variety. This is known as intraspecific hybridization between the widespread 'Bradford' variety and other newer varieties.

Because Callery pear varieties are so well established as landscaping trees in urban settings, there is an urgent need to monitor the impact of the newly evolved *P. calleryana* on the ecosystem. This study provides the first step to combat this potential problem. By understanding the factors that contribute to the evolution of invasiveness in an introduced species, scientists can provide practical suggestions for how the horticultural industry can monitor plant introductions and implement effective methods of control to prevent introduced plants

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from becoming invasive and spreading within the United States.

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