

УДК 582.475

P. C. MOE

**THE UNIVERSITY OF MINNESOTA LANDSCAPE ARBORETUM PINUS COLLECTION:  
A VALUABLE RESOURCE FOR RESEARCH, EDUCATION AND CONSERVATION**

*The University of Minnesota Landscape Arboretum, Chaska, Minnesota, USA,  
e-mail: moexx004@umn.edu www. arboretum.umn.edu*

*(Received 11.2014)*

Introduction. *Pinus* is one of the most widely distributed genera in the northern hemisphere [3]. Within Minnesota, there are three native pine species: eastern white pine (*Pinus strobus*), red pine (*P. resinosa*), and jack pine (*P. banksiana*). Because of their soft wood, relatively fast grow rate, and abundance, pine trees played an important role in Minnesota's history. For more than a century, the pine trees were the critical natural resource which brought people to Minnesota. As the trees were aggressively harvested by the timber industry between 1860 and 1920, they literally laid the foundation for the building of our communities, cities and our state. Every northern landscape includes pine trees which provide welcome year-round color; food, shelter and nesting sites for birds and wildlife; and lower energy costs if properly located on a site.

Minnesota is located in the northern tier of the United States and has a continental climate with hot summers and cold winters. The growing conditions and climate at the Arboretum are well suited to a variety of pines. The arboretum is located at 44.51 «30' latitude and 93.35»63' longitude. Elevations range from 287 m to 324 m above sea level, with an average elevation of 290 m. The average summer temperature is 26.6 °C (79.9 °F) and the average winter temperature is -12 °C (10.4 °F). The yearly mean wind speed is 17 km/h. Normal yearly precipitation is 74.7cm and occurs over an average of 124.2 days.

**Review and Future Plans.** The Minnesota Landscape Arboretum's Pine Collection is comprised of 271 pine specimens, representing 25 species and 11 cultivars. The collection is dominated by native red pine (*Pinus resinosa*) and white pine (*P. strobus*), but also includes other cold-hardy species. The collection includes the following species commonly used for timber: 24 accessions of *P. resinosa*; 22 accessions of *P. strobus*; 16 accessions of *P. ponderosa*; 4 accessions of *P. contorta*; and 2 accessions of *P. banksiana*. Popular ornamental pines in the collection include: *P. cembra*, *P. densiflora*, *P. flexilis*, *P. koraiensis*, *P. mugo*, *P. ponderosa*, *P. strobus*, *P. sylvestris*, and *P. wallichiana*. There are also many dwarf and weeping cultivars and other cultivars selected for unusual needle color or form; an example of the latter is *Pinus strobus* 'Contorta'. Additionally the collection holds two accessions of *P. aristata* and one accession of *P. peuce* that are on the Red List of near threatened to critically endangered pine species [4].

Plans to improve the *Pinus* Collection to meet standards of the NAPCC and the five main objectives of GSPC include: collecting herbarium specimens; conducting gap analysis (which species are missing?); collecting seed and storage in -40 °C freezer; building an accessible pathway with interpretation; collecting seed from native *Pinus* and growing new plants; and monitoring the collection for pests. Following are specific goals to meet the five main objectives of the Global Strategy for Plant Conservation.

*Curatorial Work (GSPC Objectives 1 and 2).* The Arboretum is required to expand curatorial work on the Pine Collection in order to better document the existing collection and prepare herbarium specimens.

The Minnesota Landscape Arboretum has started to collect specimens to properly document the Pine Collection. This complete documentation will include: 1) the collection and mounting of specimens, 2) the creation of five sets of herbarium specimens for distribution to major herbaria including the University of Minnesota Herbarium in St. Paul, and 3) the preparation of photographic records of the collection.

In addition to documenting and preserving specimens of the Pine Collection, this project will strengthen the Arboretum's value to the North American Plant Collections Consortium and by better documenting the collection, many of the skills that will be developed and perfected will be transferable for future projects.

*Plant Conservation Value of the Arboretum's Pine Collection (GSPC Objectives 2 and 3).* The Minnesota Landscape Arboretum's Pine Collection is an international resource that is preserving genetic diversity of *Pinus* sp. threatened by climate change, plant pathogens and damaging insects including mountain bark beetles, *Dendroctonus ponderosae*, overharvesting for lumber, bio-fuels or clearing for development or agriculture.

*Increased Access to Collection (GSPC Objectives 4 and 5).* A recent review of the Pine Collection was conducted in anticipation of its application to the NAPCC by a student pursuing a master's degree in horticulture [1]. In the review the Arboretum's collection was noted as «a good representation of native Minnesota species as well as popular ornamental plantings for the region.» However, the review also provided a critique that «users of the Arboretum may be unfamiliar or even unaware of the collection,» and suggested that «physical space and potential interest would allow the collection to be expanded».

In order to better educate guests about the stunning beauty and ornamental value in landscapes, the Arboretum has installed a modular paver pathway to increase safe access to the Pine Collection. The collection is located adjacent to the Arboretum's Three Mile Drive, however the new pathway is important in order to provide a safe route for visitors to walk to the Pine Collection on pedestrian walkways, rather than sharing space on the roadways with vehicles. A beginning section of 67 m of paver brick path was installed into the Pine Collection in 2012. This section was paid for by an Arboretum donor who desired to honor her parents by funding a capital improvement in one of the Arboretum's tree collections. A generous donor has provided funding for a complete Pine Pathway that extends for another 260 m and links into an existing walkway system and provides a direct connection to the Maze Garden and a parking area.

*Increased Interpretive Signage (GSPC Objectives 4 and 5).* The new Pine Pathway provides locations for several interpretive signs that describe features of pine trees and the Pine Collection. How pines reproduce is covered and another highlighted theme is the value of pine trees in ornamental landscapes. Of particular focus is the year-round beauty of these trees (which has a strong appeal in northern climates), the wide variety of color shades and the different textures and forms available. The interpretive signage also describe the role pine trees play in preventing soil erosion and providing food and shelter to birds and wildlife. In addition, the signage mentions the critical role pine trees have played in Minnesota's history.

The Pine Collection's value for plant conservation is also highlighted with interpretive signage and possibly with a mobile website.

**Conclusion.** The Arboretum's Pine Collection is an important germplasm repository for the genus *Pinus*. Acceptance into the North American Plant Collection Consortium increases the importance of this collection and its integrity. Not only is there an increased effort to effectively conserve the plant diversity of *Pinus*, but the Arboretum's new pine walk and interpretive signs offer public engagement and education on the diversity, conservation, and the importance of pines in our lives.

## Literature

1. *Andersen C.* / University of Minnesota Department of Horticultural Sciences. 2010.
2. Convention of Biological Diversity / Botanic Gardens Conservation International. Richmond (UK), 2012.
3. *Critchfield W. and Little E.* / U. S. Department of Agriculture, Forest Service. Miscellaneous Publication 991, 1966.
4. IUCN Red List of Threatened Species. 2014. The IUCN Red List of Threatened Species webpage. [http:// www.iucnredlist.org](http://www.iucnredlist.org).

**THE UNIVERSITY OF MINNESOTA LANDSCAPE ARBORETUM PINUS COLLECTION:  
A VALUABLE RESOURCE FOR RESEARCH, EDUCATION AND CONSERVATION**

**Summary**

The University of Minnesota Landscape Arboretum's Pinus collection is an important global resource for plant conservation and was accepted into the North American Plant Collection Consortium (NAPCC) in December, 2011. The NAPCC is a program of the American Public Garden Association in cooperation with the United States Department of Agriculture (USDA) and the National Arboretum. The Minnesota Landscape Arboretum has the official responsibility of collecting and preserving the Pine Collection and the genetic resources it represents. The 271 managed specimens in the collection have high conservation value and more species will be added as wild collected seed from known locations are incorporated into the collection. The Arboretum's Pinus collection functions to meet the 5 main objectives of the Global Strategy for Plant Conservation(GSPC):

1. Plant diversity is well understood, documented and recognized.
2. Plant diversity is urgently and effectively conserved.
3. Plant diversity is used in a sustainable and equitable manner.
4. Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on Earth is promoted.
5. The capacities and public engagement necessary to implement the strategy have been developed.