

## Tree of the Month, February 2014: Chihuahuan spruce (*Picea chihuahuana*)

Most spruces are found in the cool, northern temperate and boreal forests of Canada, Asia and Europe. However, if you look further south - down to the Mexican states of Chihuahua and Durango, you will find small, isolated stands of the endangered Chihuahuan spruce, *Picea chihuahuana*. This gray-green, extremely sharp-needled species grows in sheltered mountain gorges high up in the Sierra Madre Occidental.

The Chihuahuan spruce was first discovered in 1942 by a Mexican botanist and professor named Maximino Martinez. Based on pollen fossils, scientists think this species was widespread in Mexico during the Pleistocene epoch, when glaciers and permafrost covered much of North America. About 11,000 years ago, the climate began to warm, and the conifer forests of Mexico slowly became deserts. The Chihuahuan spruce was forced to retreat up into the mountains of the Sierra Madre, where the climate remained cool. Today, *Picea chihuahuana* consists of a few small mountain-top populations, cut off from each other by desert lowlands.

The mixed conifer forests at the top of the Sierra Madre Occidental are known as 'sky islands' because they are isolated by inhospitable terrain (in this case by desert, which surrounds sky islands as water surrounds oceanic islands). This isolation encourages the evolution of new species of unique flora and fauna, and can shelter species that have died out elsewhere. The Sierra Madre Occidental is home to a number of endemic and endangered species, including the thick-billed parrot (*Rhynchopsitta pachyrhyncha*), which eats the seeds of *Picea chihuahuana* and other conifers, and nests in old woodpecker holes.

Chihuahuan spruce numbers are declining in the wild. They mature slowly, so their populations can't recover quickly from logging or forest fires. Small populations lead to inbreeding and low genetic diversity, which affects the health and viability of seedlings.

Attempts to preserve the species in its native habitat is hampered by the threat of climate change – if temperatures in the Sierra Madre get any higher, *Picea chihuahuana* may not be able to survive in its mountain refuge any more. Conservationists may try to save the Chihuahuan spruce by growing seedlings and planting them in more stable northern forests. This is called assisted colonization, and may be necessary in the future to save threatened species if climate change begins to alter their habitats. Assisted colonization is, however, a controversial conservation method because of the potential damage it could inflict on an established ecology. Who can predict what the Chihuahuan spruce would do in a Canadian boreal forest? Would it outcompete native trees for habitat?

Botanical gardens can help to preserve the Chihuahuan spruce by growing specimens and providing seeds and tissue for research and conservation efforts. At VanDusen, we have five young *Picea chihuahuana* in our Conifer Collection.