

## Spring 2020

As the ground finally became less waterlogged this spring, we were able to get going on a big planting scheme in Churchill's wood to the right of the Walled Garden where we had been thinning silver birch (*Betula pendula*) this winter. Once the forest mulcher had passed through, turning the ground to a fine tilth, the area was ready for the next stage in its transformation from woodland to pinetum. It was certainly rewarding to be part of it at the start and finish and, in these turbulent times, to establish a new area for future generations to enjoy.



**Figure 1: Planting stakes**



**Figure 2: Planted trees**

Some large slash pine (*Pinus elliottii*) were especially relieved to be released, along with Japanese bush spruce (*Picea maximowiczii*) and Noble fir (*Abies procera*). In *P.elliottii*'s native range of the south eastern states of the USA, this tree has been used to study how hurricanes impact tree growth. Chlorosis (yellowing of normally green leaves due to a lack of chlorophyll), caused by salt spray and/or defoliation from high winds, was identified in wood analysis data, revealing how hurricanes affect trees in more subtle ways than just blowing them over. Being fast growing, *P. elliottii* has been planted globally as an important timber tree for railways and construction, unfortunately becoming an invasive species in South Africa and Zimbabwe. It has also been used as a root stock on which to graft the living fossil **Cathay Silver Fir** (*Cathaya argyrophylla*) at the Xinning arboretum, Hunan, China. *Picea maximowiczii* is known in Japan as Hime-baromi (daughter of Baromi) in reference to the tiger-tailed spruce (*Picea torano*). Some established examples of this tree can be found in Dallimore Valley on the stream side of the main path. *Abies procera* meanwhile, is famed for its strong light timber and, historically, has been used to make ladders and airplanes.

Along with the bluebells, some good floral displays in this section of the Pinetum came from the mountain needlebush (*Hakea lissosperma*), pacific dogwood (*Cornus nuttallii*) and Japanese crab apple (*Malus sieboldii*). Originating from south eastern Australia and Tasmania, *H. Lissosperma* resembles a conifer but is actually an angiosperm in the *Proteaceae* family, a family which includes the macadamia nut. Its hard needle-like leaves are a result of a condition called sclerophylly which prevents moisture loss, while its proteoid roots allow it to find moisture in dry, nutrient poor soils.



**Figure 3: Mountain needlebush**  
(*Hakea lissosperma*)



**Figure 4: Pacific dogwood**  
(*Cornus nuttallii*)

The white “petals” in *C. nuttallii* are leaves with the flowers in the middle. The wood from this tree has been used for bows, arrows, thread spindles, cabinets, piano keys, mallet handles, golf club heads and other tools, while the young shoots were made into baskets by the first nations of the Sierra Nevada.

*M. Sieboldii* is important as a root stock to help combat the phytoplasma disease, apple proliferation (*Phytoplasma mali*), which is a significant problem on the continent. It causes shrunken fruits, deformed leaves and a reduced root system, and is spread by root fusion or insect vectors such as leaf hoppers (symptoms can be seen here). As it reduces fruit weight by up to 75%, this disease is especially economically damaging, but trees grafted onto *M. sieboldii* or *M. sieboldii* hybrid root stocks have proven to be resistant. This demonstrates the continued importance of wild tree and plant species to those concerned with cultivating food for human consumption.



**Figure 5: Japanese crab apple** (*Malus sieboldii*)

In the absence of our volunteers during lockdown, Sarah and I spent a large part of May weeding and mulching the big bed behind the visitor centre, and it looked smarter for the work. Over time the new grasses and viburnums will fill out and, eventually, leave less room for weeds, while the application of mulch will gradually improve the soil quality. We also continued with the cardboard lasagne technique introduced by Cat which is proving very successful at suppressing weed growth and therefore reducing staff time weeding!



**Figure 6: Pre-chip**



**Figure 7: Post chip and raking**

Along with this maintenance Cat, Sarah and I also pushed on with unestablished checks in sections 23 (the overflow car park) and 24 (between the overflow car park, the concert field and the main bottom path). This rotation around the site is a great way to see how the young trees are doing and provide any care that they need.

There is a deer problem onsite, so it often makes sense to replace the short rabbit fencing with taller versions as we did with this Tibetan Rowan (*Sorbus thibetica*) and Mizunara (*Quercus Mongolica subspecies crispula*). However, some trees were deemed established and therefore ready to be released from their cage, like this Quinghai spruce (*Picea crassifolia*). Mizunara is a Japanese oak which, during the trade embargo



**Figure 8: Tibetan rowan (*Sorbus thibetica*)**



**Figure 9: Mizunara (*Quercus mongolica subsp. crispula*)**

of the Second World War, was used in the absence of American oak barrels to mature whisky. This species now produces the most expensive barrels in the world.

The Quinhai spruce has been used to study the effects of early season droughts in its native Helan mountains in China, an area which is experiencing serious climate change. Lack of moisture can result in the trees closing their stomatas to decrease transpiration through their leaves reducing the risk of xylem embolism; when gas pockets are formed in the xylem by the breaking of the water chain. Carbon dioxide uptake is also curtailed when this occurs, and subsequent growth is limited. The way plants and trees recover from such damage is now the subject of intense research and is becoming increasingly important as we search for species that will cope in a more extreme climate.



**Figure 10: Quinhai spruce (*Picea crassifolia*)**