Special Report

TENNESSEE STATE UNIVERSITY

Evergreen Ornamentals and Extreme Cold

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There's no doubt about it, January, 2014 was an unusually cold month for the southeast including Tennessee. This cold period meant that many mature and potentially marketable plants suffered permanent damage. From first reports and observations, the most severely affected plants appeared to be the broadleaf evergreens and plants like Cryptomeria, Michelia, Osmanthus and some crapemyrtle that are borderline for hardiness. In the field, it is difficult to determine the full extent of damage because even the same cultivar will behave differently from nursery to nursery, field to field and plant to plant.

To help understand the extent of freeze damage, 5 ball and burlap specimen plants were brought into the TSU Nursery Research Center for evaluation. The plants consisted of a 'Forest Pansy' redbud, a 'Yoshino' cryptomeria, a 'Nellie R. Stevens' holly, a Fosteri (Foster) holly and an 'American Greenleaf' holly. These plants were placed inside a climate controlled greenhouse where they would receive warm temperatures, supplemental lighting, and regular watering. It was our goal to determine if these plants sustained any permanent freeze damage and is so, how much? With this information, we would be able to generalize, whether or not other plants in the field were marketable.

When the 5 plants were first brought into the greenhouse on February 3rd, it appeared that several inches of the newest growth would be lost off of the 3 hollies. However, after several weeks of supplemental warmth, light and water, it appeared that no or very little growth had been lost from the terminal growth on all 3 hollies (Images 7, 10, 11 and 12). The 'Nellie R. Stevens' displayed some mild leaf desiccation or "freeze burn" on several outer leaves (Images 8 and 9) but these will not likely result in any permanent damage. The 'American Greenleaf' did not appear to have as much leaf desiccation but had begun to drop leaves (Images 5 and 6). The foster holly (Image 12) and redbud appear to be in fair shape. Both show little or no leaf desiccation or terminal growth dieback. They will continue to be monitored for any signs of change.

The Cryptomeria on the other hand has lost a large portion of its top (Image 1). Immediately after the hard January freezes it was difficult to tell just where the line between the damaged top portion of growth and the undamaged lower portion met. However, after 3 weeks, a clear point between the deteriorating top growth and greening lower growth has been identified (Images 2, 3 and 4). The line between the damaged and undamaged tissue appears to be 135 cm from the top.

The most severe cases of freeze damage this winter will likely result from plants grown in containers. Roots are far less hardy than the above ground, stem portion of the plant. A good

example can be seen in some containerized dogwood (*Cornus florida*) trees (Image 13). At first glance, the above ground portion looks undamaged on the trees left outside. The cambium is still green and the flower buds are turgid. However, when these dogwoods are taken out of their containers and their roots compared with ones that have been protected inside a greenhouse, there are major differences. The roots on the dogwoods left outside have become brown and mushy which fail to hold onto the bark media. The protected dogwoods housed inside a greenhouse, on the other hand, still have white undamaged roots. This spring, container plants left outside and unprotected may fail to break dormancy or they may break dormancy and immediately collapse and perish due to a damaged root system.

All plants including the same cultivar will respond differently to severe cold. The observations I am taking from the hollies brought into the Research Center appear to be doing better than I initially thought. However, these plants are by no means a 100% representation of all plants everywhere affected by the extreme January freezes. To determine whether a plant is marketable will still remain a judgment call between the buyer and seller. If the damage is minimal, it should be pruned or sheared off. If damage is severe, the plants can either be pruned back and retrained or removed and destroyed if quality will ultimately suffer. Unfortunately, neither decision is easy.

Image 1
Freeze damage to a field grown ‘Yoshino’ Cryptomeria.

Image 2
Cryptomeria ‘Yoshino’ freeze damage.

▲ **Image 3**
Freeze damage at 115 cm on ‘Yoshino’ Cryptomeria.

▲ **Image 4**
Cryptomeria ‘Yoshino’ at 135 cm

▲ **Image 5**
This American holly has been partially defoliated.

▲ **Image 6**
This American holly has been partially defoliated.

▲ **Image 7**
The vascular cambium of this apical shoot of American holly was undamaged by the cold.

▲ **Image 8**
Some leaf drop occurred on the‘Nellie R. Stevens’ holly

▲ **Image 9**
Freeze damage to ‘Nellie R. Stevens’ holly

▲ **Image 10**
The apical growing shoots on‘Nellie R. Stevens’ holly appear undamaged.

Image 11
The cambium is still alive on the 'Nellie R. Stevens' holly

Image 12
The cambium appears undamaged on the Fosteri (Foster) holly.

Image 13
The roots of an unprotected containerized dogwood tree (right) have been killed.