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Frost Crack Damage

By Toso Bozic

Frost crack damage occurs when rapid changes in temperature cause the bark and underlying wood of a tree to split open. Frost crack damage typically occurs during winter months when temperatures fluctuate dramatically between daytime warmth and nighttime cold. The process begins when the sun warms the bark(usually south and southwest side), causing it to expand. As temperatures plummet at night, the bark contracts rapidly, while the underlying wood contracts at a slower rate. This dissonance in contraction rates can lead to the formation of cracks in the bark and wood, known as frost cracks. Frost cracks may be up to several feet long and may heal in the summer only to reopen again in winter. Repetitive cracking and healing over years can result in the formation of **"frost ribs."**

Causes of frost crack damage

Several factors contribute to the formation of frost cracks in trees:

- **Temperature fluctuations:** Rapid changes in temperature, particularly when warm daytime temperatures give way to freezing nighttime temperatures, are the primary cause of frost crack damage.
- **Sun exposure:** Trees growing on the south or southwest side are more susceptible to frost cracks due to increased exposure to sunlight, which can cause rapid expansion of the bark.
- **Tree species:** Certain tree species, such as maples, ash, oaks, lindens, aspen and fruit trees, are more prone to frost crack damage than others due to variations in bark thickness, moisture content, and growth characteristics. Many fruit trees are very susceptible to frost crack.
- **Tree age and health:** Older trees with thicker bark are more susceptible to frost crack damage, as are trees with compromised health or structural integrity.

Pictures: Large frost crack during frigid winter (L); same frost crack closed during summer (C) and frost crack and frost rib on mayday tree (R)

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Effects of frost crack damage

Frost crack damage can have several adverse effects on trees such wakened structural Integrity which makes tree more susceptible to wind damage, insect infestations, and disease. The open wounds created by frost cracks provide entry points for pests such as insects and pathogens like fungi, which can further damage the tree and hinder its ability to heal. Trees that experience recurrent frost crack damage may have shortened lifespans and reduced overall vigor, impacting their ecological value and contributions to the environment.

Management options for frost crack damage

While it may not be possible to completely prevent frost crack damage, very few managements options can help mitigate its impact.

- Pruning or remove any dead or damaged branches that pose hazard risk to people or property.
- Watering and maintain adequate soil moisture levels, particularly during periods of drought or dry winter weather, to promote healthy bark and wood and reduce the likelihood of frost crack formation.
- Avoiding and minimize stress factors such as compacted soil, improper planting depth, and mechanical damage, which can weaken trees and make them more vulnerable to frost crack damage.
- Avoid fertilizing late in growing season and add wood chips may avoid incidence of frost crack.
- Do not apply any wood dressing as it will not seal exposed wood to moisture and pathogens.
- Regularly monitor the progress of the tree's healing process and provide ongoing care, including appropriate irrigation, fertilization, and pest management, as needed.

Frost crack damage is a prevalent issue affecting trees during fluctuating winter temperatures. Unless frost cracks pose tree hazards risk to people and property where removal of damaged branch or trees is required, monitoring and proper maintenance is what is only need it.

For more information:

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