

# Orchard Storm Damage Recovery

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Orchards in Eastern New York occasionally suffer damage from hurricanes that have deteriorated into tropical storms. Likewise orchards in western New York may experience damage from severe windstorms that originate in the Great Lakes. Such severe storms are not frequent or predictable; consequently there has been no research on how to treat damaged trees after a storm. All the information available concerning the susceptibility of fruit trees to wind storms and how injured trees should be treated following a storm is based upon orchard observations.

A point that needs to be emphasized is that apple trees can recover from wind damage very well. In 1991, Hurricane Bob hit Southern Maine in late August. Following the storm, 100 trees each of 12-year-old McIntosh/M.7 and spur Delicious/M.7 were evaluated. Twenty-six McIntosh trees were knocked over and were propped up; one subsequently died. Forty-six Delicious trees required propping and 11 subsequently died. Of the trees that died, all did so within a year after the storm.

Eight years after the hurricane, the reduction in growth for those trees that re-established was less than 10 percent compared to undamaged trees in both varieties. The greater number of tipped trees and higher mortality of Delicious may have been due to the fact that spur Delicious trees tend to have fewer lateral roots. Despite the greater damage to Delicious, though, the extent of recovery was the same as for McIntosh. Trees that die do so soon after the damage occurs; trees that survive recover quite well, despite the extent of the damage to the root system. Thus, it pays to salvage storm-damaged orchards.

The critical step in getting the orchard on the road to recovery is regenerating

new roots to replace those broken off in the storm. This article describes the steps a grower can take to hasten recovery of storm-damaged orchards.

Our recommendation is to upright the trees as soon as possible. Speed is favored over permanence. Root regeneration begins immediately after the damage occurs, and is critical to re-establishing good anchorage. A notched 2X4 board makes a quick, inexpensive prop. Hurricanes and tropical storms often occur just before or during the harvest season, when farm labor is focused on harvest. Consequently, growers often decide to upright their trees after harvest, which can be six or more weeks after the storm. The consequences of this long delay are thought to be detrimental.

Be careful to tamp the soil in and around the roots of propped trees to pre-

In early September, 1999, Hurricane Floyd came up the East Coast and hit the Hudson Valley and lower Champlain Valley with strong winds from the north. The storm tipped over many trees right before harvest. A similar catastrophe hit the Western New York apple industry on Labor Day, 1998. Although it is very discouraging to see a once beautiful orchard that has suffered damage in a windstorm, don't give up. Propping storm-tipped trees has been shown to successfully salvage the damaged trees.



Hurricane damage to a block of spur Delicious trees in Virginia. Spur Delicious are especially prone to tipping over in high winds, but can be salvaged, given prompt care.

## Keys to Recovery of Storm Damaged Trees

1. Prop tipped trees promptly
2. Tamp the soil around the roots
3. Prune minimally following the storm
4. Apply B and N to soil to stimulate rooting
5. Irrigate to prevent soil moisture deficits

vent pockets of air or water and possible early winter cold injury to exposed roots. Air pockets around the roots of storm-damaged trees can also provide good habitat for voles, so careful monitoring and vole control measures are advisable. Often the motion of the tree trunk in the wind has caused a cup to form at the base of the tree that fills with water. This cup should be filled with soil to prevent ice injury, which can lead to collar rot infection.

Trees with damaged root systems take up less water and are more sensitive to drought. Root growth stops when soils dry out. Extra care in preventing soil water deficits through careful monitoring and scheduling frequent irrigation, if needed, is warranted in the growing season following a storm.

Another recommendation frequently given after trees have been propped up is to prune the canopy severely to bring the canopy volume into balance with the reduced root volume. The benefit of severe pruning as a storm damage recovery practice has not been documented, and the opposite suggestion (minimal pruning) is also often given. The primary benefit of severe pruning may be to reduce the potential for cropping in the season following storm damage. The presence of fruit has been

shown to dramatically reduce root regeneration. Our present recommendation is to prune the injured trees minimally during the dormant season and to reduce cropping as much as is practical in the following year.

A third question centers on mineral nutrition. Nitrogen and boron are key elements for root growth, and soil-applied fertilizer is considered to be more beneficial for stimulating roots than foliar applied fertilizer. The possible loss of winter hardiness from late applications of N to the soil needs to be weighed against the potential tree loss, poor growth and loss of productivity that would result from slow root development following storm damage. However, there is no research-based information to support this judgment. At this time, it is recommended that a maintenance dose of nitrogen and boron be soil applied in early spring following storm damage.

It is very discouraging to see a once beautiful orchard suffer damage in a wind-storm, but don't give up. Propping storm-tipped trees is inexpensive in terms of material and labor. Experience has shown that if the damage has occurred in an orchard with desirable varieties, rootstocks, and other characteristics, you will not be throwing good money after bad to salvage the damaged trees.



Severe Hurricane damage caused by soaking rain followed by high winds.

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