Many types of fruit trees produce suckers around the base of the tree. Crown suckers arise in the area immediately surrounding the tree trunk (Photo 1), and root suckers can arise from roots further away from the trunk. Not only are suckers around trees unsightly, but they can also harbor insect pests like wooly apple aphid and provide points of entry for diseases like fire blight. If suckers are profuse, they interfere with in-row weed management and can absorb systemic herbicides such as glyphosate.

Some rootstocks used for fruit trees such as M.7 for apples and Mazzard for cherries are genetically predisposed to produce suckers. M.9 clone RN-29 is more inclined to sucker than other M.9 clones. In some cases, sucker growth is a symptom of partial incompatibility between the rootstock and scion. Suckers can also result from injury to the crown, such as extreme cold or mechanical damage. Whatever the cause, managing suckers takes time and expense.

Photo 1. This young apple tree has profuse suckers around the crown of the tree. Left unmanaged, the suckers will grow up into the lower parts of the tree. Photo by Teryl Roper.
Sucker management falls into two general categories: mechanical and chemical. Each approach has merit depending on the orchard situation.

**Mechanical Control**
When only a few suckers are present, they are often removed during dormant pruning. In severe cases, using sickle bar mowers or gas-powered hedge shears can remove suckers. However, mechanically removing suckers in some situations can cause multiple new shoots to arise from cutting a single sucker, making the problem worse. Expensive and labor-intensive, mechanical control may be required more than once per year.

Related to mechanical control is control by heat. In a Utah State University (USU) trial, burning suckers with a propane torch provided reasonable control that lasted several weeks. This may present an effective approach for a few suckers here and there. Treating an entire block with a torch would require very slow drive speeds, consuming a substantial amount of propane. Without care, damage could occur to irrigation tubing.

**Chemical Control**
Chemically controlling suckers can be effective and is less labor-intensive than mechanical control. A single operator can treat many acres in a day. Chemical controls for suckers can be grouped into three categories: plant growth regulators, herbicides, and desiccants.

**Plant Growth Regulators.** Commercial fruit growers have long used a synthetic auxin, Naphthalene Acetic Acid (NAA), to reduce the growth of suckers. This is the same plant growth regulator (PGR) used to thin fruit, but the timing and concentration are very different. Because NAA will cause a thinning response, application must be delayed until a month after petal fall. This allows time for the fruit to set and become less sensitive to NAA. Nevertheless, the application should be made at a low pressure (10-20 psi) using nozzles that produce large droplets to reduce drift. A specific formulation of NAA (Tre-Hold A-112™) is registered for this use. For apples, a 0.5% to 1% solution of NAA should reduce the growth of root suckers.

**Herbicides.** Some specific contact herbicides are registered for managing suckers on fruit trees. While registered for sucker suppression or control, they are still herbicides and can damage trees, especially young trees, where the bark is green and not yet corky. Therefore, take care to not treat tree trunks during application. Install trunk wraps on young trees before applying herbicide products. Contact herbicides have the added advantage of providing some control for weeds emerging after spring herbicide applications.

General application principles for herbicides to manage suckers include spraying only during calm winds, and using low pressure and large droplet size. Low drift nozzles are preferred. The use of off-center nozzles may lead to overspray on trunks. For these contact herbicides, good coverage of the sucker foliage is essential. Thus, spray sufficient water to wet the leaves thoroughly. Treating when suckers are still young and succulent and not woody achieves the best result.

Paraquat (Gramoxone™) is a caustic, non-systemic, post-emergent herbicide that burns green vegetation. Paraquat is rapidly absorbed by green plant tissues and reacts with photosynthesis to produce superoxides that kill plant cells. Highly toxic to humans, Paraquat is a restricted-use pesticide that can only be mixed and applied by certified pesticide applicators. It provides good burn-down of suckers at the higher rates.

Glufosinate (Rely 280™, Cheetah™) is another contact herbicide registered for sucker management. It is the slowest acting of the herbicide products included in this fact sheet. It can take 20-25 days to
reach the level of control provided by the other herbicides in 10-14 days.

Carfentrazone-ethyl (Aim EC) is registered for sucker control in fruit trees. Aim must be applied using a hooded sprayer to minimize the opportunity for drift. Also, it must be mixed with an appropriate rate of a nonionic surfactant or crop oil concentrate. Although Aim is effective at controlling green and non-woody suckers, the opportunity for injury from drift makes this a less desirable choice.

Pyraflufen-ethyl (Venue) is a contact herbicide providing post-emergent control of a range of broadleaf weeds. It also has a supplemental label for controlling suckers in fruit trees. It is fast-acting and effective at the 4 fluid ounces per acre rate. Cherry suckers are more susceptible to Venue than apple.

Table 1. Use Patterns for Herbicides Registered for Sucker Control in Tree Fruits

<table>
<thead>
<tr>
<th>Generic name</th>
<th>Trade name</th>
<th>Rate/acre</th>
<th>Applications/year</th>
<th>Restricted-entry interval (REI) (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraquat</td>
<td>Gramoxone</td>
<td>2.5 to 4 pints</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Glufosinate</td>
<td>Rely, Cheetah</td>
<td>48 to 56 fluid ounces</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Carfentrazone-ethyl</td>
<td>Aim</td>
<td>2 fluid ounces</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Pyraflufen-ethyl</td>
<td>Venue</td>
<td>3 to 4 fluid ounces</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

*Note. Check product labels for specific use information.*

**Desiccants.** Recently, we became aware of a material used elsewhere for sucker control in tree fruits and nuts. The liquid fertilizer Urea Ammonium Nitrate (UAN) is a powerful desiccant. It is not registered as a pesticide. Growers can purchase it in co-op agronomy centers in the Intermountain West. When sprayed on suckers in the spring, it desiccates the succulent foliage and stunts growth. Since it is 32% nitrogen by weight, it also provides additional nitrogen when applied for sucker control.

In 2019, we conducted a trial assessing UAN for sucker control. The trial was conducted on a block of ‘Gala’ on EMLA.7 rootstocks at the Kaysville Research Farm in Kaysville, Utah. The trees were planted in 2006 and had a long history of extensive root suckering. In the early spring, we cut off all the existing suckers with hedge shears. That ensured sucker regrowth and made the various treatments uniform in not having suckers present when we began the trial. Treatments were assigned to trees in five orchard rows in a completely randomized design with four replications. Applications were made on four dates in 2019: April 30, May 3, May 9 and May 20. The first treatments were made when initial sucker growth ranged between 3 and 6 inches. Treatments were water (control), 1% NAA, Paraquat, UAN, and burning with a propane torch. NAA and Paraquat were mixed immediately before use. All liquid treatments were applied with a one-gallon pump up sprayer, and the suckers were sprayed to runoff. When we burned with a propane torch, we burned the area under the tree until all the suckers were devoid of leaves.

We evaluated the treatments on May 9, June 10, and July 1, 2019. We photographed each single tree plot and gave a control rating between 1 (no control) and 5 (complete control).
Figure 1 shows the results of the study. Water was the control and provided no control across evaluation dates. Paraquat provided good initial control, but this was short-lived. Also, it offered better control with the latest treatment date. NAA delivered better and longer-lived sucker control, although the results were somewhat variable. Even by July 1, we still observed some control from the April 30 NAA treatment. UAN also provided better control with later treatment dates. The May 20 treatment still provided acceptable control by July 1. UAN produced the longest-lasting control. In general, later treatments provided longer-lasting control in the period we evaluated.

Based on this research, we conclude that UAN is an acceptable material for sucker management in the late spring through early summer. It offered better control than Paraquat and control equal to NAA. Paraquat, NAA, and UAN are easily applied with a boom sprayer in a commercial setting. Paraquat has the added advantage of also suppressing early weed growth. UAN has the added advantage of providing some nitrogen as well as suppressing early weed growth.

Table 2 displays the estimated cost of sucker control products on a per-acre basis. The lowest cost product is Paraquat, followed by UAN and NAA. The cost of application labor, fuel, and depreciation are not included in these costs. However, applying UAN at a rate of 20 gallons per treated acre provides about 20 pounds of nitrogen per projected acre, thus offsetting nitrogen that would otherwise be applied.
Table 2. Cost\textsuperscript{a} per Treated Acre of Various Sucker Control Products on a Projected Area Basis, Based on a Six-Foot Treated Area per Tree Row.

<table>
<thead>
<tr>
<th>Product</th>
<th>20-foot row spacing</th>
<th>15-foot row spacing</th>
<th>10-foot row spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>UAN</td>
<td>$10.50</td>
<td>$14.00</td>
<td>$21.00</td>
</tr>
<tr>
<td>Paraquat</td>
<td>$3</td>
<td>$4</td>
<td>$6</td>
</tr>
<tr>
<td>1% NAA</td>
<td>$15</td>
<td>$20</td>
<td>$30</td>
</tr>
<tr>
<td>Rely</td>
<td>$11</td>
<td>$15</td>
<td>$23</td>
</tr>
<tr>
<td>Aim</td>
<td>$5</td>
<td>$7.50</td>
<td>$10</td>
</tr>
<tr>
<td>Venue</td>
<td>$7</td>
<td>$9</td>
<td>$14</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Based on 2019 chemical prices.

In apple orchards, not all rootstocks are equally prone to sucker. We recommend avoiding planting apple trees on M.7 rootstocks. Also, when nursery trees are “high-budded” so the root system can be planted slightly lower, this can reduce the amount of suckering. However, this approach can be overdone. Avoiding mechanically damaging rootstocks can also prevent suckering.

Disclaimer
References to chemicals in this publication are for your convenience and are not endorsements of...
particular products over other similar products. Plant growth regulators are classified as pesticides by the U.S. Environmental Protection Agency. You are responsible for using pesticides according to the manufacturer’s current label directions. Follow directions exactly to protect people and the environment from pesticide exposure. Failure to do so violates the law. This information is provided as an educational tool to inform growers what materials are legal to apply and what is effective. No implication is intended that Utah State University recommends the use of any materials.

References
