Basal spray  Stem injection  Foliar spray  Cut-stump treatment
SECTION I: STEM INJECTION SUMMARY

• Use 38-percent solution of Accord® Concentrate in a water carrier.
• Use 50-percent solution of Garlon® 3A, Roundup Pro®, Glyphomate®, or Razor® Pro in a water carrier.
• Use 6-percent solution of Arsenal® or 3-percent solution of Arsenal® AC in a water carrier.
• Arsenal® herbicide is very effective on maple (Acer spp.).
• Make one incision per inch of diameter at breast height (d.b.h.) spaced evenly around the stems.
• Apply 1.5 milliliters (ml) (0.05 oz.) of solution per incision.
• Treatment is applicable to stems ≥1.0 inch d.b.h.
• The “cut stub” treatment (Figure 14) is very effective on stems smaller than 1.0 inch d.b.h.
• Treatment is best applied from June 1 to November 1.
• Do not apply during periods of heavy sap flow (February through May).
• Treatment costs $50-$75 per acre (chemical and labor).
Table 1.—How to prepare various herbicide solutions for stem injection vegetation control treatments

<table>
<thead>
<tr>
<th>Desired herbicide solution concentration</th>
<th>Chemical name (percent active ingredient)</th>
<th>Herbicide component</th>
<th>Carrier component</th>
<th>All Components&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>38-percent Accord® Concentrate</td>
<td>Glyphosate (53.8-percent a.i.)</td>
<td>1,438 ml (49 oz.)</td>
<td>2,347 ml (79 oz.)</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 7</td>
</tr>
<tr>
<td>50-percent Roundup Pro®</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>1,893 ml (64 oz.)</td>
<td>1,892 ml (64 oz.)</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 6</td>
</tr>
<tr>
<td>50-percent Glyphosate®</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>1,893 ml (64 oz.)</td>
<td>1,892 ml (64 oz.)</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 5</td>
</tr>
<tr>
<td>50-percent Razor® Pro</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>1,893 ml (64 oz.)</td>
<td>1,892 ml (64 oz.)</td>
<td>3,785 ml or 1 gallon</td>
<td>Figures 4, 9, 12</td>
</tr>
<tr>
<td>50-percent Garlon® 3A</td>
<td>Triclopyr (44.4-percent a.i.)</td>
<td>1,893 ml (64 oz.)</td>
<td>1,892 ml (64 oz.)</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 8</td>
</tr>
<tr>
<td>6-percent Arsenal®</td>
<td>Imazapyr (28.7-percent a.i.)</td>
<td>227 ml (8 oz.)</td>
<td>3,558 ml (120 oz.)</td>
<td>3,785 ml or 1 gallon</td>
<td>Figures 10, 11</td>
</tr>
<tr>
<td>3-percent Arsenal® AC</td>
<td>Imazapyr (53.1-percent a.i.)</td>
<td>114 ml (4 oz.)</td>
<td>3,671 ml (124 oz.)</td>
<td>3,785 ml or 1 gallon</td>
<td>Figures 10, 11, 13</td>
</tr>
</tbody>
</table>

<sup>a</sup>Agitate well.
Figure 3.—Applying herbicide to incision. To make a good incision, chop through the bark into the wood at an angle to make a cuplike incision; then bend the hatchet head down by twisting your arm to open the incision. Leaving the hatchet blade in the incision, squirt herbicide directly into the incision. Do not overfill incisions because any herbicide that runs out is wasted and might impact nontarget plants. When defective incisions will not hold herbicide, make additional incisions next to them. In difficult-to-control species like black gum (*Nyssa sylvatica* Marsh), hickory (*Carya* spp.), red maple (*Acer rubrum* L.), and large cull trees, space incisions closer or add a few incisions at the base of the tree where large roots are attached to the trunk to increase efficacy.
Figure 4.—An applicator injecting a cull tree using a hatchet with a ground-down bit and a spray bottle with a 50-percent solution of Razor® Pro herbicide in a water carrier. This tree injection method is called hack-and-squirt. It is usually considered one of the cheapest manual application methods. Use 1.5 milliliters (ml) of solution per inch of tree d.b.h. in incisions spaced evenly around the tree. Spray bottles do not all spray the same amount per pull, but they can be readily calibrated. Fill the spray bottle with water and use a complete pull to squirt 10 times into a graduated cylinder and then determine the average volume dispensed with each complete pull. The spray bottle shown here dispenses 2.8 ml per complete pull, so it requires about one-half pull per incision.
Figure 8.—Tree injection in a yellow-poplar (Liriodendron tulipifera L.) stand using a 50-percent solution of Garlon® 3A in a water carrier to release a yellow-poplar crop tree from other competing yellow-poplar trees. Since functional root grafts are often formed between roots of the same species, Garlon® 3A was used because triclopyr, the active ingredient, is not translocated well in plants and will not impact nearby yellow-poplar trees. However, injecting competing trees attached to the same stump as crop trees is not recommended. A 5-foot buffer between crop trees and treated trees of the same species is recommended with use of glyphosate herbicides, the most commonly used herbicides in crop tree release operations. Arsenal® AC is not recommended for crop tree release operations because damage can occur to nontarget plants. Imazapyr, the active ingredient, exhibits soil activity and can be absorbed by the roots of nontarget plants. However, reduced concentrations of Arsenal® (Figure 10) can be used to inject scattered cull trees and small understory trees of species different from nearby desirable trees.
Figure 9.—Basal sprouts on a top-killed striped maple (Acer pensylvanicum L.) that had been injected with a 50-percent solution of Razor® Pro. Some trees, especially maples, are prone to resprouting after being injected with glyphosate herbicides.
SECTION II: BASAL SPRAY SUMMARY

• Use 10- to 20-percent mixture of Garlon® 4 in an oil carrier (10-percent mixture on thin-bark species).
• See herbicide label for recommended oil carriers.
• Spray completely around stems 12-15 inches above groundline to point of runoff.
• Treatment is applicable to stems <6.0 inches d.b.h. and treatments involving <1,000 stems per acre.
• Apply any time of the year stems are dry.
• Treatment costs $80-$125 per acre depending on the number of stems treated (chemical and labor).
Table 2.—How to prepare various herbicide solutions for basal spray vegetation control treatments

<table>
<thead>
<tr>
<th>Desired herbicide solution concentration</th>
<th>Chemical name (percent active ingredient)</th>
<th>Herbicide component</th>
<th>Carrier component</th>
<th>All components</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-percent Garlon® 4 Ultra (60.5-percent a.i.)</td>
<td>Triclopyr (60.5-percent a.i.)</td>
<td>379 ml (13 oz.) chemical</td>
<td>3,406 ml (115 oz.) oil</td>
<td>3,785 ml or 1 gallon</td>
<td>Figures 15, 16, 17, 18</td>
</tr>
<tr>
<td>20-percent Garlon® 4 Ultra (60.5-percent a.i.)</td>
<td>Triclopyr (60.5-percent a.i.)</td>
<td>757 ml (26 oz.) chemical</td>
<td>3,028 ml (102 oz.) oil</td>
<td>3,785 ml or 1 gallon</td>
<td></td>
</tr>
</tbody>
</table>
Figure 15.—Basal bark spraying small beech stems 12-15 inches above the groundline using a backpack sprayer with a 10-percent mixture of Garlon® 4 and oil. Target stems must be dry, free of snow to the groundline, and completely wetted on all sides with the spray mixture. Basal spraying is a very effective treatment on small stems <6 inches d.b.h., but it can require carrying large volumes of solution on steep topography and it normally costs more than tree injection treatments. Basal spraying is especially adapted for treating relatively low numbers of small, thin-bark species like beech and striped maple because they require less spray, and lower concentrations of spray (10-percent Garlon® 4) are effective.
SECTION III: CUT-STUMP TREATMENT SUMMARY

• Use 50- to 100-percent glyphosate herbicide product in a water carrier.
• Use 3-percent Arsenal® AC or 6-percent Arsenal® in a water carrier.
• Treat stumps as soon as possible after cutting, although treatment can be effective on beech in the central Appalachians up to 4 days after cutting.
• Spray outer 2 inches of stump surface.
• Treatment is effective on all sizes of stumps.
• Root sprout mortality is greater around larger stumps.
• Do not use this treatment when stumps and nearby desirable trees are the same species.
• Treatment is best applied from June 1 to November 1.
• Do not apply during heavy sap flow (February through May).
• Treatment costs $40-$60 per acre (chemical and labor).
Table 3.—How to prepare various herbicide solutions for cut-stump vegetation control treatments

<table>
<thead>
<tr>
<th>Desired herbicide solution concentration</th>
<th>Chemical name (percent active ingredient)</th>
<th>Herbicide component</th>
<th>Carrier component</th>
<th>All components</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-percent Roundup Pro®</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>1,893 ml (64 oz.) chemical</td>
<td>1,892 ml (64 oz.) water</td>
<td>3,785 ml or 1 gallon</td>
<td>Figures 26, 28, 30</td>
</tr>
<tr>
<td>50-percent Glyphosate® 41</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>1,893 ml (64 oz.) chemical</td>
<td>1,892 ml (64 oz.) water</td>
<td>3,785 ml or 1 gallon</td>
<td>Figures 27, 28, 30</td>
</tr>
<tr>
<td>50-percent Razor® Pro</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>1,893 ml (64 oz.) chemical</td>
<td>1,892 ml (64 oz.) water</td>
<td>3,785 ml or 1 gallon</td>
<td>Figures 21, 22, 28, 30</td>
</tr>
<tr>
<td>6-percent Arsenal®</td>
<td>Imazapyr (28.7-percent a.i.)</td>
<td>227 ml (8 oz.) chemical</td>
<td>3,558 ml (120 oz.) water</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 30</td>
</tr>
<tr>
<td>3-percent Arsenal® AC</td>
<td>Imazapyr (53.1-percent a.i.)</td>
<td>114 ml (4 oz.) chemical</td>
<td>3,671 ml (124 oz.) water</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 30</td>
</tr>
<tr>
<td>10-percent Garlon® 4 Ultra</td>
<td>Triclopyr (60.5-percent a.i.)</td>
<td>379 ml (13 oz.) chemical</td>
<td>3,406 ml (115 oz.) oil</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 29</td>
</tr>
</tbody>
</table>
Figure 21.—Applying the cut-stump treatment to a freshly cut beech stump using a 50-percent solution of Razor® Pro in a water carrier. Brush the sawdust from the stumps before treatment. Using a glyphosate herbicide that contains a surfactant or adding a nonionic surfactant is often recommended to increase penetration. It is necessary to wet only the outer 2 inches around larger stump surfaces; the entire surface of small stumps is treated.
Figure 22.—Applying the cut-stump treatment using a spray bottle to dispense herbicide on a freshly cut beech stump. Although it is usually recommended that this treatment be applied to stump surfaces as quickly as possible after cutting, recent research indicates that waiting up to 4 days after partial cutting before treating beech stumps with a 50-percent solution of Razor® Pro in a water carrier did not significantly reduce root sprout or stump sprout efficacy in a partially cut Appalachian stand.
Figure 23.—Stumps after treatment with a glyphosate herbicide. They turn yellow within 1 hour after treatment.

Figure 24.—Beech stumps treated with a glyphosate herbicide containing dye. Using a dye recommended for use with glyphosate to enhance the coloration, makes it easier to keep track of treated stumps. It is necessary to wet only a 2-inch band encompassing the cambium layer on larger stumps while the entire surface of smaller stumps is sprayed.
Figure 27.—Northern red oak seedlings being planted in the spring among beech stumps that were treated the previous fall with a cut-stump treatment using a 50-percent solution of Glyphosate® herbicide in a water carrier.
SECTION IV: FOLIAR SPRAY SUMMARY

• Use 1-percent or 2-percent solution of a glyphosate product that contains a surfactant, or add a surfactant.

• Use 1-percent or 2-percent solution of Arsenal® AC and add a surfactant.

• Use 2-percent solution of Arsenal® and add a surfactant.

• See herbicide label for recommended surfactants.

• Use minimum sprayer pressure to control drift.

• Mix with clean water.

• Treatment is applicable to target stems less than 6 feet tall.

• Completely wet foliage.

• Apply during rain-free periods.

• Best results are obtained in late summer while foliage is still green.

• Add Oust® (sulfometuron-methyl) for better control of herbaceous weeds and grass.

• Treatment costs $150-$200 per acre (chemical and labor).
<table>
<thead>
<tr>
<th>Desired herbicide solution concentration</th>
<th>Chemical name (percent active ingredient)</th>
<th>Herbicide component</th>
<th>Carrier component</th>
<th>Other component</th>
<th>All components</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-percent Glyphosate® 41 (weeds, brush, fern and grass)</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>76 ml (3 oz.) chemical</td>
<td>3,709 ml (125 oz.) water</td>
<td>0.08 oz. Oust® XP&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 31</td>
</tr>
<tr>
<td>2-percent Razor® Pro (weeds, brush, fern and grass)</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>76 ml (3 oz.) chemical</td>
<td>3,709 ml (125 oz.) water</td>
<td>0.08 oz. Oust® XP&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 33</td>
</tr>
<tr>
<td>2-percent Accord® Concentrate (weeds, brush, fern and grass)</td>
<td>Glyphosate (53.8-percent a.i.)</td>
<td>76 ml (3 oz.) chemical</td>
<td>3,709 ml (125 oz.) water</td>
<td>19 ml (0.6 oz.) surfactant</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 32</td>
</tr>
<tr>
<td>2-percent Glyphosate® 41 (weeds, brush, fern and grass)</td>
<td>Glyphosate (41.0-percent a.i.)</td>
<td>76 ml (3 oz.) chemical</td>
<td>3,709 ml (125 oz.) water</td>
<td>19 ml (0.6 oz.) surfactant</td>
<td>3,785 ml or 1 gallon</td>
<td></td>
</tr>
<tr>
<td>2-percent Arsenal® AC (weeds, brush)</td>
<td>Imazapyr (53.1-percent a.i.)</td>
<td>76 ml (3 oz.) chemical</td>
<td>3,709 ml (125 oz.) water</td>
<td>19 ml (0.6 oz.) surfactant</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 35</td>
</tr>
<tr>
<td>3-percent Garlon® 4 Ultra (Rhododendron and Kalmia species)</td>
<td>Triclopyr (60.5-percent a.i.)</td>
<td>114 ml (4 oz.) chemical</td>
<td>3,671 ml (124 oz.) water</td>
<td>19 ml (0.6 oz.) Cide-Kick® II&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 34</td>
</tr>
<tr>
<td>5-percent Garlon® 4 Ultra (Dense Rhododendron and Kalmia species)</td>
<td>Triclopyr (60.5-percent a.i.)</td>
<td>189 ml (7 oz.) chemical</td>
<td>3,596 ml (121 oz.) water</td>
<td>19 ml (0.6 oz) Cide-Kick® II&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3,785 ml or 1 gallon</td>
<td>Figure 34</td>
</tr>
</tbody>
</table>

<sup>a</sup>Oust® XP as sulfometuron-methyl (75-percent a.i.)

<sup>b</sup>Spray adjuvant
Figure 31.—Tubed northern red oak seedlings planted on the edge of a skidroad with a heavy grass cover. A backpack sprayer was used to spray a 3-foot radius circle around the seedlings. A spray mixture containing a 2-percent solution of Glyphomate®, which contained a surfactant and the equivalent of 2 ounces of Oust® XP (sulfometuron-methyl) per acre (approximately 0.25 oz. per 3 gallons of solution), in a water carrier was used. Including Oust® XP in the spray mixture adds longevity to the treatment because Oust® XP has preemergent activity that helps prevent grass and herbaceous seeds from germinating.
Figure 32.—Using a backpack sprayer and minimum pressure with a 2-percent solution of Accord® Concentrate and 0.5-percent nonionic surfactant in a water carrier to spray around a seedling protected with a section of 10-inch stovepipe, equipped with a cover and handle. Foliar sprays with glyphosate herbicides are more effective later in the growing season. This same solution can also be used to prepare planting sites by spraying small circular spots of groundcover in August or September to control competition prior to spring planting.
Figure 35.—Direct spraying a clump of autumn olive using a backpack sprayer to thoroughly wet leaves to the point of runoff (but not causing runoff) with a 2-percent solution of Arsenal® AC plus 0.5 percent by volume nonionic surfactant in a water carrier. Nonnative invasive plants are especially difficult to control; thus follow-up treatments will probably be necessary. Since Arsenal® AC has soil activity, avoid treating areas where the roots from desirable plants are present. It is difficult to foliar spray vegetation taller than 6 feet with a backpack sprayer. Foliar spraying tall vegetation increases the possibility of drift, which can damage nontarget vegetation.
Herbicide products are sold in a variety of concentrations of active ingredients (a.i.). For example, undiluted Glyphosate® is sold as 41.0-percent a.i. (glyphosate), while undiluted Accord® Concentrate is sold as 53.8-percent a.i (glyphosate). Use the following procedure to determine the equivalent herbicide solution mixture when changing from a familiar herbicide product and a standard solution mixture to a different herbicide product with a different concentration of active ingredient. In this example, assume you have been using a 50-percent standard mixture of Glyphomate® and you wish to change to an equivalent mixture of Accord® Concentrate.

Step 1: Assemble information about the familiar herbicide product, the desired standard solution mixture, and the mixing instructions.

Familiar herbicide product: Glyphomate® 41.0 percent-a.i. (glyphosate)
Standard solution mixture: 50 percent
Per-gallon (128 ounces) mixing instructions: Add 64 ounces (50 percent of 1 gallon) of Glyphomate® to 64 ounces of water for a total of 128 ounces or 1 gallon.
Step 2: Compute the equivalent concentration of the new or unfamiliar herbicide product and the new mixing instructions.

\[
\text{Familiar herbicide} \times \text{Standard solution mixture} = \text{Equivalent concentration} \\
\text{New herbicide}
\]

\[
\text{Glyphosate® 41.0-percent a.i. (glyphosate)} \times 50 \text{ percent} = 38.1 \text{ percent} \\
\text{Accord® Concentrate 53.8-percent a.i. (glyphosate)}
\]

A 38.1 percent solution of Accord® Concentrate is equivalent to a 50-percent solution of Glyphosate®.

Per-gallon (128 ounces) mixing instructions: Add 49 ounces (38.1 percent of 1 gallon) of Accord® Concentrate to 79 ounces of water for a total of 128 ounces or 1 gallon.
Herbicide Solution Cost Comparisons

Often there are large differences in cost for undiluted forms of herbicides. The important point to consider is the cost of the herbicide solution that will be applied for a given treatment. The following example is a comparison of stem injection solution costs ($ per gallon) for a 3-percent solution of Arsenal® AC and a 50-percent solution of Glyphomate®.

To calculate the cost per gallon for a 3-percent solution of Arsenal® AC:

Assume Arsenal® AC costs $150 per gallon.
1 gallon = 3,785 milliliters (ml)

\[
\frac{150}{1 \text{ gal}} \times \frac{1 \text{ gal}}{3,785 \text{ ml}} = \$0.0396 \text{ per ml}
\]

1 gallon of a 3-percent solution of Arsenal® AC contains 114 ml \((0.03 \times 1 \text{ gal} \times \frac{3,785 \text{ ml}}{1 \text{ gal}})\) of the herbicide.

\[
\text{Cost per gallon for a 3-percent solution of Arsenal® AC} = \frac{0.0396}{1 \text{ ml}} \times 114 \text{ ml} = \$4.51 \text{ per gallon}
\]
To calculate the cost per gallon for a 50-percent solution of Glyphomate®:

Assume Glyphomate® costs $26 per gallon.  
1 gallon = 3,785 ml  

\[ \frac{\$26}{1 \text{ gal}} \times \frac{1 \text{ gal}}{3,785 \text{ ml}} = \$0.0069 \text{ per ml} \]

1 gallon of a 50-percent solution of Glyphomate® contains 1,893 ml \((0.50 \times 1 \text{ gal} \times \frac{3,785 \text{ ml}}{1 \text{ gal}})\) of the herbicide.  

Cost per gallon for a 50-percent solution of Glyphomate® = \[ \frac{\$0.0069}{1 \text{ ml}} \times 1,893 \text{ ml} = \$13.06 \text{ per gallon} \]
<table>
<thead>
<tr>
<th>Herbicide</th>
<th>EPA Reg. No.</th>
<th>Active ingredient (%)</th>
<th>Herbicide cost ($)</th>
<th>Treatment</th>
<th>Soil activity</th>
<th>Carrier</th>
<th>Solution conc. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accord® Concentrate (glyphosate)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>62719-324</td>
<td>53.8</td>
<td>$23/gal.</td>
<td>Foliar&lt;sup&gt;d&lt;/sup&gt; spray, stem injection, cut-stump</td>
<td>No</td>
<td>Water</td>
<td>2-100</td>
</tr>
<tr>
<td>Razor® Pro&lt;sup&gt;b&lt;/sup&gt; (glyphosate)</td>
<td>228-366</td>
<td>41.0</td>
<td>$17/gal.</td>
<td>Foliar spray, stem injection, cut-stump</td>
<td>No</td>
<td>Water</td>
<td>2-100</td>
</tr>
<tr>
<td>Roundup Pro&lt;sup&gt;ab&lt;/sup&gt; (glyphosate)</td>
<td>524-475</td>
<td>41.0</td>
<td>$50/gal.</td>
<td>Foliar spray, stem injection, cut-stump</td>
<td>No</td>
<td>Water</td>
<td>2-100</td>
</tr>
<tr>
<td>Glyphosate&lt;sup&gt;b&lt;/sup&gt; 41 (glyphosate)</td>
<td>2217-847</td>
<td>41.0</td>
<td>$26/gal.</td>
<td>Foliar spray, stem injection, cut-stump</td>
<td>No</td>
<td>Water</td>
<td>2-100</td>
</tr>
<tr>
<td>Garlon&lt;sup&gt;e&lt;/sup&gt; 3A (triclopyr)</td>
<td>62719-37</td>
<td>44.4</td>
<td>$72/gal.</td>
<td>Stem injection, cut-stump</td>
<td>No</td>
<td>Water</td>
<td>50-100</td>
</tr>
<tr>
<td>Garlon&lt;sup&gt;e&lt;/sup&gt; 4 Ultra (triclopyr)</td>
<td>62719-527</td>
<td>60.5</td>
<td>$91/gal.</td>
<td>Foliar and basal spray</td>
<td>No</td>
<td>Water-Oil</td>
<td>3-20</td>
</tr>
<tr>
<td>Arsenal® (imazapyr)</td>
<td>241-346</td>
<td>28.7</td>
<td>$119/gal.</td>
<td>Foliar&lt;sup&gt;d&lt;/sup&gt; spray, stem injection, cut-stump</td>
<td>Yes</td>
<td>Water</td>
<td>2-6</td>
</tr>
<tr>
<td>Arsenal® AC (imazapyr)</td>
<td>241-299</td>
<td>53.1</td>
<td>$150/gal.</td>
<td>Foliar&lt;sup&gt;d&lt;/sup&gt; spray, stem injection, cut-stump</td>
<td>Yes</td>
<td>Water</td>
<td>1-3</td>
</tr>
<tr>
<td>Oust® XP (Sulfometuron-methyl)</td>
<td>352-601</td>
<td>75.0</td>
<td>$83/lb.</td>
<td>Foliar</td>
<td>Yes</td>
<td>Water</td>
<td>2-5 oz./ac.</td>
</tr>
</tbody>
</table>

<sup>a</sup>Trade name and (common active-ingredient name)
<sup>b</sup>Contains surfactant
<sup>c</sup>Average costs obtained from herbicide distributors in 2010
<sup>d</sup>Requires nonionic surfactant

Labels can be downloaded at http://www.cdms.net
PLEASE READ AND FOLLOW THE LABEL.