

Is it dead yet?

Controlling weeds with Enlist® herbicides

Attacking weeds where they live and disrupting how they grow

A few questions have been raised about how Enlist® herbicides work and the process they follow when killing hard-to-control broadleaf weeds. Enlist One® and Enlist Duo® herbicides provide a way for farmers to control yield-stealing weeds using the power of 2,4-D choline with Colex-D® technology, glyphosate and glufosinate.

Enlist herbicides at work

Weeds sprayed with Enlist herbicides may take up to 24 hours to show outward signs of herbicide efficacy because the mode of action starts by attacking from within the weed.

The active ingredient in Enlist One herbicide is 2,4-D choline, which is a synthetic auxin, or group 4, growth regulator herbicide. A synthetic auxin is a class of plant hormone that regulates plant growth. Once applied, the herbicide travels from leaves into the cells responsible for plant division and growth. Upon reaching this cellular region, the herbicide prompts unregulated growth and death in weeds. To put it another way, the active ingredient mimics naturally occurring plant auxins and overloads the plant's natural processes including cell division and elongation, leading to abnormal growth and destruction. Weeds show initial symptoms, including drooping leaves and epinasty, within 24 hours of application. Additional stages of weed deterioration include chlorosis, necrosis, leaf and stem malformation and growth inhibition. Death and desiccation typically occur in three to five weeks.

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Look for signs of leaf curling, stem twisting, leaf wrinkling, stunting and color change.

Synthetic auxins like 2,4-D choline are absorbed in the leaves but need time to travel through the plant.

Glyphosate is absorbed in plant leaves but must travel through a weed's sap stream until it reaches the plant roots where it blocks nutrient uptake.





Additionally, glufosinate is often used in conjunction with Enlist One to provide a second mode of action. The two herbicides can be tank-mixed. Glufosinate is a group 10 herbicide that acts by preventing glutamine synthetase or disrupting the formation of the amino acid glutamine. The interruption causes a buildup of phytotoxic ammonia in plants, which damages cell membranes. The herbicide can be used to help control broadleaf and grassy weeds. Initial symptoms of effective application include necrosis of leaves and shoots and may take two to four days to be visible.

Enlist Duo has two active ingredients, 2,4-D choline and glyphosate, which provide a group 4 growth regulator or synthetic auxin and a group 9 glycine herbicide or EPSP synthase inhibitor. **This means that when weeds are sprayed with Enlist Duo, they take damage multiple ways:**

- **First**, 2,4-D is a synthetic auxin, and the same active ingredient present in Enlist One, making the herbicide's mode of action the same for this stage.
- **Second**, glyphosate is a growth rate inhibitor. It prevents the EPSP enzyme plants use for protein synthesis from functioning and thereby restricts plant growth. Once applied, it's absorbed by the plant leaves and stems producing stunted growth, color change, leaf wrinkling or malformation and tissue death as the weed starves.
- **Overall**, once weeds have been sprayed with Enlist Duo, the herbicide must move from the foliage to the roots. Visible effects include stem curvature and leaf twisting, followed by wilting and color change as the plant turns yellow, then brown and underground plant parts deteriorate. Physical effects from herbicide application can be seen within two to four days post application because the herbicide needs time to travel within the weed.



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