

Rotate Herbicide Modes of Action



Herbicide resistance is the inherited ability of a weed to survive a rate of herbicide which would normally give effective control. With a better understanding of herbicide resistance, you can implement a series of practices to proactively manage weed populations and avoid its onset.

MANAGE

DIVERSIFY

IMPLEMENT

Diversify modes of action to reduce the risk of herbicide resistance

The **mode of action** (MOA) is the way in which the herbicide controls susceptible plants. Over-reliance on a single herbicide MOA places heavy selection pressure on a weed population and may eventually result in the evolution of resistant weeds. Over time, the resistant weeds may multiply and become dominant in the field, resulting in herbicides that are no longer effective.

Alternating herbicides with different MOAs in season, and in successive seasons, helps:

- Prevent over-reliance on key cereal herbicides
- Delay the onset of herbicide resistance
- Target specific weeds

“Understanding which mode of action is being utilized can help when planning a herbicide program. Changing the mode of action will ensure the weed is attacked in different ways.”

— Kirk Howatt,
Weed Scientist at North Dakota State University

Herbicide performance is impacted by many factors including correct application timing; the use of full labeled rates; proper use of adjuvants and effective spray application. But what if you’ve done everything right, and weeds are still taking over your fields?

This lack of control might mean that you are facing a herbicide resistance issue.

Herbicide MOAs are classified by group number

Although Groups 1 and 2 are the most common MOAs in cereal grass herbicides, there are several others that make for a diverse rotation program.

Group 1 wheat herbicides, or ACCase (Acetyl coenzyme A carboxylase) inhibitors, kill grass weeds.

Group 2 wheat herbicides, or ALS (acetolactate synthase) inhibitors starve grass and broadleaf weeds of key amino acids needed for plant growth, leading to eventual death.

Group 4 wheat herbicides, or synthetic auxins, are generally selective for broadleaf control in grass crops; however, there are some uses for preplant and in-season weed control in broadleaf crops.

DEFINITION

Mode of Action is the overall manner in which a herbicide affects a plant at the tissue or cellular level.

▶ Syngenta recommends controlling weeds by making an effective herbicide application. Our robust portfolio of cereal herbicides offers growers multiple grass, broadleaf and cross-spectrum options with varying MOAs.



- **Group 1** (ACCCase-inhibitor) grass herbicide for legendary control of mixed grass weeds
- Wide application window and 30-minute rainfastness manages weather delays and reduces risk of weed infestation
- Tank-mix flexibility to target the weed spectrum prescriptively on a field by field basis



- **Group 1** (ACCCase-inhibitor) grass herbicide delivers proven performance against a number of critical grass weeds
- Superior crop safety; tank-mix flexibility
- Allows more than 50 herbicide tank-mix options for one-pass weed control



- **Group 2** (ALS-inhibitor) cross-spectrum herbicide for control of ACCCase-resistant wild oat and green foxtail
- Grass and broadleaf weed control with tank-mix flexibility
- Wide application window allows for early-season protection with extended residual



- **Group 1** (ACCCase-inhibitor) grass herbicide and **Group 4** (synthetic auxin) broadleaf herbicide, to provide superior mixed-grass and leading kochia control in wheat and barley
- Helps produce weed-free fields for strong start
- Offers tank-mix and rotational crop flexibility



- **Group 2** (ALS-inhibitor) cross-spectrum herbicide controls many broadleaf weeds and suppresses some grass weeds (see label for full list)
- Provides excellent residual control
- Wide application window in both wheat and barley



- **Group 2** (ALS-inhibitor) and **Group 4** (synthetic auxin) broadleaf herbicide delivers quick, season-long control of more than 70 broadleaf weeds
- Fast knockdown while controlling weeds all season long
- Tank-mix flexibility



- **Group 2** (ALS-inhibitor) broadleaf herbicide offers a unique combination of both powerful, lasting broadleaf weed control and excellent crop safety
- Wide application window and tank-mix flexibility
- Apply after small grain harvest to keep fields free of weeds for the next crop



- **Group 2** (ALS-inhibitor) and **Group 4** (synthetic auxin) broadleaf herbicide is highly effective against yield-robbing broadleaf weeds
- Single use rate keeps weed control simple; superior rotational crop flexibility
- Moves systemically within the weed to deliver rapid weed control



- **Group 4** (synthetic auxin) broadleaf herbicide eliminates many of your most destructive broadleaf weeds including ALS-resistant kochia
- Reliable alternative to ALS-inhibitor herbicides
- Flexible tank-mix options for efficient, one-pass weed, disease and/or insect control