

W1947 (Revised January 2026)

# North Dakota Herbicide Chart

Repeated use of herbicides with the same site of action alone can result in the development of herbicide-resistant weed populations.

## By Mode of Action (effect on plant growth)

This chart groups herbicides by their modes of action to assist you in selecting 1) to maintain greater diversity in herbicide use and 2) to rotate among herbicides with different sites of action to delay the development of herbicide resistance.

The Site of Action Group is a classification system developed by the Weed Science Society of America and Herbicide

|                                  | Site of Action Group | Site of Action                                                                | Number of resistant weed species in U.S. | Chemical Family                   | Active Ingredient                                                                                                                                                               | Product Examples Trade Name ®                                                                                                                               |
|----------------------------------|----------------------|-------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lipid Synthesis Inhibitors       | 1                    | ACCase Inhibitors (acetyl CoA carboxylase)                                    | 14                                       | Aryloxyphenoxy propionate "Fop"   | clodinafop-propargyl<br>fenoxaprop-ethyl<br>fluzafop-butyl<br>quizalofop-ethyl                                                                                                  | Discover NG<br>Tacoma, others<br>Fusilade DX<br>Assure II, Targa, others                                                                                    |
|                                  |                      |                                                                               |                                          | Cyclohexanedione "Dim"            | clethodim<br>sethoxydim                                                                                                                                                         | Select Max, Arrow, others<br>Poast, others                                                                                                                  |
|                                  |                      |                                                                               |                                          | Phenylpyrazolin "Den"             | pinoxaden                                                                                                                                                                       | Axial XL                                                                                                                                                    |
| Amino Acid Synthesis Inhibitors  | 2                    | ALS Inhibitors (acetolactate synthase)                                        | 53                                       | Imidazolinone "Imi"               | imazamox<br>imazapic<br>imazethapyr                                                                                                                                             | Beyond Xtra<br>Plateau<br>Pursuit                                                                                                                           |
|                                  |                      |                                                                               |                                          | Sulfonylurea "SU"                 | halosulfuron-methyl<br>mesosulfuron-methyl<br>metsulfuron-methyl<br>nicosulfuron<br>rimsulfuron<br>sulfosulfuron<br>thifensulfuron-methyl<br>tribenuron-methyl<br>triflusaluron | Permit, Sandea, others<br>Osprey<br>Ally, Escort, others<br>Accent Q<br>Matrix, Resolve, others<br>Outrider<br>Harmony, others<br>Express, others<br>UpBeet |
|                                  |                      |                                                                               |                                          | Triazolopyrimidine - type 1 "TPS" | cloransulam-methyl<br>florasulam<br>flumetsulam                                                                                                                                 | FirstRate<br>component of several<br>Python                                                                                                                 |
|                                  |                      |                                                                               |                                          | Triazolopyrimidine - type 2 "TPS" | pyroxsulam                                                                                                                                                                      | PowerFlex HL                                                                                                                                                |
|                                  |                      |                                                                               |                                          | Triazolinones "SACT"              | flucarbazone-Na<br>propoxycarbazone-Na<br>thiencarbazone-methyl                                                                                                                 | Everest 3.0, others<br>Olympus<br>Varro                                                                                                                     |
| Auxin Mimics (Growth Regulators) | 4                    | Synthetic Auxins TIR1, AFB1-5, and Unkown auxin receptor                      | 11                                       | Benzoate                          | dicamba                                                                                                                                                                         | Banvel, Clarity, others                                                                                                                                     |
|                                  |                      |                                                                               |                                          | Phenoxy-carboxylate               | 2,4-D<br>MCPA                                                                                                                                                                   | 2,4-D, Enlist One, others<br>MCPA, others                                                                                                                   |
|                                  |                      |                                                                               |                                          | 6-Chloropicolinate                | clopyralid                                                                                                                                                                      | Stinger, others                                                                                                                                             |
|                                  |                      |                                                                               |                                          | 6-Arylpicolinate                  | halauxifen-methyl                                                                                                                                                               | Elevore                                                                                                                                                     |
|                                  |                      |                                                                               |                                          | Pyridyloxy-carboxylate            | fluroxypyr                                                                                                                                                                      | Starane, others                                                                                                                                             |
| Photosynthesis Inhibitors        | 5                    | Photosystem II Inhibitors D1 Serine 264 binders and non-histidine 215 binders | 28                                       | Aryl carboxylate                  | diflufenzopyr                                                                                                                                                                   | component of Status                                                                                                                                         |
|                                  |                      |                                                                               |                                          | Phenyl-carbamate                  | phenmedipham                                                                                                                                                                    | Spin-Aid                                                                                                                                                    |
|                                  |                      |                                                                               |                                          | Triazine                          | atrazine                                                                                                                                                                        | AAtrex, others                                                                                                                                              |
|                                  |                      |                                                                               |                                          | Triazinone                        | metribuzin                                                                                                                                                                      | Metribuzin, others                                                                                                                                          |
|                                  |                      |                                                                               |                                          | Ureas                             | linuron                                                                                                                                                                         | Lorox, others                                                                                                                                               |
| Nitrogen Metabolism Inhibitor    | 6                    | Photosystem II Inhibitors D1 Histidine 215 binders                            | 1                                        | Benzothiadiazole                  | bentazon                                                                                                                                                                        | Basagran, others                                                                                                                                            |
|                                  |                      |                                                                               |                                          | Nitrile                           | bromoxynil                                                                                                                                                                      | Maestro, others                                                                                                                                             |
|                                  |                      |                                                                               |                                          | Phenyl pyridazine                 | pyridate                                                                                                                                                                        | Tough                                                                                                                                                       |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
| Pigment Inhibitors               | 10                   | Glutamine Synthetase Inhibitor                                                | 3                                        | Phosphinic acid                   | glufosinate<br>glufosinate-P                                                                                                                                                    | Liberty 280, others<br>Liberty Ultra                                                                                                                        |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
|                                  | 13                   | DXP Synthase Inhibitor                                                        | 2                                        |                                   | clomazone                                                                                                                                                                       | Command                                                                                                                                                     |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
|                                  | 27                   | HPPD Inhibitors                                                               | 3                                        | Isoxazole                         | isoxaflutole                                                                                                                                                                    | Balance Flexx                                                                                                                                               |
|                                  |                      |                                                                               |                                          | Pyrazole                          | pyrasulfotole<br>topramezone<br>tolpyralate                                                                                                                                     | component of Huskie<br>Armezon, Impact<br>Shieldex                                                                                                          |
|                                  |                      |                                                                               |                                          | Triketone                         | bicyclopyrone<br>mesotrione<br>tembotrione                                                                                                                                      | Optogen<br>Callisto, others<br>Laudis                                                                                                                       |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
| Cell Membrane Disrupters         | 14                   | PPO Inhibitors                                                                | 7                                        | Diphenyl ether                    | acifluorfen<br>fomesafen<br>lactofen                                                                                                                                            | Ultra Blazer<br>Flexstar, Reflex, others<br>Cobra, Phoenix                                                                                                  |
|                                  |                      |                                                                               |                                          | N-phenyl-imide                    | flumiclorac-pentyl<br>flumioxazin<br>fluthiacet-methyl<br>saflufenacil<br>tiafenacil                                                                                            | Resource<br>Valor EZ<br>Cadet<br>Sharpen<br>Reviton                                                                                                         |
|                                  |                      |                                                                               |                                          | Phenylpyrazole                    | pyraflufen-ethyl                                                                                                                                                                | ET, Venue, Vida                                                                                                                                             |
|                                  |                      |                                                                               |                                          | N-Phenyl triazolinone             | carfentrazone<br>sulfentrazone                                                                                                                                                  | Aim<br>Spartan, others                                                                                                                                      |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
| Seedling Root Growth Inhibitors  | 3                    | Microtubule Assembly Inhibitors                                               | 6                                        | Dinitroaniline "DNA"              | ethalfuralin<br>pendimethalin<br>trifluralin                                                                                                                                    | Sonalan<br>Prowl H <sub>2</sub> O, others<br>Treflan, others                                                                                                |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
|                                  |                      |                                                                               |                                          |                                   |                                                                                                                                                                                 |                                                                                                                                                             |
| Seedling Shoot Growth Inhibitors | 15                   | Very Long-Chain Fatty Acid Synthesis Inhibitor                                | 8                                        | α-Chloroacetamide                 | acetochlor<br>dimethenamid-P<br>S-metolachlor                                                                                                                                   | Harness, Surpass, others<br>Outlook<br>Dual Magnum, others                                                                                                  |
|                                  |                      |                                                                               |                                          | Benzofuran                        | ethofumesate                                                                                                                                                                    | Norton, others                                                                                                                                              |
|                                  |                      |                                                                               |                                          | Isoxazoline                       | pyroxasulfone                                                                                                                                                                   | Zidua SC                                                                                                                                                    |
|                                  |                      |                                                                               |                                          | α-Oxyacetamide                    | flufenacet                                                                                                                                                                      | -                                                                                                                                                           |
|                                  |                      |                                                                               |                                          | Thiocarbamate                     | cycloate<br>EPTC<br>triallate                                                                                                                                                   | Ro-Neet<br>Eptam, others<br>Far-Go, Avadex                                                                                                                  |
| COLD HARD STEEL                  | 99                   |                                                                               | 0                                        |                                   |                                                                                                                                                                                 | Cultivator, Plow, others                                                                                                                                    |

\* indicates product is not registered for use at the time of printing. Check for a label and MSDS at [www.cdms.net](http://www.cdms.net) to confirm status.

This chart lists herbicides alphabetically by their trade names so you can identify the premix's component herbicides and their respective site of action groups. Refer to the Mode of Action chart on the left for more information.

|                                     |                 | Component           |  | Site of Action Group |
|-------------------------------------|-----------------|---------------------|--|----------------------|
| Premix Trade Name ®                 | Trade Name ®    | Active Ingredient   |  |                      |
| Acuron                              | AAtrex          | atrazine            |  | 5                    |
|                                     | Callisto        | mesotrione          |  | 27                   |
|                                     | Dual II Magnum  | S-metolachlor       |  | 15                   |
| Acuron Flexi                        | Optogen         | bicyclopyrone       |  | 27                   |
|                                     | Callisto        | mesotrione          |  | 27                   |
|                                     | Dual II Magnum  | S-metolachlor       |  | 15                   |
| Acuron GT                           | Optogen         | bicyclopyrone       |  | 27                   |
|                                     | Callisto        | mesotrione          |  | 27                   |
|                                     | Dual II Magnum  | S-metolachlor       |  | 15                   |
|                                     | Roundup         | glyphosate          |  | 9                    |
| Afforia                             | Optogen         | bicyclopyrone       |  | 27                   |
|                                     | Harmony Express | thifensulfuron      |  | 2                    |
|                                     | Valor           | tribenuron          |  | 2                    |
| Anthem Flex                         | flumioxazin     |                     |  | 14                   |
|                                     | Aim             | carfentrazone-ethyl |  | 15                   |
|                                     | Zidua           | pyroxasulfone       |  | 15                   |
| Armezon Pro                         | Outlook         | dimethenamid-P      |  | 15                   |
|                                     | Armezon         | topramezone         |  | 27                   |
| Authority Assist                    | Pursuit         | imazethapyr         |  | 2                    |
|                                     | Spartan         | sulfentrazone       |  | 14                   |
|                                     | FirstRate       | cloransulam         |  | 2                    |
| Authority First or Sonic            | Spartan         | sulfentrazone       |  | 14                   |
|                                     | Spartan         | sulfentrazone       |  | 14                   |
| Authority Supreme or Authority Edge | Zidua           | pyroxasulfone       |  | 15                   |
|                                     | Spartan         | sulfentrazone       |  | 14                   |
| Axial Bold                          | Tacoma          | fenoxaprop-P ethyl  |  | 1                    |
|                                     | Axial XL        | pinoxaden           |  | 1                    |
| Axial Star                          | Tacoma          | fenoxaprop-P ethyl  |  | 1                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| Batalium Amped                      | Maestro         | bromoxynil          |  | 6                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
|                                     | Everest         | flucarbazone        |  | 2                    |
| Boundary                            | Metribuzin      | metribuzin          |  | 5                    |
|                                     | Dual Magnum     | S-metolachlor       |  | 15                   |
| BroadAxe XC                         | Spartan         | sulfentrazone       |  | 14                   |
|                                     | Dual Magnum     | S-metolachlor       |  | 15                   |
| Bronate                             | Maestro         | bromoxynil          |  | 6                    |
|                                     | MCPA            | MCPA                |  | 4                    |
| Capreno                             | Varro           | thiencarbazone      |  | 2                    |
|                                     | Laudis          | tembotrione         |  | 27                   |
| Carnivore                           | MCPA            | MCPA                |  | 4                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| Colt + Salvo                        | Maestro         | bromoxynil          |  | 6                    |
|                                     | 2,4-D           | 2,4-D               |  | 4                    |
| Colt + Sword                        | Starane         | fluroxypyr          |  | 4                    |
|                                     | MCPA            | MCPA                |  | 4                    |
| Corvus                              | Starane         | fluroxypyr          |  | 4                    |
|                                     | Varro           | thiencarbazone      |  | 2                    |
| DiFlexx Duo                         | Balance Flexx   | isoxaflutole        |  | 27                   |
|                                     | DiFlexx         | dicamba             |  | 4                    |
| Fierce EZ                           | Laudis          | tembotrione         |  | 27                   |
|                                     | Valor           | flumioxazin         |  | 14                   |
| Fierce MTZ or Pro                   | Zidua           | pyroxasulfone       |  | 15                   |
|                                     | Valor           | flumioxazin         |  | 14                   |
| Flexstar GT                         | Kyber           | pyroxasulfone       |  | 15                   |
|                                     | Metribuzin      | metribuzin          |  | 5                    |
| Halex GT                            | Roundup         | glyphosate          |  | 9                    |
|                                     | Flexstar        | fomesafen           |  | 14                   |
| Harness Max                         | Roundup         | glyphosate          |  | 9                    |
|                                     | Dual II Magnum  | S-metolachlor       |  | 15                   |
| Huskie                              | Callisto        | mesotrione          |  | 27                   |
|                                     | Maestro         | acetochlor          |  | 15                   |
| Huskie Complete                     | -----           | bromoxynil          |  | 6                    |
|                                     | -----           | pyrasulfotole       |  | 27                   |
| Huskie FX                           | Starane         | fluroxypyr          |  | 4                    |
|                                     | Maestro         | bromoxynil          |  | 6                    |
| Impact CORE                         | -----           | pyrasulfotole       |  | 27                   |
|                                     | Harness Impact  | acetochlor          |  | 15                   |
| ImpactZ                             | Impact          | topramezone         |  | 27                   |
|                                     | AAtrex          | atrazine            |  | 5                    |
| Irongate                            | Impact          | topramezone         |  | 27                   |
|                                     | Everest         | flucarbazone        |  | 2                    |
| Katagon                             | PowerFlex       | pyroxsulam          |  | 2                    |
|                                     | Accent Q        | nicosulfuron        |  | 2                    |
| Keystone NXT or Keystone LA NXT     | Shieldex        | tolpyralate         |  | 27                   |
|                                     | Surpass NXT     | acetochlor          |  | 15                   |
| Kochiavore                          | AAtrex          | atrazine            |  | 5                    |
|                                     | 2,4-D           | 2,4-D               |  | 4                    |
| Kyro                                | Starane         | fluroxypyr          |  | 4                    |
|                                     | Maestro         | bromoxynil          |  | 6                    |
| Maverick                            | Surpass NXT     | acetochlor          |  | 15                   |
|                                     | Impact          | topramezone         |  | 27                   |
| OpenSky                             | Stinger         | clopyralid          |  | 4                    |
|                                     | Zidua           | pyroxasulfone       |  | 15                   |
| Panoflex                            | Callisto        | mesotrione          |  | 27                   |
|                                     | Stinger         | clopyralid          |  | 4                    |
| PerfectMatch                        | Powerflex       | pyroxsulam          |  | 2                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| Pereptuo                            | Stinger         | clopyralid          |  | 4                    |
|                                     | Resource        | flumiclorac         |  | 14                   |
| Pixxaro EC                          | Zidua           | pyroxasulfone       |  | 15                   |
|                                     | Elevore         | halauxifen-methyl   |  | 4                    |
| Prefix                              | Starane         | fluroxypyr          |  | 4                    |
|                                     | Flexstar        | fomesafen           |  | 14                   |
| Preview 2.1 or Sonic Boom           | Dual Magnum     | S-metolachlor       |  | 15                   |
|                                     | Metribuzin      | metribuzin          |  | 5                    |
| Quelex                              | Spartan         | sulfentrazone       |  | 14                   |
|                                     | -----           | florasulam          |  | 2                    |
| Resicore REV                        | -----           | halauxifen-methyl   |  | 4                    |
|                                     | Surpass NXT     | acetochlor          |  | 15                   |
| Revulin Q                           | Callisto        | mesotrione          |  | 27                   |
|                                     | Stinger         | clopyralid          |  | 4                    |
| Rezuvant                            | Accent Q        | nicosulfuron        |  | 2                    |
|                                     | Callisto        | mesotrione          |  | 27                   |
| Sentralias                          | Elevore         | halauxifen-methyl   |  | 4                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| Sequence                            | Axial XL        | pinoxaden           |  | 1                    |
|                                     | Harmony         | thifensulfuron      |  | 2                    |
| Sinate                              | Starane         | fluroxypyr          |  | 4                    |
|                                     | Dual Magnum     | S-metolachlor       |  | 15                   |
| Spartan Charge                      | Roundup         | glyphosate          |  | 9                    |
|                                     | Liberty         | glufosinate         |  | 10                   |
| Starane Flex                        | Impact          | topramezone         |  | 27                   |
|                                     | Spartan         | sulfentrazone       |  | 14                   |
| Starane NXT                         | Aim             | carfentrazone       |  | 14                   |
|                                     | -----           | florasulam          |  | 2                    |
| Status                              | Starane         | fluroxypyr          |  | 4                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| Storen                              | Maestro         | bromoxynil          |  | 6                    |
|                                     | Clarify         | dicamba             |  | 4                    |
| Supremacy                           | -----           | diffufenzopyr       |  | 19                   |
|                                     | Dual II Magnum  | S-metolachlor       |  | 15                   |
| SureStart II or TripleFlex II       | Callisto        | mesotrione          |  | 27                   |
|                                     | Zidua           | pyroxasulfone       |  | 15                   |
| Surtain                             | Optogen         | bicyclopyrone       |  | 27                   |
|                                     | Harmony         | thifensulfuron      |  | 2                    |
| Surveil                             | Express         | tribenuron          |  | 2                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| Talinor                             | Python          | flumetsulam         |  | 2                    |
|                                     | Stinger         | clopyralid          |  | 4                    |
| Tendovo                             | Surpass NXT     | acetochlor          |  | 15                   |
|                                     | Sharpen         | saflufenacil        |  | 14                   |
| TriVolt                             | Zidua           | pyroxasulfone       |  | 15                   |
|                                     | FirstRate       | cloransulam         |  | 2                    |
| Tolvera                             | Valor           | flumioxazin         |  | 14                   |
|                                     | Maestro         | bromoxynil          |  | 6                    |
| TriVolt                             | Optogen         | bicyclopyrone       |  | 27                   |
|                                     | Metribuzin      | metribuzin          |  | 5                    |
| Verdict                             | Dual Magnum     | S-metolachlor       |  | 15                   |
|                                     | FirstRate       | cloransulam         |  | 2                    |
| Vios FX                             | Maestro         | bromoxynil          |  | 6                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| Weld                                | MCPA            | MCPA                |  | 4                    |
|                                     | Starane         | fluroxypyr          |  | 4                    |
| WideMatch                           | Stinger         | clopyralid          |  | 4                    |
|                                     | Stinger         | clopyralid          |  | 4                    |
| WideARMatch                         | Starane         | fluroxypyr          |  | 4                    |
|                                     | Elevore         | halauxifen-methyl   |  | 4                    |
| Wolverine Advanced                  | Starane         | fluroxypyr          |  | 4                    |
|                                     | Stinger         | clopyralid          |  | 4                    |
| Zalo                                | Tacoma          | fenoxaprop-P        |  | 1                    |
|                                     | -----           | pyrasulfotole       |  | 27                   |
| Zidua Pro                           | Maestro         | bromoxynil          |  | 6                    |
|                                     | Liberty         | glufosinate         |  | 10                   |
|                                     | Assure          | quizalofop          |  | 1                    |
|                                     | Zidua           | pyroxasulfone       |  | 15                   |
|                                     | Sharpen         | saflufenacil        |  | 14                   |
|                                     | Pursuit         | imazethapyr         |  | 2                    |