| GROUP | 2 | HERBICIDE |
|---|---|---|

## High resistance risk

Globally, herbicide resistance to the Group 2 herbicide mode of action has been confirmed and documented in more than 170 grass and broadleaf weed species across more than 40 countries. Resistance to Group 2 is extensive and prolific, with tens of millions of hectares affected, in fact it is the most likely herbicide mode of action to develop resistance.

Group 2 resistance exists in Australia in 28 species (10 grasses) including more than 30,000 populations of annual ryegrass, more than 200 populations of barley grass, brome grass, more than 200 populations of wild oats, paradoxa grass and crabgrass and in at least seventeen broadleaf weeds including more than 5,000 populations of wild radish, common sowthistle, black bindweed, charlock, more than 2000 populations of prickly lettuce, more than 1,000 populations of Indian hedge mustard, Mediterranean (wild) turnip and turnip weed. Resistance has developed in broadacre, golf courses, horticulture, rice and pasture situations. In respect to rice, there are Group 2 resistant populations to three broadleaf weeds, namely dirty Dora, arrowhead and starfruit.

Research has shown that as few as four applications to the same population of annual ryegrass can result in the selection of resistant individuals and as few as six applications for wild radish. A population can go from an apparently small number of resistant individuals to a whole paddock failure in one season.



A significant challenge facing growers managing Group 2 resistance is the control of brome grass and barley grass in winter cereal crops. Group 2 herbicides are presently the post emergent herbicides that provide effective control of these grass weeds and this poses a severe risk of Group 2 resistance for growers with cereal dominant rotations.

If a pre-emergent application is made with a Group 2 herbicide for broadleaf or grass weed control, monitor results and, if required, apply a follow up spray, preferably with a non-Group 2 herbicide, for control of escapes and to avoid weed seed set. If a follow up Group 2 (post-emergent herbicide) is applied, ensure that complete weed seed set control is achieved.

Whether using Group 2 herbicides as a pre-emergent or post-emergent application, consider the use of registered tank mixes with herbicides from other modes of action.

When using a Group 2 herbicide for post-emergent broadleaf or grass weed control, ideally this should be preceded by an effective pre-emergent herbicide treatment with other mode of action.

1. Avoid applying more than two# Group 2 herbicide treatments in any four year period on the same paddock. Where more than two treatments are applied introduce alternative control measures to avoid seed set and seed shed in the paddock.

2. A Group 2 herbicide may be used alone on flowering wild radish only if a Group 2 herbicide has not been previously used on that crop.
3. All cases if there are significant escapes following the herbicide application consider using another herbicide with a different mode of action or another control method to stop seed set.
4. Imidazolinone tolerant crops where Intervix® is used refer to the Clearfield® Production Systems – best management practice guide. If Sentry® or Intercept® is to be used consult the Nufarm Best Management Practices Guide.

The above recommendations should be incorporated into an Integrated Weed Management (IWM) program. In all cases, try to ensure surviving weeds from any treatment do not set and shed viable seed. Keep to integrated strategies mentioned in this brochure including cultural weed control techniques to reduce the weed seedbank. Make sure you mix and rotate herbicides from different mode of action groups. Always consult the product label prior to use.

[#] where there are multiple applications of a Group 2 herbicide to the same plants, with none of these applications to new generations of plants (of the same species), this may be viewed as the same as a single application of the Group 2 herbicide with respect to selection for Group 2 resistant plants. This is sometimes the case in turf where Group 2 herbicides are applied for the control of perennial grasses like kikuyu, paspalum or bahia grass, in a program of 2 to 3 applications in close intervals (to the same plants).



| Chemical family | Active constituent (first registered trade name) |
|---|---|
| **GROUP 2<br>Inhibition of acetolactate synthase (ALS inhibitors), acetohydroxyacid synthase (AHAS)** | |
| Imidazolinones (IMIs) | imazamox (Intervix®*, Raptor®), imazapic (Bobcat I-Maxx®*, Flame®, Midas®*, OnDuty®*), imazapyr (Arsenal Xpress®*, Intervix®*, Lightning®*, Midas®* OnDuty®* Roundup PNG Weedkiller®)), imazethapyr (Lightning®*, Spinnaker®) |
| Pyrimidinylthiobenzoates | bispyribac (Nominee®), pyrithiobac (Staple®) |
| Sulfonylureas (SUs) | azimsulfuron (Gulliver®), bensulfuron (Londax®), chlorsulfuron (Glean®), ethoxysulfuron (Hero®), flazasulfuron (Katana®), foramsulfuron (Tribute®), halosulfuron (Sempra®), iodosulfuron (Hussar®), mesosulfuron (Atlantis®), metsulfuron (Ally®, Stinger®*, Trounce®*, Ultimate Brushweed®* Herbicide), prosulfuron (Casper®*), rimsulfuron (Titus®), sulfometuron (Oust®, Eucmix Pre Plant®*, Trimac Plus®*), sulfosulfuron (Monza®), triasulfuron (Logran®,<br>Logran® B-Power®*), tribenuron (Express®), trifloxysulfuron (Envoke®, Krismat®*) |
| Triazolopyrimidines – Type 1 | florasulam (Crest®*, Gangster®*, Paradigm®*, Saracen® Vortex®*, X-Pand®*), flumetsulam (Broadstrike®, Thistrol Gold*®), metosulam (Eclipse®) |
| Triazolopyrimidines – Type 2 | pyroxsulam (Crusader® Rexade®*) |

* *This product contains more than one active constituent.*

**Notes:**

List of chemical families, approved active constituents and, in parenthesis, the trade name of the first registered product or successor. Refer to the APVMA website (www.apvma.gov.au) to obtain a complete list of registered products from the PUBCRIS database.