

FAQs – Herbicide resistance in perennial grasses

Jo Powells
Senior Agricultural Advisor
South East Local Land Services

Perennial grass weeds such as serrated tussock (*Nassella trichotoma*) and African lovegrass (*Eragrostis curvula*) cause major agricultural and environmental impacts to landscapes across the NSW Tablelands and in some coastal regions.

Herbicide resistance has been confirmed in both species on the Southern Tablelands of NSW.

What is herbicide resistance?

Herbicide resistance is the ability of a plant to survive and reproduce after exposure to a dose of herbicide that would normally be lethal.

In a plant, resistance usually occurs through natural selection resulting from genetic mutations. These mutations mean that susceptible plants are killed while herbicide-resistant plants survive to reproduce. If the herbicide treatment is repeated, the resistant plants can successfully reproduce and become dominant in the plant population.

What resistance has been found?

Resistance to the herbicide flupropanate was first recorded in serrated tussock in Victoria in 2002. Further resistant populations were in and then across the Monaro region in 2017.

Testing across multiple sites on the Monaro identified flupropanate resistance in African lovegrass in 2020.



Figure 1: A herbicide resistant serrated tussock (on left) stands out amongst more susceptible plants in a sprayed paddock (J. Powells).

What causes herbicide resistance?

The appearance of herbicide resistance in a plant population is an example of weed evolution and typically develops when a weed species has been exposed to 10-14 years of continued application of a particular herbicide group or type.

Large weed populations increase the likelihood of resistance developing.

For example, flupropanate (a group J, Mode Of Action (MOA) herbicide) has been heavily relied upon by land managers to control vast populations of serrated tussock and African lovegrass. Plants resistant to this herbicide have survived these treatments and continued to

reproduce thus creating herbicide resistant populations of these weeds.

What's changed in these resistant plants?

Research into flupropanate resistance in serrated tussock plants has suggested that the roots of resistant plants may have different membrane structures that interfere with the absorption of the herbicide.

How can I minimise the risk of developing herbicide resistance?

Don't just rely on herbicides to manage perennial grass weeds. If using herbicides, always apply herbicides according to the label directions.

Rotation of herbicides from different Mode of Action (MOA) groups is an important way to minimise the development of herbicide resistance. For example, rotating between Group J (Flupropanate) and Group M (Glyphosate).

What other herbicides can I use?

If herbicide resistance has been confirmed in a certain Mode Of Action (MOA) group (eg/ flupropanate – Group J), other MOA herbicides need to be considered. MOA information is located on the front of every product label and examples for serrated tussock listed in table 1.

What other options can I implement to control these weeds?

It is critical that land managers adopt an integrated approach to weed management and not rely solely on one herbicide type to control perennial grass weeds.

Land managers should consider other options such as mechanical control (such as chipping and cultivation), cropping, pasture renovation and grazing management techniques.

Herbicide use should always be strategic and applied at the most appropriate time and stage of plant growth. Keeping good spray records for every paddock can also be helpful when trying to later identify possible herbicide resistance.

Always monitor sprayed areas and follow up control (eg/ chip out) any re-growing plants that have survived. Always apply herbicides according to label directions.

Table 1: Herbicides registered for use to control serrated tussock in NSW (APVMA Permit 9792, <http://permits.apvma.gov.au/PER9792.PDF>).

Herbicide (active ingredient)	Mode of Action Group	Product Examples
Flupropanate	J	Taskforce, Tussock,
Glyphosate	M	Roundup
Haloxypop	A	Verdict
Imazamox	B	Raptor
Imazethapyr	B	Spinnaker

Further information

Recognising, managing and preventing herbicide resistance in serrated tussock

(<https://www.dpi.nsw.gov.au/biosecurity/weeds/weed-control/herbicides/recognising-managing>)

Integrated Weed Management – NSW DPI

(<https://www.dpi.nsw.gov.au/biosecurity/weeds/weed-control/general-management/integrated-weed-management>)

Acknowledgments:

NSW Department of Primary Industries, Agriculture Victoria.