

Semi-selective herbicide use in nursery weed control[©]

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SEMI-SELECTIVE HERBICIDE USE

Definition

The use of non-selective knockdowns at ultra-low concentrations to control weeds and to avoid off-target damage in bushland and nursery situations. This presentation is our introduction of this concept to nursery weed control.

Background

A considerable body of science in the use of semi-selective herbicide use has been developed by scientists and practitioners in Western Australia to combat particular environmental weeds in quality bushland.

The intention has been to find effective weed controls using herbicides without off-target damage. This work over many years has led to the development of very successful techniques which may have application to nursery weed control.

Products

The following are some of the knockdown herbicides that are currently being used in semi selective mode with Western Australia bushland; these are permitted for off label uses in Western Australia.

- Metsulphuron (Brush Off[®]) Du Pont
- Triasulfuron (Logran[®]) Syngenta
- Clopyralid (Lontrel[®]) Dow Agrosiences
- Halosulfuron (Sempra[®]) Nufarm
- Haloxyfop (Verdict[™]) Dow Agrosiences

New Zealand studies

I could find only one reference to herbicide use in semi-selective mode – Metsulphuron for use on Onehunga weed (*Soliva sessilis*) control on golf courses (Massey University, 2014).

New Zealand herbicide brand name match:

- Metsulphuron: Associate[®] 600 WDG (Nufarm), Agpro Meturon[®] (Agpro), Eradicate 600 (Ravensdown), Escort[®] (E. I. du Pont de Nemours), Matrix[™] (Orion Crop Protection), Mustang[®] (Orion Crop Protection).
- Triasulfuron: Titan (Genfarm).
- Clopyralid: Versatill[™] (Dow Agro Sciences).
- Halosulfuron: EnviroMax[®] (Nufarm).
- Haloxyfop: Hurricane[®] (Orion Crop Protection), Ignite[™] (Zelam).

Overview of trials

- Determine if control could be achieved without off target damage.
- Which chemical would provide best overall results and which was best for particular weeds.
- If mortality was not achieved, was it possible to prevent weed-seed set.

Preparation and application

The following is a guide for nursery application:

- Accurate measurements by weight critical

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- Use clean filtered water
- Granular herbicides – use warm water to aid dissolution
- Waiting period for watering will apply
- Avoid spraying on warm days
- Mix in 20-L volume and dispense to smaller units
- Apply to strong plants
- Apply once, avoid double spray
- Target weeds as best possible

Trial outline

- Various application rates and mixtures were trialled on individual plants, including combinations of two herbicides given their compatibility.
- Nine species of Perth natives chosen for weed treatment
- Settled on the following:
 - Triasulphuron at rate 12 g 20 L⁻¹
 - Metsulphuron at rate 6 g 20 L⁻¹
 - A 50:50 (v/v) combo of above

Weed species targeted for control

Table 1. Weeds targeted.

Scientific name	Common name
<i>Cardamine hirsuta</i>	Flick weed
<i>Chamaesyce</i> species	Asthma weed, cats hair
<i>Gnaphalium</i> species	Cudweed
<i>Oxalis</i> species	Wood sorrels
<i>Sagina procumbens</i>	Pearlwort
<i>Marchantii polymorpha</i>	Liverwort
bryophyte	Mosses

Results for Logran

- Effects in place within 1 to 2 days for cudweed and flick weed.
- Cud weed species were heavily affected; within a week most wilted off.
- Stunted and discolouration of *Oxalis* species; weeds left in an inferior state, roots and stems still in place with leaves wilted off.
- Liverworts and sponge-like moss displayed changes by the 2nd week and treatment appeared to be effective.
- No abnormal changes in grass-like moss (pearlwort).
- Successfully achieved aims; no off-target impact.

Table 2. Effect of Logran after 1 month.

Weed	Impact
Flick weed	Decayed/rotted off/eradicated
Asthma weed	Stunted growth, yellowing of leaves
Cudweed	1 to 2 days; strong signs of wilt, decayed
Wood sorrels	Stunted growth, yellowing of leaves
Liverwort	Eradicated
Moss	Stunted growth
Pearlwort	No effect, seed set of pearlwort not affected

Results for Metsulfuron

- Changes took 2 to 3 weeks to be observed.
- Successful on flick weed and cudweed species; most wilted off completely by the end of the month.
- Similar to the effects of Logran on *Oxalis* species; roots and stems still in place.
- Successfully achieved aims.

Table 3. Effect of Metsulfuron after 1 month.

Weed	Impact
Flick weed	Stunted growth, strong signs of wilt
Asthma weed	Stunted growth, signs of rot
Cudweed	Eradicated
Wood sorrels	Stunted growth, yellowing of leaves

Results for Metsulfuron and Logran mix

- Effects take up to 3 to 4 weeks; slow to act compared to other trials.
- Cudweed did not wilt off completely within a month compared to other trials.
- Good against flick weed species; by the end of the month most had wilted off completely.
- Effective against *Oxalis* species; able to produce adverse effects on infestations.
- Possibility that Logran and Metsulfuron are working against each other.
- Aims achieved but not best option.

Table 4. Effect of Metsulfuron and Logran mix after 1 month.

Weeds	Impact
Flick weed	Stunted growth, strong signs of wilt
Asthma weed	Stunted growth, yellowing of leaves
Cudweed	Stunted growth
Wood sorrels	Stunted growth, yellowing of leaves
Pearlwort	No effect
Moss	Stunted growth

Summary of results

- Earlier stages of trials are positive.
- Trials show that Logran and Metsulfuron act better on certain weeds.
- Same mode of action, different active constituents; affect different weed species at different rates.
- Ongoing trials: Liverwort regrowth, time it takes for new weed growth after application.
- More trials to be done with different Group B Herbicide products.
- Repeat current trials for conclusive evidence.

Potential with caution

- Encouraging results.
- Impacts on succulents/herbs may be adverse.
- May be more relevant to natives and strong ornamentals.
- Suggest small scale trials with very low concentrations, and then upscale to achieve weed morbidity and assess off-target impact.

LET'S STAY IN TOUCH

- We will proceed with more trials and report via IPPS and to New Zealand.
- It's an interesting exercise/variety for staff.

- Let us know of any results from New Zealand.

Literature cited

Massey University. (2014). Onehunga weed. <http://www.massey.ac.nz/massey/learning/colleges/college-of-sciences/clinics-and-services/weeds-database/onehunga-weed.cfm>.