Aminocyclopyrachlor – a new herbicide for woody weed control

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Abstract

Aminocyclopyrachlor is a new generation herbicide which has been used in North America for woody weed control for several years. Several years of research trials in Australia have led to registration and availability of this herbicide. Details of the features and benefits of the herbicide including mode of action, application, spectrum of activity will be presented along results from a range of weed trials conducted in Australia.

Keywords: aminocyclopyrachlor, herbicide, woody weeds.

Introduction

Aminocyclopyrachlor (ACP) is a pyrimidine carboxylic acid herbicide which mimics the naturally occurring phytohormone indole acetic acid (auxin), thereby disrupting plant growth. ACP is readily absorbed by foliage and roots and translocated in the phloem throughout above-ground parts of the plant, concentrating in the areas of new growth. Typical symptoms include twisting of the leaves and stems, which can become apparent in a matter of hours. This abnormal growth will cause the plant to die over time, with more susceptible plants dying in a matter of days.

In the CropLife Australia herbicide mode of action classification it fits in the Group 4 chemical family (Disruptors of plant cell growth (synthetic auxins)). Other active constituents belonging in the same group include aminopyralid, clopyralid, picloram and fluroxypyr. ACP can show more activity than some of the other active constituents (Sperry, 2020).

ACP is a herbicide that is highly effective on broadleaf plants and woody vegetation and releases grasses like the other herbicides in this group (Carter, 2018). The trade name of the herbicide is Method® 240 SL Herbicide, which is a 240 g/L soluble concentrate (SL) formulation.

Discussion

ACP Herbicide

The use pattern of ACP in Australia is the same as in other countries, as a herbicide for vegetation management in native conservation areas, pastoral grazing land, industrial sites such as railways, roadways, fence lines, and utility rights-of-way.

ACP is registered in countries including USA, Canada, Mexico, New Zealand and now Australia.

ACP can be applied as a broadcast ground application and by various individual plant treatment methods (foliar spray, basal bark, cut stump and injection). Reduced injection points with ACP can be an advantage is speeding up treatment application (Enloe, 2023).

ACP is taken up by plant foliage and roots and shows significant translocation to below ground tissue (Lindenmayer, 2012). This is valuable for the control of plants with significant underground roots systems, corms, bulbs, rhizomes etc.

The use methylated seed oil (MSO) adjuvant improves absorption and weed control (Bukun, 2010).

Combination products of ACP with other herbicides are commercially available in the USA and Canada. Research has demonstrated the effectiveness in control of some weeds in applying ACP with other herbicides (Reis, 2016). Combinations with other mode of action herbicides can also be an advantage in resistance management.

ACP has some residual activity, particularly on dicots (Sebastian *et al*, 2017). This will be an advantage in the control of germinating seeds and establishment of new plants in the period after application.

The maximum broadcast application rate of ACP is 312 g/ha per year.

Australian Trials

Australian trials have been conducted on a large range of plant species using different types of broadcast and individual plant treatment application methods to evaluate the efficacy and plant safety of Method 240 SL Herbicide alongside various industry standards as a herbicide for vegetation management.

Over 70 trials have been conducted since 2008 in Australia. Field trials were carried out in four states – Queensland (South East Queensland, Central Queensland, Far North Queensland), New South Wales, Victoria and Tasmania.

These trials have resulted in registration for the control of around 50 individual weeds as well as genera like *Eucalyptus* and *Acacia*. Some of the key species include Weeds of National Significance as shown in Table 1.

Table 1. Weeds of National Significance for which ACP is registered.

Common name	Scientific name
African boxthorn	*Lycium ferocissimum*
Asparagus fern	*Asparagus sprengeri*
Blackberry	*Rubus fruticosus*
Broom	*Cytisus scoparius*
Fireweed	*Senecio madagascariensis*
Gorse	*Ulex europaeus*
Lantana	*Lantana camara*
Mesquite	*Prosopis glandulosa x P. velutina*
Prickly acacia	*Vachellia nilotica*

A trial programme is continuing to evaluate other weeds and control methods.

ACP provides a new Group 4 herbicide option for the control of woody and other dicot weeds. It has unique features which will be an advantage with certain weeds, application techniques and situations.

Conflicts of Interest

The author is employed by 2022 Environmental Science Au Pty Ltd who commercialise Method herbicide.

References

Bukun, B., Lindenmayer, R., Nissen, S., Westra, P., Shaner, D., & Brunk, G. (2010). Absorption and Translocation of Aminocyclopyrachlor and Aminocyclopyrachlor-Methyl Ester in Canada Thistle (*Cirsium arvense*). *Weed Science, 58*(2), 96-102. doi:10.1614/WS-09-086.1

Carter, T., & Lym, R. (2018). Native Forb Response to Aminocyclopyrachlor. *Invasive Plant Science and Management, 11*(1), 56-60. doi:10.1017/inp.2018.5

Conkin, K. (2012). Aminocyclopyrachlor: weed control, soil dissipation, and efficacy to seedling grasses. A Thesis Submitted to the Graduate Faculty of the North Dakota State University of Agriculture and Applied Science.

Enloe SF, Leary JK, Lastinger C, and Lauer DK (2023) Reduced hack and squirt treatment with aminocyclopyrachlor and aminopyralid for invasive shrub control. *Invasive Plant Sci. Manag* 16: 64–72. doi: 10.1017/inp.2023.10

Lindenmayer, R. (2012). Understanding aminocyclopyrachlor behaviour in soil and plants. Dissertation in partial fulfilment of the requirements For the Degree of Doctor of Philosophy Colorado State University Fort Collins, Colorado Spring.

Reis, F.C., Cason, J.B., Toledo, R., Sotomayor, J.F., Freitas, M.M., Filho, R. (2016). Aminocyclopyrachlor: New Option for Trumpet Flower Control in Pastures. *Planta Daninha*. 34 (4), 759-764.

Sebastian, D., Nissen, S., Sebastian, J., Meiman, P., & Beck, K. (2017). Preemergence Control of Nine Invasive Weeds with Aminocyclopyrachlor, Aminopyralid, and Indaziflam. *Invasive Plant Science and Management, 10*(1), 99-109. doi:10.1017/inp.2017.7

Sperry, B., Dias, J., Prince, C., Ferrell, J., & Sellers, B. (2020). Relative activity comparison of aminocyclopyrachlor to pyridine carboxylic acid herbicides. *Weed Technology, 34*(3), 402-407. doi:10.1017/wet.2019.129