Metazachlor (Butisan® Herbicide): new herbicide for the control of annual ryegrass (*Lolium rigidum* Gaud.) and other weeds in canola (*Brassica napus* L.) in Australia

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Introduction

Annual ryegrass (*Lolium rigidum* Gaud.) causes significant yield and quality loss in the Australian cropping systems. Butisan® is a suspension concentrated herbicide contains 500 g/L of metazachlor, a Group K chloroacetamide. The chemical acts by disruption of fatty acid syntheses (Group K) which results in a decrease in root elongation (thereby reducing availability of water) and decreased shoot growth. Butisan® enters target plants primarily through the roots, the hypocotyl, and the cotyledons of the germinating and emerging weeds. Butisan® is a pre-emergent herbicide that is applied prior to planting and incorporated by sowing (IBS) with knife point tines. Crop safety of Butisan® in canola is provided by a combination of both tolerance and physical separation of the plants and chemical in the planting furrow. Annual ryegrass has developed resistance to many pre-emergent and post-emergent herbicides including Group A (Fops and dims), Group B (imidazolinone, Sulfonylureas), Group C (Triazine), Group D (Trifluralin), Group M (Glyphosate), Group L (Paraquat) and new control options are required to manage this weed species. The development of Butisan® brings a new mode of action with crop selectivity for canola into our herbicide rotations.

Materials and Methods

The efficacy & crop safety of Butisan® was evaluated in 25 field trials conducted between 2014 and 2015 across the major canola growing regions of Australia covering a range of common varieties grown in each of the regions. Trials were conducted as randomised complete block design with 4 replicates.

Treatments were:

- Metazachlor (500 g a.i./kg) Butisan® was applied at 1.5, 1.875, 2.25 L/ha
- Trifluralin (480 g a.i./L) several commercial brands applied at 1.7 to 2 L/ha,
- Propyzamide (500 g a.i./L) Rustler applied at 1 L/ha,

The applications were made before sowing at the IBS timing. Efficacy assessments and crop safety was completed between 4 and 18 weeks after sowing (WAS) aimed to evaluate the weed control and the crop safety of Butisan®. This included visual percentage of weed control, crop establishment, phytotoxicity and biomass. Selected field trials were also harvested in order to evaluate the impact of Butisan® on canola yield.

Fig.1 Annual Ryegrass Percentage of Control at 10 to 18 Weeks after the IBS Application
(green bars are Butisan ® Target rate/orange bars are current industry standards)

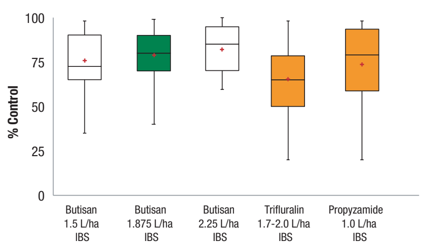

Fig.2 Wild Oat Percentage of Control at 10 to 18 Weeks after the IBS Application
(green bars are Butisan ® Target rate/orange bars are current industry standards)

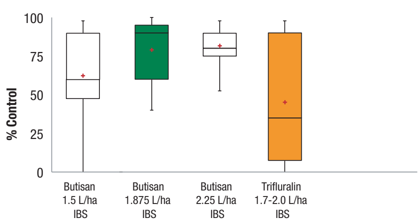

Fig 3. Physical chemistry properties of common pre-emergent herbicides
(IUPAC http://sitem.herts.ac.uk/aeru/iupac/index.h®)

Product	Group	Water Solubility (mg/L)	Adsorption coefficients Koc	Vapour Pressure mPa @ 25°C
Trifluralin	D	0.22	15800	9.5
Pyroxasulfone	K	3.5	95	0.0024
Propyzamide	D	9	840	0.03
Prosulfocarb	J	13	1860	0.79
Atrazine	C	30	100	0.0039
Metazachlor	K	450	54	0.09
Metolachlor	K	480	200	3.7

Fig 4. Butisan® Demonstration trial images
Dookie, Victoria 2016, images Melissa Palviainen BASF

Untreated Control | **Propyzamide 1.0 L/ha IBS** | **Butisan 1.8 L/ha IBS**

Results and Discussion

An ever increasing area of Australian winter cropping regions are being adversely impacted by annual ryegrass resistance. New modes of action for in crop management are required for use in canola production where options are required. Canola often follows a pulse or pasture (lay) phase which can increase the grassy weed control problems. A strong and effective control of annual ryegrass (as well as other problem weeds) in the first year of the cropping phase is essential to set up a successful "whole of rotation" weed management strategy. Figures 1 and 2 show the superior control and consistency of Butisan® relative to the current industry standards (trifluralin and propyzamide) on both annual ryegrass and wild oats. Butisan®'s physical chemistry properties (Fig.4) blend high solubility, moderate soil binding and low volatility and crop tolerance allow Butisan® to fill this need gap in Canola. A major strength of Butisan® is the ability of the molecule to move back into the furrow following the "IBS throw". Greater control on the furrow walls and in the bottom of the furrow relative to propyzamide can be seen both in Fig 1 and Fig 4.

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