

# Angel medic tolerates sulfonylurea herbicide residues in south western NSW.

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## Introduction

Sulfonylurea (SU) herbicides such as triasulfuron (eg Logran<sup>®</sup>), chlorsulfuron and metsulfuron-methyl are used extensively in the cereal-livestock zones of temperate Australia. They are regarded by farmers as effective, cheap and safe-to-apply herbicides with useful levels of residual activity in the year of application. However these residues can persist into following years, particularly in areas with alkaline soils and low rainfall, where their breakdown by microbial action and chemical hydrolysis is significantly reduced. Regenerating pasture legumes such as annual *Medicago* spp. can be intolerant of even very low residues of SU herbicides, resulting in stunting, reduced dry matter production, lower seed yields, poor persistence and decreased N fixation.

The SARDI Pastures Group and Adelaide University have developed a mutant strand medic (Angel<sup>®</sup>, *Medicago littoralis*) with greatly improved tolerance to SU herbicide residues. An evaluation trial was sown to compare the performance of Angel medic with six other annual medic cultivars in the presence of triasulfuron residues in far southwestern NSW.

## Materials and Methods

The evaluation was sown at Kerribee Station, NSW (approximately 30 km east of Mildura, Victoria); average annual rainfall, 268 mm. Soil at the site is a Belah red loamy sand, pH 7.6 (top 10 cm).

One month prior to planting, triasulfuron was applied in strips at four rates (0, 1.5, 3 and 6 g/product/ha which equates to 0, 5, 10 and 20% full label rate) in an attempt to simulate a range of residues that might be experienced by regenerating pastures after application in the cropping phase of a cereal/pasture rotation. Seven annual medic cultivars representing four species (Angel<sup>®</sup> and Herald<sup>®</sup> strand medic (*M. littoralis*); Scimitar<sup>®</sup> and Cavalier<sup>®</sup> burr medic (*M. polymorpha*); Caliph<sup>®</sup> and Jester<sup>®</sup> barrel medic (*M. truncatula*) and Toreador<sup>®</sup> hybrid disc medic (*M. littoralis* x *tornata*)) were compared.

Following a late break of 38 mm, the medics were sown into a lightly scarified seedbed at 10 kg/ha on

the 29 June 2005, across the simulated herbicide residue strips in unreplicated plots of 6.2 m x 1.8 m. Broadstrike<sup>®</sup> (flumetsulam) was used to control broadleaf weeds and Verdict<sup>®</sup> (haloxyfop) volunteer cereals and grasses. Fertiliser was applied at 100 kg/ha of single superphosphate (8% P, 11% S).

Visual estimates of dry matter production were made at approximately 14 weeks post sowing (19 October 2005) and pod and seed yields at plant senescence.

## Results and discussion

Rainfall during the growing season from June to the end of September 2005 was 139 mm. In the presence of increasing SU residues, Angel<sup>®</sup> clearly showed its superior SU tolerance compared with the other cultivars, generally producing relatively higher dry matter, pod and seed yields (Table 1), however its pod and seed yield did decline with increasing residue levels. Scimitar<sup>®</sup> and Cavalier<sup>®</sup> burr medics appeared to be particularly sensitive to SU residues (and poorly adapted to the local environment) whereas Jester<sup>®</sup> was able to tolerate all but the highest rate. Toreador<sup>®</sup> herbage production in the untreated control plot was high, suggesting good adaptation, but declined significantly with increasing residue levels. As the parent of Angel<sup>®</sup>, Herald<sup>®</sup>'s relatively low pod and seed yield in the untreated control plot was puzzling, given its agronomic performance in the absence of SU residues would be expected to be similar to Angel<sup>®</sup>. Triasulfuron was last applied on this site in 1997 but is it possible that there is still some residual activity under certain conditions, hampering the performance of regenerating pasture legumes. It is concluded that where SU residues are used in mallee cropping systems Angel<sup>®</sup> will provide a greater level of seed and dry matter production than other currently available medic cultivars.

**Table 1** Dry matter production (kg/ha), pod yield (kg/ha) and seed yield of several annual medics under various simulated SU residual treatments at Kerribee Station NSW.

Treatment g/ha Logran	Angel <sup>b</sup>	Herald <sup>b</sup>	Toreador <sup>b</sup>	Caliph <sup>b</sup>	Jester <sup>b</sup>	Scimitar <sup>b</sup>	Cavalier <sup>b</sup>
<b>Dry matter (kg/ha)</b>							
0	1200	1200	1200	1200	1200	700	550
1.5	1200	1200	1200	1200	1200	600	400
3	1200	700	900	900	700	200	450
6	1200	600	550	600	600	200	200
<b>Pod yield (kg/ha)</b>							
0	1288	839	1229	948	1020	845	631
1.5	1085	724	944	621	951	349	164
3	973	279	483	328	1161	453	154
6	981	193	45	43	328	103	5
<b>Seed yield (kg/ha)</b>							
0	425	185	430	129	248	268	174
1.5	325	133	285	117	238	33	24
3	260	60	108	39	296	92	30
6	274	22	5	6	84	16	1

6