

Decay of pre-emergent herbicides in dry soils

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Key messages

- Results indicate that Sakura®, Boxer Gold® and TriflurX® decay slowly under dry soil and can be applied early under these conditions
- Under wet conditions decay of these herbicides was rapid and was highest under warm conditions (earlier application)
- Sakura had the slowest decay rates followed by Boxer gold and then TriflurX
- Soil type had little effect on the decay rates.
- Do not rely on pre-emergent herbicides to give you adequate control under wet conditions when sowing in April.

Aims

To determine the decay curves of pre-emergent herbicides when dry seeding wheat to develop weed management strategies when sowing early.

Method

Sakura, Boxer gold and TriflurX was sprayed onto various soil types, dates and moisture regimes over a two year period (Table one). Herbicides were applied using a hand boom at 100 L/ha using a medium droplet size. At application the herbicides were incorporated by applying a 2 -3cm layer of soil over the top of the treatments within 30 minutes of application. A bioassay was taken at time of application, and every week for 6 weeks, by scraping the top 5 cm of top soil into a plastic cup, planting 20 annual ryegrass seeds (susceptible) and watered. An assessment of efficacy was determined, as a percentage of the control, 7 to 10 days later.

Table One. Treatments

Trial Details 2014

3 soil types from Cunderdin	Heavy (Sandy Clay, Ph 6.9) Medium (sandy Loam, Ph 5.2) Light (Grey sand. Ph 4.3)
3 Herbicides:	Sakura at 118 g/Ha (Pyroxasulfone) Boxer Gold at 2.5 L/ha (Prosulfocarb plus S-Metalachlor) Triflur X at 2 L/ha (Trifluralin)
Application Date:	01/05/2014 Under Wet conditions
3 Replications	

Trial Details 2015

1 soil types from Cunderdin	Light (Grey sand. Ph 4.3)
3 Herbicides:	Sakura at 118 g/Ha (Pyroxasulfone) Boxer Gold at 2.5 L/ha (Prosulfocarb plus S-Metalachlor) Triflur X at 2 L/ha (Trifluralin)
2 Application Dates:	15/04/2015 and 29/04/2015
3 replications	
2 Moisture treatments	Natural and Covered

Results

Under relative dry conditions all herbicides persisted in the soil over the 6 week period (Figure 2) which makes them all suitable for dry seeding. There was a decline in efficacy towards the end of the experiment that could have been due to the high humidity conditions and some seeping of moisture under the covers. In previous work experiments have shown that pre-emergent can be applied months in advance under perfectly dry conditions and not decay (Walsh and Minkey 2005).

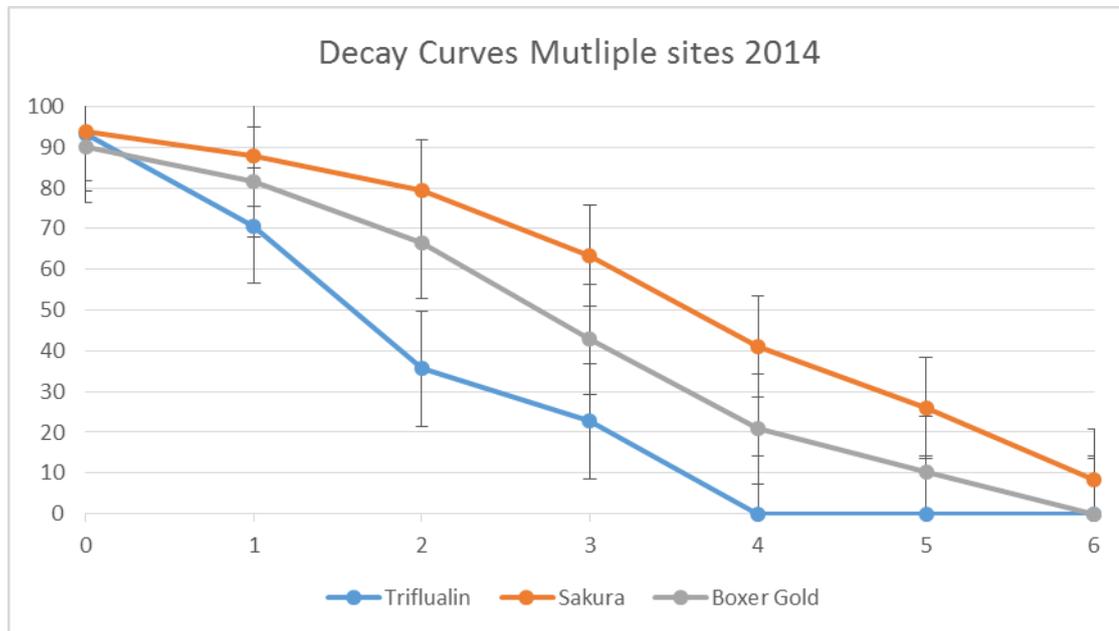
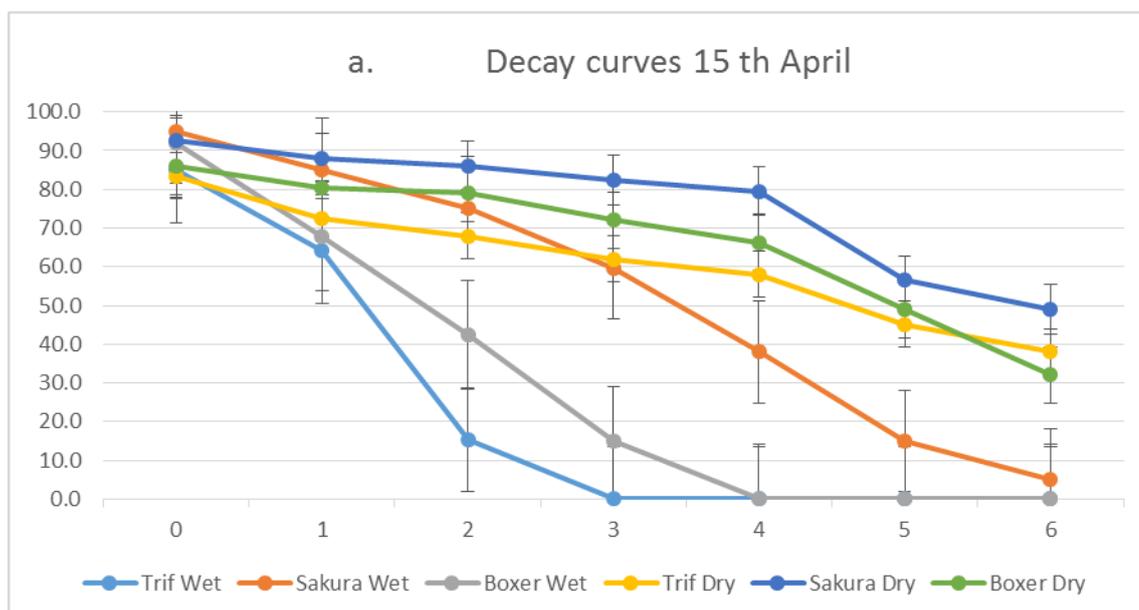


Figure 1. Summary of all decay curves for Trif (TriflurX), Sakura and Boxer (Boxer Gold) over multiple sites and soil types during 2014. Y axis is Efficacy expressed as percent of control. X axis is weeks after application of herbicide.

Under natural wet conditions as experienced during 2014 and 2015 decay of the herbicides trials decayed at different rates with TriflurX being the fastest, followed by Boxer Gold and then Sakura (Figures 1, 2a and 2b). Results indicate that TriflurX would give you 2-3 weeks protection, Boxer Gold 3-4 weeks protection and Sakura 4-6 weeks protection. However, efficacy was assessed under a non-competitive environment (no crop) which may reduce the protective time frame. The rate of decay did reduce faster under the earlier applications presumably due to the warmer conditions encountered (data not shown). Soil type did not appear to affect decay although bio availability may have been reduced (not significant) in the heavier soil type.



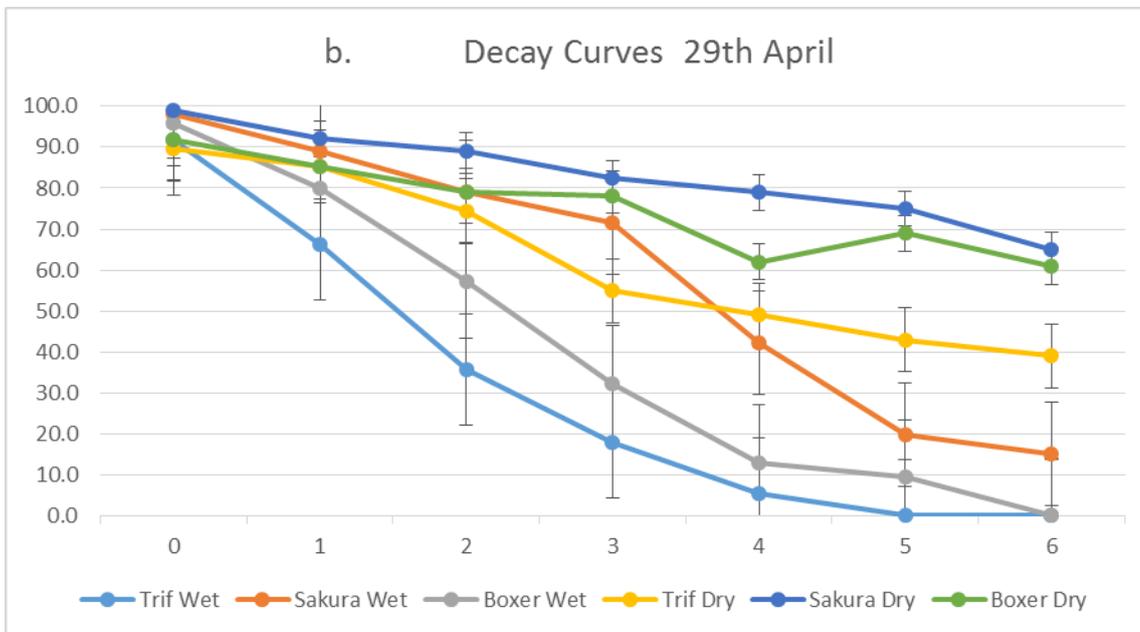


Figure 2. Decay curves under wet and dry conditions for Trif (TriflurX), Sakura and Boxer (Boxer Gold) when applied at two different dates; a. 15th April 2015 and b. 29th April 2015. Y axis is Efficacy expressed as percent of control. X axis is weeks after application of herbicide.

Using the Weed seed wizard to predict germination in Cunderdin in 2015 (data not shown) the model showed that the major flush of germination of annual ryegrass to be around mid May. If sowing wet in Mid-April, while you will have significant crop competition, most of your herbicide options would have run out with the expectation of possibly Sakura. With a late April sowing you would have protection from the major flush with all options but not later flushes with TriflurX and maybe Boxer Gold. Sakura would give you some protection into early June. Significant risk is therefore a major factor when dry seeding very early. Predicting future rainfall events will be crucial for dry sowing early.

Conclusions

Under dry soil conditions the herbicides used in the study all persisted until the 5th or 6th week. A small decline in efficacy was observed but was concluded that this was due to a slight increase in soil moisture due to humidity and seepage. Under these conditions all pre-emergent used would be deemed suitable for dry seeding purposes and have been shown to be in earlier work (Minkey and Ashworth 2012).

The risk with early dry seeding wheat is when a rainfall event occurs before dormancy of annual ryegrass is broken and the residual life span is not long enough to last until the major flush of germination occurs – usually mid to late May. To minimise these risks:

1. Use a longer residual herbicide such as Sakura (followed by Boxer Gold, then TriflurX).
2. Delay dry seeding until late April or early May with a 1 week dry period to follow.
3. Ensure weed seed bank is low
4. Use forecast services and the weed seed wizard to predict when germination overlaps with active pre-emergent herbicides.
5. If early rain occurs wait until surface and sub surface has dried out before dry seeding.

Key words

Dry Seeding, Annual Ryegrass, Pre-Emergent Herbicides, Decay Curves, Weed Management.

Acknowledgments

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References

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