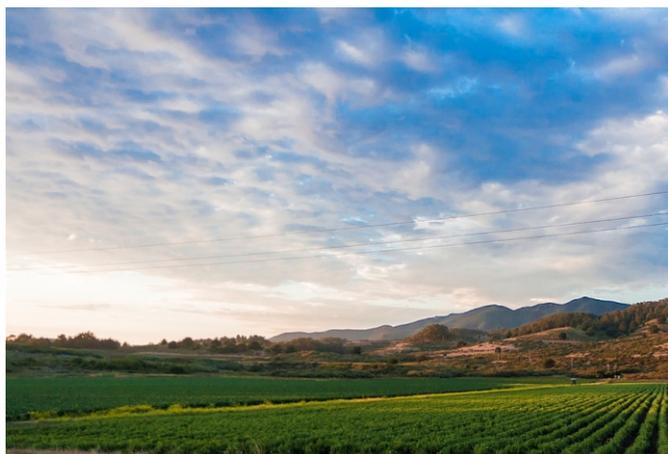


Sinmosa® 250 – Crop-topping in Pulse Crops

Active Constituent : 250g/L paraquat dichloride

What is Crop-topping in Pulse Crops?

Crop-topping means the application of sub-lethal rates of paraquat or glyphosate in maturing crops. The aim is to reduce viable seed set of annual ryegrass (ARG) without substantially reducing the yield and quality of the crop. The registered pulse crops for use with Sinmosa® 250 are field peas, lentils, chickpeas, faba beans, lupins and vetch. The registered rate of Sinmosa is 400-800ml/ha. Adzuki beans, cow peas and mung beans have registrations for glyphosate only.



The most important aspect of crop-topping is timing. An application carried out too early is likely to cause significant losses in a maturing crop. However, it also remains critical to apply Sinmosa at the correct weed stage. The key is to give the crop as much time as possible to mature, without allowing the ARG to escape its application window. Therefore, early maturing crops/varieties are ideally suited for crop-topping.

Weed Management

One reason to grow pulse crops in a farm rotation is to use different mode of action herbicides on problem weeds such as ARG. Crop-topping provides another possibility to use a Group L

Crop-topping with Sinmosa® 250 in Pulse Crops

Proven Key Benefits

Weed Management

- Consistently between 75 and 95% reduction in viable Annual Ryegrass (ARG) seeds
- Part of integrated weed management
- Resistance management tool (very cost effective)

Productivity

- Very low risk of yield loss in
 - Field peas
 - Vetch
 - Lupins (early varieties)
 - Lentils
- Higher risk in
 - Faba Beans
 - Chickpeas

Comparison to Glyphosate

Sinmosa offers

- Similar efficacy around flowering of ARG
- Better efficacy at milk and dough stage
- Wider window of application
- Ability to target a wider segment of the seed head population
- Better crop safety

herbicide, at very cost effective rates, late in the season. Weed management is a numbers game and the ability to reduce the viability of seeds from escaped ARG plants is priceless. Trials have demonstrated that paraquat consistently reduces the viability of seeds between 75 and 95%.

If crop-topping is used as a planned and integrated weed management tool, the farmer has the opportunity to plant a pulse crop and variety which is most suited for this type of application.

Timing of Annual Ryegrass (ARG)

Sinmosa is ideally applied to ARG at the milky dough stage. However, in reality a wide range of seed stages will be present and the most likely outcome will be a compromise; most of the seed heads have emerged and are at least flowering, while only few of the early seeds have entered the hard dough stage. The longer the application can be delayed, the better it is for the crop.

Timing of Pulse Crops

Pulse crops and their varieties differ in the time taken to maturity. Early maturing crops such as field peas and lupins are very well suited to be crop-topped – they will be close to maturity at the time of application. Later maturing crops such as chickpeas run a high risk of yield and quality loss.

Field Peas - Field peas mature early and are an excellent choice for crop-topping. The possibility of yield and quality loss is low. Early maturing varieties such as Twilight are preferable over long season varieties such as Kaspia.

The best timing is after the lower 75% of the plant show yellow/brown, leathery pods with firm seeds, while the seeds in the top 25% of the plant split, rather than squash, when pressed.

Vetch - This crop is also well-suited for crop-topping. Indicators for best timing are similar to field peas.

Lentils - Lentils are also excellent for crop-topping. Again, early varieties such as Blitz or

Flash are better suited than long season varieties such as Nugget. Best timing to crop-top lentils is when 50% of the seeds in the top third of the plant have changed colour and the remaining 50% split when pressed, rather than squash.

Lupins - The variety of lupins is a critical factor. Albus lupins mature too late to be considered a viable option for crop-topping. However, amongst the narrow leaf lupins, the short to medium maturity varieties such as Mandelup allow crop-topping to be successful. Best timing for lupins is after 80% leaf drop (any brown, but still attached leaf is considered dropped). Coverage of the ARG seed heads is more difficult. The 800ml rate of Sinmosa achieves more reliable results.

Faba Beans - Early varieties are suited for crop-topping. Best timing is after the seed hilums in the top of the canopy show a distinctive black line. The hilum is the eye-like area where the seed attaches to the pod. Seeds must be taken out in order to check. Plants will be still surprisingly green at this stage. Check “Windrowing faba beans – NSW DPI” for images.

Chickpeas - This pulse crop generally matures too late. Best timing is when more than 90% of the seeds have reached maturity. This is indicated by the lightening of the green seed colour and yellowing of the pod wall. Generally at this stage ARG has also matured. Any earlier application is likely to result in yield loss.



Pulse Crops Grown for Seeds

DO NOT crop-top a pulse seed crop. Incorrect application can reduce viability of seeds.

Why use Sinmosa instead of Glyphosate?

For most pulse crops glyphosate is registered for crop-topping as well as Sinmosa. The GRDC and others established that both herbicide types work equally well around the ARG flowering stage, however, Sinmosa works much better at the milk and dough stage. In the GRDC trials, paraquat used at the milk stage achieved 64 - 97% control compared to glyphosate achieving only 14 - 74% control. Sinmosa simply provides a much wider window of opportunity, in a situation where timing is critical. Compared with glyphosate, the crop can be sprayed later, reducing the risk of yield and quality loss. i.e. glyphosate is more likely to cause crop damage. While with Sinmosa, a broader portion of the ARG seed head population can be effectively targeted.

What other Weeds can be targeted with Crop-topping?

ARG is the main target weed for crop-topping, as it is the most problematic weed in Australia and its maturity period is relatively close to pulse crops.

Brome grass and barley grass mature earlier and their maturity timing does not correspond very well with the window of opportunity in pulse crops.

In WA, many farmers target wild radish, but the risk of yield and quality loss is quite high.



Desiccation of Pulse Crops

While desiccation of Pulse crops involves similar knockdown herbicides and is carried out around the same time of the year, there are major differences to crop-topping.

Crop-topping is all about reducing seed set of ARG. Desiccation is about preparing the crop for harvest, by evening out the ripening process throughout the paddock. Much higher product rates are used for desiccation, because the aim is to shut the crop plant down and reduce the moisture content. Amongst the bipyridyl products, paraquat is replaced with the diquat product called Dia-Kill® 200. The usual application rate of Dia-Kill® is 2-3 L/ha. Timing is generally later, when the crop is around 90% mature.

Reducing seed set or killing weeds in the desiccation process is only a secondary effect.

Crop-topping with Sinmosa and desiccation with Dia-Kill – rates and timing, based on practical field situations

Crop	States	Use Pattern	Product Rates	Grazing WHP	Harvest WHP
Field Peas Lentils Lupins Vetch Chickpeas Faba Beans	All	Crop-topping	Sinmosa® at 400-800 ml/ha	1 day (horses 7 days) remove stock from treated area 3 days before slaughter	7 days
Dry Peas Dry Beans Mung Beans Lupins Chickpeas Faba Beans Lentils	All	Desiccation	Dia-Kill® at 2-3 L/ha	1 day	nil 2 days

Do you need to add additional wetter?

Sinmosa has a highly effective inbuilt surfactant system. In most situations the amount of wetter is more than sufficient for an effective application. However, in crop and pasture topping situations, low product rates are used with relatively high water volumes. As a result, the concentration of the surfactant system is likely to be suboptimal.

The table below can be used to tailor the exact amount of wetter which should be added.

Additional wetter required ml / 100 L										
Sinmosa® rate per ha	Water rate / ha									
	50L	60L	70L	80L	90L	100L	120L	150L	200L	250L
400mL	60	60	60	60	60	80	80	80	80	80
800mL					40	40	60	60	60	60
1000mL	no wetter required						40	60	60	60
1200mL	no wetter required							40	60	60
1600mL	no wetter required								40	60
2000mL	no wetter required									40
2400mL	no wetter required									
3000mL	no wetter required									

No under dosing, no overdosing. Sinon Australia offers this precise information to optimise crop-topping performance.

Surfactant quality can vary considerably. Sinon recommends the use of a good quality wetter such as: BS 1000, Chemwet 1000 or Spreadwet 1000.

References

Douglas Alex (2012): *Crop-topping pulse crops*. Department of Agriculture and Food, Western Australia.

GRDC (2014): *Pre-harvest Herbicide Use, fact sheet (revised October 2014)*.

Peltzer, S. & P. Newman (2009) *Spraytopping E-Weed, Newsletter of the Department of Agriculture & Food WA: Vol 10 No 7, 1-7*

This is general information. It may be valuable to seek advice from a qualified agronomist about your specific situation, particularly on crop and weed stages and timing of application.

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Testing for Growth Stages of Seeds

It is best to use seeds from the middle of the head for testing. Pull the seeds off and squeeze between thumbnails or fingers.

- **Watery ripe** – the seeds release sappy liquid (storage cells are formed).
- **Milk stage** – the seeds release white liquid (starch is being deposited). The thickness indicates **early, middle** and **late** milk stages.
- **Dough stage** – cloggy but still **soft** and like dough. There is a soft dough stage, changing to the **hard** dough stage when hardly any moisture is left in the seed. However, even at the hard dough stage, the seed will still compress when squeezed.
- **Ripening** – the seed hardly compresses when squeezed and colour is yellow/brown. Too late to get control.

(source, Peltzer&Newman 2009)



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