

# Independent expert witness report

## Supplemental 1

regarding

Stephen William Marsh v  
Michael Owen Baxter

On instruction of

Slater & Gordon  
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Melbourne

Prepared by

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of

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*Note: for ease of referencing the contents numbering is contiguous with my original report.*

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**Response to further instructions from Slater and Gordon with regard to Marsh v Baxter dated 22<sup>nd</sup> November and 27<sup>th</sup> November, 2013.**

Please note: general discussion of the following witness statements is conducted in ascending paragraph order and notes have been made only where it is considered relevant. With regard to specific paragraph/s the instructions draw attention to; they are covered as they occur within the above format. For clarity I have added the witness' initials as a prefix to the paragraph reference where appropriate.

***3.1 Re: Witness statement of Michael Baxter 28/8/13. Please comment on the measures implemented to control Wimmera ryegrass described in Mr. Baxter's statement: we draw your attention in particular to paragraph 34.***

**MB Para 21 [1], [2]** It is noted Mr. Baxter does not attempt to control wimmera ryegrass in pasture paddocks (570 ha) dedicated to his sheep enterprise.

It is inferred there is no cross-over from pasture to crop. If however, sheep are allowed to graze the cropped area it should be noted that there is the potential for ryegrass seeds to pass through the animal and be deposited as a viable seed.

**MB Para 28 to 36** generally describes Mr. Baxter's planned cropping processes

**MB Para 29 [6]** It is implied that Wimmera ryegrass is "readily spread by wind" – this is not particularly true of ryegrass with the majority of seed being dispersed within the immediate vicinity of the parent plant unless carried away by animal or machinery.

**MB Para 34 [1]** Of note Mr. Baxter states that his rotation program includes "the control of a particular type of wimmera ryegrass known as herbicide resistant wimmera ryegrass ("HRWR")" acknowledging the presence of herbicide resistance, although no tests have been done to confirm this.

**MB Para 34 [3]** of particular relevance is his observation that "crop yields in some paddocks on my farm were reduced by around 30% by HRWR over the 5 year period leading up to 2010".

This signifies an acceptance on his behalf that he has herbicide resistant ryegrass at a significant level and in MB Para 45 [1] Mr. Baxter defines the problem as severe in Range and Two Dams paddocks.

**MB Para 35 [2]** gives an indication that the HRWR on Mr. Baxter’s properties is resistant to *at least* herbicides from mode of action group A.

**MB Para 36** Despite the above observations and significant losses Mr. Baxter has not had the resistance profile of the HRWR tested – which in my opinion is crucial to planning an appropriate management strategy and where I would have expected a competent agronomist to have strongly recommended testing.

In his affidavit, Mr. Baxter’s agronomist, Mr. Robinson, states (CR Para 9 [4]) that he takes “plant samples which are sent off for testing for herbicide resistance”. If that is the case why was it not done on Mr. Baxter’s farm where herbicide resistance was strongly suspected as the cause of a major loss of production?

Given that Mr. Baxter was aware that HRWR was reducing his profitability considerably and that he employed a professional agronomist, I am dismayed that the business was 100% reliant on herbicides to control HRWR in 2010.

Any system that relies on herbicides alone to combat HRWR *will* fail to do so. Mr. Baxter’s farm program should have aimed to integrate a variety of herbicide resistance management tools including non-herbicidal options.

This could have included making hay, cut prior to the milk stage of ryegrass seed development, as this will remove 80% plus HRWR seed from a paddock and if followed with a gramoxone spray, seed set can be reduced by as much as 95%.

Similarly, swath (or windrowing) of canola collects most HRWR seeds into the windrow. Swathing will also help prevent late developing ryegrass seeds from being viable due to the stem of the HRWR being cut, stopping moisture and nutrients being drawn from the soil to finish grain fill.

To further reduce the amount of viable HRWR seed a recommended HRWR management practice, where canola is windrowed, is to harvest the canola with the harvester chaff spreaders disengaged, allowing the chaff to be formed into a concentrated row. In early autumn this chaff trail can be burned to further reduce the amount of viable HRWR seed.

Alternately, a chaff cart could be used to collect material as it emerges from the back of the harvester.

Mr. Baxter had not used swathing prior to 2010 (MB Para 42 [6]). There are reasons for and against the practice. In areas where yields are less than 1 t/ha modern harvesters fitted with a finger reel front are quite capable of processing such crops' bulk efficiently. This will save approximately \$30/ha by not having to pay a contractor or invest capital in owning a windrowing machine. In addition, Mr. Baxter's normal canola area is only 170 – 200 ha (MB Para 19 [2]) a further factor indicating that the investment in owning a modern windrower is not warranted. Accordingly, direct heading would save his business approximately \$30/ha.

In crops yielding higher than 1 t/ha (see *Reference 1 Oilseeds WA – Growing Western Canola*) windrowing is the preferred practice to ensure an efficient harvest as the crop becomes too bulky to be handled without excessive pod shattering (causing a loss of the canola seed) at the harvester front.

The points to consider in windrowing are outlined in *Reference 2 - Canola best practice management guide*.

Among the benefits of windrowing are:

- it allows the crop to mature evenly;
- the capacity to manipulate the timing of the canola harvest to accommodate other crops e.g. harvesting can take place while other crops such as wheat are still maturing, thereby increasing the overall efficiency of harvest significantly;
- HRWR can be better managed to reduce accessions to the seed bank.

**3.2 Re: Witness statement of Christopher Robinson 29/8/13, in particular please address:**  
**a) the significance, if any, of not turning a paddock to fallow (refer to paragraph 26 [3]);**

**b) the statement at paragraph 33 [2] that the reduction of the wimmera ryegrass by 80 – 90% could not have been achieved without growing RR canola and using Roundup**

The majority of Mr. Robinson’s statement is as I would expect and there are only a few points of further comment.

**CR Para 9 [4]** states that he takes plant samples and sends them to be tested for herbicide resistance.

Clearly he is aware of herbicide resistance as an issue, yet nowhere in his program for Mr. Baxter does it appear to be addressed, except by relying on herbicides.

**CR Para 15 [6]** states in part “Wimmera ryegrass is not resistant to paraquat and Sprayseed.”

If this is the *current* situation repeated use will increase selection pressure – closing the timeframe to their failure if other strategies are not also employed.

There are recorded instances of Group L herbicides paraquat and Sprayseed (which is a combination of paraquat and diquat) resistance in wimmera ryegrass. In fact, at the time of writing, there are now two confirmed populations of ryegrass that are resistant to both Group L paraquat *and* Group M glyphosate (roundup) i.e. the only non-selective herbicides currently available for fallowing, spray-topping and knockdown spraying ...see [www.glyphosateresistance.org.au](http://www.glyphosateresistance.org.au) website - Reference 3.

**CR Para 19**

i) As mentioned previously wind is not a major factor in ryegrass seed dispersal.

**CR Para 21 [1]** in addition to the herbicides mentioned I would expect Mr. Robinson to also have listed glyphosate resistance as an issue as there are now hundreds of cases of Wimmera ryegrass populations that are resistant to glyphosate including (at the time of writing my original report ex [www.glyphosateresistance.org.au](http://www.glyphosateresistance.org.au)) 105 on winter grain crops across southern Australia and 43 confirmed in WA.

**CR Para 22** Used strategically growing RR canola is a useful strategy in managing HRWR *however* it should not be the only strategy used or the risk will be a much more rapid onset of glyphosate resistance – the implications of which are discussed in my original report.

**CR Para 24** the statement “if the RR crop is grown successfully the cereal crops grown in the paddocks in the years after the RR canola crop are able to grow without significant competition from weeds including wimmera ryegrass” - assumes low numbers in the weed seed bank – which from the information provided seems unlikely.

**CR Para 26 [1]** the stated crop rotation of canola – cereal – cereal – canola as a continuous crop sequence is considered to be unsustainable in the long term. Over time this duo-culture will deplete natural soil nutrient reserves and soil health generally. In addition such a ‘tight’ rotation (i.e. one lacking in diversity) means consistently relying on a fairly limited number of herbicides which will inevitably increase selection pressure (as defined in my original report) and a more rapid onset of herbicide failure.

**3.2 (a) ...CR Para 26 [3]** states that paddocks are not turned to fallow at Seven Oaks or Baxter’s Block.

A fallow is when a paddock is taken out of production for a period of time, and if weeds are controlled, reduces weed seed numbers, allows for conservation of moisture for use by a following crop (or pasture) as well as a disease and pest break.

In the case of Mr. Baxter’s farm, I infer that Mr. Baxter is continuously cropping these paddocks meaning there is no pasture phase. The significance of this relates to the unavailability of some herbicide resistance management tools for use against HRWR. It does not mean however there are no non-herbicidal options available.

**CR Para 27 [1]** Why, when herbicide resistance was suspected, were samples not collected and sent for herbicide resistance testing? Confirmation and more importantly the resistance profile (i.e. the extent of resistance and to what herbicide group or groups the weed is resistant) would allow a more thoroughly considered long term sustainable plan for control to be developed using a suite of strategies not just one.

**CR Para 29 [4]** is very similar to MB Para 59 [6] of Mr. Baxter’s statement.

Given that both gentlemen recall clearly that the presence of HRWR influenced the decision to windrow the canola, I am surprised no mention is made of a further decision to manage the windrow residue to reduce weed seed (as discussed under MB Para 36 previously).

**CR Para 32 ]** In my experience volunteer canola plants do survive in crop and pasture *and* will set seed unless removed.

**3.2 (b)... CR Para 33 [2]** Mr. Robinson states that Wimmera ryegrass population has been reduced by 80 – 90% and this could not have been done without growing RR canola.

Between Mr. Robinson advice and Mr. Baxter’s actions, herbicide resistant ryegrass was allowed to build to the point where yields were reduced by 30%, narrowing the crop choices to a point where RR canola was a “get out of gaol card” and in reducing the weed population almost certainly laid the foundation for a Roundup resistant (RR) ryegrass population in the near future.

Two options which would achieve at least the same level of ryegrass reduction are given below:

- i) If Mr. Baxter had chosen a hay crop in 2010 for the Two dams and Range paddocks followed by Lupins (crop topped) in 2011 and hay again in 2012 the presence of ryegrass in the seed bank at the commencement of 2013 would have been reduced by the 80 – 90%.
- ii) Equally sowing a pasture and utilizing strategic grazing and spray-topping would give a similar result.

Results Mr. Robinson asserts could only be achieved by using RR canola!

**3.3 Re: Witness statement of Professor Stephen Powles 6/8/12; and in the Supplementary Report (4/11/13).**

***In particular, please address:***

**3.3 (a) question 11 in the first report, namely the disadvantages (if any) to the agricultural industry of growing GM canola in the traditional grain growing areas of Western Australia;**

Professor Powles has a well deserved reputation as a leader in herbicide resistance research in Australia.

I am perplexed therefore that he does not mention the probability that the use of RR canola will accelerate the development of RR ryegrass as is happening in New South Wales (NSW) where RR canola was first grown commercially in 2008. Similarly to WA, NSW and Victoria are required to segregate genetically modified (GM) and non-GM canola. This is managed to the satisfaction of end users. GM canola trades at a discount of \$10 - \$20 to non-GM canola.

Handling systems and markets may be different in WA compared to NSW, but glyphosate is the same chemical, Wimmera ryegrass is the same species and the development of glyphosate resistance is a MAJOR threat to all cropping farmers including WA grain farmers as glyphosate is the predominant summer weed control and autumn knockdown spray in southern Australia – as discussed in my original report.

**3.3 (b) question 6 on page 3 of the supplementary report, namely what factors would you expect a farmer in the Kojonup area or south-west WA generally to take into account in determining whether to plant GM canola on a farm or in any particular field on a farm;**

The factors influencing a decision to grow canola are largely as Professor Powles describes. *However*, my view of RR canola is that it plays a unique strategic role in combating HRWR and as such I would expect a farmer to use it accordingly. There is no other compelling reason to plant GM canola (of which RR is the only type) in Kojonup or anywhere else. The extra supply chain management required in growing GM canola - from machinery hygiene through to segregation and limited delivery points are not worth the alleged higher yield which to my knowledge has not been consistently achieved in the field.

***3.3 (c) the factors identified by Professor Powles in response to question 6, namely soil moisture status of the paddock in April in the year under consideration and potentially the seasonal rain forecast for that growing season, noting any other relevant factors;***

With regard to soil moisture and seasonal rainfall forecasts, these are always important, the soil moisture in April especially so. In most cropping areas of southern Australia the crop water demand in spring exceeds the amount of rainfall, therefore a good store of moisture in autumn will help increase the likelihood of a successful canola crop (or any crop).

In areas such as Kojonup if the soil profile is dry at the end of April a farmer may decide to dry sow canola. This can make RR canola a convenient choice as the possibility of killing the first generation of weeds with a knockdown spray prior to sowing the canola (in a timely fashion) recedes. With RR canola of course, this first generation of weeds can be taken out by glyphosate applied post sowing.

If there is no soil moisture and the autumn break is late, the farmer may decide not to grow canola at all. Where HRWR is an issue a hay crop, which can be sown later into May without serious yield reduction, might be substituted and weed seed reduction achieved through removal of the ryegrass in the baled product. Using gramoxone or glyphosate to spray any re-growth after the hay is removed will reduce weed seed set by up to 95%.

***3.3 (d) the process of spray-topping and any limitation on the use of this process having regard to the species variety of canola grown.***

Spray topping is a technique where a herbicide is applied to a crop, early in weed seed development with the aim of reducing weed seed set without reducing crop yield. Limitations are: timing is critical to the success of this practice and spraying taller varieties is basically impractical.

Swathing the crop would remove any necessity to crop top a canola crop.

3.4 Dr. Rudelsheim...Please note his report will be responded to in a separate report in due course.

#### **4 Additional questions in letter from Slater and Gordon 27/11/13**

***4.1 We refer to the witness statement of Mr. Baxter dated 28/8/13. Please comment on Mr. Baxter’s statement in Paragraph 59 [6] that swathing canola crop would enable wimmera ryegrass plants to be cut down before they set seed.***

Mr. Baxter describes “late germinating” ryegrass. Windrowing (swathing) canola cuts the canola crop stems at a point below the branches off the main stem. Generally, this will be at a point approximately 20 cm above ground level.

Weeds present will also be cut in this process and quite often the cutter bar will be lowered as far as practical to include the seed heads and stems of ryegrass in the windrow.

If Mr. Baxter’s ‘late germinating’ ryegrass was at the flowering stage and the heads were removed with, say 10 cm of stem attached they would not have set seed as they would not have had sufficient moisture and nutrients available to finish seed development. On the other hand if the ryegrass was at milky dough and had 30 cm of stem attached when cut then it would have the capacity to set at least some viable seeds. This is a situation where windrow management becomes critical.

*4.2 Can you explain the differences between swathing and direct heading of a crop such as canola. Please consider as part of your answer any differences in cost, efficiency, time, capital required, yield and any other differences that you regard as relevant. Are there reasons why a farmer would choose one method over the other.*

Please see the attached notes from a grower guide ‘Canola best practice management guide’ (appended - Reference 2) that describes the pros and cons of swathing and direct heading. Please also refer to the response to the previous question as well as discussion under **MB Para 36**

In summary the advantages of swathing are:

- More uniform maturity of the crop;
- More efficient harvest logistics for the whole business – reducing weather risk for ripe cereals;
- As an Integrated weed management (IWM) strategy it facilitates the capture of weed seeds in a windrow allowing a high percentage of seeds to be removed by collection in chaff carts or destroyed by windrow burning;
- Less threat of seed loss through pod shatter.

The advantage of direct heading is:

- Lower cost (potential saving of \$30/ha, the cost of contract windrowing);
- In lower yielding crops most modern harvesters can cope with standing crops.

In my opinion swathing is better all round practice.

Direct heading would eliminate movement of seeds in the wind. The strength of a willy willy required to carry seeds stripped from a standing crop would be a rare experience, much rarer than that required to move a cut stem.

Without resorting to a wind tunnel I suggest that a spherical shaped seed of 1 – 1.5 mm in diameter is more resistant to wind than a 50 cm section of hollow stem with some seed pods attached.

**4.3 Re: the witness statement of Professor Powles dated 6/8/12.**

***We refer you to part 14 of Prof. Powles' report. Do you consider direct heading (direct harvesting of GM canola to be any more or less effective than swathing in preventing the movement of parts of GM canola plants in the wind?***

3) I would consider direct heading to be considerably safer in preventing seed movement. With a windrowed crop there is the potential for strong winds or a willy willy to dislodge a stem or stems with pods and seeds attached. However post harvest, movement of stubble would be easy to achieve with a willy willy with either method i.e. while seed is unlikely to move on its own, where it still attached in crop residues it could be moveable by a willy willy or strong wind.

**4.4 Re: the supplementary report of Professor Powles dated 4/11/13.**

***We refer you to parts 7 – 9 of Prof. Powles' supplementary report. Do you agree with the reasoning and conclusions set out in those parts of the report.***

4) I largely agree with Professor Powles on his answers to points 7, 8 and 9 in his supplementary report. His answers are very general in nature and I would add that his answers pertaining cropping situations only obliquely touch on any technique not involving a herbicide.

It is disappointing to note from Professor Powles answer to question 7 that more farmers do not take advantage of the commercial HR tests which cost only a couple of hundred dollars. As previously mentioned, not having any herbicide resistance testing done means operating without a full understanding of the extent of the problem or the full range of potential options available. Not knowing the resistance profile of the ARG population on farm severely limits a farmer's ability to develop the most effective *long term* weed management strategy in terms of sustaining both a viable cropping operation as well as the effectiveness of the herbicide groups not currently compromised by resistance.

Furthermore, it is worth repeating – it is just simply good practice to use a number of techniques as part of an integrated weed management plan. This means *including non herbicide techniques* NOT just relying solely on herbicides to continually work away at keeping weed seed numbers down and this becomes imperative when resistant weeds are present.

In discussing spray topping Professor Powles does not mention that paraquat (Group L) or glyphosate (Group M) as the main herbicides used in this process. He discusses mixed pasture and cropping situations where paddocks are rotated with crop and pasture phases. Mr. Baxter's farm does not follow this practice but rather has designated crop and livestock areas that do not cross over.

One statement in Q8 I challenge is where Professor Powles states a single spray top will greatly reduce ryegrass infestation in a following crop. While the statement is factual, it is not the whole story – it comes back to the number of ryegrass seeds in the seedbank at the time, if numbers are high there will still be enough ryegrass seeds to germinate in that following crop to cause significant yield loss if not treated with herbicides. This means another use of herbicide that adds to selection pressure and the slippery slope to the development of herbicide resistance.



Peter McInerney  
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I have made all inquiries that I believe are appropriate to this matter. All relevant information has been provided in my reports and, to my knowledge, nothing of significance has been withheld from this report to the court.

# APPENDICES

## APPENDIX III

### Additional Instructions from Slater & Gordon Lawyers

22<sup>nd</sup> November, 2013

27<sup>th</sup> November, 2013

*Not attached to email copy*

## APPENDIX IV

### References

1. *Oilseeds WA – Growing Western Canola* (as PDF)
2. *Canola best practice management guide* (as PDF)
3. [www.glyphosateresistance.org.au](http://www.glyphosateresistance.org.au) website