

Extent and attitudes of growers to dry seeding in the agroecological zones of Western Australia

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Abstract

Seeding into dry soil before the break of the season has been widely adopted in Western Australia; however the extent, risks and management of dry seeding are not well documented. One hundred and five face to face surveys were completed by growers across the agro-ecological zones of Western Australia to gather information on the extent of dry seeding and what perceptions they had on the benefits and risks. In addition, an existing Planfarm 2011 client survey (197 growers) was used to determine dry seeding practices in that season. Based on these surveys, dry seeding was practiced on half of the farms from the low rainfall zone, 43% in the medium rainfall zone and 26% in the high rainfall zone. Of the farms that practiced some dry seeding the mean proportion of the farm dry seeded was similar (23-32% of total farm area). Farmers dry sowed 80-100% of their canola and lupin crop while 30% of their wheat was dry sown on average. Weed control was ranked as the most important risk, followed by poor crop emergence and then frost. The ability to start sowing by date was perceived to be the most important benefit from dry sowing and growers were more confident to dry sow after a wet summer. Implications of the findings and future research directions are discussed.

Introduction

More than 90% of farmers in the West Australian wheat-belt undertake no-tillage farming where crops are sown in one-pass with a knife point combine (D'Emden and Llewellyn 2006; D'Emden, Llewellyn et al. 2008). The major advantage for crop production over the last 30-40 years has been timelier seeding and increased yield potential of crops sown earlier after the break of the season (D'Emden and Llewellyn 2006; D'Emden, Llewellyn et al. 2008). However, over the last decade farmers have had to make significant adjustments to their seeding program to continue receiving the benefits of the no-tillage system and remain profitable. With farm sizes increasing and the high cost of machinery farmers are having to seed over a longer time frame. In WA farms also experience low and highly variable rainfall (often late) in the planting window resulting in low water-use efficiency and yields (Lawes, Oliver et al. 2009). As a result, there is anecdotal evidence that farmers have started sowing a larger proportion of their wheat crops early before the break of the season into dry soil, therefore extending their planting window. This allows them to complete their cropping program in the required time regardless of the amount and timing of opening rainfall despite risks of false breaks, poor germination and potential frost risks.

While dry seeding has been adopted in Western Australia, especially in the lower rainfall agronomic zones for lupin and canola, the extent and management of dry seeding are not well documented for wheat crops. Consequently, a survey of 105 growers in the low, medium and high rainfall zones of Western Australia was conducted in 2012. An existing Planfarm Database of 196 growers was used to examine the extent to which dry seeding was practiced. The surveys were also used to assess the relationships between various climatic factors across the WA wheat belt, potential farm yield benefits in response to the amount of dry seeding practiced, growers management practices of dry sowing, and their attitudes towards the risks and benefits of dry sowing.

Materials and method

A state-wide survey of grain growers was conducted across the agro-ecological zones to gather information on current practices used when crops were sown dry. The Western Australian No-Tillage Farmers Association (WANTFA) surveyed 105 growers across three agroecological zones. The survey was designed to gain insight into how and why growers seeded dry and what perceptions they had on the practices benefits, disadvantages and opportunities. In this paper results for dry sowing adoption and farmer's perception of risk are presented. Surveys were completed by farmers at agricultural field days, events and online via e-mail. In

addition, a Planfarm 2011 client survey (197 growers across the State) that includes questions on dry seeding and equipment used was also analysed. A multivariate analysis was undertaken on the Western Australian No-Tillage Farmers Association survey data using Genstat, 14th edition. Planfarm Benchmark Survey: The database was grouped into four groups (0%, 0-10%, 10-20%, 20-30% and >30% dry seeding). We then examined any changes in farm level wheat yield for these four groups. In the data the area of the farm dry sown refers to all crop species. The available data did not distinguish between crops species. In terms of the yield benefits we focused on the wheat yield only. Our assumption was that early sowing of other crops due to dry seeding would mean that any subsequent wheat crops were also planted earlier.

Results and discussion

Extent of Dry Seeding

Our results indicated that dry seeding was practiced most widely in the low rainfall zone, to a lesser extent in medium rainfall zone, and much less in the high rainfall zone (Table 1, figure 1). Half of the farms in the low rainfall zone practiced some dry seeding. This decreased to 43% in the medium rainfall zone and 26% in the high rainfall zone. Of the farms that practiced some dry seeding the mean proportion of the farm dry sown was similar (23-32% of total farm area) between rainfall zones. There was a wide range in the proportion of farm dry sown, with some farms in the low and medium rainfall zones that dry seeded their whole farm in 2011 (data not shown). Overall a large number of the farms were doing comparatively small amounts of dry seeding (<10%) with a much smaller number of farmers practicing widespread (>50%) dry seeding (Figure 1).

Table 1 Proportion of farms dry seeding and proportion of farm dry seeded for high, medium and low rainfall zones in 2011 Planfarm Database.

Rainfall zone	Total number of farms	Proportion of farms practicing some dry seeding	Proportion of farm dry sown ¹
High	31	26%	30%
Medium	92	43%	23%
Low	74	51%	32%
Total	197	44%	27%

¹ Data are averages from farms that practiced some dry seeding.

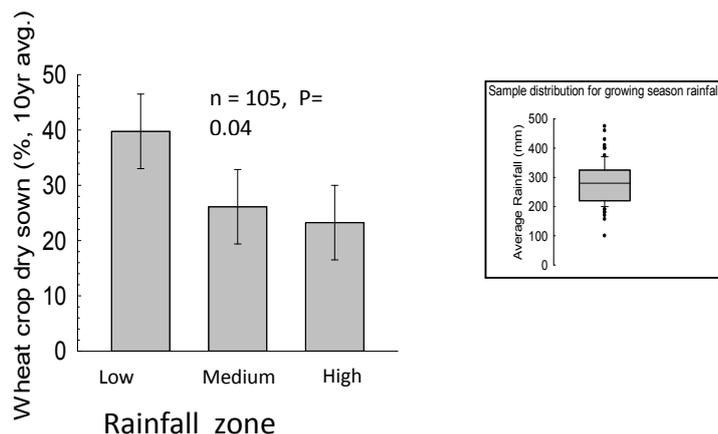


Figure 1 Proportion of wheat sown dry in the WANTFA survey. Figures represent the average percentage of wheat dry sown on their property over the last ten years.

Perceived risks with dry sowing

Participants in the WANTFA survey were asked to rank risks from least important to most important (Figure 2). The results suggest that weed burden was the most important risk to manage when dry sowing followed by frost and poor emergence (Figure 2).

In open ended questions most farmers perceived that dry seeding was fairly low risk if they have sub soil moisture. The farmers surveyed indicated the biggest benefit to dry seeding were timeliness of operation and making the most of rainfall. The answers revealed that some farmers preferred to stick with dry sowing canola or only dry sowing wheat into clean paddocks if it didn't rain in the preferred timeframe. Ideally many growers would like it to rain in early April so they can get a good knockdown on germinated weeds before sowing the wheat crop, however over the past ten years this has become a less likely occurrence. The overriding response from farmers was that dry seeding has become the most economical way of sowing their desired cropping program in the right timeframe. Buying more seeders or increasing machinery size would be an alternative but farmers indicated that this was a cost prohibitive option. Growers commented that in low rainfall years, dry sowing could be the difference between successful implementation of their cropping program or crop failure after missing out on vital early rainfall.

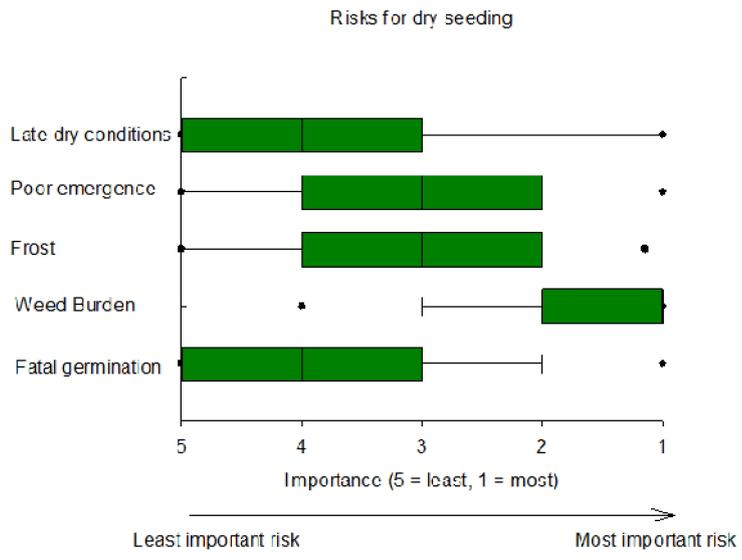


Figure 2 Perceived risks of growers when making the decision to sow crops dry

Grain Yield

When a comparison was made between the WANTFA survey results discussed previously and the Planfarm survey results (Figure 3 a and b) there were striking similarities in the trends for dry and wet sowing. The WANTFA survey considered farm wheat production records recalled by farmers for 4 previous seasons (2008-2011). By comparison, the analysis undertaken of Planfarm client data considered observed farm yields and dry sowing percentages for all crops grown on farms in one season (2011). Despite these differences in approach, Figure shows similar trends towards higher grain production with dry seeding in both analyses

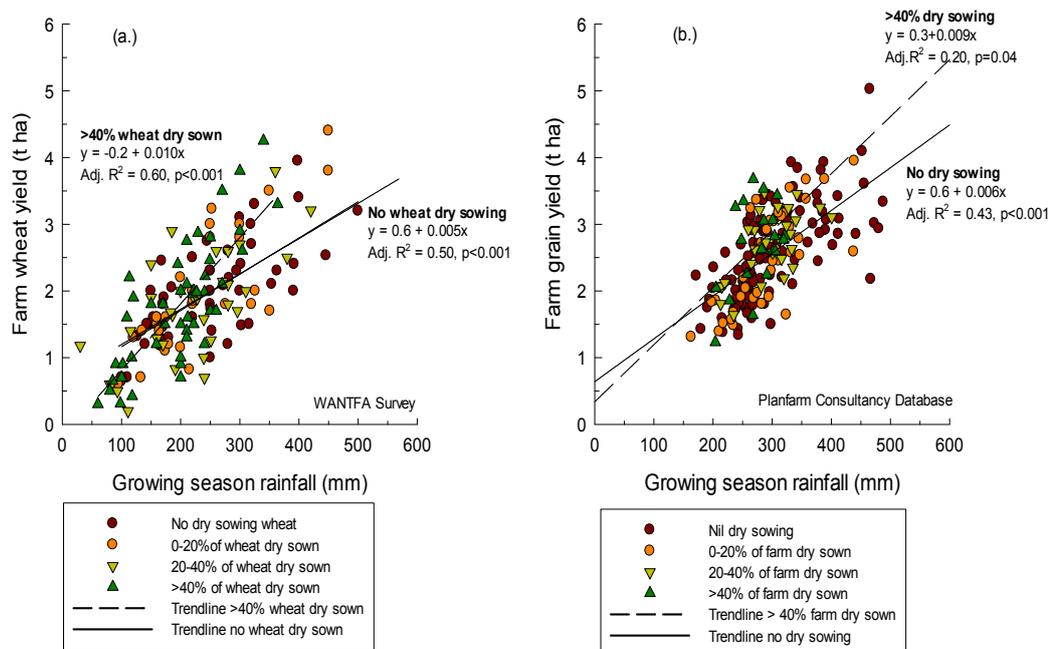


Figure 3 Comparison of (a) WANTFA random survey data (2008-2011) and (b) Planfarm consultancy data (2011). The graphs in the Figure show the relationship between farm yields and rainfall with respect to the percentage of wheat crop (WANTFA, left) and all crops (Planfarm, right) dry sown on farms. Lines have been fitted through the categories >40% area dry sown (green triangles) and nil dry sowing (red circles) for comparison.

Conclusions

The surveys showed that dry seeding was practiced most widely in the low rainfall regions with approximately 50% of farms practicing some dry seeding. There is an indication of yield benefits in wheat of up to 500 kg/ha from dry sowing in average years. Growers preferred to dry seed crops, rather than wait for a break, because the perception was that it improves overall farm profitability despite not knowing how big that benefit was. Survey participants perceived the major risks to be weed burden followed by poor emergence and frost. Continued seasonal instability and the potential to improve farm profitability with dry seeding is cause for further research to improve dry seeding agronomy.

References

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