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Opportunity knocks

sowing wheat early in the north-eastern wheatbelt

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Farmers consider many factors in deciding whether to start sowing wheat, but the most important are the amount of rain and time of year.

In this study we assessed the chances of farmers in the north-eastern wheatbelt (less than 325 mm rainfall) receiving enough rain to sow wheat early. In low rainfall areas such as this, where an early finish to the season is likely, it is especially important that farmers take advantage of all early sowing opportunities.

The potential benefits of sowing wheat early generally outweigh the associated risks, particularly in lower rainfall areas. However, early sowing depends on an early break to the season, and this will not happen every year.

We determined a 'planting rule' for the north-eastern wheatbelt which defined the amount of rain needed before sowing could start. The 'planting rule' was developed by asking 25 farmers about their planting decisions. We then used rainfall records to determine the chances of receiving early sowing opportunities to the season.

Farmer survey - planting decisions

None of the 25 farmers interviewed would sow wheat before April 25, even if soil preparation and sowing rains were adequate. The percentage of farmers who would sow increased rapidly from 28 per cent on April 25 to 96 per cent on May 15 (see Figure 1).

Dry conditions after sowing, high temperatures and grass weed control were the most common reasons why farmers were not prepared to sow earlier. More than 70 per cent of the farmers thought frost damage, higher incidence of leaf disease, suitability of varieties and reduced sheep feed in autumn were insignificant factors in the planting decision. For late sowings, 30 per cent of farmers considered June 15 to be too late to sow, while 60 per cent felt June 30 was too late to sow.

A preliminary survey showed that the planting rule was complex and varied for each paddock. Summer rain, soil type, cultivation requirements and weed burden all influenced the planting decision. We asked farmers to disregard these factors and concentrate only on the amount of rain required before they would start seeding York gum country (red brown sandy loam - red brown sandy clay loam), a common
soil type in the area. This response estimates the potential to plant early independent of the management required to achieve success.

The amount of rain needed before farmers would start seeding declined as the season progressed. Each farmer had a different rule of thumb for planting; three examples which represent the range of responses are shown in Figure 2. The solid line in Figure 2 represents a common farmer response and was used for the subsequent analyses.

Using this ‘assumed rule’, at least 19 mm of rain is needed over three days to begin sowing on April 30, and only 5 mm for seeding from June 19 onwards. Such a planting rule gives a conservative estimate of seeding opportunities because it ignores stored water and previous small amounts of rain.

Sowing opportunities

Timing of sowing opportunities was assessed for Morawa, in the north-eastern wheatbelt. Using 64 years of rainfall records, we searched for the days when the amount of rain exceeded the amount required by the planting rule; starting on April 15 and ending on July 19 in each year. The years were then put in order according to the time of the first opportunity (see Figure 3) — from earliest opportunity to the latest opportunity in 64 years of records. The chance of getting sowing opportunities or the percentage of years with sowing opportunities before a given date could then be determined (see Table 1).

Chance of getting sowing opportunities between April 15 and a given date were determined for three planting rules. The assumed farmer rule was compared with rules requiring either 5 or 20 mm in three days regardless of date. Using the assumed planting rule, in which the amount of rain required varied with date, a sowing opportunity occurred between April 15 and May 18 in 50 per cent of years at Morawa. A planting rule requiring 20 mm in three days delays planting in some years and results in a 50 per cent chance of planting between April 15 and May 25.

At Morawa, the opportunity for early sowing (between April 15 and May 10) occurs about one year in three. The situation is similar for the entire eastern wheatbelt, extending from Mullewa to Merredin, and in the 275 to 325 mm rainfall zone. This represents a significant
opportunity for which wheat producers should plan. At least some paddocks should be prepared for early sowing and seed retained of a long season variety such as Spear.

Penalty for missing a sowing opportunity
We also calculated the penalty, in terms of days delayed, if a sowing opportunity was missed. We assumed that a second planting opportunity was not recorded until at least five days after the first sowing opportunity.

For years with a sowing opportunity before May 10, there was generally a long wait (30 to 55 days) before the next sowing rain was received, although in a few years rain was received within 5 to 10 days (see Figure 4). Of 23 years where a sowing opportunity occurred before May 10, 15 years (see shaded area on the left of the May 10 line in Figure 4) had a 30 to 55 day wait and five years had only a 5 to 10 day wait. For years with the first opportunity after May 10, the next planting opportunity was generally received within 10 to 14 days, although the delay could be as long as 45 days (shaded area on the right of the May 10 line).

The long delay between sowing opportunities in many years provides a compelling argument for using every available sowing opportunity and sowing at least some crop early. Delays in sowing are very costly because wheat yield decreases by 100 to 400 kg/ha for every week sowing is delayed after early May (see Delane and Hamblin, 1989).

Because of the possible delay between sowing opportunities, farmers should keep seed of several wheat varieties of differing maturity. This will ensure that the most suitable variety is sown for a given sowing date. For example, a long season variety such as Spear should be used when a sowing opportunity is received in late April. A short season variety, such as Kulin or Gutha, should be sown when the season does not break until early June.

Summary
Based on their own criteria for sowing, wheat farmers in the north-eastern wheatbelt could sow wheat before May 10 in about one year in three. If these sowing opportunities are missed, the penalty can be great, with a delay of between five and 50 days before the next opportunity.

With the prospect of only light rain and warm temperatures for three to four weeks after sowing wheat in early May, it is important to ensure good germination and establishment of the crop so it can cope with a period of limited rain and warm temperatures.

A slightly higher seeding rate and good seeding depth control to ensure the seed is placed accurately into moist soil are recommended.

**Figure 3. A farmer needing only 5 mm of rain in three days to start seeding has a 50 per cent chance of sowing wheat before April 29.**

**Higher Yield Potential**

Early sowing is one of the most important management practices through which wheat growers can increase grain yield.

Early sown wheat crops have higher yield potential than later sown crops because the warmer temperatures stimulate early vigorous growth. Strong early growth means that the crop will produce a greater proportion of its biomass from June to August, when it is most efficient in terms of water use. The crop will also flower earlier and grain will fill under less water stressed conditions.

But there are a number of risks associated with sowing crops early. These include increased difficulty with grass weed control, frost damage in susceptible areas and a higher incidence of leaf disease.

In drier areas, these risks can be minimized through sound management practices. For example, careful use of rotations, grazing, herbicides and tillage to obtain good grass weed control, and sowing late maturing wheat varieties, such as Spear, to reduce the risk of frost damage.
Warm temperatures will help both weed and crop growth. Early weed control will minimize competition for moisture and nutrients.

This information has implications for the type and quantity of wheat varieties which farmers should keep on hand. Long season varieties such as Spear and Dagger do have potential in these low rainfall areas, but they should normally constitute a small portion of retained seed. Most wheat kept should be mid season varieties such as Eradu, Gamenya and Schomburgk and short season varieties such as Gutha, Kulin, Wilgoyne and Bodallin.

Reference

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**What brings the first rains of the season?**

By Ian Foster, Climatology Research Officer, Division of Resource Management, South Perth

There are two major sources of rainfall over south-western Australia. One is from upper atmospheric disturbances, decaying tropical cyclones or heat troughs. These sources bring water vapour from the tropics and can generate localized heavy rain from thunderstorms.

The other source is from cold fronts and mid-latitude low pressure systems to the south of Australia. These sources generally transport water vapour from the southern Indian Ocean, with some tropical air sometimes being drawn southwards ahead of the fronts.

Tropical rainfall generally occurs during summer and autumn. An early seasonal break, that is rain during April, is most commonly of this type.

The northern, central and eastern agricultural regions are more likely to be affected by such disturbances than the south coast, although widespread rains are possible from persistent systems.

In years when the season breaks in or after May, the opening rains come from the first significant cold fronts to cross the west coast. Tropical or upper atmospheric disturbances are generally absent during April in those years.

So, early seasonal breaks are characterized by tropical or upper level disturbances and later breaks are caused by the first cold fronts after May.