1-1-1993

Production of high-value wheats: one sustainable answer to the cost:price squeeze

Wal Anderson
Alan Peggs
Doug Sawkins

Follow this and additional works at: https://researchlibrary.agric.wa.gov.au/journal_agriculture4

Part of the Agricultural Economics Commons, Agronomy and Crop Sciences Commons, Marketing Commons, and the Plant Biology Commons

Recommended Citation
Anderson, Wal; Peggs, Alan; and Sawkins, Doug (1993) "Production of high-value wheats: one sustainable answer to the cost:price squeeze," Journal of the Department of Agriculture, Western Australia, Series 4: Vol. 34 : No. 4 , Article 3.
Available at: https://researchlibrary.agric.wa.gov.au/journal_agriculture4/vol34/iss4/3

This article is brought to you for free and open access by Research Library. It has been accepted for inclusion in Journal of the Department of Agriculture, Western Australia, Series 4 by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandra.papenfus@agric.wa.gov.au, paul.orange@dpird.wa.gov.au.
Production of high-value wheats: one sustainable answer to the cost:price squeeze

By Wal Anderson, Senior Research Officer
Plant Industries, South Perth

Alan Peggs, Adviser, Policy Analysis and Industry Development, South Perth

Doug Sawkins, Officer in Charge, Narrogin

Over the past 10 years or more there has been intense interest in, and considerable adoption of, conservation farming techniques such as minimum tillage, residue retention, cultivation on the contour, diverse rotations and tree planting.

Yet in many places salinity has increased, soil erosion has continued, herbicide resistant grasses have appeared and soil fertility has possibly declined.

Farmers and scientists alike over the past decade have sought to address the declining terms of farm trade (the cost:price squeeze) by increasing wheat yields in ways that will ensure both their economic and ecological survival.

Nevertheless, costs have continued to increase as a proportion of the value of the product (see Table 1).

Many farmers have increased their wheat yields substantially and the industry as a whole is more conscious of the quality of its product.
Department of Agriculture research since the mid 1980s has shown that if new varieties and improved agronomic practices are adopted, a higher proportion of the rain that falls in the growing season can be converted into grain.

The Australian Wheat Board's recent (September 1993) announcement of added payments for Australian Standard White wheat with 10 per cent protein or more, should assist growers to adopt cropping systems that will be more sustainable without losing income.

There is a common belief that farmers in the low rainfall areas have been quick to adopt new technologies such as stubble retention, minimum tillage, herbicides, early sowing and new varieties. If this is so, it may be more sensible to concentrate in future on increasing the value of the grain produced rather than attempting to increase yields in such a risky environment.

The most worrying trends are those in the eastern wheatbelt where seasonal variability, the influence this has on farmer attitudes to risk, and a possible fertility decline, may affect yield.

Water use efficiency tends to be greatest in our medium rainfall shires and less in the low rainfall, where seasonal risks cause farmers to reduce inputs. It is also lower in the high rainfall where waterlogging is the most likely cause.

Average wheat yields in Western Australia are still well below the potential set by the average rainfall in most shires. This potential for cereals can be estimated by a method that has evolved over many years, but which was improved and popularised in 1984 by R.J. French and J.E. Schultz in South Australia. It is illustrated by the formula below:

\[
\text{Average yield in 1990} = \frac{Y_0 + \text{Yield trend}}{2}
\]

Where:
- \(Y_0\) is the average yield in 1990,
- \text{Yield trend} is the average yield from linear trend as a percentage of potential yield.

There is a common belief that farmers in the low rainfall areas have been quick to adopt new technologies such as stubble retention, minimum tillage, herbicides, early sowing and new varieties. If this is so, it may be more sensible to concentrate in future on increasing the value of the grain produced rather than attempting to increase yields in such a risky environment.

The Australian Wheat Board's recent (September 1993) announcement of added payments for Australian Standard White wheat with 10 per cent protein or more, should assist growers to adopt cropping systems that will be more sustainable without losing income.

Department of Agriculture research since the mid 1980s has shown that if new varieties and improved agronomic practices are adopted, a higher proportion of the rain that falls in the growing season can be converted into grain.
This is illustrated in Figure 1, where the straight line represents the optimum management and the curved line represents the practices common in the wheatbelt five to ten years ago. The water not used by the crop has been halved and water converted efficiently to grain has been increased up to at least 350 mm by improving crop management.

**Crop yield 'packages'**
The research of many people has been used to create a 'package' of best practices that will most often result in full use of the growing season rainfall. It has become known as the high yield package, and can be summarised as follows:

**The high yield package**
- Select good cropping land
- Use a legume rotation
- Control grass weeds one or two years before the cereal crop
- Select productive varieties and sow them at the appropriate times
- Increase nitrogen fertiliser and seed rates to take advantage of the improved yield potential

The package technology can contribute in a positive way to the sustainability of our cropping systems. Matching cropping to appropriate soil types, the reduction of runoff, and deep drainage can be useful in addressing some current problems such as erosion and salinity.

However, some aspects of the package, and modifications of it, are not necessarily so friendly towards the environment. For example, the pressure to control grass weeds may sometimes have led to overuse of chemicals that could have aggravated the development of herbicide resistance.

We must continue to refine production packages to find the least cost methods, both economic and ecological, of using all the rain that falls in a growing season.

**Special Hard**
Modification of the original high yield package towards more valuable types of wheat has led to the development of several new packages.

The Special Hard Package aims to increase the chances of producers obtaining the higher prices that are paid for wheat over Special Hard grade. So far, this work has concentrated in the low and medium rainfall areas using the best red clay loam soils.

Probably the key practice for obtaining high protein has been the use of good medic pastures. Despite low prices for wool there are already indications that farmers are increasing their interest in this pasture-based system with increased sowing intentions of Special Hard varieties in several areas (three to five fold in 1992–93 compared with 1990–91, Australian Wheat Board).

Our results from 1989 to 1992 have shown that late May sowings are optimal, but that provided the right rotation, soil type and varieties are used there is little response of either grain yield or grain protein to nitrogen fertilisers. The package has produced grain of suitable protein (13 per cent or more) in nine out of ten experiments.
It is anticipated that reliable production of wheat meeting high-value quality requirements will increase the returns that growers can expect from their crops, but will reduce the pressure to continually increase yields. In turn, this should reduce the degrading pressures on the landscape and farm environment.

Continuing research
Research to find better ways to produce the specialised, high-value wheats with less risk is continuing.

Where grain samples from the early sowings were unacceptable for the grade, owing to either high protein or excessive small grains, they either followed a long, clover-dominant pasture or were grown on soils that were marginally deficient in potassium. In our experiments, which were mostly in a lupin:wheat rotation, the soft wheat varieties Tincurrin and Corrigin were inclined to produce unacceptable grain samples particularly from later (June) sowings, especially when nitrogen fertiliser was used (see Table 4). The main cause of samples that did not meet the receival standards was small grain, but high protein and low hectolitre weights were also implicated occasionally.

The main problems facing producers have been the production of unsuitable grain samples owing to high levels of small grain (grain passing a 2 mm sieve), grain proteins above 9.5 per cent and low hectolitre weights. Wheats accepted into this grade are mainly used for making biscuits and cakes.

The main reason we did not achieve this protein in some of our experiments was poor control of grass weeds. Only 30-40 per cent of grassy crops achieved 9.5 per cent protein or more but over 90 per cent of ‘grass-free’ crops did so. Most of the research was conducted in the medium rainfall zone (325-450 mm) using lupin:wheat rotations, but adequate yields and proteins were obtained over a wide range of conditions north to south and in both low and high rainfall areas as well.

Noodle wheats
Wheats suitable for making Japanese-style, white, salted noodles need a protein content that exceeds 9.5 per cent but is not more than 11.5 per cent.

The Australian Soft package
• Plant Tincurrin or Corrigin
• Sow after lupins, canola or short clover ley
• Sow in late May (after 15 May, later in the high rainfall areas)
• Use up to 50 kg/ha of nitrogen if sowing in late May
• Test soil and/or tissue for potassium
• Do not use high seed rates if sowing late with nitrogen fertiliser

Wal Anderson can be contacted on (09) 368 3521

Table 4. Percentage of soft wheat grain samples that did not meet the receival standard when sown late (June) with nitrogen fertiliser. Data from experiments in 1989 to 1991

<table>
<thead>
<tr>
<th>Sowing time</th>
<th>0 kg/ha nitrogen</th>
<th>40 kg/ha nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>Late</td>
<td>56</td>
<td>75</td>
</tr>
</tbody>
</table>

Australian Soft
Wheat suitable for the Australian Soft grade has been produced in Western Australia for many years. The maximum grain protein acceptable into the grade is 9.5 per cent and bonuses are paid for proteins below this down to 8.5 per cent.