

Coordinated on-farm testing in the Wimmera.

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Abstract

TOPCROP is very active in the Wimmera region of Victoria, with sixteen functioning grower groups. Over the past four years, the achievements of these groups have been recognised at both a state and a national level, with two groups - Wallup and Wal Wal/Lubeck – winning the Australian TOPCROP Group of the Year award and the Woorak group winning the Victorian TOPCROP award.

In 2001, most TOPCROP groups participated in on-farm testing to examine agronomic issues such as crop nutrition, crop varieties and pesticide selection and timing. While all of the sites were sown, harvested and maintained using conventional broadacre equipment, a range of experimental designs were employed. As a result of the variable designs, it was not possible to combine the results from a number of the trials to draw regional conclusions.

Wimmera TOPCROP growers are now coordinating their on-farm testing through focused wheat and barley variety evaluation trials. The standard design is “nearest neighbour”, with controls every third plot and common varieties at each site. Repeating the trials at a number of different sites allows conclusions about variety performance across the region to be drawn, as well as providing localised information. Farmer participation results in a high degree of on-farm relevance and encourages adoption of suitable wheat and barley varieties by Wimmera farmers.

Key words

TOPCROP, farmer trials, agronomy, cereal varieties

Introduction

TOPCROP is the major vehicle for grains extension work conducted by Victoria's state agricultural agency - the Department of Natural Resources and Environment (NRE). TOPCROP consists of a network of grower groups extending across the main grain growing regions of Victoria, with sixteen active TOPCROP groups in the Wimmera region. In the past, all of these groups have been involved in some form of on-farm testing of new agronomic technology. This could have involved anything from paired paddock comparisons to replicated trials run by NRE's variety evaluation unit.

In 2002, trials conducted by Wimmera TOPCROP groups were coordinated to ensure valid conclusions could be drawn from individual trials as well as crop variety performance across districts. Merging results from a number of trials adds to the power of the data by removing some experimental error (V. Matassa, pers. comm.) and highlighting trends across whole districts. The trials were not set up to conduct basic research but rather to apply existing ideas to the paddock, using a farmer friendly method.

This activity has embraced the Victorian TOPCROP State Focus concept of investigating a single issue via on-farm trials, repeated in a number of locations, using the nearest neighbour design (1), but is focused specifically on the Wimmera region. Wimmera Farming Systems (WFS), a large farmer group with a grower member base that extends across the Wimmera, have also used the nearest neighbour design to generate information for the last two years (2, 3) and has found coordination of these trials to be vital in generating information for their members (A. Weidemann, pers. comm).

In this type of participatory-action learning it is essential that the grower groups take ownership of the trials and don't perceive them as trials driven by NRE. To overcome this, farmers were involved from the

beginning by selecting cereals as the focus and the individual varieties to be tested. Throughout the growing season, ownership was encouraged through regular group visits to the trials, monitoring of the trial by group members and making the sites available for individual visits. These techniques keep group members aware of what is occurring at the sites and facilitates more rapid adoption of “proven” technologies.

This approach to variety evaluation allows farmers to take an active role in the selection and adoption of new crop varieties. The evaluation provides growers with objective varietal information and provides locally relevant information to contribute to agronomic packages.

Methods

Variety selection

In February 2002 a meeting was held with farmers from six TOPCROP groups located within a 60km radius of Nhill in the West Wimmera to compile a list of key wheat and barley varieties being grown in the area. Six wheat and four barley varieties, all commercially available, were to be tested at every site. In addition, the new wheat variety, Annuello, and the new barley, Sloop Vic, were added to this list to enable an assessment of their suitability for local environments. Optional varieties were trialed in addition to the standard varieties to ensure each trial site could include locally relevant varieties.

All seed requirements for WFS and TOPCROP trials were supplied from a central source to remove a source of error.

Table 1: List of varieties tested. Variety names in standard font are core varieties tested at each location; italics indicate optional varieties.

Wheat	Barley
Annuello	Franklin
Chara	Gairdner
Frame	Schooner
H45	Sloop
Janz	Sloop Vic
Mitre	<i>Arapiles</i>
Yitpi	<i>Barque</i>
<i>Camm</i>	
<i>Goroke</i>	

Lorikeet

Meering

Rosella

Whistler

Wyalkatchem

Trial design

Each site was sown with conventional broadacre equipment provided by the host farmer, making plots at least 9m wide and 100m long. This improved on-farm relevance but meant replication of treatments at each site was not possible. However, treatment replication occurred across locations.

The nearest neighbour design was employed whereby every third plot was designated as a control. Control plots were set up to reduce the effect of spatial variability and hence improve the estimate of the treatment effect (4). This method is a variation on the small block nearest neighbour design discussed by Dixon (4).

The replicated control plots provided the basis for analysis of variance to estimate residual errors, least significant differences and probability values for comparing treatments (5). The control variety used in each instance was the variety being grown by the host farmer in the remainder of the paddock.

Table 2: Example wheat variety trial layout. In this instance, Yitpi is the control.

Yitpi	Chara	Mitre	Yitpi	H45	Annuello	Yitpi	Janz	Frame	Yitpi
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Data collection

TOPCROP group members conducted counts of plant establishment at the sites. Grain was harvested with a broadacre header (supplied by the host farmer) and a grain weigh bin was used to establish yield. A grain sample from each plot was taken for protein and screenings percentages.

Results

In total, ten wheat and ten barley variety trials were established in the Wimmera, extending as far north as Rainbow, south west to Apsley and south east to Navarre. A partnership with WFS was established to reach a wider audience than just TOPCROP members, resulting in the establishment of four additional sites managed by WFS.

Results from these trials will be available in early 2003, in the TOPCROP Victoria On-Farm Testing 2003 booklet and in the WFS 2002-2003 Results Manual.

Future Developments

The adoption of the nearest neighbour design across all trials was a significant development for Wimmera TOPCROP growers. The use of standard varieties at each site gives weight to any analysis conducted on nearest neighbour trials. Use of standard treatments across sites in future work will enhance results from

trials managed by farmers and provide a basis for credible demonstration and adoption of new technology.

Extending the trials across a number of groups has provided the option for groups to travel to other districts to compare how varieties are performing in a different environment, thereby strengthening the TOPCROP network. Additionally, the work has produced much stronger links between WFS and TOPCROP, with the results from these trials contributing to data sets used for crop performance interpretation by WFS. This partnership will continue in 2003 to increase the amount of data from local trial work available to Wimmera farmers.

This network of TOPCROP farmers actively involved in on-farm testing will be equally important in future years for testing/evaluating other new agronomic technologies, such as crop protection and nutrition. In 2003, Wimmera TOPCROP groups will be part of an evaluation of new chickpea varieties to be released by Australian Agricultural Commodities (AAC), by establishing trials in the same manner as for the cereal evaluation described here. Data from the work in 2003 will also contribute to the development of agronomic management packages for these new varieties.

Seed companies such as PlantTech, Sunprime Seeds, AWB Seeds and The Lentil Company have donated seed for the 2002 trials in the knowledge their varieties will be fairly evaluated against current and potential lines. The sites also provide exposure for these companies and their new varieties and allow growers to see how they compare agronomically. In the future there is the potential for breeders to showcase potential new varieties in demonstrations with high levels of grower involvement and awareness, provided sufficient seed is available for large-scale comparisons.

References

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