The Three Tonne Club: pioneering a new cropping era?

M W. Perry
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The Three Tonne Club — pioneering a new cropping era?

by M. W. Perry

In March 1979 a group of progressive wheat producers formed the 'Three Tonne Club'. They were quickly followed by groups in the eastern wheatbelt who formed nine local 'Two Tonne Clubs' and by a 'Two Tonne Coarse Grains Club' on the south coast. This year has seen the start of a 'Two Tonne Direct Drilling Club' at Karlgarin and a 'Two Tonne Lupin Club' centred in Watheroo. Although these groups vary in their interests, all have a common aim: to increase crop yields through better knowledge of and more informed management of their cropping enterprises.

This article records the origins of the Three Tonne Club, outlines the concepts behind its operation and considers the benefits that producers and research organizations may derive from participation in a Club.

Origin and Aims of the Three Tonne Club

The Three Tonne Club arose from discussions in the Grains Committee of the Rural and Allied Industries Conference. Mr Harry Perkins of Belka, increasingly concerned over rising production costs, saw that one key to future profitability was to increase productivity by growing more grain per hectare.

Mr Perkins had become acquainted with 'Programmed crop production' techniques used in Europe. These specify in some detail the management a crop must receive at each stage from seeding through to maturity. In Europe this may include multiple fertiliser applications at carefully timed growth stages, use of growth regulating chemicals and application of fungicides to control disease.

Not all these measures may apply in Western Australia, but Mr Perkins was impressed by the planned approach to crop production and, in particular, by the careful monitoring of the growth stage of the crop in relation to management practices.

By comparison, Western Australia's crop production techniques appeared primitive and Mr Perkins proposed that by adopting a similar approach Western Australian producers might also dramatically improve grain yields per hectare. A similar concept was expounded by the Department of Agriculture's Plant Research Division Chief, N. J. Halse at the Australian Cereal Agronomy Conference held in Perth in October 1978.

His idea was that research should identify potential wheat yields... that is, the yields achievable if all constraints of nutrition, weeds, diseases etc. were removed and only the climatic limitations remained. As a follow-up, further research should estimate the yield losses due to the avoidable constraints of weeds and diseases.

Three Tonne Club member Bruce Ivers of Kojonup, with a section of crop which exceeded three tonnes per hectare.
etc. that restrict farm crops to yields far below their true potential.

From these beginnings arose the idea of forming a group of expert wheat producers who could join with industry and research groups to try to attain maximum wheat yields per hectare.

The Institute of Agriculture, CSBP and the Department of Agriculture pledged support for the idea at a meeting convened by the Grains Committee. In particular, the Department of Agriculture agreed to summarise the existing information on factors affecting wheat yield in Western Australia.

This summary, published as the booklet entitled—"Toward Higher Wheat Yields"—was distributed at the inaugural meeting of the Three Tonne Club in March 1979. At this meeting the grain producers present resolved to each establish an area of crop on which they would try to achieve maximum wheat yields and which they would monitor at frequent intervals.

They saw monitoring as an important activity which would give producers a better 'feeling' for their crop and which would enable them to build up and share a specification for a high yielding crop. The information in "Toward Higher Wheat Yields" was a first step toward this specification.

To cater for the crop monitoring activity the Department of Agriculture prepared a "Monitoring Handbook" and CSBP undertook to sample and analyse members' crops for nutritional status. The information collected was to be analysed and returned to members before the next seeding.

The club also agreed to sponsor special seminars and field days where appropriate to encourage greater interaction between producers and others in rural research and rural industry.

The theory in practice

Crop monitoring was the founding principle of the Three Tonne Club—the idea that special 'three tonne paddocks' would receive planned intensive management, that all inputs would be recorded and that the results would be monitored and shared amongst members. The idea expressed in this statement has two parts; the planned intensive management of a paddock, and the recording of inputs and the observation of their results.

Better management implies more and better information about the crop and its response to environmental and management inputs. The booklet "Toward Higher Wheat Yields" was a first attempt to provide a management plan or specification for a high yielding crop. It covered the most important factors known to affect local wheat yields. These are time and rate of seeding; fertiliser; weeds and root and leaf diseases.

Any management programme must be built around these basic factors. Once these are established to provide the highest possible yield potential, producers can start to intensify their management by experimenting with growth regulators such as CycoVel, with fungicides or by applying nutrients late in the season by foliar sprays. Here, club members will be moving toward areas which have received only scant research in Australia.

The second part of crop monitoring was the recording of all inputs used, observations of the results and the sharing of these through a crop survey.

In a crop survey each paddock is an experiment—not the classical experiment where only one or a few factors vary, but an experiment where a certain set of conditions gives a certain paddock yield. When the sets of conditions are known and enough paddocks are included, the survey can start to identify trends and correlations in the results.

But there are two vital limitations. The results of a survey can only be as good as the data that goes in, and the more paddocks covered the better the survey results.

The initial 1979 crop survey covered only 27 paddocks. The results highlighted some of the difficulties of crop monitoring. Participants provided excellent information on paddock histories, actual cropping practices, fertiliser regimes and the like. But even dedicated club members had difficulty recording actual crop and weed densities, ear numbers and so on. It was also clear that 27 paddocks was too small a sample to draw out significant trends. For example, the ICI 10-tonne winter wheat surveys in the United Kingdom analyse about 1000 paddocks each year.

In response to these problems the 1980 crop survey forms were modified to encourage participants to include some data on as many paddocks as possible. Even so, it may be two to three years before a continuing crop survey can accumulate enough data to provide meaningful results.

Nevertheless, the discipline of recording inputs and monitoring crops can benefit producers in a number of ways—

• Awareness: Regular planned inspection and plant tissue analysis of crops as part of a monitoring programme will lead to the rapid identification of problems and quick action to correct the situation.

• Education: There is no doubt that producers with a real appreciation of how their crops grow will be in a position to intelligently adopt new technology rapidly and profitably. Effective use of herbicides is likely to depend increasingly upon planned application at specific growth stages of the crop. Growth regulators and fungicides likewise need to be applied at defined stages for maximum effect.

• Participation: By pooling information on cropping practices and their results, members should benefit by seeing where they stand relative to other producers, and all participants should be able to see what practices are associated with the best results.

The other main objectives of the club were to provide a forum where producers could share experiences amongst themselves, with research workers in agricultural industry, the Universities and the Department of Agriculture.
Lupins lift wheat yields

Harvesting a Department of Agriculture plot, testing three tonne production techniques for maximum yields.

Associated with this was the desire for easier transfer of information from the research area to progressive producers. The club has been eminently successful with these objectives.

The definition of problem areas as seen by producers and the transfer of these problems to the research arena has long been a major problem for research organizations. The club has provided a unique opportunity for researchers to see problems from the producers' perspective. Already, this has resulted in some new emphasis in research programmes.

The wealth of ideas and practical experience of club members themselves is yet practically unexploited.

All members face the same problems of spraying, seeding, harvesting etc., to which each has a different solution. To draw these out in open discussion amongst members themselves could be a valuable addition to club activities.

Equally important, the club has highlighted problems in the delivery of information to producers. As the scale of farm operations increases and the expertise of managers improves, so must the quality of the information the supporting organizations provide. Simple recommendations no longer suffice where producers demand supporting data to make their own informed decisions.

The future

The future of the Three Tonne Club will depend upon how well it fulfils the expectations of its membership. However, whatever the future of the club itself, it already has had an important influence on attitudes to research and to the provision of information to producers.

The growth of similar groups throughout the wheatbelt is playing a major role in making all grain producers consider the limitations within their cropping systems and how these may be removed. The activities of an expert group—the Three Tonne Club—have thus, in less than two years had an important impact on cereal production in Western Australia.

Plots sown to wheat or lupins in 1979 were re-cropped to wheat in 1980 with varying rates of nitrogen fertiliser. Harvest results show that one year of sandplain lupin gave higher wheat yields than any rate of nitrogen fertiliser up to 300 kg/ha of Agran 34:0 applied to wheat-following-wheat.

This year, the wheat-after-lupin plots will be allowed to regenerate to lupins from soil seed reserves plus seed dropped at the 1980 harvest. Other plots, under lupins in 1980, will be sown to wheat and again compared with continuous wheat receiving varying rates of nitrogen.

The sandplain lupin, *Lupinus cosentinii* has been used for many years as a soil fertility improver and forage plant on the sandy soils of the northern agricultural areas.

Dr J. S. Gladstones has improved this lupin in his breeding programme. His most recent line, CB49, is earlier flowering than the wild parent, has non-shattering pods, and a low level of bitter alkaloid. It has been registered under the name 'Eregulla', but has not yet been released to growers because it is still too hard-seeded for normal agricultural use.

But Department of Agriculture Research Officer M. W. Perry of the Division of Plant Research, and Geraldton Regional Officer in Charge, C. M. Ralph saw the combination of harvestability, high protein content, hard seed and nitrogen fixing ability as assets which could be valuable in a one-to-one rotation with wheat. In such a rotation, the lupin would replace the clover or medic pasture. Some winter grazing would be lost, but 500 to 1 000 kg/ha of lupin seed could be harvested.

To test the idea, they established trials at Mingenew and Tenindewa.

<table>
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<th>Rate of Agran (kg/ha)</th>
<th>Mingenew 1979 crop:</th>
<th>Tenindewa 1979 crop:</th>
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<tbody>
<tr>
<td>Wheat</td>
<td>Lupin</td>
<td>Wheat</td>
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<tr>
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