THE CONFLICT BETWEEN WHEAT QUALITY AND YIELD IN WHEAT BREEDING

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Since 1928, wheat breeders have had an impossible task trying to satisfy the two committees responsible for controlling the release of new wheat varieties and for regulating the growing of wheat in New Zealand under a rigid price control system. The Wheat Research Committee, a DSIR advisory committee appointed by the Minister of Science, controls the release of new wheat varieties. The other committee, the Wheat Board, is appointed by the Minister of Trade and Industry and controls the wheat industry. The main objective of both these committees has been to obtain and grow varieties which improved both the yield to growers and quality to all consumers.

For obvious biological reasons it is impossible to combine the highest yield (largely starch) with the highest baking quality (largely protein). The result of these conflicting objectives always has to be a compromise between the wheat growers and the processing industry. With some new varieties, the growers have had a temporary benefit because of superior yield (e.g. Kopara and Karamu). With other varieties, the millers have benefited through higher flour yields (e.g. Cross Seven and Aotea) or the bakers have benefited through higher protein and baking quality (e.g. Hilgendorf and Oroua). The Wheat Board has had the very difficult (and almost impossible) task of equating the benefits to all sectors of the wheat industry upon each decision on the release of each new variety. For the Wheat Board it would be ideal if the wheat breeder could develop in one variety superior quality attributes to suit all sectors of the wheat industry. However, since this is impossible, it has been necessary to breed and release different varieties best suited to the different sectors of the industry. The Wheat Board has regulated the production of these different varieties by a system of price discounts and premiums to growers. In the past there has been a lack of flexibility in making these price adjustments but, more recently, these adjustments have been made much more rapidly and the system is working with far better efficiency.

The major improvement proposed to automatically improve the sensitivity of this system is to add a series of small price differences within each variety for variations in quality. The most important quality is baking quality and within each variety this can be most accurately, rapidly and reliably estimated by the reflectance test for protein. These tests are used overseas to apply differential payments for quality and it has been established that a similar system could be applied to the N.Z. wheat crop.

The greatest benefits available from the plant breeders (i.e. their superior varieties) and from improvements in methods of crop production will only be achieved, when the improved methods of testing quality are used to give an added price incentive for quality within the present variety price system.