

GRAIN YIELDS OF FOUR BARLEY
CULTIVARS IN FIELD TRIALS 1965-71

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SUMMARY

In experiments in the five-year period 1965-71 Zephyr outyielded Carlsberg, in both North and South Islands and in each year. In the same period in South Island districts Zephyr clearly outyielded Research. In North Island feed barley trials, commenced in 1965, Argentine II gave the highest yield in northern, more humid districts but was inferior to both Zephyr and Carlsberg in southern districts because of loss of grain through shaking.

INTRODUCTION

Until recently evaluation of barley cultivars has largely centred on the requirements of the malting industry based in Canterbury. In 1951-52 the cultivar Research occupied 59% of the malting barley area of Canterbury and North Otago, Golden Archer 24% and Kenia 12% (Barrer, 1952). By 1954 two-thirds of the Canterbury crop was Kenia with Research taking most of the other third (Malcolm 1954). The ratio of these two cultivars was reversed by 1959 with two-thirds of the barley crop being Research (Malcolm 1959). In 1968-69 Kenia occupied 51%, Research 42% and Zephyr 7% of the malting barley areas of Canterbury (Malcolm pers. comm.).

After its introduction in 1951 Kenia was the most widely grown feed grain barley in the North Island but in 1962 Booth recommended that it be replaced by Carlsberg, introduced in 1959. Carlsberg had outyielded Kenia in both North and South Island trials by 15% but in the South Island it was unacceptable for malting (Booth 1962a).

In 1965 Kenia was the dominant cultivar grown in the Horowhenua Country but Carlsberg was recommended (Hopkins 1965). Carlsberg was also recommended for the Wairarapa (Willis 1967).

This paper reviews the results of trials which tested the four cultivars Carlsberg, Research, Zephyr and Argentine II over the period 1965-71. Sixty-one trials were conducted, 27 in the North Island and 34 in the South Island. The testing of Argentine II, a feed grain, was largely restricted to the North

Island and Research, a cultivar for malting to the South Island.

METHOD

The cultivars tested were:

2-Rowed Barley

Carlsberg, a Danish cultivar (Nordgaarden) from Maja x Prentice. Carlsberg I entered trials in 1954 and Carlsberg II in 1957. It is the standard cultivar in New Zealand for grain yield.

Research, reselected in N.Z. from the Australian cultivar of the same name (Werribee), from Plumage Archer x Prior. Originally introduced into N.Z. in 1943 and reselected in 1946. It is the standard cultivar in N.Z. for malting quality of barley.

Zephyr, a Netherlands cultivar released by the M.G.H. Combine in 1965 from Carlsberg x Heine 2149. Introduced into New Zealand by a farmer and entered trials in 1966.

6-Rowed Barley.

Argentine II, a cultivar imported from Argentina about 1958 for greenfeed purposes and entered feed grain production trials in 1965.

The trials were sown with combine drills seven or nine coulter wide, with fertiliser as required. Individual plots were single drill strips usually about 40 metres long. Replicated randomised block designs were used.

Plots were harvested with header harvesters except in a few instances when hand-sampling was done, using the method described by Lynch (1960).

RESULTS

CARLSBERG VERSUS ZEPHYR

These were directly compared in trials throughout both North and South Islands. There were 56 such comparisons, 22 of them in the North Island and 34 in the South Island (Table 1).

Zephyr outyielded Carlsberg significantly in 24 (43%) of the 56 trials. The effect was similar in all districts with the exception that it appeared somewhat more marked in Marlborough.

TABLE 1: Comparison of the Grain Yields kg/ha of Carlsberg and Zephyr Barley Cultivars in Trials Throughout New Zealand.

District	No. of Trials	Grain Yields		Zephyr relative to Carlsberg=100
		Carlsberg	Zephyr	
Northern North Island	15	3840	4110	107
Southern North Island	7	4450	4690	105
Marlborough	9	4500	5350	119
Canterbury	16	5400	5750	106
Otago-Southland	9	4930	5230	106
MEAN		4620	5030	109

Zephyr outyielded Carlsberg in all four years.

ZEPHYR VERSUS CARLSBERG AND RESEARCH IN MALTING BARLEY TRIALS, SOUTH ISLAND.

There were 24 trials in the malting barley districts of Marlborough, Canterbury and North Otago in which Zephyr was compared with Carlsberg and Research (Table 2).

In 20 trials (83%) Zephyr significantly outyielded Research while Carlsberg outyielded Research in 15 trials (63%). In the lower yielding North Otago trials, Zephyr and Carlsberg did not show the same advantage in yield over Research as in Canterbury and Marlborough.

TABLE 2 : Comparison of the Grain Yields Kg/ha of Zephyr, Carlsberg and Research Barley Cultivars in Malting Barley Trials in South Island.

District	No. of Trials	Grain Yields			Relative to Research=100	
		Zephyr	Carlsberg	Research	Zephyr	Carlsberg
Marlborough	7	6040	4940	4330	140	114
Canterbury	13	5610	5230	4450	126	118
North Otago	4	3840	3620	3440	112	105
MEANS		5160	4600	4070	126	112

NORTH ISLAND FEED GRAIN TRIALS WHICH INCLUDED ARGENTINE II

In the North Island Argentine II was compared with Zephyr in 17 trials and with Carlsberg in 20 trials (Table 3).

Districts had a great effect on these comparisons. In northern North Island districts Argentine II significantly outyielded Zephyr in 7 out of 12 trials, and Carlsberg in 7 out of 13. However, in southern North Island districts the reverse effects occurred, where Argentine II was significantly inferior to Zephyr in all trials, and Carlsberg in 5 out of 7 trials.

The results in Southern North Island districts were greatly influenced by the severe losses of grain which occurred in Argentine II through shaking.

TABLE 3 : (a) Comparison of the Grain Yields kg/ha of Zephyr and Argentine II Barley Cultivars in North Island Trials

District	No. of Trials	Grain Yields		Zephyr relative to Argentine II = 100
		Zephyr	Argentine II	
Northern North Island	12	4150	4590	93
Southern North Island	5	4400	2830	155
MEANS		4270	3710	124

TABLE 3 : (b) Comparison of the Grain Yields kg/ha of Carlsberg and Argentine II Barley Cultivars in North Island Trials.

District	No. of Trials	Grain Yields		Carlsberg relative to Argentine II = 100
		Carlsberg	Argentine II	
Northern North Island	13	3730	4480	83
Southern North Island	7	4250	3390	125
MEANS		3990	3930	104

ARGENTINE II IN SOUTH ISLAND TRIALS

Argentine II was included in two South Island trials. In 1967-68 at South Canterbury it suffered severe shaking near harvest. In 1970-71 it was harvested satisfactorily in a South Otago trial but was inferior to Carlsberg and Zephyr.

AGRONOMIC FEATURES OTHER THAN YIELD

Apart from yield, information was obtained by observation on factors such as lodging, straw-break, shaking, disease incidence and maturity. The observations can be summarised as follows:-

Lodging Research appeared to be the most prone to lodging of the four cultivars (although it was not compared directly with Argentine II). In a number of trials Zephyr was more resistant to lodging than other cultivars. Argentine II, in spite of relatively tall growth, did not lodge, in general, to any greater extent than Carlsberg.

Strawbreak Some South Island trials in 1966/67 and 1967/68 were subjected to high winds prior to harvest, causing straw-break among most varieties; but this occurred less in Zephyr.

Shaking In Southern North Island Argentine II shook badly in some trials; and also in one South Island trial. This did not occur in northern districts.

Disease Incidence Mildew Erysiphe graminis DC occurred in some Marlborough trials, where Zephyr appeared to be less affected than Carlsberg. There was an instance in one Waikato trial of the occurrence of leaf-blight Rhynchosporium secalis which was extensive on Zephyr, less evident on Carlsberg and absent in Argentine II. Subsequently the disease was observed in the Waikato on autumn-sown Argentine II.

Maturity In South Island Research was generally somewhat earlier than Carlsberg and Zephyr. In North Island Argentine II was distinctly earlier maturing than Carlsberg and Zephyr.

General Appearance Argentine II gave much taller and much heavier growth than Zephyr and Carlsberg. This could be an advantage if great bulk of straw was desirable.

DISCUSSION

In all districts Zephyr barley outyielded Carlsberg, and coupled with its sound agronomic qualities such as resistance to lodging it can be recommended to replace this latter cultivar. Zephyr has also proved superior to Research in grain production and with its acceptance for malting may also replace this cultivar. In the last three years there has been a rapid rise from 7 to 33 percent of the malting barley crop in Zephyr, with a consequent drop in the area growing Kenia or Research cultivars. It is expected that the percentage of the total crop in Zephyr will increase still further (W. J. Thompson, pers. comm.).

In the humid districts of the Waikato, Bay of Plenty and Auckland areas, Argentine II outyielded Zephyr and in these districts it should be the recommended cultivar. Argentine II did not perform as well in the southern North Island districts, Hawkes Bay, Manawatu and Rangitikei, and for feed grain production in these areas Zephyr is recommended. The poor performance of Argentine II in these areas was due to the loss of grain through shaking.

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