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WHEAT AND BARLEY TRIALS

1956-57

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THE results of cereal variety trials on wheatbelt research stations and also a barley trial on the property of Messrs. Hamilton Bros., Moora, are included in two separate articles in this Journal. Trials with wheat and barley are discussed in this article, while the oat variety trials have been incorporated into "Oat Trials and Usage in the Wheatbelt, 1956." (See page 551.)

Two new wheats were under test for the first time; viz., Koda, bred by the University of Sydney and W.35 a fixed cross-bred developed at the Wongan Hills Research Station.

SEASONAL CONDITIONS, 1956-57

Rainfall figures for the research stations are shown in Table 1. Merredin is not included, as the experiments were destroyed by hail storms in November.

Good opening rains were received in May at all stations except Salmon Gums, where the recording was below average. This satisfactory start of the season, together with fine weather in June, enabled

cropping to be completed on time. The fine weather was accompanied by low temperatures, but the effects on plant growth were not particularly detrimental.

Satisfactory falls continued until the end of July but from then on, extremely dry conditions prevailed, with rainfall in August and September well below average. Light rains in October were of considerable benefit and assured an average finish to the season, except at Salmon Gums, where the rains came too late to be of any value.

Crops were sown on unfallowed clover ley land at Avondale, Chapman, Esperance and Wongan Hills. At Salmon Gums the land was fallowed in 1955, while at

TABLE 1.
Rainfall at Research Stations.

Station.	Growing Period.									Annual Total.
	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total.	
<i>Avondale</i> , 1956	20	63	312	346	352	24	61	45	1140	1252
Average 30 years	75	89	219	315	297	221	102	79	1234	1561
<i>Chapman</i> , 1956	84	30	436	394	451	70	25	70	1446	1620
Average 51 years	62	78	239	404	388	258	138	90	1516	1785
<i>Esperance</i> , 1956	9	116	190	261	228	136	125	104	1044	1276
Average 7 years	50	134	250	238	202	212	245	163	1310	1815
<i>Newdegate</i> , 1956	45	93	218	187	188	33	72	36	734	989
Average 2 years	49	192	162	141	145	175	172	94	890	1535
<i>Salmon Gums</i> , 1956	7	106	87	143	141	28	68	86	553	728
Average 31 years	121	91	126	150	140	141	106	110	773	1314
<i>Wongan Hills</i> , 1956	29	22	403	333	370	31	59	60	1256	1429
Average 31 years	84	91	196	254	260	194	91	69	1064	1404

Newdegate, the trials were sown on new land which had been under fallow for two seasons.

Seasonal conditions and cultural operations on the individual stations were as follows—

AVONDALE RESEARCH STATION, BEVERLEY

The experimental site was first sown to subterranean clover in 1952. It was scarified in the third week in May, 1956, and followed a few days later with a disc ploughing. The trials were sown with 60 lb. seed and 112 lb. superphosphate per acre. Initial growth was slow under the cold conditions and with a dry August, weeds tended to gain a hold. However, the plots made good recovery in September and October and satisfactory yields were obtained.

CHAPMAN RESEARCH STATION, NABAWA

The experiments were sown on land which had been under subterranean clover and Wimmera ryegrass pasture since 1943. The initial ploughing was with a sundercut in May, 1956, followed by tyne cultivation to control weeds before the first trial was planted in mid-May with a spring tyne combine. The trials were sown with 60 lb. seed and 80 lb. superphosphate per acre.

ESPERANCE PLAINS RESEARCH STATION, GIBSON

The trial was planted on ley land which had been under clover since 1952. The area was ploughed twice in May, then seeded with a disc-harrows drill combination. The seeding rate was 60 lb. per acre with 50 lb. of superphosphate (the area having been topdressed prior to cultivation with 150 lb.). The early rains were below average but good falls in August and September resulted in a satisfactory average yield of 17.0 bushels per acre.

NEWDEGATE DEMONSTRATION FARM, NEWDEGATE

The sowing rate for the wheat trials was 45 lb. with 190 lb. per acre super-copper-zinc mixture, and for the barley trial the

rates were 50 and 200 lb., respectively. Despite the dry finish to the season, satisfactory yields were obtained.

SALMON GUMS RESEARCH STATION, SALMON GUMS

The trials were sown on land which had been fallowed in July, 1955, scarified in October and again in April, 1956, to control weeds. The wheat trials were planted with a combine, 45 lb. of seed and 90 lb. of superphosphate per acre being applied. Dry conditions, particularly in August and September, produced thin, short crops with drought-tipped heads. The late-planted wheat trial was particularly affected by these conditions and no useful results were obtained.

WONGAN HILLS RESEARCH STATION, WONGAN HILLS

The trials were sown on land which had been established to clover pasture in 1951. The site was disc ploughed in the first week in May, and cultivated a fortnight later with disc harrows and a one-way discer. The wheat was sown at 45 lb. per acre with 112 lb. of superphosphate. The cold, wet conditions retarded crop growth until September but later, beneficial falls finished the grain well and above average yields were obtained, the early planted trial averaging 27.8 bushels per acre.

WHEAT VARIETY TRIALS

The yields are presented in Table 2. These are expressed both in bushels and as percentages of Bencubbin 48 and Wongoondy, the control varieties respectively, in the early and late planted trials.

The varieties under trial fall into three maturity groups, late-midseason, mid-season and early. The late-midseason group should be planted first and those in the early group last. If the latter are planted too early, disease such as Septoria and excessive shedding by wind on over-tall and rank crops are likely to occur.

Late-midseason Maturity.

Celebration, Kondut and Panther.

Midseason Maturity.

Bencubbin 48, Eureka 2, Sabre, M.114.

TABLE 2.
Wheat Variety Trials at Research Stations, 1956-57 Season.

Variety.	Avondale.		Chapman.		Newdegate.		Salmon Gums.		Wongan Hills.		Esperance.	
	Yield. Bus./ Acre.	Percent. of Control.	Yield. Bus./ Acre.	Percent. of Control.	Yield. Bus./ Acre.	Percent. of Control.	Yield. Bus./ Acre.	Percent. of Control.	Yield. Bus./ Acre.	Percent. of Control.	Yield. Bus./ Acre.	Percent. of Control.
		1956.		Average.		1956.		Average.		1956.		Average.
<i>Midseason Maturing Varieties—</i>												
Bencubbin 48	20.9	100	(6) 100	100	13.5	100	5.4	100	(5) 100	28.7	100	(5) 100
Kondut	20.8	99	(6) 110	106	14.4	107	5.0	92	(5) 105	29.2	102	(5) 105
Eureka	21.2	101	(6) 115	110	13.7	102	4.7	88	(2) 98	28.3	98	(5) 105
Sabre	21.3	102	(3) 110	106	13.9	104	5.3	99	(2) 98	25.9	90	(3) 108
M. 114	20.1	96	(2) 105	101	103	...	...	...	(2) 92	26.7	93	(2) 98
Celebration	...	...	...	...	...	...	...	...	...	...	...	...
Panther	...	...	...	...	...	...	...	...	...	...	15.5	(2) 107
	...	...	...	...	...	...	...	...	...	...	16.7	(5) 106
Diff. for sig. P = .05	Not significant.	0.7	4	...	0.7	5	Not significant.	0.8	3	...	1.1	8
<i>Early Maturing Varieties—</i>												
Wongoody	22.2	100	(10) 100	100	17.5	100	...	...	...	22.6	100	(10) 100
Gabo	20.9	94	(10) 105	96	16.2	93	...	...	...	22.4	99	(10) 107
Insignia 49	23.6	106	(5) 113	111	16.0	91	...	...	...	21.8	96	(6) 110
Koda	19.7	89	...	88	14.2	81	...	...	...	18.2	81	...
W.33	19.6	88	(2) 97	85	14.8	85	...	...	...	18.6	82	(2) 88
W.34	20.9	94	...	97	15.9	90	...	...	...	22.7	101	(2) 91
W.35	22.5	101	...	94	15.7	89	...	...	...	22.5	100	...
Diff. for sig. P = .05	1.6	7	...	4	1.1	6	...	...	1.1	5	...	...

N.B.—Figures in brackets indicate the number of years under trial.

Early Maturity.

Gabo, Insignia 49, Koda, Wongoondy, W.33, W.34, W.35.

Disease Resistance.

Flag-smut.—Gabo is susceptible and Insignia 49 is moderately resistant. The other varieties are either resistant or highly resistant.

Stem rust.—The strain of rust capable of attacking Eureka and Wongoondy, has not yet become established in this State and therefore these two varieties can still be regarded as resistant. The only rust strain isolated during the last few years is that known as 126 Anz. 1. All varieties (except Kondut) in the trials last season, are resistant to this rust strain.

Flour Quality.

Both Bencubbin 48 and Insignia 49 are of weak flour quality, the other varieties are either medium-strong or strong. Results obtained from variety trials and crop competitions indicate that in most areas of the wheatbelt, farmers can change over to the better quality wheats without any loss in yield. This change is taking place; the latest statistical returns show that 40 per cent of the total acreage is sown to varieties of improved flour quality.

Late-midseason and Midseason Varieties.

Kondut and Eureka gave satisfactory yields last season on the higher rainfall stations, also at Newdegate where the rainfall for the growing period was only 734 points. Eureka yielded well at Esperance whilst previous trials show it to be a very suitable variety for this area; Kondut is not recommended because of its susceptibility to stem rust. Both Sabre and Panther have also given good results at Esperance. Sabre, produced by Roseworthy College, also yielded well at Avondale and Chapman. As it has satisfactory disease resistance, good flour quality and straw strength, it is a variety which appears suitable for planting in the medium and high rainfall zones of the State where cropping on clover ley land is practised.

In the low rainfall areas, the highest yielding midseason varieties are Bencubbin 48 and Bencubbin. While Bencubbin 48 is no better than Bencubbin in flour quality, it is to be preferred because of its resistance to stem rust.

The crossbred M.114, did not yield particularly well last season at Avondale, Chapman and Wongan Hills, although previously under lower rainfall conditions, its yielding ability appeared satisfactory, suggesting that it may prove a useful variety to replace Bencubbin 48.

Early Maturing Varieties.

Over the last five years, Insignia 49 has been the highest yielding early variety in the research stations trials, but in 1956, this was only the case at Chapman. In the westerly districts, and where ley farming is practised, Gabo is to be preferred to Insignia 49. Although the average figures at Avondale suggest that it has outyielded Gabo by 8 per cent.—a direct comparison for the same five-year period shows that the difference is only a negligible half per cent. Further, Insignia 49 is a weak quality variety and consequently should be confined to the lower rainfall districts where the quicker finish to the season tends to result in grain of higher protein content.

Wongoondy continues to prove a very good early variety. Last season at Newdegate it outyielded all other varieties and, judged by previous trials at Merredin, it is more suitable than Gabo for the lower rainfall districts because of its greater drought resistance. Both Gabo and Wongoondy are medium strong varieties and on this account are to be preferred to Insignia 49.

Koda, a new variety from the Sydney University, gave yields inferior to the standard varieties at all stations. It appears to be unsuitable for local conditions.

The crossbreds W.33, W.34 and, W.35 produced at the Wongan Hills Station, were included in all the early trials but did not give any outstanding yield. W33 has been discarded and the other two will be included in the 1957 experiments.

The following table lists the varieties recommended for the different zones, taking into account yield data, flour quality tests, disease resistance and straw strength.

Bencubbin 48 and Insignia 49 are of weak flour quality, the others are medium-strong to strong.

TABLE 3.
Recommended Wheat Varieties.

Maturity.	Early Zone.	Midseason Zone.	Late Zone.
	Less than 14 in. annual rainfall.	14 in. to 18 in. annual rainfall.	Above 18 in. annual rainfall.
Late-midseason	.....	Kondut	Kondut
Midseason	Bencubbin 48	Eureka	Eureka
.....	.....	Bencubbin 48	.....
Early	Wongoondy	Gabo	Gabo
.....	Insignia 49	Wongoondy	Wongoondy
.....	.....	Insignia 49	.....

time. Further tests are necessary before any firm conclusion can be drawn.

M.119 is a hooded cross-bred, produced at Merredin from a cross between Greenough and Arabian Blue. As its yielding ability is low, it has now been discarded.

The two-row section included five varieties, Freja, Maja, Riegel, Ymer and Maltworthy in comparison with the local standard malt type—Prior. The first four are later maturing than Prior and only capable of high yields and good malting qualities in long seasoned districts. Malt-

TABLE 4.
Barley Variety Trials, 1956-57 Season.

Variety.	Avondale.			Newdegate.			Moora.		
	Yield Bus./Acre.	Percent. of Control.		Yield Bus./Acre.	Percent. of Control.		Yield Bus./Acre.	Percent. of Control.	
		1956.	Average.		1956.	Average.		1956.	Average.
Prior	22.9	100	100	15.3	100	100	14.0	100	100
Maltworthy	26.6	116	(4) 124	11.4	75	(2) 91	15.9	114	.....
Beecher	30.6	134	(4) 137	16.2	106	(2) 111	22.3	159	(2) 125
Atlas	27.3	119	(4) 131	16.4	107	(2) 102	19.1	136	(2) 122
Atlas 46	25.0	109	.....	16.5	108	.....	.....	.....	.....
M. 119	21.0	92	.....	14.2	93	.....	.....	.....	.....
Freja	22.0	96	(4) 107	.....	.....	.....	.....	.....	.....
Maja	22.3	97	.....	.....	.....	.....	20.2	144	.....
Riegel	21.1	92	(2) 80	.....	.....	.....	19.1	137	.....
Ymer	18.2	79	(2) 68	.....	.....	.....	.....	.....	.....
Diff. for sig. P = .05	2.4	11	.....	1.5	10	.....	3.3	23	.....

BARLEY VARIETY TRIALS

Last season, barley variety trials were carried out at Avondale, Newdegate and Moora, and the results are detailed in Table 4.

Of the six-row varieties, Beecher has continued to give higher yields than Atlas. Taking into account its better yielding ability, together with the fact that it is a white kernel variety, and consequently more acceptable to the Japanese trade which is now developing, Beecher is obviously a much better variety than Atlas for West Australian conditions.

Atlas 46—a back-cross variety, similar to Atlas, but resistant to powdery mildew—was included in the trials for the first

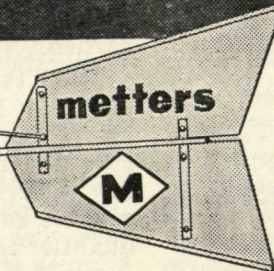
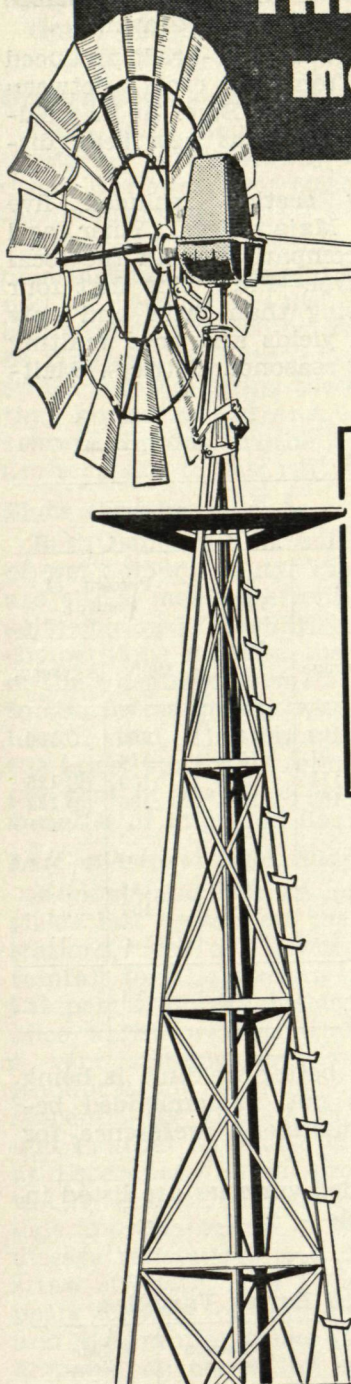
worthy, although better yielding, is being discarded and is not recommended because of local maltsters' preference for Prior.

The recommended varieties are listed in the following table—

TABLE 5.
Recommended Barley Varieties.

Use.	Early Zone.	Midseason Zone.	Late Zone.
	Less than 14 in. annual rainfall.	14 in. to 18 in. annual rainfall.	Over 18 in. annual rainfall.
Local Malting	.....	Prior	Prior
6-row export	Beecher	Beecher	Beecher
Grazing and Fodder Grain	Atlas	Atlas	Atlas
	Beecher	Beecher	Beecher

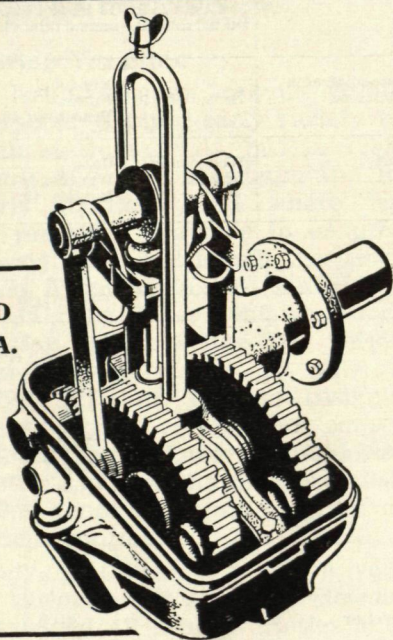
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