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# 1976 Early crossbreds

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EXPERIMENTAL SUMMARY 1976 - C.M. FRANCIS

EARLY CROSSBREDS

A) 1967 Series Crossbreds

1976 was a drought season and three new trials failed to set seed. This was unfortunate because more data is needed to support the pending release of Nungarin, the first early maturing clover to arise from this programme. A third year stand, however, yielded seed data (Table 1). 175.1 (Nungarin) had significantly ( $P < .05$ ) more seed than Geraldton, Northam A or crossbred 239. However, when figures are compared with 1974 first year seed yields it can be seen that each cultivar set only enough seed in succeeding years to maintain its seed bank.

TABLE 1: Seed Yield 3rd Year Stand Merredin Research Station, 1976

<u>Variety</u>	<u>Seed yield kg/ha</u>	
175 (Nungarin)	286	(308)*
239	214	(224)
Northam A	228	(187)
Geraldton	167	(161)

LSD  $P < .05$  = 56

\* Seed yield 1974 (in brackets)

The same trial yielded some information about likely survival after crops (Table 2). Half the plots had been prevented from seeding in 1975 by spraying out (with Reglone) plants which had germinated from the 1974 seed reserve.

TABLE 2: Seed reserves after a season's loss of seed production and its relation to hard seed data

Variety	Seed prior to break kg/ha	Seed reserve at end of season	% initial seed remaining	Hard Seed Estimates April Field sample	Lab test*
Nungarin	308	153	49	45	53
239	224	151	67	60	53
Northam A	187	55	29	31	32
Geraldton	161	47	29	26	19

\* 4 months storage at 15-60°C

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The seed reserve of 175 and 239 was three times that of Geraldton or Northam A. This seed bank after the spray could be related to hard seed calculations based on field sample taken in April and a standard laboratory test on seed harvested December 1975. The results support the contention of the value of hard seed to maintain a reserve in the crop year (here simulated by killing the seedlings). Also, interestingly, the laboratory test seemed to fit quite well with the field samples and rates of hard seed breakdown were apparently similar for the Merredin summer and the 15-60°C diurnally fluctuating laboratory ovens.

Seedling survival in drought or false break

One trial at Bencubbin, though not eventually yielding seed, showed better establishment than the other two 'failed' trials at Bonnie Rock and Campion. Based on theoretical establishment (with seed of known viability) Northam and Nungarin showed better seedling survival than Geraldton.

TABLE 3:

	<u>Seedling Establishment per dm<sup>2</sup></u>	<u>% Survival</u>
Nungarin	20	40
239	16	31
Northam A	25	43
Geraldton	9	15

This is interesting because Northam A and Nungarin were the largest seeded varieties with the biggest seedlings. We have noted the same effect at Merredin under paddock conditions with apparently better survival of Northam A than Geraldton after a false break in 1975. More precise experimental work in this field as indicated as seedling survival is undoubtedly an important factor in persistence, and varietal differences, if any, should be evaluated.

B) Preliminary Seed Evaluation of Early Crossbreds  
(1969 series)

These were sown at Merredin. It was very dry early, but the season finished reasonably well. Seed yield of some of the 1969 crossbreds was surprisingly good for such a dry season. In comparison with Geraldton, Northam A (and even Nungarin) yields compared very favourably. Seed supplies will allow more extensive evaluation in 1977.

HD	<u>(Mt Helena A x Daglish)</u>	Seed Yields	Flowering time, hard seed content	
		Merredin 1977	Wongan Hills 1976	
		<u>kgs/ha</u>	<u>Flowering</u>	<u>H.S. Content*</u>
HD	5.1.2B	131	82	45
	5.2,4	118	81	48
	20.1.2	130	83	71
	20.3.3	119	83	72
	30.1.2	93	81	56
	33.1.1	121	84	42
8N	<u>(Dalkeith x Northam A2)</u>			
8N	31.1.2.	162	78	43
ND	<u>(Northam C x Daglish)</u>			
ND	11.1.2	146	80	38
	23.2.2	74	80	19
BD	<u>(Bellevue x Daglish)</u>			
BD	6.3.1	121	84	58
<u>Controls</u>				
	Nungarin	108	78	53
	Geraldton	87	92	35
	Northam	72	81	35

LSD P .05 = 32 kg/ha

\* 4 months at 15-60°C

C) Kabatiella Research

(a) Advanced generation crossbreds

Several Kabatiella resistant crossbreds have been assessed at Denmark. 210.10.26.1 again showed promise in dry matter production. Kabatiella was not severe in 1976, but the crossbred still outyielded the susceptible cultivar Seaton Park (see Table 3) at the time of the last cut Mr Barker was still flowering and the figure represents an underestimate.

TABLE 3: Dry Matter Production Denmark 1976

<u>Variety</u>	<u>kgs/ha*</u>
210.10.26.1 (Bacchus x Daliak)	5498
Mt. Barker	5362
MBD 21.1 (Midland B x Daliak)	5166
Woogenellup	5142
MBD 25.2 (Midland B x Daliak)	4916
MBD 30.1 (Midland B x Daliak)	4896
Daliak	4654
Seaton Park	4008

\* Total of 5 cuts LSD 5% = 420 kg

The crossbred 210.10 has been bulked at Esperance and awaits a decision by the Herbage Plant Liaison Committee as to a final bulk year with tentative commercial release in 1978.

Flowering dates of the varieties were assessed at Denmark bearing in mind the need for a 3 week gap between the crossbreds and the morphologically similar Daliak. The flowering time difference between 210.10.26.1 and Daliak is accentuated by a slower rate of flower production and longer flowering period in the crossbred so that its final senescence is more than a month later than Daliak. The Midland B crossbreds matured more quickly than 210.10 and were thus earlier despite a similar initial flowering date.

Flowering Times Denmark-Perth 1976

<u>Variety</u>	<u>Days to first flower 1976*</u>	
	<u>Denmark</u>	<u>Perth</u>
Mt Barker	169	140
Woogenellup	165	133
210.10.26.1	155	126
MBD 21.2	155	123
MBD 30.1	153	127
Dinninup	151	119
MBD 25.2	146	127
Seaton Park	136	111
Daliak	130	99

\* Planting dates Denmark 25/3/76  
Perth 3/5/76

Of these crossbreds none show more promise than 210 which has already been bulked. Its maturity, good seed and dry matter production make 210 well suited as an interim variety. It has moderate hard seed levels. It possesses a formononetin pattern somewhat like Daliak, i.e. moderate values approx. 0.45% (0.40 in the winter) declining to about 0.20 (or lower) in mid-late spring. Its spring values of 0.23% compare closely with Woogenellup (0.19%) a cultivar not yet having been associated with sheep infertility.

(b) Earlier Generation Crossbreds

F4 Series - (Mt Helena A x Nangeela) x Daliak (HND) and Toodyay C x Daliak (DT) both have a high degree of Kabatiella resistance confirmed and a maturity range from about Dinninup-Mt Barker. The HND series have made better growth and several of Woogenellup maturity. Lack of leaf marking is a handicap as the crossbreds are otherwise quite impressive. The Toodyay C cross are poor in winter growth.

F3 Series - Screened for Kabatiella resistance for the first time in 1976. Includes the highly promising DMN series Daliak x (Midland B x Nangeela) some of these (DMN 4 and 5) have demonstrated root rot tolerance as well as low Kabatiella ratings. They are of Mt Barker Maturity and seem ideal candidates for this maturity range.

F2 Series - Not yet tested for Kabatiella. The Guildford D variety has been widely used as a parent. Being both Kabatiella resistant and root rot tolerant, crosses involving Guildford D should yield many promising types. About 150 segregates will be screened in the 1977 Kabatiella tests.