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1975 Evaluation of new subterranean clover cultivars

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Recommended Citation

Francis, C M. (1975), *1975 Evaluation of new subterranean clover cultivars*. Department of Agriculture and Food, Western Australia, Perth. Report.

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INTERIM REPORT 1975

EVALUATION OF NEW SUBTERRANEAN CLOVER CULTIVARS

This year's trials have added little to the data already accumulated on the crossbreds 175.1 and 239.2 (Table 1). Higher seed yields at Merredin would have included some hard seed from the previous year. The lack of reliable data from the May sowings due to poor viability of some seed lines (including 175 and 239) grown at Medina was unfortunate. Data from Lake King is not yet available. Geraldton performed surprisingly well in the late sowings despite overall low seed yields. With late sowing its flowering date was within a few days of the crossbreds so that late sowing appears to cancel the usual early flowering advantages of the crossbreds, and in such a situation the rapid seed production of Geraldton is an advantage. Northam A for the third consecutive season was mediocre in seed yield despite its impressive looking growth in the swards and on seed yield data it has to date been significantly poorer than the best of the crossbreds (175.1.3) in seven out of eight May sown (or germinating) trials at the Merredin, Bencubbin and Bunjil test centres. At these centres 175.1.3 has outyielded Geraldton in five of the eight trials.

TABLE 1

Early Crossbreds Seed Yield : Hard Seed and Maturity Data
1975

	Second Year Stands		First Year May Seeding		Late June Seeding		
	Merredin	Bunjil	Merredin	Bencubbin	Merredin	Bencubbin	Bunjil
175.1.3	153***	153	++	105*	90	36	18
239.2	151***	96	++	43	61	51	16
92B		108	++	66			
29B		99		172			
503.1		138		201			
584.1		136		170			
301.3		99		156			
492.1B		93		129(*)			
74B				165			
547.1.1				123(*)			
Northam A	55	100		43	66	22	12.5
Geraldton	47	122		55	88	39	15
Dwalganup				47			

+ poor establishment (low quality seed)

* differs from Geraldton at 5 % level

** " " " " 1 % "

*** " " " " 0.1% "

Hard seed and maturity data derived from Merredin and Wongan Hills in 1974/75 were consistent with previous years.

	Hard seed content % after 6 months at 15-60°		Flowering time Days
	<u>Merredin</u>	<u>Wongan Hills</u>	<u>Merredin</u>
175.1.3B	25	43	89
239.2	32	64	91
29B	20	40	92
92B	32	44	92
503.1	20	27	93
584.1	26	36	98
303.3	25	49	95
492.3	17	28	94
74B	36	57	94
547.1	25	39	96
Northam A	19	33	93
Geraldton	12	14	102
Dwalganup	6	16	95

Additional hard seed and maturity data will be forthcoming from Merredin and Wongan Hills in March 1976, completing five seasons' figures for the above cultivars. Large scale (up to 4 ha) seed increase plots at Speddingup included varieties Northam A, 175.13, 239, 584 and 503 are expected to yield about 100 kg/ha and so provide ample seed supplies for larger scale field evaluation and seed increase in 1976.

Additional Early Maturing Crossbreds

From a total of 320 some 160 crossbreds were selected largely on the basis of hard seeds and maturity 1974 and sown at Wongan Hills 1975. Of this series several show distinct promise, particularly some based on crosses between Mt. Helena and Daghish and Northam C and Daghish. Having a different set of leaf markings than the current crossbreds, they will provide a useful backup in the continuing quest for early maturing cultivars. Sufficient seed will be available for preliminary small plot seed yield evaluation in 1976.

Breeding and Selection for Kabatiella Resistance

The Kabatiella testing programme of crossbreds continued in 1975 in co-operation with Dr Chatel. Advanced generation crossbreds, Bacchus Marsh x Daliak (F₇₋₈) and Midland B x Daliak (F₅₋₆) were evaluated for the second year in the field and most demonstrated more or less complete resistance to the disease; at least under the test conditions. These crossbreds bear the same leaf markings as Daliak. Most however, flowered within three (3) weeks of Daliak and were eliminated on a maturity basis. It is apparent the Kabatiella resistant crossbreds need to be of three types:-

- (i) Woogenellup (or earlier) maturing suited to Esperance sand plain and South Stirlings.
- (ii) Mt. Barker maturity (or a few days later) suited to high rainfall south coastal areas.
- (iii) A resistant cultivar (T.yanninicum) for waterlogged areas.

Of the advanced generation crossbreds, maturity and hard seed data are available and a few fairly hard seeded crossbreds fall within the convenient maturity ranges for category (i) requirements viz. MBD 25.1, MBD 30.1, MBD 21.2 (Midland B x Daliak). Crossbred 210.10.26.1 (Bacchus Marsh x Daliak) is the only survivor of the Bacchus crosses series and appears to have retained the hard seed content of the Daliak parent (Table 1). Its herbage and seed yields have been superior to Woogenellup and Seaton Park under conditions where Kabatiella is prevalent (Table 2). A bulk plot of this cultivar at Medina should yield 5-10 kg of seed.

TABLE 2
Herbage and Seed Yields Denmark 1975
kgs/ha

Kabatiella Resistant Crossbreds		
	<u>Seed Yield</u>	<u>Herbage (to Oct. 3 only)</u>
210.10.26.1*	608	1672
P31+	514	1243
P12+	501	1232
209.8(17.4)*	440	2190
209.8(19.1)*	415	1396
208.3 (4.1)*	362	1539
209.8 (5.4)*	326	1256
P4+	295	1939
Woogenellup	163	1138
Seaton Park	117	903

- * Bacchus x Daliak
- + Midland B x Daliak

The latest maturing crossbreds 210.10.26.1 and P31 were the highest yielders in this trial. The low yields of Seaton Park and Woogenellup can be accounted for by Kabatiella which infected these plots naturally. The relative differences between these and resistant cultivars could well be greater under heavier Kabatiella attack. Herbage yield differences would also have been greater but for accidental grazing of the heaviest yielding (late October) swards.

A total of 35 F₃ lines were selected for maturity and Kabatiella resistance from crossbreds (Mt. Helena x Nangeela) x Daliak and Daliak x Toodyay C. The latter cross produced types more susceptible than either parent indicating a different genetic basis for the Daliak and Toodyay C type of resistance. The Toodyay C crossbreds were selected towards the Mt. Barker maturity range but despite their promise it is felt that for this later maturity range, material derived from crosses yet to be evaluated may prove more agronomically useful and the following F₃ selections were made for inclusion in 1976 Kabatiella screening trials.

Daliak x (Midland B x Nangeela)	34
Daliak x (Midland B x Ruakura)	29
Dinninup x (Daliak x Toodyay C) (<u>Kabatiella</u> and root rot resistant (?))	21
Daliak x Woogenellup	17
Daliak x H 20.1 (Howard x Midland B) (<u>Kabatiella</u> and stunt varus resistant (?))	24

The interspecies T.yannanicum x T.subterraneum (Daliak) crosses have also proven successful as part of the attempt to produce a low oestrogen Yarloop type resistant to Kabatiella (category iii). Many were very low in fertility but from 119 F₃ plants selected on a maturity and vigour basis about 80 should set sufficient seed for inclusion in 1976 screening trials.

An additional range of crossbreds will be available next year. These are based on the variety Guildford D (high in formononetin but Kabatiella resistant). These new segregations provide a powerful backup to the existing Kabatiella programme, whilst the inclusion of Dinninup in some of these may be of value in the quest for root rot resistance, a characteristic now incorporated into the breeding programme.

Subterranean Clovers from Turkey

Preliminary evaluation of subterranean clovers collected in Turkey indicates up to 250 new varieties. About half of these are members of T.brachycalycinum. These represent the largest single collection of subterranean clover yet made from any one country and varieties of T.subterraneum will be introduced into the Kabatiella screening programme in 1977. In this context the performance of late maturing varieties from the vicinity of the Black Sea will be of interest.

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February 1976
PLG