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DEPARTMENT OF AGRICULTURE
Western Australia

SUMMARY OF EXPERIMENTAL RESULTS 1982

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ALTERNATIVE PASTURE SPECIES TO RYEGRASS FOR AREAS
AFFECTED BY ANNUAL RYEGRASS TOXICITY

Introduction

The aim of this project is to find alternative pasture species to ryegrass in areas which are affected by Annual Ryegrass Toxicity (ARGT). Of special interest are the areas of heavy land, such as the grey Moort clays. The pH (0 - 10 cm) of most of these heavy soils is neutral, ranging from 6.5 to 7.5, so soil acidity or alkalinity should not affect growth or persistence of pasture legume species. There are a few areas of alkaline (pH 8.5 to 9.0) red clay loam which would be unsuitable for subterranean clovers but should support a medic.

The pastures associated with these soils are dominated by ryegrass. The legume content is almost non-existent as the currently recommended pasture legumes fail to grow or persist. Thus, when ryegrass is controlled with herbicides the stock carrying capacity of these pastures is greatly reduced.

1981 Programme

Six trials commenced in 1981. These are divided into two types:

- (i) Pasture species
row evaluation

in which a range of species were grown out in small rows to determine if they would grow and persist on heavy soils.

- (ii) Medic species
evaluation.

Five commercial medic varieties were grown on two different sites to determine if they were suitable for soils in this area.

Results and Discussion

Unfortunately seed yield data is not yet available for any of the trials therefore, only preliminary comments on the results can be given.

In the row evaluation trials the performance of the M. polymorpha lines was outstanding on all sites. The other outstanding species was M. murex. The lines of this species had good early winter growth producing a dense, prostrate growth. This species also appeared to stay green after all other species had dried off. These first year results must be treated with caution since the survival of the associated rhizobia in the soil is imperative if the variety is to persist in the pasture.

Circle Valley was the outstanding variety in the commercial medic trial, producing 4 251 kg/ha/yr of dry matter (D.M.) on sandy loam (82 KA 44) and 687 kg/ha/yr D.M. on clay loam (82 KA 45). Serena and Cyprus also performed well, but their production rankings were almost totally reversed depending on the site. On the sandy loam (82 KA 44) Cyprus cut 4 185 kg/ha/yr D.M. which was just below Circle Valleys production whereas,

Serena gave the second lowest production of 3 439 kg/ha/yr D.M. On the clay loam site (82 KA 45) Serena produced 586 kg/ha/yr D.M. to put it second to Circle Valley while Cyprus produced the lowest amount of 287 kg/ha/yr D.M.

Unfortunately neither site was grazed and the 82 KA 45 site was stressed by drought and infested with minor weed species such as Blue Pimpernel (Anagallis arvensis) and Crasliula sp. In future it seems desirable to graze the larger trials to approximate the current farming pasture system as long as the grazing isn't detrimental to the species being tested.

PASTURE SPECIES ROW EVALUATION 82 KA 40

Property: Dumbleyung (O. & H. Mott)
 Soil Type: Sandy loam pH 6.5
 Original Vegetation: Salmon Gum/Flat top Yate
 History: Old land
 Sowing Date: 22-6-82
 Seeding Rate: 1g seed in 2 metre row
 Fertilizer: Superphosphate 120 kg/ha

RESULTS

<u>Species</u>		Winter Growth Rating 1 - 9 scale	Days to flowering
<u>M. arabica</u>	1. 3629	2.5	84
<u>M. littoralis</u>	2. Harbinger	5.5	77
<u>M. polymorpha</u>	3. 3176	6.0	77
<u>var. polymorpha</u>	4. 3627	5.5	76
	5. 4973	7.0	69
<u>M. polymorpha</u>	6. Serena	6.5	68
<u>var. brevispina</u>	7. Circle Valley	8.0	85
	8. 793 - 2/4	6.5	67
	9. 329301	6.5	68
	10. 4965	5.5	68
	11. 4980	6.0	70
	12. 4991	5.5	75
<u>M. tornata</u>	13. Tornafield	3.0	89
	14. Swani	No seed available	
	15. 5290	1.0	86
<u>M. truncatula</u>	16. Cyprus	7.0	75
	17. 1493.4	5.5	72
<u>T. hirtum</u>	18. Kondinin	4.0	106
	19. Olympus	4.0	109
<u>T. cherleri</u>	20. Beenong	4.5	94
	21. Yamina	4.0	93
<u>T. brachycalycinum</u>	22. CPI 25308B	3.0	81
	23. CPI 70129B	3.5	95
<u>T. subterranean</u>	24. Nungarin	3.5	73
	25. Northam	3.5	72
	26. Dalkiak	1.0	91
	27. Seaton Park	3.5	96
	28. Dwalganup	2.5	81

COMMENTS:

- 1) Seed yields not yet available
- 2) Site was kept weed free.
- 3) Rainfall was below average for the year.
- 4) Site was invaded by Blue Green aphid in late spring.
- 5) Circle Valley and Cyprus both showed very good winter growth.
- 6) Both lines of T. brachycalycinum and Daliak had very poor germination.
- 7) Site will be monitored in 1983.

PASTURE SPECIES ROW EVALUATION 82 KA 41

Property: Gnowangerup (D. Holmes)
 Soil Type: Grey loamy clay pH 6.5
 Original Vegetation: Moort
 History: Old land
 Sowing Date: 9-6-82
 Seeding Rate: 1g of seed in 2 metre row.
 Fertilizer: Superphosphate 120 kg/ha

RESULTS

<u>Species</u>		<u>Winter Growth Rating</u>	<u>Days to Flowering</u>
<u>M. arabica</u>	1. 3629	3.0	96
<u>M. littoralis</u>	2. Harbinger	5.0	92
<u>M. polymorpha</u>	3. 3176	7.0	80
<u>vas. polymorpha</u>	4. 3627	7.5	85
	5. 4973	6.0	77
<u>M. polymorpha</u>	6. Serena	7.5	74
<u>var. brevispina</u>	7. Circle Valley	8.5	96
	8. 793 - 2/4	7.0	75
	9. 329301	7.0	78
	10. 4965	6.5	77
	11. 4980	7.0	80
	12. 4991	7.0	77
<u>M. tornata</u>	13. Tornafield	3.0	95
	14. Swani	No seed available	
	15. 5290	1.0	95
<u>M. truncatula</u>	16. Cyprus	6.0	84
	17. 14934	5.5	80
<u>T. hirtum</u>	18. Kondinin	4.5	107
	19. Olympus	5.0	111
<u>T. cherleri</u>	20. Beenong	5.5	95
	21. Yamina	5.0	103
<u>T. brachycalycinum</u>	22. CPI 25308B	2.5	93
	23. CPI 70124B	4.0	106
<u>T. subterranean</u>	24. Nungarin	3.5	82
	25. Northam	4.5	83
	26. Daliak	1.5	100
	27. Seaton Park	3.5	97
	28. Dwalganup	3.0	91

COMMENTS:

- 1) Seed yields not yet available.
- 2) Site kept weed free.
- 3) Rainfall for the year was below average.
- 4) All varieties of M. polymorpha, and M. truncatula Cyprus performed extremely well considering the season. Circle Valley appeared to be the outstanding variety.
- 5) Both lines of T. brachycalycin and Daliak had very poor germination.
- 6) Half of each row was harvested and the remaining half will be monitored in 1983.
- 7) Site was invaded by Blue Greenaphids in late spring.

PASTURE SPECIES ROW EVALUATION 82 KA 42

Property: Amelup (Moir Bros.)

Soil Type: Red clay loam pH 8.5

History: Old land

Sowing Date: 14-6-82

Seeding Rate: 1g seed in 2 metre row.

Fertilizer: Superphosphate 120 kg/ha

RESULTS

Species		Winter Growth Rating 1 - 9 scale	Days to Flowering
<u>M. arabica</u>	1. 3629	3.5	101
<u>M. littoralis</u>	2. Harbinger	4.5	93
<u>M. polymorpha</u>	3. 3176	4.5	84
<u>var. polymorpha</u>	4. 3627	4.5	94
	5. 4973	4.5	77
<u>M. polymorpha</u>	6. Serena	5.5	76
<u>var. brevispina</u>	7. Circle Valley	6.0	100
	8. 793 - 2/4	4.0	84
	9. 329301	5.5	78
	10. 4965	6.0	78
	11. 4980	4.0	83
	12. 4991	5.0	83
<u>M. tornata</u>	13. Tornafield	1.5	103
	14. Swani	No seed available	
	15. 5290	1.5	90
<u>M. truncatula</u>	16. Cyprus	6.5	82
	17. 1493.4	5.5	77
<u>M. murex</u>	18. CD50.5	4.5	112
	19. CD73.1	2.5	120
	20. CD99.2A	5.5	116
	21. CD109.2A	5.5	107
	22. CD133.2	3.5	117
	23. CD134.2	4.5	124
	24. CD141.2	4.0	110
<u>T. hirtum</u>	25. Kondinin	5.5	110
	26. Olympus	4.0	96
<u>T. cherleri</u>	27. Beenong	4.0	98
	28. Yamina	4.5	98
<u>T. brachycalycinum</u>	29. CPI 25308B	2.0	94
	30. CPI 70124B	2.5	105

Species		Winter Growth Rating 1 - 9 Scale	Days to Flowering
<u>T. subterranean</u>	31. Nungarin	4.0	82
	32. Northam	2.0	84
	33. Daliak	1.0	107
	34. Seaton Park	3.5	100
	35. Dwalganup	2.5	94

Comments

- 1) Seed yields are not yet available.
- 2) Site was stressed by drought.
- 3) Site was kept weed free.
- 4) Cyrpus, Circle Valley and M. polymorpha brenspina 4965 showed reasonable growth considering the difficult seasonal conditions.
- 5) M. murex lines produced a dense prostrate vegetation early in winter and appeared to stay green after all other species had dried off.
- 6) Site was invaded by Blue Green aphids in late spring.
- 7) Site will be monitored in 1983.

Property: Gnowangerup (D. Holmes)

Soil Type: Loamy sand over clay pH 7.0

Original Vegetation: Mallee

History: Old land

Sowing Date: 10-6-82 (Rain 1 hour after sowing)

Seeding Rate: 1g of seed in 2 metre row.

Fertilizer: Superphosphate 120 kg/ha

RESULTS

Species		Winter Growth Rating 1 - 9 scale	Days to Flowering
<u>M. arabica</u>	1. 3629	3.0	103
<u>M. littoralis</u>	2. Harbinger	5.0	91
<u>M. polymorpha</u>	3. 3176	6.0	77
<u>var. polymorpha</u>	4. 3627	8.0	89
	5. 4973	7.5	76
<u>M. polymorpha</u>	6. Serena	7.0	73
<u>var. brevispina</u>	7. Circle Valley	8.5	93
	8. 793 - 2/4	6.5	74
	9. 329301	7.0	76
	10. 4965	7.5	75
	11. 4980	7.0	77
	12. 4991	6.5	76
<u>M. tornata</u>	13. Tornafield	3.0	95
	14. Swani	No seed available	
	15. 5290	1.0	95
<u>M. truncatula</u>	16. Cyprus	6.5	82
	17. 1493.4	7.0	82
<u>M. murex</u>	18. CD50.5	6.0	105
	19. CD73.1	6.5	105
	20. CD99.2A	7.0	107
	21. CD109.2A	6.0	104
	22. CD133.2	6.5	103
	23. CD134.2	8.0	104
	24. CD141.2	4.5	105
<u>T. hirtum</u>	25. Kondinin	6.0	113
	26. Olympus	4.0	109
<u>T. cherleri</u>	27. Beenong	6.5	95
	28. Yamina	7.0	104

Species		Winter Growth Rating 1 - 9 scale	Days to Flowering
<u>T. subterranean</u>	31. Nungarin	4.0	80
	32. Northam	3.5	81
	33. Daliak	1.0	99
	34. Seaton Park	4.0	96
	35. Dwalganup	2.5	87

Comments

- 1) Seed yields are not yet available
- 2) Site was kept weed free
- 3) Rainfall was below average for the year.
- 4) Site was invaded by Blue Green aphids in late spring.
- 5) Circle Valley showed outstanding growth, as did M. murex CD 134.2 and M. polymorpha polymorpha 3627.
- 6) The M. murex lines all had good early winter growth and produced a dense prostrate vegetative cover. This species also appears able to stay green after all other species had dried off.
- 7) Site will be monitored in 1983.

MEDIC SPECIES TRIAL 82 KA 44

Property: Dumbleyung (O. & H. Mott)

Soil Type: Sandy loam pH 6.5

Original Vegetation: Salmon Gum/Flat Top Yate

History: Old land

Sowing Date: 22-6-82

Seeding Rate: 15 kg/ha inoculated and lime pelleted. (Scratched in with a combine).

Fertilizer: 120 kg/ha Superphosphate

RESULTS

Variety	Plant Establishment Count Plant/m ²	Winter Vigor Rating 1 - 9 scale	Dry Matter Production 15-10-82 kg/ha
Cyprus	252	5.7	4 185
Harbinger	263	4.5	3 780
Tornafield	106	3.0	2 634
Serena	235	6.3	3 439
Circle Valley	235	6.7	4 251

COMMENTS:

- 1) Site was ungrazed but virtually free of weeds except for a small amount of Ryegrass and Barley grass.
- 2) All varieties established well, except for Tornafield.
- 3) Circle Valley was the outstanding variety. Serena also appeared to do well, however, it matured very early compared to the other varieties.
- 4) Seed yield results are not yet available.

MEDIC SPECIES TRIAL 82 KA 45

Property: Gnowangerup (D. Holmes)

Soil Type: Grey clay loam

Original Vegetation: Moort

History: Old land. Legume pasture nonexistent.

Sowing Date: 9-6-1982

Seeding Rate: 15 kg/ha Inoculated and Lime pelleted. Disc drilled in.

Fertilizer: 120 kg/ha Superphosphate

RESULTS

Variety	Plant Establishment count. Plants/m ²	Winter Vigor Rating 1 - 9 scale	Dry Matter Production (14-10-82) kg/ha
Cyprus	280	5.7	287
Harbinger	325	4.7	306
Tornafield	168	5.0	388
Serena	325	6.7	586
Circle Valley	207	7.0	687

COMMENTS:

- 1) Rainfall for the year was below average and plants were often stressed.
- 2) Site was ungrazed and became heavily infested with minor weed species eg. Blue Pimpernel (Anagallis arvensis) and Crashula sp. Ryegrass was also prevalent.
- 3) Circle Valley was the outstanding variety and both it and Serena appeared to set a large amount of seed.
- 4) Seed yield results are not yet available.