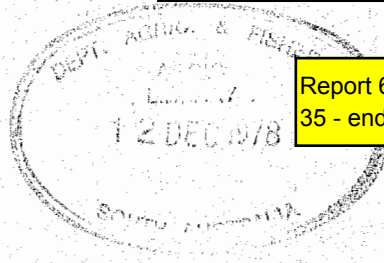
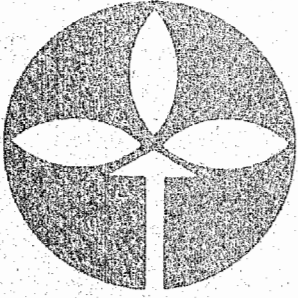


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Report 69: part 2 pages
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DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA

Agronomy Branch Report

AGRONOMY BRANCH ANNUAL REPORT

1974-75

Report No.

69

PASTURE UTILISATION SECTION

SECTION LEADER:

Dr. P.S. Cocks, M.Ag.Sc., Ph.D.

SENIOR RESEARCH OFFICER:

Mr. M.V. Smith, M.Ag.Sc., M.Ec.

RESEARCH OFFICER:

Mr. P.R. Gibson, B.Ag.Sc.

FIELD ASSISTANT:

Mr. J.R. Phillips

PASTURE UTILISATION SECTION

1. INTRODUCTION:

Two species of Hordeum have been found in South Australia following a study of ecotypic variation in barley grass. The two species, Hordeum glaucum and H. leporinum, are morphologically similar, but H. glaucum is a diploid (with 14 chromosomes) while H. leporinum is a tetraploid (with 28 chromosomes).

The two species have distinct distributions. H. glaucum grows in the drier parts of the State (usually less than 450 mm of rainfall), while H. Leporinum grows where rainfall exceeds 425 mm. Barley grass in most of the wheat belt, and in the sheep raising district adjacent to the interior is usually H. glaucum, while that in the South East, Kangaroo Island, the Mt. Lofty Ranges as far north as Clare, and on Yorke and Lower Eyre Peninsula is H. leporinum.

The first group of weaners were introduced to pastures in an experiment comparing three perennial grasses under grazing at Mt. Alma in the southern Mt. Lofty Ranges. The next three years should show whether differences exist between hybrid Phalaris, Demeter tall fescue and Mt. Alma perennial ryegrass based pastures in raising weaner sheep.

2. RESEARCH PROGRAMMES:

2.1 New Programmes

2.1.1 Vegetable fault in wool - P.S. Cocks,
E.D. Higgs & P.J. Woods

Vegetable fault in wool costs the Australian wool grower dearly. It has been estimated that reducing the contamination of all wool by only one fault level would increase the value of the Australian clip by a minimum of \$8M. Further, contamination of wool reduces the predictability of its behaviour during processing, thus affecting its competitive position vis-a-vis synthetics.

Wool is sampled at each of the Adelaide wool sales, and the botanical composition of the contaminating vegetable matter is determined. Using a computer the distribution of the various species will be mapped and relationships with various attributes of the wool will be studied.

2.1.2 The competitive ability, yield & seasonal
fixation of nitrogen of three cultivars
of subterranean clover - W.G. Wootton &
P.S. Cocks

In a previous year the competitive ability and fixation of nitrogen by Mt. Barker subterranean clover was studied at the Kybybolite Research Centre. A new project, extending this study to the vaccinicum cultivars, Yarloop and Trikkala, began at the same site in late April.

2.1.3 A model of the economic value of using annual medic leys in cereal farming systems - M.V. Smith

Very little is known about the ecology and use of annual medic pasture. Most of the available information centres around establishment, yield of herbage in the first year and some measure of regeneration. We need to know more about the amount of nitrogen fixed, what happens to the fixed nitrogen, the increase in yield of cereals as a result of growing annual medics, and the value of the grazing component of the medic-cereal rotation. These are complex problems and so a computer model is being constructed to find preliminary information and to pose further questions to be answered in subsequent field investigations.

2.2 Continuing Programmes

2.2.1 Ecotypic variation in *Hordeum leporinum* Link and *H. glaucum* Steud. - P.S. Cocks, K.G. Boyce & P.M. Kloot

2.2.2 Evaluation of five pasture types in terms of liveweight changes and wool production - P.R. Gibson

2.2.3 Evaluation of three perennial grass cultivars at Mt. Alma - P.R. Gibson

3. STAFF:

Mr. A.D. Murray resigned as Field Assistant and was replaced by Mr. J.R. Phillips.

Dr. P.S. Cocks attended a Management School conducted by the Department of Further Education.

4. PUBLICATIONS:

Cocks, P.S. (1974) - "Potential production of grass and clover monocultures in a Mediterranean-type environment - an experimental approach". Aust. J. Agric. Res. 25, 835-46.

Cocks, P.S. (1975) - "Volunteer plants in annual pasture". J. Dept. Agric. S. Aust., 78, (in press).

Hawthorne, W.A. & Cocks, P.S. (1975) - "The growth of some perennial grasses under irrigation on a rendzina soil in the Lower South East of South Australia". Agricultural Record 2 (in press).

Smith, M.F. (1974) - "Stochastic influences on the profitability of resowing rundown pastures with perennial species". Proc. XIIth Int. Grassl. Congr., "Improvement of natural and production of seeded meadows and pastures", page 388.

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PLANT BREEDING SECTION

SECTION LEADER:

Mr. M.J. Mathison, B.Ag.Sc.

RESEARCH OFFICERS:

Mr. I.D. Kaehne, B.Ag.Sc.

Mr. G.W. Lawton, B.Ag.Sc. (on study leave without
pay, overseas)

TECHNICAL OFFICERS:

Mr. B.C. Bull, L.D.A. (seconded as District
Agronomist, Loxton)

Mr. C.S. Morner, Landm. (Univ. Sweden)

Mr. D.W. Parker, R.D.A.T.

LABORATORY OFFICERS:

Miss B. Martin

Mrs. S. McLean

PLANT BREEDING SECTION

1. SECTION ACTIVITIES:

The principal aim of the research carried out by the Plant Breeding Section is to produce improved cultivars for Australian, especially South Australian, agriculture.

The research projects are concerned with improvement of three groups of herbage plants, annual medics for cereal areas, lucerne and other perennial Medicago species for dryland, irrigated and water-logged situations and perennial grasses, especially tall fescue and ryegrass for high rainfall and irrigated areas.

The Section has its headquarters at the Northfield Research Laboratories and operates on the principle of evaluation of breeding material in the regions of principal use wherever practicable. Specially devised equipment is used extensively to facilitate evaluating plants in experiments in various regions of the State and at the laboratories. The equipment is being continually refined to improve the efficiency of individual operations, especially sowing and harvesting of small field plots.

The annual medic and lucerne breeding projects receive major financial support from industry trust funds. The Australian Wheat Research Council and the South Australian Wheat Research Committee help to finance annual medic breeding and the Wool Research Trust Fund helps to finance lucerne breeding.

During 1974-75 the Australian Wheat Research Council initiated financial support specifically for a project to select and breed annual medics and lucernes with tolerance or resistance to the sitona weevil, Sitona humeralis Steph. A new field assistant position for this project was created in mid-1975. This will allow further development of the work so successfully started within the existing annual medic and lucerne breeding projects. This project on sitona weevil forms part of an integrated attack on this insect pest by the Department's Agronomy Branch sections of Plant Breeding and Entomology at Northfield, C.S.I.R.O. Biological Control Unit in Montpellier, France and C.S.I.R.O. Division of Entomology, Canberra.

In the northern hemisphere spring and summer of 1974, Messrs. Kaehne and Mathison were overseas. They made short study tours of plant breeding stations in Europe, visited C.S.I.R.O. scientists in France working on biological control of sitona weevil, and attended the 12th International Grassland Congress in Moscow. They then made very extensive collections of seeds of more than 2,000 samples of pasture plants for further study and breeding in Australia. With officers from the N.S.W. Department of Agriculture, C.S.I.R.O. Division of Plant Industry and U.S.S.R. scientists they collected seeds of wild and cultivated plants in four southern Republic of the U.S.S.R. Mr. Kaehne went on to collect wild lucernes in Iran. Mr. Mathison attended the 6th International Sunflower Conference in Bucarest, Romania and continued on to collect seeds of annual medics and other wild annual legumes in the Balkans, North African countries and Lebanon.

The overseas travel of the two officers was made possible by grants in addition to South Australian Treasury funding. Mr. Kaehne received a grant from the Howard Memorial Trust. Mr. Mathison received grants from the Australian Wheat Research Council, the South Australian Wheat Research Committee and the Ford Foundation, New York. As well as the grants, much of the success of the collecting missions was due to help from individuals and especially help with interpreters and transport provided by the Ministries of Agriculture in the U.S.S.R. and in Algeria, C.S.I.R.O. in southern France, the Ministry of Education in Romania, and personnel from CIMMYT and Ford Foundation in Tunisia, Algeria and Lebanon.

Plants from the seed collections made by Messrs. Kaehne and Mathison are being grown under quarantine at the Northfield Laboratories and the Parafield Plant Introduction Centre.

Details of routine research activities are described under the specific research project headings.

2. RESEARCH PROJECTS:

2.1 Breeding of Annual Medicago - M.J. Mathison, B.C. Bull, D.W. Parker & Mrs. S. McLean

2.1.1 Evaluation of introductions, parents & progeny

Improvements are being sought in winter herbage yield and seed and burr yield, re-establishment and wide adaptability to important Australian wheat belt environments. Assessments of annual medic introductions and bred material are made in swards sown at five localities chosen as representative of some of the most important of the South Australian environments. Sites used are near Lameroo, Mindarie, Northfield, Mundoora and Jamestown.

About 500 lines of annual medics were evaluated at each site. Most of these lines are from introductions of M. truncatula (barrel medic) sown in 1973 and 1974. Large numbers of lines in the same experiments are from the species M. polymorpha (burr medic), M. tornata (disc medic) and M. scutellata (snail medic).

Several lines of M. tornata have been outstandingly better than our commercial cultivars for one or more of the yield and regeneration attributes when grown on sandy soils (Mindarie, Lameroo and Mundoora). Sixteen of these lines are being sown in 1975 and subsequent years with a view to selecting one for release as a new cultivar. Breeding to recombine the best attributes in one progeny line has started.

Some lines of M. polymorpha grew well in the year of sowing at the Jamestown site in 1974. This is in contrast to most other annual legumes sown on the hard setting red brown earth soil there. The regeneration in 1975 and especially in 1976 will help decide whether a line of M. polymorpha can be selected for direct release for hard setting soils in the region. A further experiment with the best lines will be sown there in 1976.

Several lines of M. scutellata produced very high yields of seed (up to 1400 kg/ha) at the Mundoora site. As the collection of M. scutellata includes several with ability to regenerate well and one with moderately good resistance to adult sitona weevil, breeding has been started to recombine these attributes in one progeny line.

Preparations were made to sow a further 350 introduced medic lines in 1975. Due to drought at four sites the only experiment sown with this material was at Northfield.

2.1.2 Studies of the effect of fluctuating temperatures on changes to hard seed of medics

This work is associated with attempts to incorporate improved regeneration characteristics in bred material, especially of M. truncatula. The studies are aimed to help devise a faster and more reliable technique for screening breeding material for good regeneration than is used at present where seeds in burrs are left in the field for several years and regeneration scored each autumn-winter.

The studies as such were suspended during 1974-75. Meanwhile, more crosses were made using Tunisian lines of M. truncatula found in 1972 to regenerate well in the field. Another line with good regeneration was found in the cultivar, Jemalong, by C.S.I.R.O. workers in Canberra. Seeds of this line have been obtained and breeding starting with it. Agronomic studies are expected to show that it has better winter growth characteristics than the Tunisian material and so is likely to be better parental material.

2.1.3 Selection for resistance to adult sitona weevil damage

This project is now co-ordinated with similar work with lucerne and is described in section 2.3.

2.2 Breeding of Lucerne - I.D. Kaehne, C.S. Morner, Miss B. Martin

2.2.1 Lucerne introduction & quarantine programme

The Department's lucerne collection now contains 1,300 introduced lines of lucerne, representative of all 16 species of perennial Medicago. Quarantine is a continuing process with approximately 100 varieties currently under quarantine.

2.2.2 Selection for high yield and persistence under irrigated and dryland conditions

Sixty introduced varieties are under test in replicated plots to measure yield and persistence. A number of introduced varieties are equivalent and superior to local commercial varieties.

2.2.3 Selection of lucerne for adaptation to water-logged and poorly drained conditions

A glasshouse experiment for selection within hybrid material was concluded and a field experiment containing selected clones has been established at Meadows. Some clones derived from hybrids between commercially suitable varieties and tolerant selections have expressed tolerance far superior to present commercial cultivars.

2.2.4 Selection of lucerne for persistence under continuous grazing

A broadly based population of hybrid material derived from crosses between "wild" types and high yielding cultivated varieties has been planted, assessed for yield, and further seed produced for testing under various grazing managements.

2.2.5 Selection for resistance to stem nematode

The techniques for extraction of nematodes from infected stands, and inoculation of test seedlings have been developed. Screening has demonstrated that resistance to stem nematode is present in material suitable for commercial use in Australia.

2.2.6 Selection for resistance to adult sitona weevil damage

This project is now co-ordinated with similar work on annual medics and is summarised in section 2.3.

2.3 The Selection & Breeding of Medicagos Resistant to Sitona Weevil - M.J. Mathison, I.D. Kaehne, B.C. Bull, C.S. Morner, D.W. Parker, Miss B. Martin, Mrs. S. McLean

2.3.1 Annual medics resistant to adult sitona weevil

Screening of annual medics for resistance or tolerance to sitona weevil adults continued.

Seeds of about 20 introductions with some resistance were prepared for agronomic testing at four sites in 1975. Due to drought they were only sown at Northfield.

Crosses between resistant-resistant and resistant-non-resistant parents were and are being continued.

No resistance has been found in M. tornata and highly resistant lines of M. truncatula have yet to be found. Attempts to chemically induce resistant mutants (in collaboration with Dr. C.M. Francis and B.J. Quinlivan, W.A. Department of Agriculture) have not enabled resistance to be found in M2 progeny.

Plant material obtained from overseas in 1973 and 1974 may contain resistant lines of M. tornata and highly resistant lines of M. truncatula.

2.3.2 Lucernes resistant to adult sitona weevil

Earlier screening of commercial varieties and introductions found no resistant plants. A few tolerant plants were detected.

Crosses made between tolerant plants have produced progeny with a higher level of tolerance than the parents.

The selection, breeding and screening of new material will continue as it is released from quarantine.

2.4 Perennial Grass Breeding Programme -
G.W. Lawton & all Plant Breeding
Section officers

This programme is aimed at increasing pasture productivity in the high rainfall (greater than 600 mm p.a.) and irrigated areas of the State, especially where lucerne is poorly adapted because of winter wetness. Genetic variation within the species Lolium perenne L. (perennial ryegrass) and Festuca arundinacea Schreb. (tall fescue), will be exploited to advantage.

Introductions of both species have been assembled. Initially studies are being concentrated on tall fescue. The two broad objectives of these tall fescue studies are:-

- * To develop a persistent cultivar with a seasonal growth rhythm closely matching the needs of grazing animals in that the winter growing ability and drought tolerance of some Mediterranean ecotypes is combined in the one synthetic cultivar with the spring, summer and greater total yield potential of some temperate lines.
- * To develop a cultivar adapted to a more intensive form of agriculture than used at present. This would be one very responsive to nitrogen, resistant to frequent cutting and grazing and adapted to a monoculture situation. Under appropriate conditions tall fescue is known to have crop growth rate characteristics rarely matched by other species.

The collection has been compiled from as large a range of origins as possible so as to form a broad genetic base for the programme. Chromosome counts have been made to sort out the material into less divergent groups for facilitating hybridisation. Enough seed of some lines was produced to establish swards in the spring of 1973 and autumn of 1974 for initial field evaluation at Woodside in the Adelaide Hills.

Periodic cutting, fertilising with nitrogen and irrigating in summer has been and will be carried out to establish the seasonal growth patterns in relation to Australian cultivars of tall fescue and other perennial grasses. Several introductions from Mediterranean climates have outstanding winter production and there appears to be considerable scope for breeding and selecting material with several of the attributes sought.

Introductions have been maintained as clones in nursery rows and pots and as seeds in carefully controlled conditions of low temperature and low humidity. The reaction of grazing animals to clones in nursery rows indicates clear preferences between and within populations of introductions.

3. STAFF:

Mr. B.C. Bull was seconded to the District Agronomist position at Loxton early in 1975 as a consequence of the involvement of Departmental officers in the El Marj project in Libya.

Mr. D.W. Parker is replacing Mr. Bull in the interim. Mr. Parker graduated with the R.D.A.T. from Roseworthy Agricultural College in 1974-75.

Mr. G.W. Lawton was granted two years' leave from July, 1974 to study for an M.Sc. in plant breeding at the University of Missouri U.S.A. All members of the Section have contributed to maintaining the grass breeding research started by Mr. Lawton.

4. TRAINING:

Members of the Section have attended and taken part in a number of conferences and meetings. Messrs. Bull, Kaehne, Mathison, Morner and Parker regularly participate in the monthly meetings of the pasture research group. Messrs. Kaehne and Mathison attended an Agronomy Branch mini-conference on overseas travel, and as already mentioned, they studied plant breeding methods and organisations in Europe and attended international conferences there.

Mr. Kaehne continued, as an external student, with his studies of waterlogging tolerance in lucerne as part requirement for an M.Ag.Sc. degree from the University of Adelaide.

As mentioned, Mr. Lawton is on overseas study leave.

5. VISITORS:

Mr. A. Stevens, Tasmanian Department of Agriculture, visited the Section for a week especially to discuss lucerne breeding and agronomy research.

Mr. Ali Rastegar, Deputy Director of Agriculture, Iran; Messrs. M.S. El Barghathi and M. Rhalifayounes, Ministry of Agriculture, Libya; Dr. Hafiz, F.A.O., Cairo, Egypt; Messrs. Adem and Bouazza of Projet Cereales, Ministry of Agriculture, Algeria, visited the Section.

Agricultural Bureaux and student groups continued to form a large component of the visitors from within the State.

As well as activities related to plant breeding, another "happening" occurred in 1974-75. Mr. Kaehne, as Chairman of the Department of Agriculture Monarto Staff Relocation Committee, has had to devote about 10% of his working time to this activity.

6. PUBLICATIONS:

Kaehne, I.D. (1974) - "Breeding lucerne (Medicago sativa L.) with higher tolerance to waterlogging". Proc. XII Inter. Grassl. Congress, 146-153, Moscow, 1974.

- Kaehne, I.D. (1974) - "Overseas Study Tour, 19th May to 31st July, 1974". Agronomy Branch Report No. 59.
- Lawton, G.W. (1974) - "Tall fescue". J. Agric. S. Aust., 77(1): 26-29.
- Lawton, G.W. (1974) - "Ryegrass". J. Agric. S. Aust., 77(2): 106-110.
- Mathison, M.J., Dube, A.J. & Bull, B.C. (1974) - "High incidence of leaf rust (*Uromyces anthyllidis*) on burr medic (*Medicago polymorpha*)". Australasian Plant Breeding & Genetics Newsletter No. 24: 115-117.
- Mathison, M.J. & Kaehne, I.D. (1974) - "Proposed Overseas Seed Collecting Missions for *Medicago* spp.". Australasian Plant Breeding & Genetics Newsletter No. 24: 115-117.

PLANT INTRODUCTION SECTION

SECTION LEADER:

Mr. E.J. Crawford, R.D.A.

LABORATORY ASSISTANT:

Mrs. M.S. Schubert (part time)

PARAFIELD PLANT INTRODUCTION CENTRE:

Mr. B.G. Nankivell, R.D.A.

Mr. P.L. Blesing

Mr. L.K. Ramsay

Mr. S.H. Kelly

Mr. K.S. Roberts

Mr. W.R. Porter

PLANT INTRODUCTION SECTION

1. INTRODUCTION:

Climatically, 1974 was an atypical year throughout much of South Australia. At the Parafield Plant Introduction Centre, annual rainfall of 668 mm was 42% above average whilst the growing season (April-October) rainfall of 509 mm was 37% above average.

The above average October rainfall of 107 mm ensured that plant growth of annuals was not affected by moisture stress.

The nursery programme continued with the growing of 580 lines of seven Leguminosae general, 552 of which were annual species of the genus Medicago.

Regional experiments on Eyre Peninsula comparing the newly registered cultivar, Ghor barrel medic, with commercial cultivars, Cyprus and Harbinger, continued.

New experiments comparing the performance of four selected lines of M. rugosa with existing cultivars and four lines of Trifolium subterraneum spp. brachycalycinum with Clare sub. clover were sown at Narridy and Manoora respectively.

A pilot trial to screen a large collection of annual legumes for adaption to the hard setting sandy red brown earth soils was sown at Caltowie.

A demonstration cum evaluation trial comparing the performance of 169 selected genotypes of the sub-species of Medicago with Jemalong and Paragosa annual medics; was sown at the Parafield Plant Introduction Centre.

Seed production of 528 genotypes for further evaluation and exchange purposes was a major part of the year's programme on the Centre.

2. RESEARCH PROGRAMMES:

2.1 Indexing of Introduced Plants

During the year 854 new introductions or selections within previous introductions were indexed. These were mainly annual species of Medicago.

2.2 Classification of New Introductions

2.2.1 Annual Medicago species

The morphological and agronomic classification of 552 genotypes of 18 annual species of the genus Medicago was continued as part of the overall programme of data collation and genotype evaluation undertaken by the Section. These represented individual introductions from 27 different countries.

The major group, viz. M. polymorpha (149 lines) was the most complex with a large number of variables being isolated from within a group received from Algeria. Similarly, within M. truncatula many selections were made within lines received from Algeria confirming earlier data on the variability within ecotypes in that country. Of the total collection, 54% came from North African countries.

In all, 89 lines exhibited better seedling vigour than their species control, the majority being M. tornata and truncatula lines from Morocco and M. intertexta from all sources.

A significant finding in the collection grown in 1974 is that 21 of the 22 genotypes of M. polymorpha and M. truncatula of Libyan origin were earlier flowering than the cultivar, Cyprus, thus indicating an additional source of earliness over and above that previously found in Cyprus and Israel.

Accessions of M. polymorpha exhibited the best winter vigour, 89 of the 108 grown being better than the cultivar, Jemalong.

Overall, 165 of the 552 lines grown had better winter production than Jemalong.

The nature of the growing season favoured good seed production in all species.

2.2.2 Miscellaneous leguminous species

Twenty-eight accessions of six genera were grown for clarification of identification and seed production. Many of these were early flowering lines collected, along with 35 annual Medicago species, in Libya by a group of farmers working in the country in 1973.

2.3 Sward Evaluation of Ghor Barrel Medic

Trials to compare the performance of Ghor with Cyprus barrel and Harbinger strand medics were sown at Mudamuckla, Pygery and Buckleboo in 1973 and 1974 incorporating techniques of "under crop" and "stubble" sowing in the year following the cereal crop.

Atypical climatic conditions in both years resulted in Mudamuckla receiving about 45% and Buckleboo 65% above annual average rainfall.

Results must be viewed in this light.

At Pygery, the 1973 sown site was abandoned because of extreme competition from volunteer medic, and subsequent sowings have been made on another property more recently cleared from scrub.

At Mudamuckla, natural regeneration was approximately 1% Ghor, 3% Harbinger and 12% Cyprus of the seed produced the previous year with resultant dry matter (winter) production of 2500 kg ha⁻¹ Harbinger, 200 kg ha⁻¹ Cyprus and 600 kg ha⁻¹ Ghor, respectively.

At Buckleboo, natural regeneration was approximately 1% Ghor, 6% Cyprus and 7% Harbinger of the seed produced the previous year with resultant dry matter (winter) production of 900 kg ha⁻¹ Harbinger, 200 kg ha⁻¹ Ghor and 60 kg ha⁻¹ Cyprus, respectively. Competition from wild geranium (Erodium cygnorum) was severe at Buckleboo and dominated the whole site.

Natural regeneration and subsequent winter production will be measured at these sites in 1975.

Establishment on the 1974 sown sites was not good and reflects the problems associated with control of depth of sowing with farmer machinery on light soils.

The combination of poor establishment and dense cereal in spring made competition for light an important factor controlling seed set and resultant yields were low.

At Mudamuckla, Harbinger at 240 kg ha⁻¹ seed easily out-yielded Cyprus 87 and Ghor 69, respectively.

Actual seed yields at Pygery and Buckleboo await threshing and calculation.

Natural regeneration and winter production will be measured in 1975.

Resowings were made in the three environments in 1975.

2.4 Regional Evaluation of Four Selected Lines of M. rugosa

As a result of sward trials at Turretfield Research Centre and Parafield Plant Introduction Centre comparing 50 genotypes of M. rugosa with Paragosa and other commercial cultivars, four lines have been selected for regional evaluation in northern environments of heavy grey brown/black self-mulching soils subject to summer thunderstorms. Three lines have been specifically selected to maintain seed coat impermeability in February/March when Paragosa often germinates as a result of thunderstorm activity and subsequently dies. The fourth line, although soft seeded in February, has some degree of Sitona weevil tolerance as evidenced in sward trials at Northfield in 1972.

The four lines are being compared with commercial cultivars of barrel medic and Clare subterranean clover at Manoora, and without Clare at Narridy.

Seed production, natural regeneration (both after thunderstorms if applicable) and in winter, and subsequent winter herbage production will be measured. Both sites were sown as replicated drill strip trials in May, 1975.

2.5 Regional Evaluation of Four Lines of Trifolium subterraneum spp. brachycalycinum

Clare subterranean clover is well adapted to calcareous clay loams receiving greater than 450 mm annual rainfall. The extension of the sub-species brachycalycinum to lower rainfall areas of similar soil types is desirable.

Selection work by the Western Australian Department of Agriculture has resulted in four genotypes of sub-species brachy-calycinum being earlier flowering than Clare under Western Australian conditions.

These four lines were sown in May, 1975 under sward conditions in the same environments as 2.4 above and will be compared with the cultivar, Clare for seasonal herbage production, seed production, regeneration and subsequent winter production.

2.6 Evaluation of Annual Leguminous Species on a Hard Setting Sandy Red Brown Earth

The unsatisfactory performance of existing commercial annual legume cultivars on the poorly structured, low fertility sandy red brown earth soils in the regions receiving less than 425 mm annual rainfall is a problem resulting in declining cereal yields and general farm production.

In an attempt to find an annual legume adapted to these environments, a pilot trial was sown at Caltowie in May, 1975, to compare the establishment, growth, seed production and regeneration of 930 genotypes of 14 annual genera, the emphasis being on Trifolium (603 lines) and Medicago (226 lines).

This has been sown as a double check plot grid using Geraldton sub. clover and Jemalong barrel medic as the control cultivars.

An attempt will be made to establish if any species within genera are better adapted to the environment before length of growing season requirements of any particular genotype are considered.

Further exploitation of world resources may be warranted if particular species are found to have some potential under the prevailing conditions.

2.7 Demonstration & Agronomic Evaluation of 169 Genotypes of 48 of the 51 Sub-species of the Genus Medicago

The increasing number of visitors from North African and Middle East countries wherein volunteer annual medics have survived possibly centuries of over-grazing by nomadic flocks of sheep, goats and camels, often ask how their indigenous surviving species compare with improved Australian cultivars.

As a consequence, an experiment (designed also to be a demonstration to visitors) comparing 160 genotypes of 48 of the 51 sub-species with Jemalong barrel and Paragosa gama medics was sown at the Parafield Plant Introduction Centre in May, 1975.

Establishment, seasonal herbage production, seed production and natural regeneration (following cropping to barley in the second year) will be measured.

Genotypes of the sub-species were selected with due consideration of:-

- * Seedling vigour
- * Earliness of flowering
- * Winter production
- * Lateness of flowering
- * Seed yield

The experiment will be resown on an adjoining site, currently sown to barley, next year.

3. SEED PRODUCTION & EXCHANGE:

During the 1974-75 season, 528 genotypes of 12 different genera were grown for pure seed production for further evaluation within the plant introduction and plant breeding programmes and for exchange with interstate and overseas organisations.

In all, 338 samples of seed were despatched to nine overseas countries and ten organisations within Australia.

4. EXTENSION ACTIVITIES, VISITORS, ETC.:

Bureaux, conferences, seminars, etc.	10
Student, industry group visits	4
Interstate visitors (from 3 states)	5
Overseas visitors (from 9 countries)	27

5. PUBLICATIONS:

Crawford, E.J. (1974) - "Paravivo - a long lived winter growing lucerne". J. of Agric., August, 1974, Vol. 77, No. 3.

Beale, P.E. & Crawford, E.J. (1975) - "Assessment of Trifolium species and other annual pasture legumes with particular reference to tolerance to Kabatiella caulivora". Agricultural Record, 1975.

PLANT PATHOLOGY SECTION

SECTION LEADER:

Dr. A.J. Dube, B.Ag.Sc.(Hons.), Ph.D.

RESEARCH OFFICERS:

Mr. A.H. Mayfield, B.Ag.Sc.

Vacant

LABORATORY OFFICER:

Mr. C. Wilmshurst

FIELD ASSISTANT:

Mr. R. Short, O.N.D., D.B.S.

PLANT PATHOLOGY SECTION

1. INTRODUCTION:

The main emphasis in research and services of this Section have been on diseases of cereals. This is particularly relevant when it is estimated that there was in wheat alone a yield loss of 0.4M. tonnes during the 1974-75 season due to rust, haydie and septoria. This was reflected in the delivery of 22% (normally 2%) of wheat delivered to the Wheat Board was classified as special purpose and feed (i.e. less than 74 kg/hl). These diseases of wheat and diseases of barley and oats have been aggravated by the exceptionally wet years and the over summer rains. The incidence of rust was also aggravated by the large area of the one variety. Co-operation in the National rust prevention programme will help in the prevention of widespread rust damage in the future.

2. RESEARCH:

2.1 Management Control Methods of Annual Ryegrass Toxicity

2.2 Management Control Methods of Cereal Eelworm

2.3 Field Assessment of the Host Efficiency of West Oats

2.4 Barley Leaf Scald Project

- * Effect of leaf scald on the yield and quality of barley
- * Screening for resistance to leaf scald
- * Identification of races present in South Australia
- * Rotation trial
- * Stubble treatments and their subsequent infection by barley scald.

2.5 Smuticide Assessment

2.6 Sprayseed and the Occurrence of Root Diseases

2.7 Turf Grass Diseases

- * Fungicidal control of dollar spot
- * Fungicidal control of spring dead patch.

3. SERVICES:

3.1 Disease Identification

The Section is working in co-operation with Mr. J. Walker (Senior Research Scientist), New South Wales Department of Agriculture, to identify correctly all crop and pasture diseases in South Australia. New recordings of diseases will be included in the National fungal collection maintained by Mr. Walker. Correct identification will allow the development of a properly classified reference herbarium of crop and pasture diseases in South Australia. During the year 180 specimens were identified, of these 4 were mouldy feed samples from the Institute of Medical and Veterinary Science.

New disease recordings were:-

3.1.1 Lupins

- * Stemphylium botryosum
- * Pleiochaeta setosa
- * Phomopsis rossiana and its perfect state Diaporthe woodii
- * Botrytis cinerea

3.1.2 Lentils

- * Botrytis cinerea

3.1.3 Broad beans

- * Botrytis cinerea

3.1.4 Sunflowers

- * Macrophomina phaseolina
- * Puccinia helianthi
- * Scleroteria minor
- * Botrytis cinerea

3.1.5 Lucerne

- * Colletotrichum trifolii
- * Stagonospora melioli

3.1.6 Annual medic

- * Colletotrichum trifolii

3.1.7 Subterranean clover

- * Physoderma trifolii

3.2 Rust Survey

Rust surveys were conducted in September, 1974 and May, 1975 and samples collected from these surveys and those from advisory staff and growers totalled 330. These were forwarded to Sydney to the Plant Breeding Institute for strain identification which is part of the National rust prevention programme.

3.3 Emergence Testing

Eighty-four samples of cereals were emergence tested for farmers. From these 1972-73 emergence tests a de-registration of Mancozeb on wheat was submitted to Technical Committee on Agricultural Chemicals.

4. EXTENSION:

Addresses were given at four Agricultural Bureau conferences. Dr. Dube reported to the Advisory Board of Agriculture on seed dressings. Mr. Mayfield addressed farmers on rust at a field day held by the Blyth Bureau and at the open day at Mortlock Experimental Station. Three addresses were given to Bureau groups.

An exhibition was presented at the Royal Adelaide Show in the Barley Board pavilion on rust and seed dressings.

5. CONFERENCES:

Mr. Mayfield attended the Barley Improvement Technical Committee Conference in Melbourne.

Dr. Dube attended the nematology workshop in Mildura.

6. STAFF:

Mrs. C. Rix resigned as laboratory officer and this position has been filled by Mr. C. Wilmshurst.

Mr. R. Short has joined the Section as a field assistant.

7. VISITORS:

Messrs. A. Bokor and M. Barbetti from the Western Australian Department of Agriculture visited the Section for a discussion on Kabatiella caulivora.

8. PUBLICATIONS:

Dube, A.J. (1975) - "Stem Nematode Disease of Lucerne". Jnl. of Agric. February, 1975.

Dube, A.J., Matz, N.R. & Krause, M.R. (1974) - "Cereal Smuts". Special Bulletin No. 15.

Krause, M.R., Heard, T.G., Marshall, B.J., Dube, A.J. & Mayfield, A.H. (1974) - "Cereal Variety Recommendations for 1975". Special Bulletin No. 7.

Johnsson, J. (1975) - "Kabatiella caulivora (Kirch) Karak. - The causal organism of Northern Anthracnose on clover scorch". Agronomy Branch Report No. 63.

SEED PHYSIOLOGY SECTION

SECTION LEADER:

Dr. K.G. Boyce, M.Ag.Sc., Ph.D.

RESEARCH OFFICER:

Mr. C.M.J. Williams, B.Ag.Sc.(Hons.)

TECHNICAL OFFICER:

Mr. E.S. Hogg, R.D.A.

LABORATORY OFFICER:

Miss A.M. Kelly

FIELD ASSISTANT:

Mr. M.O. Coleman

SEED PHYSIOLOGY SECTION

1. INTRODUCTION:

The work of the Section involves generation of technical information relating to production, processing, storage and utilisation of all types of seeds. At present investigations with herbage seeds predominate but some attention has been given to cereals, vegetable and flower seeds and seeds of species of turf.

Agronomic research on the nitrogen fertiliser-grazing management interaction for perennial grass seed production has moved a further step forward with the initiation of a grazing experiment at Kybybolite Research Centre in May, 1975. The influence of stocking rate, grazing season and nitrogen fertiliser on seed yield of three perennial grass species is being tested.

Other field projects include continuation of the evaluation of seed production potential of herbage cultivars of European and Japanese origin and a study of the comparative phenological development of Australian and foreign standard cultivars of important herbage grasses. This study is a co-operative one with the Victorian Department of Agriculture seed research group. Flowering times of Australian cultivars of phalaris, ryegrass, tall fescue and cocksfoot are being compared with those of standard cultivars developed in New Zealand, the United Kingdom and the United States of America.

A research and development seed project has been initiated on Struan Research Centre with the aim of demonstrating the commercial feasibility of herbage cultivars offered to South Australian seed producers for contract multiplication by overseas seed companies. Preparation of seed production areas for 1976 sowings has been initiated.

In the laboratory and controlled environment units, studies are continuing on growth and development of herbage seeds, particularly in relation to seed quality. With the use of a two-dimensional thermogradient germination plant, studies are continuing on characterisation of germination responses of herbage seeds in relation to a number of temperature parameters.

2. RESEARCH PROJECTS:

- 2.1 Effect of grazing and nitrogen application on perennial grass seed yield - C.M.J. Williams, K.G. Boyce.
- 2.2 Time of harvest studies for perennial grass seed crops - K.G. Boyce.
- 2.3 Perennial herbage grass seed growth and development - K.G. Boyce.
- 2.4 Evaluation of seed production potential of foreign bred species - K.G. Boyce, C.M.J. Williams.
- 2.5 Influence of temperature on germination in herbage grass and legume seeds - K.G. Boyce.

2.6 Phenological development in sown pasture grasses -
K.G. Boyce, C.M.J. Williams, L. Cook, F. Robinson.

2.7 Ecotypic variation in barley grass (Hordeum leporinum
L.) - P.S. Cocks, K.G. Boyce, P.M. Kloot.

3. STAFF:

Mr. E.S. Hogg, Technical Officer, transferred to the Seed Production Section on termination of the A.W.C. project held by the Seed Physiology Section since 1970. Mr. Hogg has moved to the South East Regional Headquarters, Struan as a seed production advisory officer.

Miss Kelly successfully completed second year of a Biology Laboratory Technician's course at the Levels Campus of S.A.I.T. in December, 1974 and is continuing on to the third year.

Mr. C.M.J. Williams has taken up the position of Research Officer and moved to the South East Regional Headquarters at Struan in late May. He submitted his Ph.D. thesis to the University of Adelaide in July.

4. VISITORS:

Mr. A. Loccisano, Far North Queensland Seeds, Walkamin, Queensland, visited on 7th October, 1974 to discuss technical aspects of the use of belt thrashers in the cleaning and processing of tropical seeds.

Dr. L.J. Cook, Seed Research Officer, Victorian Department of Agriculture, visited on 7th November, 1974 to discuss joint seed research programmes between South Australia and Victoria.

Mr. J.N. Landers, Project Manager for International Plant Breeders, Sao Paulo, Brazil, visited on 10th April, 1975 to discuss technical procedures for herbage seed production in NE Brazil.

5. PUBLICATIONS:

Boyce, K.G. (1975) - "Seed production research equipment developed in South Australia". Aust. Seed Review, Winter 1975 (in press).

Boyce, K.G. (1975) - "S.A. seed growers group discuss carbon banding". Aust. Seed Review, Winter 1975 (in press).

Williams, C.M.J. (1974) - "The effects of seeding rates on plant animal production from annual pastures in their establishment year". Proc. Aust. Soc. Anim. Prod 10: 396.

Williams, C.M.J. (1975) - "The biological basis of grazing management practices". Ph.D. thesis. Submitted to University of Adelaide.

Williams, C.M.J. & Allden, W.G. (1976) - "Production and economic returns from newly sown pastures". Proc. Aust. Soc. Anim. Prod. 11: (in press).

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SEED PRODUCTION SECTION

SECTION LEADER:

Mr. D.C. Ragless

EXTENSION OFFICERS:

Adelaide Office

Mr. G.E. Cooper

Mr. C.A. Schubert

South East Regional Headquarters, Struan

Mr. W.O. Coleman, R.D.A.

Mr. E.S. Hogg, R.D.A.

Mr. I.H. Simons

TECHNICAL ASSISTANT:

Miss C. Dodson

SEED PRODUCTION SECTION

1. INTRODUCTION:

The total production of certified pasture seed in South Australia for 1974-75 has been the highest since 1970-71. The figure reached 2,146 tonnes.. There has been record production for some crops. They are Jemalong barrel medic, Harbinger strand medic, Tornafield disc medic, Seedmaster phalaris, Demeter tall fescue, Deborah brome grass and Yarloop subterranean clover.

"Truth-in-labelling" has commenced on a voluntary basis for all lines of seed released for sale. It is compulsory on lines with restricted weeds. Analytical details are printed on self-adhesive stickers which are applied to the tags.

2. DEMONSTRATION PROJECTS:

2.1 Test the effectiveness of Asulox(R) in controlling Rumex spp. in established lucerne fields in comparison to 2,4-DB and amine 2,4-D plus dicamba.

2.2 Determine the effect of Igran(R), Bromoxynil, Tropotox(R), 2,2-DB, Nitrofen and Tribunil(R) on Paragosa gama medic in the control of wild mustard.

2.3 Evaluate the effectiveness of Igran(R), Bromoxynil, Tropotox (R), Reglone(R), Gramoxone(R) to control sow/milk thistle in Tallarook subterranean clover.

2.4 Evaluate the effectiveness of 2,4-D ester on medics to control wild turnip.

2.5 Determine the effect of Bucril MA(R), Tribunil(R), Treflan (R), Neoban(R) in controlling Emex spp. in medics.

2.6 Development of an automatic seed sampler for use in seed certification schemes.

2.7 Assistance has been provided to the Plant Introduction Section with regional testing of Paravivo lucerne and to the Seed Physiology Section with the testing of foreign cultivars for seed production in the South East.

2.8 Plot tested the annual legume seed as part of the routine check on the effectiveness of certification procedures. All lines exceeded minimum standards. Fifty-four lines of annual legumes have been plot tested since January in connection with the "grow on" scheme.

3. EXTENSION PROGRAMMES:

3.1 Stock Seed for Certified Seed Establishment

This programme has been continued, as the results from the efforts last year have been encouraging. There has been good relationships between the Department, seed producers and the seed trade in obtaining good lines of stock seed.

3.2 Harvesting Effectiveness

This programme has commenced to make seed producers aware of the problems of harvesting their crops, particularly in regard to cleaning the seed. At this stage the emphasis has been on the Horwood Bagshaw clover harvester.

3.3 Bulk Handling

Further efforts were considered necessary to make seed growers aware of the certification requirements when handling seed in bulk.

3.4 Seed Cleaning Costs

A survey has commenced to establish the costs of cleaning seed. This will be presented to the seed trade as soon as possible.

3.5 Insect Pests in Lucerne

This programme will be activated when there is likely to be a serious insect pest problem in conjunction with district agronomists.

3.6 Increased Medic Production in Northern Regions & Eyre Peninsula

This on-going programme has been successful in the North but quite unsuccessful on Eyre Peninsula, due to better alternatives from cereals.

4. STAFF:

4.1 Staff Changes

Mr. T. France transferred to District Agronomist in December, 1974 and was replaced by Mr. E.S. Hogg in March, 1975.

4.2 Interstate Study Tour

Messrs. Coleman, Schubert, Simons and Cooper toured New South Wales, the A.C.T. and Victoria during November, 1974. Areas visited included Wagga, Temora, Cowra, Sydney, Canberra, Benalla, Mansfield, Melbourne and Ballarat. Valuable information in regard to plot testing, field inspections, seed testing and plant breeding were obtained. Helpful contacts have been made with our interstate counterparts.

4.3 Conferences

Mr. D.C. Ragless addressed the Seventh National Convention of the Australian Seed Industry Association held in Adelaide, October, 1974. Messrs. Schubert and Cooper also attended the convention.

Messrs. Ragless, Schubert, Cooper and Miss Dodson attended the Annual Symposium of the South Australian Seedgrowers Co-operative in Adelaide, November, 1974. Messrs. Ragless and Coleman attended the annual meeting of the South Australian Seed Producers Association (S.A.S.P.A.) held at Struan Regional Headquarters, September, 1974.

Mr. Ragless attended the Co-ordinating Committee for Seed Certification and Australian Seed Industry Advisory Committee meetings in Canberra, September, 1974.

Mr. Ragless attended the annual meeting of the Australian Seed Producers Federation held in Launceston, November, 1974. Mr. Ragless also attended the Australian Development Assistance Agency meeting in Canberra in February to help arrange an international training course in seed improvement and certification.

A total of 11 field days were attended by various members of the Section, including one at Saddleworth with representatives from the Horwood Bagshaw Company along with members of S.A.S.P.A. Various aspects of the clover harvester functioning were examined and discussed, from both the manufacturer's and operators' viewpoints.

All staff attended the field day held by S.A.S.P.A. following the annual meeting in the Naracoorte district, September, 1974.

Almost all meetings of the Seed Industry Association and Seed Producers Association were attended by one or more members of the Section.

5. VISITORS:

During the year the Section had eleven overseas visitors and four interstate visitors. The overseas visitors came from Libya, Argentina, Algeria, U.S.A. and Yugoslavia.

6. PUBLICATIONS:

Coleman, W.O. & Mulligan, D., (1974) - "Costs of Seed Production". Jnl. of Agric., November, 1974.

Cooper, G.E. (1975) - "Growing Giant Shaftal Clover Seed Crops". Special Bulletin 14.75.

Ragless, D.C. (1974) - "The Importance of Seed Quality". Agronomy Branch Report No. 61.

Ragless, D.C. (1974) - "Herbage Seed Production, 1973-74". Agronomy Branch Report No. 57.

Ragless, D.C. (1974) - "Marketing of Seed of New Pasture Varieties in South Australia". Australian Seed Review.

Ragless, D.C. (1974) - "The Production of Certified Seeds in South Australia During the Period, 1960-1973". Agronomy Branch Report No. 53.

Ragless, D.C. (1975) - "Future Standards for Certified Seed". Australian Seed Review (in press).

- Simons, I.H., Smith, K.R. & Kloot, P.M. (1975) - "A Guide to Herbicides for Weed Control in Lucerne Weed Crops". Special Bulletin No. 7, 75/1.
- Simons, I.H., Smith, K.R. & Kloot, P.M. (1975) - "A Guide to Herbicides for Weed Control in Annual Medic and Subterranean Clover Seed Crops". Special Bulletin No. 7, 75/2.
- Simons, I.H., Smith, K.R. & Kloot, P.M. (1975) - "A Guide to Herbicides for Weed Control in Perennial Grass Seed Crops". Special Bulletin No. 7, 75/3.

6.1 Special Reports

- Coleman, W.O. (1974) - "Small Seed - What is a Reasonable Return?".
- Simons, I.H. (1975) - "Comparison of Certified Hunter River Seed Produced in the South East from Spray and Flood Irrigation Over a Five Year Period". June, 1975.
- Simons, I.H. (1975) - "Areas of Pasture Seed Crops Certified in Each County of the South East for 1974-75". May, 1975.

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WEED SCIENCE SECTION

SECTION LEADER:

Mr. G.B. Baldwin, B.Sc., R.D.A.

SECRETARY, WEEDS ADVISORY COMMITTEE:

Mr. J.M. O'Neil, R.D.A.

RESEARCH OFFICERS:

Mr. M.J. Catt, B.Sc., Dip.Bus.Admin.

Mr. P.M. Kloot, M.Ag.Sc.

RESEARCH ASSISTANT:

Mr. D. Carter

LABORATORY ASSISTANT:

Mrs. M. Carmichael (part-time)

EXTENSION OFFICERS:

Mr. R.S. Britton, H.D.A.

Mr. J.A. Dickinson, N.D.A.(U.K.), M.R.A.C.

Mr. S.J. Garrick

Mr. D.I. Murrie, R.D.A.(Hons.)

Mr. K.R. Smith, W.D.A.

REGULATORY OFFICERS:

Mr. C.R. Alcock, R.D.A., H.D.D.(Hons.)

Mr. A.W. Lewis

OFFICE ASSISTANT:

Mrs. M. Hill (part-time)

WEED SCIENCE SECTION

1. INTRODUCTION:

There were a number of significant developments within the Weeds Science Section during the 1974-75 year. Perhaps the most important one was the reclassification of the country based technical officer positions to the position of agricultural adviser.

The maintenance of experienced specialist staff in country centres has been of continual concern to the Section over the last decade. This reclassification will bring more stability to the group and enable officers to make a career as specialist advisers.

Weeds research in South Australia took a big step forward with the opening of the Hector Orchard Weeds Research Unit at the Northfield Laboratories in November, 1974. Research has not kept pace with the facilities available as both research officers have spent much of their time preparing the manuscript for a new weeds handbook.

The Pest Plants Bill which will bring many changes to the regulatory aspects of weed control in South Australia was approved in principle by Cabinet in April, 1975.

The shortages of herbicides did not continue as forecast; no doubt the very large increases in price of many of these has helped bring them back "on stream".

Our extension publications were in keen demand and we continued to produce at a high level (35 in all) during the year.

2. WEED SCIENCE RESEARCH:

2.1 Concluded Research

Five projects were successfully completed during 1974-75.

2.1.1 B5/A9 & C5/A9 - Control of yellow burr weed in cereals (M.J. Catt) & lucerne pasture (P.M. Kloot)

Terbutryne, bromynil + MCPA, metaxuron, methabenzthiazuron, diuron and linuron and two experimental materials, provided acceptable control of Amsinckia spp. in wheat. Diuron and terbutryne were effective in lucerne.

2.1.2 K/A4 & A5 - Control of perennial peppergrass, nutgrass & African rue with glyphosate (P.M. Kloot)

Glyphosate was found to be effective on nutgrass and African rue and when it becomes commercially available it will be recommended. The result with perennial peppergrass was not as conclusive and more work is needed.

2.1.3 K/A2 - Control of phalaris on roadsides - (L.T. Jacobs, retired)

The only practical control measure was glyphosate at 5.5 l/ha. Karbutilate, alone and in mixtures, was also effective, but left the ground bare. The glyphosate plots were covered in annuals shortly after treatment. Further demonstrations are being carried out by the Bushfires Section.

2.1.4 K/A6 - Krenite on some native species & woody weeds - P.M. Kloot

This new product is most effective on the types of woody weeds on which 2,4,5-T is currently being used. "Krenite" should remove many off-target risks that exist at present.

2.1.5 B5/A10 - Control of red brom grass (glasshouse trial)

Assessment of a range of herbicides has indicated five treatments which will be examined in the field.

2.1.6 B5/A12 - Wild oat control in Clipper barley

This new wild oat herbicide, AC84777, gave significant yield increases and excellent wild oat control in Clipper barley. The importance of a rain-free period after application has been recognised.

2.1.7 B5/A13 - ULV application of 2,4-D

Special ultra low volume formulations of 2,4-D and MCPA applied by aircraft through Micronair rotary atomisers gave excellent control of wild turnip. Rates as low as 380 ml/ha of undiluted product were used.

2.2 Suspended Research

As from December, 1974, both research officers have been occupied virtually full time on a weed handbook commissioned by the former Minister. At that time the following projects were suspended. Experiments mentioned in last year's report are only listed here.

2.2.1 B5/A2 - Control of soursob in pastures & cereals - M.J. Catt

2.2.2 C5/A2 - Control of silver-leaved nightshade - M.J. Catt

2.2.3 C5/A3 - Biological control of skeleton weed - M.J. Catt

2.2.4 C5/A8 - Management of Calomba daisy - P.M. Kloot

2.2.5 C5/A13 - Taxonomy of weedy Hordeum spp. - P.M. Kloot

2.3 Minimum Tillage

Mr. Catt is the chairman of a joint Soils-Agronomy group examining aspects of minimum tillage for crop establishment. Much of the currently available information on this subject has been collected and examined for preparation of a new research programme. Long term implications of minimal tillage are of prime importance.

3. WEED CONTROL ADVISORY & EXTENSION SERVICES:

3.1 Identification & Information Services

The number of personal enquiries and those handled by letter continued to increase over previous years despite the fact that the Regional Weeds Agronomist at Jamestown, Mr. J.N. Hannay, transferred to Lameroo as a District Agronomist as from 10th March, 1975 leaving the Jamestown position vacant for the remainder of the financial year.

A total of 4,800 enquiries were handled, 4,050 personal and 750 by letter. Over 80% of all enquiries were received and dealt with by officers in the Adelaide office.

3.2 Farm Visits

The number of farm visits remained relatively stationary at 295.

3.3 Bureau Meetings & Conferences

Officers attended 23 Agricultural Bureau gatherings during the year and addressed members on a variety of topics relating to weed control.

3.4 Field Days & Displays

Forty-two field days were attended.

In most cases the work demonstrated was of a composite nature involving other sections of the Department or private industry as well as the Weeds Section. This is an interesting and logical development whereby demonstration sites are used to their maximum advantage.

3.5 Meetings with Various Organisations

During the year officers attended the following meetings:-

Adelaide Hills Noxious Weeds Eradication Committee	6
Weeds Committee of the S.A. Stockowners' Association	4
State Planning Office re Metropolitan Development Plan	
Department of Lands (weed control in drainage channels)	
South East Agricultural Chemicals Committee	

3.6 Regulatory Work

This aspect of regional agronomists' duties has increased with the probability of the introduction in the near future of a new Act to be called the Pest Plants Act to replace the present Weeds Act, 1956-69. Eighteen meetings of council groupings were held throughout the State during June-July, 1974 to explain the implications of the proposed legislation.

In addition, 230 visits by regional officers to councils were made during the year to assist and advise councils in regulatory weed control work, including budgeting, programming and all aspects of noxious weed control.

3.7 Extension Programmes (continuing)

3.7.1 Identification and eradication of skeleton weed outbreaks (Western, Northern and Central Regions).

3.7.2 Off-target damage prevention programme (South East and Central Regions).

3.7.3 Weed control on roadsides with particular reference to onion weed and soursob control (Western Region).

3.7.4 Sorrel control in newly sown pastures (Central Region).

3.7.5 Khaki weed control using various herbicides (Central Region).

3.7.6 Bracken fern control using the herbicide, Asulox, (South East and Central Regions) in conjunction with May & Baker.

3.7.7 Weed control in lupins (Western and South East Regions).

3.7.8 Weed control in linseed (South East Region).

3.8 Extension Programmes (completed or semi-completed during 1974-75 - results available)

3.8.1 Spray/graze demonstration on Lincoln weed in conjunction with District Agronomist, K.J. Holden, Western Region (completed).

3.8.2 Sheep weed control in Prior and Clipper barley - Western Region (completed).

3.8.3 Weed control in lupins in conjunction with District Agronomist, Mr. K.J. Holden - Western Region (continuing).

3.8.4 The economics of early versus late spraying of pasture weeds using amine 2,4-D and ester 2,4-D - South East Region (completed).

3.8.5 Weed control in linseed - South East Region (continuing).

3.8.6 Computer survey on distribution of bladder campion in South Australia (completed).

* Total area infested - 683,489 hectares

* Number of infestations reported - 291

* Total area infested on roadsides - 2,761 hectares

* Number of infestations reported on roadsides - 87

- * Total area infested in paddocks - 680,691 hectares
- * Number of infestations reported in paddocks - 204
- * Number of district councils infested - 22

3.9 Extension Programmes Commenced During 1974-75

3.9.1 Silver-leaf nightshade control and containment programme - all regions.

3.9.2 Khaki weed control and eradication programme - all regions.

3.9.3 Water hyacinth publicity programme, River Murray - Murray Mallee Region.

3.9.4 Weed seeds in uncertified small seeds crops - all regions.

3.9.5 Cape weed and wild turnip control in medic and clover pastures - Western Region.

3.9.6 Assess effectiveness of various herbicides on false caper - Central Region.

3.9.7 Control of horehound in cereal areas - Central Region.

3.9.8 Onion weed control in cereal areas - Murray Mallee Region.

3.9.9. Saffron thistle in cereal crops - Murray Mallee Region.

3.9.10 Comparison of IPC Carbetamide and Propyzamide in strawberry clover - South East Region.

3.9.11 Weed control in lupins to assess the tolerance to simazine and evaluate possible alternatives - South East Region.

3.9.12 Bracken fern control in established lucerne - South East Region.

3.9.13 Dock control in lucerne using the herbicide, Asulox - South East Region.

3.9.14 Weed control in sunflower - South East Region.

3.9.15 Weed control in small seed crops - South East Region.

3.9.16 Tolerance of strawberry clover to Asulox - South East Region.

4. REGULATORY SERVICES:

The standard of regulatory services to councils has improved because the regional agronomists (weed control) have become more familiar with their respective areas. Overall coverage is still, however, far from adequate as regional officers are becoming more heavily involved in advisory work, including the planning and execution of extension programmes. Where coverage has been maintained councils and landholders are adopting a more progressive attitude towards noxious weed control.

The Agronomist (Local Government Weed Control) has endeavoured to maintain as much contact as possible with regional officers and councils to back up the regulatory services and this has entailed regular visits to those officers, the councils and where applicable, weeds boards.

During the year Weed Section officers attended 18 meetings with councils throughout the State, arranged to familiarise and discuss with councillors all aspects of the proposed new weeds legislation.

One Local Government Regional Weeds Officers' Conference was held in the South East during the year.

Expenditure of Government funds on regulatory services in the control of proclaimed weeds totalled \$165,000, of which \$157,000 was paid directly to 87 councils as subsidies on the salaries of 37 weeds officers, and proclaimed weed control on unoccupied Crown lands and half roadsides adjoining Crown lands. Again there has been a substantial increase in the work involved in processing returns from councils and the allocation of subsidy funds.

Sixty-nine authorised weeds officers, excluding those district clerks who are acting as weeds officers, are employed by 83 councils. The shortage of qualified weeds officers has improved, however, 10 councils are still being subsidised on the salaries of 10 unqualified officers. Experienced officers continue to be attracted away from local government by higher salaries and better conditions.

Stock inspection services against proclaimed weeds were maintained during the year although the availability of officers to carry out such services is restricted. Stock inspections were confined almost entirely to the detection of Noogoora burr and even then it was only possible to carry out selective spot checking. The shared inspections at Yelta with Victorian authorities are continuing satisfactorily.

A total of 58 stock inspections involving 830,078 sheep and 40,676 cattle detected 26,416 Noogoora burr infested sheep from 30 separate properties. No cattle were found infested. Inspections were made at Gepps Cross (43), Yelta (11), Mallala (1), Peterborough (2), Coonalpyn (1).

Patrols of certain infestations of proclaimed weeds, mainly outside local government boundaries, were continued. The areas included:-

* Noogoora & Californian burr

Yadlamalka, North East, Little Para River, Gawler River, Morgan and the Upper Murray

* Opuntia spp.

The Flinders Ranges at Angorichina Hostel, Angorichina Station, Blinman, Quorn and Saltia. Other areas were Overland Corner, Paringa and Radium Hill

* Mesquite

Wallerberdinna and Lake Torrens Stations, Broken Hill, Cockburn, Radium Hill and Kingoonya.

5. WEEDS ADVISORY COMMITTEE:

The Weeds Advisory Committee continued throughout the year finalising matters pertaining to the Pest Plants Bill, a replacement for the Weeds Act, 1956-69.

Following a series of 18 conferences with district council groups held during June-July, 1974, the Committee made many amendments to the draft Bill. The amendments made were mainly at the request of councils.

The Bill was listed for attention by Parliament during the latter half of 1974. Due to unavoidable delays by the Parliamentary Counsel's office, the Bill was not completed and prepared by the Government Printer until early 1975.

It was then submitted to Cabinet and referred back to the Department in regard to finance.

The Bill was again submitted to Cabinet and approved in principle on 14th April, 1975. It was again listed, priority A, for attention by Parliament during the session intended to commence July, 1975.

The Minister of Agriculture, the Hon. T.M. Casey, M.L.C., sent letters to district councils and municipalities informing them that the Bill was ready to be taken to Parliament. The letters briefly mentioned the more important amendments made as a result of the June-July, 1974 conferences. Reasons were given why some amendments sought were not accepted.

The Weeds Advisory Committee produced and distributed to the primary industries and related organisations, a history of the preparation of the Bill. The more important aspects of the Bill were discussed.

A special issue of the Weeds Scene was produced. The purpose of this issue was to directly answer in detail, and to correct, inaccurate information published in local papers and given by letter to Members of Parliament.

The special issue was distributed to all councillors throughout rural areas of the State. Two copies each were sent to metropolitan councils, and copies were supplied to primary producer and allied organisations.

The Bill has the support of the United Farmers & Graziers, the Stockowners' Association, the Adelaide Hills Noxious Weeds Eradication Committee, and other organisations.

6. STAFF:

6.1 Staff Appointments, Movements

In the 1973-74 Weed Section Report, mention was made that all five regional centres were now staffed with regional weeds agronomists.

Mr. Hannay transferred to the position of District Agronomist at Lameroo in March, 1975. To date no new appointment has been made to fill the vacancy.

Mr. Jacobs who was research officer into the uses of herbicides for bushfire control, retired from the Department in August, 1974.

6.2 Staff Training

Three officers, Messrs. J.A. Dickinson, R.S. Britton and K.R. Smith, visited New South Wales and Victoria from 7th to 19th September, 1974 on a fact finding tour in relation to various aspects of weed control, including the administration and implementation of noxious weed control within those states.

Messrs. Britton, Dickinson, Garrick, Murrie and Smith attended the Communications II In-service Training Course conducted at the Gleneden School of Nursing, Marryatville from 23rd-27th June, 1975.

Mr. Carter undertook the Communications I In-service Training Course at Roseworthy Agricultural College in February, 1975.

Mr. Catt successfully completed the Diploma of Business Administration at the Institute of Technology.

7. PUBLICATIONS:

Thirty-five new extension publications were produced during the year and in addition, three more were up-dated. "A Guide to Herbicides for Weed Control in Pasture Seed Crops" has been completely revised and is now printed as three separate publications.

7.1 Special Bulletins & Miscellaneous Publications

Alcock, C.R. (1974-75) - "Weed Scene" - Issues 15-17.

Catt, M.J. (1975) - "Cereal Weed Spraying 1975".

Smith, K.R., Simons, I.H., & Kloot, P.M. (1975) - "A Guide to Herbicides for Weed Control in Lucerne Seed Crops".

Smith, K.R., Simons, I.H., & Kloot, P.M. (1975) - "A Guide to Herbicides for Weed Control in Annual Medic & Subterranean Clover Seed Crops".

Smith, K.R., Simons, I.H., & Kloot, P.M. (1975) - "A Guide to Herbicides for Weed Control in Perennial Grass Seed Crops".

Department of Agriculture (1974) - Khaki weed poster.

Catt, M.J. (Revised 1975) - "Soursob Control".

7.2 Articles, Journal of Agriculture

Robinson, B.D. & Dickinson, J.A. (1974) - "The Role of Wetters in Weed Control and Plant Protection". S.A. Jnl. of Agric., Vol. 77, 138-140.

Alcock, C.R. & Dickson, J.A. (1974) - "Field Bindweed or Convolvulus". Ibid. 77:141-144.

Smith, K.R. (1975) - "A New System of Weed Surveying and Its Use on Silver-leaf Nightshade". Ibid. 78:35-39.

7.3 Colour Plates

7.3.1 Journal of Agriculture - C.R. Alcock

Three-corner garlic	August, 1974
Horehound	August, 1974
Small fruited pheasant's eye	November, 1974
Cape tulip - 1 leaf	February, 1975
Cape tulip - 2 leaf	February, 1975
African boxthorn	May, 1975
Spiny emex or three-corner jack	May, 1975

7.3.2 Issued Separately

Khaki weed - D.I. Murrie	August, 1974
Silver-leaf nightshade - C.R. Alcock	September, 1974
Water hyacinth - D.I. Murrie	October, 1974

7.4 Weed Control Notes

Khaki Weed - K.R. Smith	July, 1974
Silver-leaf Nightshade - M.J. Catt & K.R. Smith	July, 1974
Saffron Thistle - J.N. Hannay	August, 1974
Nut Grass - P.M. Kloot	August, 1974

Control of Salvation Jane on Roadsides, Fence Lines & Similar Situations - C.R. Alcock	August, 1974
Calomba Daisy - P.M. Kloot	November, 1974
Horehound (revised) - D.I. Murrie	February, 1975
Potato Weed - R.S. Britton	February, 1975
Spiny Emex (revised) - D.I. Murrie	May, 1975
Stemless Thistle - K.R. Smith	May, 1975
Three-corner Garlic - J.N. Hannay	May, 1975
Couch Grass - J.A. Dickinson	June, 1975
Blackberry - D.I. Murrie	June, 1975
Furze or Gorse - D.I. Murrie	June, 1975
Topped Lavender - D.I. Murrie & C.R. Alcock	June, 1975