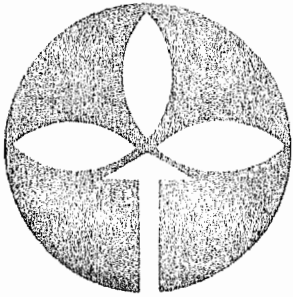


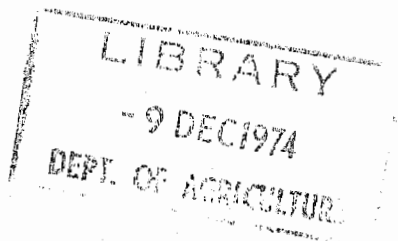
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DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA

Agronomy Branch Report

SOUTH AUSTRALIAN DEPARTMENT OF AGRICULTURE



AGRONOMY BRANCH ANNUAL REPORT,

1973-74

Report No. 58

SOUTH AUSTRALIAN DEPARTMENT OF AGRICULTURE

AGRONOMY BRANCH ANNUAL REPORT.

1973-74

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- FOREWORD -

This report aims to highlight particular aspects of the work of the Agronomy Branch which were newly introduced or which made conclusive contributions to the progress of agriculture for the year ending June 30th, 1974. In our report for the previous year all of the work of the Branch was dealt with so in many ways this report has simply built on from that publication (Agronomy Branch Report No. 49).

Again the staff would like to take this opportunity to acknowledge the valuable help the Branch has received during the year from the Executive and other branches in the Department. The Waite Agricultural Research Institute, the C.S.I.R.O. and other State and Australian Government departments have also greatly assisted us.

We also wish to thank the many landowners and employees of various companies that have helped us in so many ways.

Chief Agronomist:

A.F. Tideman

Principal Officers:

E.D. Higgs
M.R. Krause
J.D. McAuliffe

Senior Leaders:

G.B. Baldwin
P.R. Birks
K.G. Boyce
P.S. Cocks
E.J. Crawford
A.J. Dube
B.T.J. Graham
T.G. Heard
M.J. Mathison
D.C. Ragless
G.D. Webber

AGRONOMY BRANCH REPORT - 1973-74

INTRODUCTION

During the period under review, from July, 1973 to June, 1974, approximately 90 staff members were involved in extension programmes to landowners covering all aspects of crop and pasture agronomy, an applied research programme in these disciplines and various regulatory duties involving weed and insect control, seed standards and the safe and efficient use of agricultural chemicals.

At a glance the following table summarises the extension and research activities.

Extension Activities

1973-74

Publications	79
Press Releases	263
TV & Radio Talks	192
Field Days	64
Group Meetings & Conferences	506
Farm Visits	4,300
Office Interviews	4,700

Research Activities

1973-74

<u>I. Field Crops</u>	<u>No. of Projects</u>
Nutrition & Physiology	2
Breeding & Varietal Evaluation	17
Pathology & Entomology	11
Management	7
Weed Science	4
<u>II. Pasture Projects</u>	
Nutrition & Physiology	10
Breeding & Varietal Evaluation	17
Pathology & Entomology	12
Management	5
Weed Science	7

The research sections in the Branch are now operating at a high peak, the result of a long development period during the 1960's. In the past three years the number of projects has increased by about 25% mainly in pasture breeding and evaluation and in aspects of plant pathology and the sections are now lead by senior research staff, most of whom have had more than ten years' experience in their speciality.

Compared with three years ago, the extension activities are better planned and more intense. A new district has been developed in the South East and specialist services provided to War Service Land Settlers on Kangaroo Island. However, recent resignations and the retirement of Mr. Gross, an agronomist with forty years' experience, has weakened our front line extension services and there does not appear to be an immediate solution to that problem. Mainly because of our increasing requirement to give technical assistance to other Government departments, our extension services from Head Office have also failed to keep up with the demand.

During the year new laboratory and office facilities became available at the Plant Introduction Centre at Parafield. Wide publicity of this event drew attention to the growing international importance of this unit as a "gene pool" for the development of medic pastures in many countries.

The Department's Regional Centre at Struan was also opened and this has given the Branch accommodation for five extension officers and has paved the way for further regionalisation. Many officers in the Branch actively assisted Dr. Callaghan while he reviewed the Department's activities in relation to regionalisation and we welcome the planning which is still proceeding in this direction.

The Agronomy Branch has been able to maintain a high level of in-service training during the year. Besides the continuing series of Departmental schools involving training in scientific writing, communications and so on, attention has been given to staff management training for section leaders. Four staff members had opportunities to complete three to four months study leave periods overseas and three officers undertook short study visits to New Zealand research stations.

The implementation of "task force" operations has expanded during the year and is proving an excellent approach to many of our problems, particularly as it has been so readily supported by officers in other branches. Aspects of minimum tillage, plant quarantine, nitrogen fertiliser use and bunticides are being tackled in this way.

Regional extension task force operations have been further developed during the year by involving seed and weed field specialists in the Branch's regular regional extension meetings.

During the year a great deal of time has been spent developing a Grain and Plant Products Protection Act in view of the current concern to protect our export cereals and grains from insect pests. The new Pest Plant Act to replace the Noxious Weeds Act was also developed and is currently being examined by the Parliamentary Counsel.

Standing Committee on Agriculture has recently established a Commonwealth and States Plant Protection Committee to advise on all aspects of crop and pasture production and the second meeting of that Committee was held during March in South Australia. This significant development gives the Branch an opportunity to regularly review its activities in relation to those in all other states.

Finally, it is pleasing to report that world-wide interest has continued to develop in South Australian farming systems. This has involved the Branch almost to an embarrassing degree in catering for the many technical visitors who have been arriving almost weekly from overseas, particularly from the Mediterranean region. This work has, however, been very rewarding and the Branch has benefited from this vigorous interchange of views.

AGRONOMY ADVISORY SECTION

PRINCIPAL AGRONOMIST: Mr. J.D. McAuliffe, R.D.A.

SECTION LEADER: Mr. G.D. Webber, R.D.A., H.D.R.E.,
Senior Agronomist

ADVISORY OFFICERS:

- | | |
|------------------------|---|
| Adelaide Office | - Mr. S.G. Williams, R.D.A.,
Assistant Senior Agronomist |
| | - Mr. N.R. Matz, R.D.A.,
Special Agronomist |
| Kangaroo Island | - Mr. R.C. Hagerstrom, R.D.A.,
Senior District Agronomist
(War Service Land Settlers) |
| Central District | - Mr. P.D. Fairbrother, R.D.A.,
District Agronomist |
| | - Mr. M.A. Schwerdt,
Field Assistant |
| Lower North | - Mr. W.A. Michelmore, R.D.A.,
District Agronomist |
| Mid South East | - Mr. P.J. Mowatt, R.D.A., G.D.E.,
District Agronomist |
| Murray Districts | - Mr. K.G. Bicknell, D.D.A.,
District Agronomist |
| Northern Mallee | - Vacant |
| Southern Mallee | - Vacant |
| Yorke Peninsula | - Mr. T.J. Dillon, R.D.A.,
District Agronomist |
| Upper North | - Mr. A.E. Hincks, R.D.A.,
District Agronomist |
| Lower South East | - Mr. P.L. Marrett,
District Agronomist |
| Upper South East | - Vacant |
| Lower Eyre Peninsula | - Mr. K.J. Holden, R.D.A.,
District Agronomist |
| Eastern Eyre Peninsula | - Mr. P.M.S. Potter, B.Ag.Sc.,
District Agronomist |
| Upper Eyre Peninsula | - Mr. T.R. Davidson, R.D.A.,
District Agronomist |

AGRONOMY ADVISORY SECTION

1. SECTION ACTIVITIES:

During the 1973-74 season, the Agronomy Extension Section has continued to provide an extensive technical advisory and education service to primary producers in South Australia through 14 regional districts. The demand for this service continues to increase as do technical services to agricultural industries and other Government departments.

Several changes in district staff have been brought about by promotions, transfers and one resignation. This has resulted in some districts being vacant for varying periods. Despite this, a very high level of primary producer contact was maintained at field level as is indicated in the table below, showing a summary of the main activities of district officers for the year.

	1973-74
<u>Farmer Contacts:</u>	
On-farm visits	3,325
Rural group meetings	390
Office visits	4,120
Telephone enquiries	11,400
<u>Mass Media:</u>	
News items & articles (state and country papers)	220
Radio broadcasts	88
TV appearances	8
Reports on agricultural conditions & special reports	161

As can be seen, extensive use was made of all available media to extend information to producers throughout the State.

2. OTHER ACTIVITIES:

2.1 District Reports

Monthly reports were prepared by each district agronomist throughout the year. The distribution of these reports include the media, commerce and industry.

A new system of reporting on crop estimates was developed this year. The new system involves the preparation of revised estimates on a monthly basis throughout the year. These estimates are used by a large number of organisations associated with agricultural production.

Special reports were prepared on problems associated with the new wheat pickle, Mancozeb, and the severe stem rust epidemic.

Other reports included the use of alternative chemicals due to the general shortage of agricultural chemicals.

2.2 Registered Cereal Seed Production

Officers of the Section continued to service the registered seed wheat and barley schemes in South Australia. This consisted of inspections associated with 14 growers (600 hectares) of seed wheat, 12 growers (500 hectares) of seed barley.

2.3 Demonstrations

Demonstrational trials were carried out by district officers in various parts of the State. These demonstrations included work with cereals, minor crops and pasture cultivars. Techniques in establishment, weed control, pest control and general management of both crops and pastures were also demonstrated.

2.4 Liaison

Liaison by members of the extension staff was carried out with Departmental and other research workers and with industry and commercial representatives in order to provide the most effective and up to date information to the farming community and other people connected with agriculture.

2.5 Educational Tours & Training Programmes

Educational tours were conducted for farmers, agricultural students, interstate visitors and an increasing number of overseas visitors, including official parties from Tunisia, Japan and Mongolia.

Training programmes were arranged for students from Libya, Mexico and Tunisia.

2.6 Service To & From Commerce & Industry

Enquiries to and from commerce and industry on a large variety of agricultural matters have continued to expand. The good understanding and co-operation we have with these bodies is of considerable benefit in making our extension programmes more effective.

2.7 Judging of Competitions

Extension officers have continued to assist with judging Agricultural Bureau and Rural Youth competitions and have acted as judges and stewards at the Royal Show.

2.8 Special Duties

These duties have included reports on Ministerial enquiries, technical matters to other departments, attending to applications under the Rural Advances Guarantee Act, 1963, assisting the South East Drainage Board, co-ordinating assessments of re-subdivisions on behalf of the State Planning Office, being represented on the Primary Producers Emergency Assistance Advisory Committee, the Consultative Committee on Drought, the Bushfire Research Committee and the Wheat Delivery Quota Advisory Committee.

3. EXTENSION PROGRAMMES:

District extension programmes are continuing to be directed at a wide range of crop and pasture production activities, improving extension efficiency and investigational work on district problems.

Some important continuing programmes are concerned with cereal varieties, grain insect pest control, pasture improvement and off-target damage. Some of the newly developed programmes include:-

3.1 Improved Pastures for the Murray Mallee Region

This is a regional programme to promote improved medic pastures in the Murray Mallee that has been developed concentrating on areas where skeleton weed has been affected by rust.

3.2 Lupins & Oil Seed Crops

With the increased interest in lupins, linseed and sunflowers, observations and surveys will be made on these crops and relevant information extended to growers.

3.3 Wheat Varieties for Rust Prone Areas

Due to the severe rust effects on wheat crops in many areas last season, investigations to assess suitable rust resistant varieties for rust prone areas will be carried out.

3.4 Group Action Programmes

Group problem solving programmes are being further developed with farmer groups in several districts. This type of activity is seen as giving the opportunity for a greater degree of farmer improvement in programmes.

3.5 Plague Locusts

District officers have been involved in a programme of assessing plague locust activity in various areas of the State and will assist in promoting control measures as required, depending on extent of the problem.

4. STAFF:

4.1 Appointments

Mr. S.G. Williams was appointed Assistant Senior Agronomist

Mr. N.R. Matz was appointed as Special Agronomist (Adelaide Office)

Mr. T.J. Dillon was transferred to Kadina as District Agronomist for Yorke Peninsula

Mr. D.M. Crawford resigned as District Agronomist for the Northern Murray Mallee

Mr. P.J. Mowatt took up duties at Naracoorte as District Agronomist for the Mid South East district after a year's study leave in New South Wales

In order to better co-ordinate district and regional programmes, the Branch has appointed four regional leaders in the four main regions of the State to supervise and co-ordinate agronomy extension activities.

These officers are:- Mr. P.J. Mowatt (South East), Mr. K.G. Bicknell (Murray Mallee), Mr. K.J. Holden (Eyre Peninsula), and Mr. W.A. Michelmore (Northern Areas).

4.2 Training

Additional training for extension officers continued to be an important objective of the Branch.

Mr. P.J. Mowatt completed the graduate diploma course in Extension.

Mr. G.D. Webber attended the Small Group Learning Workshop at the Australian National University, Canberra, and also a one week Management School conducted by the South Australian Department of Further Education.

Mr. P.L. Marrett attended the short course in Extension at Brisbane University.

Mr. R.C. Hagerstrom attended a farm business management workshop in Western Australia.

Mr. K.J. Holden and Mr. T.J. Dillon were participants in the 1973 Commonwealth Sheep and Wool Refresher Course in Western Australia.

5. PUBLICATIONS:

5.1 Bulletins

Bicknell, K.G., Dillon, T.J. & Hincks, A.E. - "Haymaking Methods". Special Bulletin 8.73.

Williams, S.G. - "Drainage Comes First in Improving Swamp Pastures". Leaflet 3674 (Reprint).

5.2 Agronomy Branch Report

Matz, N.R. & Swincer, D. - "Coping With Change". A Report on Agronomy Branch Conference. Agronomy Branch Report No. 55.

5.3 Prepared Papers

"Future Changes in Agricultural Technology" - Tideman, A.F.

"Review of Current Changes in Agricultural Technology" - Williams, S.G.

"Concept of Future Roles of Officers of The Department of Agriculture" - Webber, G.D.

"Regulatory Developments" - McAuliffe, J.D.

"Operations and Achievements of the Extension Liaison Committee" - McAuliffe, J.D.

BUSHFIRE PROTECTION SECTION

SECTION LEADER:

Mr. B.J.T. Graham, R.D.A.

EXTENSION OFFICERS:

Mr. B.J. Francis, Bushfire Adviser

Mr. R.H.T. Freak, Bushfire Adviser

Mr. B.A. Green, Bushfire Adviser

FIELD ASSISTANT:

Mr. L.B. Hoff

SECRETARY, BUSHFIRE RESEARCH COMMITTEE:

Mr. J.M. Priest

OFFICE ASSISTANT:

Miss E. Zevedeou

BUSHFIRE PROTECTION SECTION

1. INTRODUCTION:

The activities of the Section continued to become more diversified during the past year. The expected heavy demand for farm advisory services did not eventuate due in some degree to the abnormal rains continuing on into the summer period, resulting in a shorter and milder fire season than normal.

However, there has been an increased demand from urban dwellers and hobby farmers seeking information on fire protection measures and the requirements of the Bush Fires Act in relation to the barbecues and incinerators.

Research effort has continued into a wide range of fire protection problems and already practical application has been made of some of the results. The studies undertaken into the curing of annual grasses have assisted the establishment of new fire ban districts in South Australia. The Standards Association of Australia has adopted the specifications developed as a result of the research into the fire safety requirements of incinerators.

A highlight of last summer's publicity campaign was the successful introduction of the "New Inner Adelaide Fire Ban District".

2. APPLIED RESEARCH PROJECTS:

2.1 Fire Tolerance of Fence Posts - B.J.T. Graham & B.A. Green

This project was completed and an extension article appeared in the August, 1973 issue of the Journal of Agriculture.

2.2 Minimum Fire Safety Requirements for Incinerators - B.J. Francis & B.J.T. Graham

The project is completed but development of an Australian Standard based on the recommended specifications is proceeding.

2.3 Spark Arrester Design - B.J.T. Graham

Work is proceeding at the Mechanical Engineering Department, University of Adelaide, to test two recently developed spark arresters. The test will be conducted on an imported Japanese 40-50 H.P. model and a Yuba 200 H.P. arrester.

2.4 Grass Fuel Measurements - B.A. Green

2.5 Time of Curing of Annual Vegetation -
B.J. Francis

Information gathered from both these projects has been valuable in establishing the new fire ban districts which will come into operation this summer. However, the wide range of variable factors involved in these studies are causing difficulties in producing simple guidelines for fuel reporters to estimate fuel conditions in the various fire ban districts of the State.

2.6 Herbicidal Control of Unwanted Vegetation -
B.A. Green & L.B. Hoff

This programme is now almost completed and final results of the various projects are being prepared. It is intended to carry on a limited programme of assessment of recently released herbicides for the control of phalaris on roadsides. This work is being conducted in conjunction with the Weeds Section.

2.7 Fire Suppression Using Air -
B.A. Green & B.J.T. Graham

During the year, approval was obtained to develop a prototype air blasting machine to determine its effectiveness in suppressing grass fires, and to make field comparisons with conventional water spray methods. A contract has been let to a commercial firm to manufacture the equipment which will consist of a 180 H.P. aircraft engine driving an axial fan to discharge large volumes of air through a ducting system onto the flank of a grass fire.

It is planned to test the prototype in the field during burning off operations next autumn.

3. EXTENSION ACTIVITIES & PUBLICITY PROGRAMMES:

3.1 Extension Activities

3.1.1 Individual contacts

Property visits	96
Field days	11
Group meetings	31
Conferences	25
Office visits	370
Telephone queries	1,560
District councils	185

3.1.2 Mass media

Press releases	20
Radio broadcasts	38
TV programmes	2

3.2 Publicity Programmes

3.2.1 Rural Youth Community Aid Programme

The 1973 programme resulted in entries from 23 Clubs with first place being awarded to the Balaklava Club. Zone prizes were also awarded this year and it is planned for the programme to be continued in 1974.

3.2.2 Bushfire television films

Two new television films were produced and together with three films used previously in 1972-73, provided the programme for the summer fire season. Once again excellent coverage was given to the 1073-74 series and our gratitude goes to the commercial and A.B.C. television networks for their whole hearted support in screening these films as part of their community service.

The new films gave information on:-

- * The New Inner Adelaide Fire Ban District, and
- * General information on fire bans.

A subsequent telephone survey was conducted to determine what people knew about the Inner Adelaide Fire Ban District. The results indicated that 73% had heard of the Inner Adelaide District and 61% knew whether they lived in or out of the new district.

3.2.3 Fire Prevention Week programme

Fire Prevention Week was held from 20th to 27th October, 1973.

The week's activities are co-ordinated by a Committee with representatives from all organisations involved in fire prevention in South Australia. Mr. Graham is the Bushfire Research Committee's representative.

The programme is designed to obtain maximum mass media coverage and this year's activities included a parade of fire units through the city, displays of fire equipment, evacuations of school and city buildings and a seminar on Fire Prevention which was opened by His Excellency, Sir Mark Oliphant.

3.2.4 Bushfire prevention sign programme

The erection of the 87 signs in the 42 district councils was again carried out this year.

Eight more signs produced by the Highways Department were erected at strategic locations on main roads leading through the pastoral areas. Requests for these eight new signs came from fire fighting associations in the pastoral districts which were experiencing abundant growth as a result of abnormally

heavy rains. There are now 20 signs located in the pastoral areas and it is expected that they will again be required in the 1974-75 summer.

3.2.5 Inner Adelaide Fire Ban District programme

As a result of recommendations made by a Committee set up by the Minister of Agriculture, a new Inner Adelaide Fire Ban District was established and a comprehensive publicity campaign conducted.

The work involved a great deal of survey and liaison with the Commonwealth Bureau of Meteorology, the Emergency Fire Services, the S.A. Fire Brigade Board, the Woods and Forests Department, Local Government and the Minister of Agriculture's Department.

The publicity campaign included a press conference, the production of a special TV film, radio scatters, press releases and the preparation and distribution of some 50,000 maps.

3.2.6 Summer publicity programme, 1973-74

This year's programme was based on the same "Stamp Out Bushfires" theme used last year. However, 95,000 car stickers produced in the yellow and black colours of the Glenelg Football Club were distributed following a well attended launching ceremony at the Glenelg Club Rooms on 11th December. Television films, radio scatters and special press releases were widely used by the mass media during the summer fire season.

3.2.7 Smokey's party

Nearly 2,000 children attended Smokey's birthday party held at the Adelaide Zoo on 23/1/74. Once again all television and radio networks gave strong support to the day by providing personalities to entertain the children and by carrying reports of the event in their news and children's programmes.

4. SPECIAL PROJECTS:

4.1 District Council Requests

4.1.1 Fire access tracks

Six district councils requested the construction of access tracks for fire prevention. As a result of these requests, tracks have been constructed in Mt. Gambier and Lacedpede District Councils. Investigations are proceeding in Elliston and Tatiara District Councils and the remaining two requests were not recommended.

4.1.2 District fuel breaks

Following requests from the District Councils of Beachport, Penola and Tatiara, surveys have been carried out to

determine the location and the appropriate hazard reduction measures to develop major district fuel breaks through parts of these District Councils.

In the case of Beachport District Council, a well attended public meeting was held at Furner and the proposal received the approval of the Council, Beachport Fire Fighting Association and the adjoining landowners on the Robe to Penola road.

Penola Council has also given approval in principle to the development of the Maaope Road and are negotiating to have the necessary hazard reduction work carried out.

The programme in the Tatiara District Council will require further investigations before the final recommendations are made.

4.1.3 Fire prevention sign survey

A survey has been conducted into the future requirements of district councils for fire prevention signs. The results indicated that most councils were satisfied with the existing programme, but 14 councils have requested a total of 23 additional signs for erection this summer.

In addition to the general survey, a special survey was conducted at the request of the South Eastern Fire Fighting Association into the location of all fire prevention signs located in the Association area.

The report, prepared by Messrs. Green and Hoff, and submitted to the Association indicated the need for the re-location of some signs, the erection of new signs, especially at the interstate border crossings, and emphasised the need to dismantle all signs at the end of the fire season.

A similar survey was also conducted by Mr. Freak into the future requirements of signs on Eyre Peninsula.

4.2 Fire Prevention Exhibits

Adelaide Royal Show	- Fire Protection of the Environment display
Pt. Lincoln Show	- Stamp Out Bushfire display
Northfield Research Centre	- Homestead Fire Protection display
Tea Tree Plaza	- Homestead Fire Protection display

4.3 Lions Club - Neptune Farm Homestead, Fire Protection Award

Mr. Freak assisted in the conduct and carried out the judging of the best fire protected homestead on Eyre Peninsula.

5. SPECIAL REPORTS:

5.1 Ministerial Reports

- * "The Establishment of Inner Adelaide Fire Ban Districts"
- * "The Location and Names of New Meteorological Fire Ban Districts in South Australia"
- * "The Effects of Subdivision of Land in the Adelaide Hills on the Fire Hazard Potential".

5.2 Legislative Matters

- * Rationalisation of Burning Dates
- * Rationalisation of Section 61, Council Fire Restrictions
- * Practical Problems associated with the Section 81a, Councils power to order firebreaks
- * Re-wording of Section 64, Fires in honeyhouses.

6. STAFF:

6.1 Office Accommodation

The Section's office was relocated in January and now occupies the first floor, Flinders House, Flinders Street.

6.2 Changes

Several staff changes occurred during the year. Mr. L.D. Murray, Secretary, Bushfire Research Committee, was promoted and Mr. J.M. Priest took over his duties in February.

Miss Ely Zevedeu, Office Assistant, was allocated to the Section to provide typing and office assistance after the move to Flinders House.

Mr. L.B. Hoff, Field Assistant, also joined the Section following the completion of the field work carried out by Mr. L.T. Jacobs, Bushfire Officer, Weeds Section.

6.3 Training

Mr. B.J. Francis and Mr. R.H.T. Freak attended the In-service Training School on Advanced Communications.

Mr. J.M. Priest is attending a part-time course at the Murray Park College of Advanced Education to gain the Diploma of Arts (Journalism).

In addition, Mr. B.J. Francis and Mr. L.B. Hoff are attending night classes in subjects for matriculation.

6.4 Conferences

Members of the staff attended the following conferences:- E.F.S. Regional Officers, E.F.S. Communications, Agronomy Branch, Lower Eyre Peninsula Agricultural Bureau, Eyre Peninsula Fire Fighting Association, Eyre Peninsula Local Government Association, Highways Department Engineers, Northern Districts Agronomy Advisers, S.A. Regional Fire.

6.5 Interstate Visit

In March, Mr. Graham visited Victoria and had discussions with officers from the various organisations conducting bushfire research programmes in that State. He also attended a seminar at Monash University on "The Ecological Effects of Fire".

6.6 Committees

Members of the staff have attended and played an active part in meetings of the following committees:-

	<u>Meetings</u>
Bushfire Research Committee	6
Publicity Sub-committee	8
Fire Prevention Week Committee	5
Roadside Vegetation Committee	8
National Park/Bushfire Research Liaison Committee	2
National Trust - Marble Hill Committee	6
Meteorological/Fire Ban Districts Committee	6

7. PUBLICATIONS:

7.1 Extension Articles

Graham, B.J.T. & Green, B.A. - "Treated Fence Posts Black or Green". S.A. Journal of Agriculture, August, 1973.

Graham, B.J.T. - "Water for Fire Protection". Hydrological Social of S.A. Seminar.

7.2 Maps

Inner Adelaide Fire Ban District	-	60,000 copies
Council Fire Bans	-	8,000 copies

7.3 Brochures, Leaflets & Stickers

Brochures on Home Fire Protection, Bushfire Safety were revised and distributed widely throughout the State.

CROP AGRONOMY SECTION

SECTION LEADER:

Mr. T.G. Heard, B.Ag.Sc.

RESEARCH OFFICER:

Mr. B.J. Marshall, B.Ag.Sc.

ASSISTANTS:

Mr. N.M. Brooks, R.D.A.

Mr. S.G. Cornish

Mr. P.M. Fry (resigned October, 1973)

Mr. O. Jenkins (commenced January, 1974)

Mr. I.W. Magarey, R.D.A.

Mr. R.J. Puckridge, R.D.A.

CROP AGRONOMY SECTION

1. INTRODUCTION:

Crop research in the Agronomy Branch falls into two categories. One is concerned with the evaluation of current and new cultivars and selected crossbreds for yield and quality characters. The other area of research is aimed at the improvement of cultural practices associated with field crops grown in South Australia.

During the year re-organisation of field staff was further advanced to facilitate seeding, inspection and harvesting of crop agronomy trials on a regional rather than a crop basis. The use of farmer equipment for the immediate trial operations was completely phased out.

Closer liaison was established with breeding organisations. It is anticipated that this will enable a more effective evaluation programme and hasten the possible release of new cultivars. A series of primary trials was initiated to cater for the larger number of advanced crossbreds of wheat, barley and oats available through this closer liaison. The long term change-over to smaller field equipment for use, particularly in primary trials, continued. A cone seeder, built by officers of this Section, and two Hege harvesters were used for the first time this year.

The lack of an additional crop agronomist is still severely hampering progress in alternate crop evaluation. Existing staff and equipment were used in 1973 to carry out five trials comparing the economic returns of crops such as peas, lupins, linseed, oil seed rape and safflower, with the winter cereals. Additional trials were carried out by district agronomists and staff on research centres.

The severe epidemic of wheat stem rust markedly influenced the yields obtained in more than half of the wheat trials during 1973. The new rust resistant cultivars, Kite and Condor, exhibited clear superiority over all other cultivars under these conditions and yielded as well as Halberd in situations where rust was not a limiting factor.

The barley cultivar, Weeah, which is under consideration for recommendation out-yielded Clipper in 1973 trials. The cultivar performed equally well under the much drier conditions of 1972. A number of feed type barleys from the Waite Institute breeding programme, tested for the first time in 1973, produced yields well in excess of that of Clipper.

Results of the alternate crop trials carried out indicated that returns from linseed and field peas were approximately 20% greater than that of barley, the best of the winter cereals. Increased attention should be paid to these crops in the future.

2. RESEARCH PROGRAMMES:

The following research projects were current during 1973:-

- (1) Wheat cultivar evaluation in primary trials
- (2) Wheat cultivar evaluation in secondary trials
- (3) Interstate wheat cultivar evaluation trials
- (4) Barley cultivar evaluation in primary trials
- (5) Barley cultivar evaluation in secondary trials
- (6) Response of barley cultivars to nitrogen fertiliser
- (7) Pre-harvest protein determinations in barley
- (8) Evaluation of barley crossbreds for forage production
- (9) Barley time of seeding trials
- (10) Oat cultivar evaluation in primary trials
- (11) Oat cultivar evaluation in secondary trials
- (12) Assessment of the economic potential of several alternate crops

Within project (2) there are separate trials containing cultivars suitable for bread and biscuit production. Trials of project (5) include cultivars suitable for malting purposes and animal feed production. Previously these two different types of cultivars were contained in separate trials.

Project (8) was initiated in 1973 at two sites. The aim was to assess forage production and recovery after defoliation in a number of feed type crossbreds. While only one crossbred produced more herbage than Ketch when cut 8 weeks after seeding, several showed better recovery with higher yields at a cut made 4 weeks later.

Project (9) was initiated at Turretfield and Minnipa Research Centres in 1973. At Minnipa the cultivars, Clipper and Ketch, were seeded from mid-May to early July while at Turretfield, Clipper was seeded from mid-May to late July. While there was no evident yield trends at Minnipa, yields increased at Turretfield with delay of seeding until 9th July before declining with even later seeding.

3. EXTENSION PROGRAMMES:

Messrs. Marshall, Puckridge and Brooks each spent two weeks at the Kadina office. During this time they were engaged in extension activities. Messrs. Heard and Marshall judged a total of five grain crop competitions and addressed six Agricultural Bureau meetings during the post-harvest period of 1974. Mr. Marshall addressed the Murray Lands West Bureau Conference.

4. STAFF:

4.1 Staff Changes

Mr. P.M. Fry resigned from the Department during October, 1973. His place as field assistant was taken in January, 1974 by Mr. O. Jenkins.

Monthly meetings of the Crop Agronomy Section have been held over the past twelve months. These have enabled better forward planning of work, provided for internal training of all officers and ensured a better dissemination of information with consequent increased discussion and satisfaction of all concerned.

4.2 Conferences, Study Leave & Courses

Mr. B.J. Marshall attended the Institute of Brewing Convention held in Surfers Paradise in April, 1974.

Mr. T.G. Heard spent three months overseas on study leave during the latter part of 1973. He studied the evaluation of new cereal cultivars with procedures for subsequent registration and seed production methods in the U.S.A., Canada and the United Kingdom.

Messrs. Marshall and Jenkins enrolled for the Weed Control Certificate course during 1974.

5. PUBLICATIONS:

Krause, M.R., Heard, T.G., Marshall, B.J. & Dube, A.J. - "Cereal Variety Recommendations for 1974". Dept. of Agriculture S.A. Extension Bulletin 3/74.

Reuter, D.J. & Heard, T.G. - "The effect of granule size of compound fertilisers on barley crops grown on calcareous soils". Australian Journal of Experimental Agriculture and Animal Husbandry, 14:380, 1974.

ENTOMOLOGY SECTION

SECTION LEADER:

Mr. P.R. Birks, M.Ag.Sc.

RESEARCH OFFICERS:

Mr. P.G. Allen, B.Ag.Sc.

Mrs. J. Moulden, B.Ag.Sc.

Mr. D.E. Swincer, B.Ag.Sc.

ASSISTANTS:

Mr. G.S. Dearman

Mr. K.R. Henry

Mr. R.B. Jenkins

Mr. C. Phillips, R.D.A.

ENTOMOLOGY SECTION

1. INTRODUCTION:

Wet conditions during the spring and summer, both in the agricultural and in the inland areas, resulted in unusual insect activity. A small outbreak of plague locusts on Eyre Peninsula from Kimba to Ceduna during the spring and early summer of 1973 was well controlled by landowner sprayings. Subsequently during March, 1974, another but much larger invasion of locusts occurred over most of Eyre Peninsula and to a lesser extent in much of the marginal, agricultural-pastoral country from Hawker to Burra to Robertstown and Sedan. A major plague is now expected in the spring of 1974.

The unusual weather also favoured the survival of many other insect pests, such as hairy fungus beetle, pasture cockchafers, and field crickets. *Heliothis* (climbing cutworm) after several quiet years, occurred in large flights in September and infested field peas during the spring and lucerne seed crops during the summer. The cricket, *Acheta lepidus*, usually common, but in low numbers, occurred in swarms attracted to lights during February and caused a lot of inconvenience. Dragon flies were remarkably abundant throughout southern Australia during the late summer.

Outbreaks of insect pests have been largely controlled over the last twenty-five years by using insecticides. Manufacturing problems such as the availability of basic materials, fire in manufacturing plants, waste disposal, further aggravated by shipping and other transport problems, have seriously interfered with the normal availability of insecticides. Control programmes for pasture cockchafer, plague locust, sitona weevil and climbing cutworm were affected. Whereas in recent years we have been able to select and recommend the most suitable and least hazardous insecticides, this year we have not been able to maintain this ideal. Less desirable alternatives have had to be recommended and in some cases landowners have had to accept more damage and wastage than before. The use of less desirable insecticides has involved a greater hazard to operators and an acute toxicity hazard to stock. Although farmers were warned of these dangers, a few at least failed to take heed and although no operator poisonings were reported, some drastic stock losses occurred. These losses have been widely publicised to try to overcome apathy towards reading and heeding label directions.

2. RESEARCH PROGRAMMES:

2.1 Damage Assessment of Pasture Cockchafer (*Aphodius tasmaniae*) in Pasture - P.G. Allen & K.R. Henry

In 1973, the effect of pasture cockchafer on grazed pasture was evaluated in a field trial with naturally infested pasture. There were six fenced areas, five with different

densities of larvae and one sprayed with lindane to control the larvae. Each area was grazed with the same number of sheep and the pasture dry matter, sheep liveweights and wool production were estimated during the trial. The results showed no differences in any of these parameters. This was partly due to the extremely favourable growing conditions making pasture losses relatively minor. The area with the highest mean density of larvae (approximately 400 larvae a M²) did appear to have less pasture than the other plots after the winter period, but the statistical significance of differences was not shown because of the high variability of random quadrat samplings. Electronic pasture probe estimates which have been used in some previous samplings to reduce variability cannot be used on very short grazed pastures.

2.2 Insecticidal Control of Pasture Cockchafer - P.G. Allen & K.R. Henry

In early 1974, lindane, fenitrothion and azinphos-ethyl, the insecticides recommended for pasture cockchafer control, were almost unprocurable and large infestations of pasture cockchafer were expected during the autumn and winter. An insecticide screening trial showed that endosulfan and methidathion gave a higher level of control than lindane. Both of these insecticides were recommended for the control of pasture cockchafer, but endosulfan was the main recommendation because of its lower hazard to operators and longer but still transient field life. High initial acute toxicity of endosulfan to cattle was anticipated and publicised, but some losses occurred through a few farmers failing to heed these warnings.

2.3 Release of Introduced Dung Beetles in South Australia - P.G. Allen & K.R. Henry

Three releases of dung beetles were made on southern Eyre Peninsula during spring 1973 in conjunction with C.S.I.R.O. At this stage there have been no reports of introduced dung beetles establishing themselves in South Australia. This lack of establishment has also occurred in all other temperate areas in southern Australia where dung beetles have been released.

2.4 Release of Bracon variegator, a Parasite of Coleophora frischella, the Clover Seed Moth - P.R. Birks & P.G. Allen

A sampling of field populations of Coleophora frischella from the release site at Greenways in January, 1974 failed to show the presence of any parasites. Bracon variegator may have failed to establish.

2.5 Sitona Weevil Investigations - J. Moulden, P.R. Birks, P.G. Allen, G. Dearman

During 1973 seasonal conditions were more favourable for sitona weevil and populations increased very considerably. This has indicated the importance of climatic factors in determining the size of sitona populations.

2.5.1 Maturation of adults

The first observable development of ovaries occurred just before the 11th February, 1973, some two to four weeks earlier than in 1972 and 1970, respectively. This suggests that the onset of sexual maturation is not dependant on day length, but may relate to summer rainfall.

Complete ovary development was recorded on the 15th April, 1973 the same as in 1970, but earlier than in the dry autumn of 1972 (early May to mid-June). The duration of ovary development is at least partly dependant on the availability of feed.

2.5.2 Egg laying

Pilot experiments carried out in May-June to determine the optimum temperature and humidity for egg laying were limited by the availability of sufficient eggs, but little difference in survival was apparent between 10°C and 20°C. During the experiment high adult mortality occurred and this coincided with high field mortality - see below.

2.5.3 Storage of eggs

For rearing of egg parasites and for conducting larval experiments, eggs will have to be stored for as long as five months. A pilot trial indicated eggs could be stored for at least 63 days at 1-2°C without loss of viability and some 1,800 eggs would be needed to establish a regression between time and viability.

2.5.4 Adult mortality

High mortality of adults both in the field and in the laboratory during June and July suggested that adults produced from poorly fed larvae, or adults poorly fed prior to aestivation may have reduced life spans. A statistically sound sampling basis for adult populations has not yet been established.

2.5.5 Larval densities

Intense sampling of larvae measured larval populations at 164 ± 13 per M^2 , somewhat less than recorded at Roseworthy in 1972 (247 ± 20 per M^2). Some 200 sample units were required to give density estimates to show differences of 10%. Even with dense medic growth in 1973 "clumping" of larvae was evident (dispersion parameter $k = 0.86$).

2.6 Pesticide Residues Investigations - D.E. Swincer, R.B. Jenkins

With the resignation of Mr. Lim on 2nd March, 1973 and the appointment of Mr. Swincer on 26th November, only limited progress has been made.

2.6.1 Heliothis in field peas

Preparations were made to undertake commercial aerial spraying trials using 350 gm/ha endosulfan based on 1971 and 1972 boom spray trial results. An embargo on traveling because of petrol restrictions at spraying time caused a cancellation of this project. Laboratory rearing and insecticides screening was postponed when cultures died and could not be renewed at that time of the year.

2.6.2 Heliothis in lucerne seed crops

A field trial to establish alternatives for DDT in lucerne seed crops carried out at Meningie indicated that methomyl at 200 gm/ha and endosulfan at 210 gm/ha were superior to endosulfan at 140 gm/ha which in turn was superior to the standard treatment of 550 gm/ha DDT. The cost of DDT is about \$1.40/ha, the rate of endosulfan previously recommended 350 gm/ha cost \$3.25, but this can now be reduced to 210 gm/ha costing \$1.95, and with further testing the cost may be further reduced. Methomyl at 200 gm/ha cost \$5.14 so lower rates would need to be evaluated.

3. SURVEYS & EXTENSION PROGRAMMES:

3.1 Grain Pests - P.R. Birks & C. Phillips

A survey of farmers' deliveries to Pt. Adelaide silo was carried out during November to February. One hundred samples of barley and 97 samples of wheat were drawn from Co-operative Bulk Handling inspection samples. Each sample consisted of about 500 grams of grain. Samples were incubated for 11 to 12 weeks at room temperatures, together with similar samples containing one day old eggs of grain pests. When all eggs in the control samples had had time to develop to the adult beetle stage, the samples of grain from Pt. Adelaide were examined for live insects.

No insects were detected in barley samples but in wheat samples one contained saw-toothed grain beetle, Oryzaephilus surinamensis, one contained flat grain beetle, Cryptolestes sp., and one contained rust red flour beetle, Tribolium castaneum, one of the most important problem insects of grain.

The numbers of samples found with insects was much less than the 5-10% found in other surveys and indicates that either there is very little infestation in grain as delivered, or more likely, the sampling technique was not adequate. Previous survey samplings have been taken from farmers' trucks as they began to empty, but no staff were available to undertake such a sampling, and it was hoped that special sampling would not be necessary, especially if a trace-back system was to be adopted throughout the State.

Some 38 samples of grain involving 58 identifications were undertaken during the year. No further resistance testing was undertaken although maldison resistance levels on farms still appears to be low enough to permit general farming use of that material.

3.2 Plague Grasshoppers - P.R. Birks, C. Phillips

Excellence of pasture in the plague grasshopper areas resulted in Orroroo District Council cancelling plans for a District Control campaign during 1973. A further wet spring permitted prolonged egg laying during November, and some plague locust activity in spring complicated the field situation.

3.3 Plague Locusts - P.R. Birks, C. Phillips

Hatching of plague locusts took place from late September on the west coast in areas surveyed in May, 1973, but because of the excellence of feed they attracted little interest or action until October. By the end of November crops were mature but some 950 hectares of bands had been sprayed, about 570 hectares in the District Council of Le Hunte (Wudinna) and 240 hectares in Kimba.

Locust bands occurred, especially on the eastern side of the Flinders Ranges and in the North East pastoral areas, especially near the New South Wales border. Swarms moved through the Upper Murray and insecticides were supplied to spray some 350 hectares.

A major up-surge of locusts was recorded during March-April, 1974 when swarms of adults invaded most of the agricultural areas of Eyre Peninsula and the Gawler Ranges pastoral area. Fledging locusts were also numerous in the marginal agricultural pastoral areas from Hawker to Burra, and in the Hallett, Eudunda, Robertstown, Truro, Sedan and Marne Council areas during March and April. Some of the locusts which flew into the south east from Victoria at the end of February flew out to sea, while others stayed, especially in the Kongerong, Pt. MacDonnell areas and laid eggs. Preparations for a major outbreak centred mainly on Eyre Peninsula have been made, involving the spraying, primarily by landowners of some 100,000 hectares of hoppers.

Locust control during 1973-74 involved in excess of 20,000 kilometres of special surveys, in addition to surveys carried out by other Agronomy Branch staff. Six ULV misters purchased in the spring of 1973 have been further supplemented with ten additional units. Spray trials checking the efficacy of diazinon for spraying with both conventional and ULV misters was carried out prior to ordering supplies for the 1974 outbreak.

3.4 Other Extension Activities

During the year members of the Section addressed five Agricultural Bureau meetings, three Bureau District Conferences and one Regional Advisers' meeting, in addition to giving four radio talks, three TV interviews, one field day, four technical addresses and three university student demonstrations. Some 210 identifications and 1,170 telephone enquiries were handled.

Eleven Ministerial reports on locusts, pasture cockchafers and insecticides and five Parliamentary questions were answered.

A draft of the Grain and Plant Products Protection Act was prepared, and amendments were made to the Regulations under the Noxious Insect Act.

4. STAFF:

Mr. D.E. Swincer commenced duties on 26th November, 1973 as Research Officer, Pesticide Residues Project. Mr. G.S. Dearman commenced duties on 27th March, 1974 as Field Assistant, Sitona weevil investigations.

Mr. P.G. Allen took part in a Departmental Biometry Workshop and continued his study of pasture cockchafer damage assessment for the degree of M.Ag.Sc.

Mrs. J. Moulden took part in the Agronomy Technical Conference on Medics.

Mr. D.E. Swincer attended the Departmental Induction School at Roseworthy College in February, 1974.

Mr. R.B. Jenkins passed second year of the Science Technicians Certificate course, topping the course in both subjects.

Mr. K.R. Henry commenced the Infestation Control in Stored Grain correspondence course of the New South Wales Department of Technical Education.

5. PUBLICATIONS:

"Summary of Crop and Pasture Pest Recommendations 1974".
Extension Bulletin No. 7.74.

Allen, P.G. (1973) - "Rodent Proofing Farm Storages". Dept. Agric. S. Aust. Special Bulletin No. 7.73.

Allen, P.G. (1973) - "Biology of *Desiantha caudata* Pasc. (Coleoptera:Curculionidae) in South Australia".
J. Aust. Ent. Soc. 12: 201-206.

Allen, P.G. & Moulden, J. (1974) - "Sitona Weevil". J. Agric. S. Aust. 77: 58-59.

Matz, N.R. & Swincer, D.E. - "Coping with Change". Agronomy Branch Report No. 55.

Birks, P.R. & McAuliffe, J.D. - "Grain Pest Control, Urgent and Essential". Dept. Agric. S. Aust. Special Bulletin No. 10.73.

Birks, P.R., Phillips, C. - "The Australian Plague Locust (*Chortoicetes terminifera*)". Dept. Agric. S. Aust. Leaflet No. 4019.

Birks, P.R. & Phillips, C. - "Locust Control with Conventional Spray Equipment". Special Leaflet 1974.

6. VISITORS:

Mr. Harry Sims, Deputy Chief, Division of Agriculture, Victorian Department of Agriculture, on pea weevil.

Mr. John E. Swift, State-wide Co-ordinator, Pesticides Extension Entomologist, University of California, on chemical registrations and entomology extension.

Dr. Elwood Zimmermann, Research Scientist, Curculionidae C.S.I.R.O., Canberra, on weevil taxonomy.

Mr. Ken Fairey, Forestry Commission of New South Wales, collecting Anthelidae.

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. A.D. Murray

PASTURE UTILISATION SECTION

1. INTRODUCTION:

The Section continued to study factors affecting pasture productivity and utilisation. Of these factors botanical composition was of particular interest during the year.

An experiment at the Kangaroo Island Research Centre is comparing the usefulness of renovating pastures with no renovation. A number of perennial grasses were sown in 1970 and have since been grazed at a range of stocking rates. The results show that renovation has not increased productivity. Indeed, no renovation yielded most greasy wool, while renovation with *Medea* perennial ryegrass yielded the least amount of wool.

Amount of available herbage and botanical composition influenced wool yields most in the Kangaroo Island experiment. Wool yields responded to available herbage up to 2000 kg/ha⁻¹, while at equal availabilities a high proportion of capeweed (*Arctotheca calendula*) or geranium (*Erodium* spp.) reduced yields.

During the year Mr. M.V. Smith returned from the University of New England, having completed requirements for a Masters Degree in Economics. His return to the Section will allow the development of a programme of economic evaluation of management systems within the pastoral industries. Already he has modified the Agricultural Census forms; these modifications are being submitted to the Bureau of Census and Statistics.

2. RESEARCH PROGRAMMES:

2.1 New Programmes

2.1.1 Nitrogen fixation and competition in mixtures of clover and grass - P.S. Cocks & G.B. Wootten

The ability of subterranean clover (*Trifolium subterraneum*) to fix atmospheric nitrogen is of paramount importance to the agricultural industries of Australia. In some localities we know how much nitrogen is fixed in a year, but there is doubt about what happens within any year. In this project we hope that nitrogen fixed over a short term (no more than a month) can be measured through the year. The ability of subterranean clover to compete with other pasture plants will affect nitrogen fixation, and this too is being examined. Both competitive ability and nitrogen fixation will be correlated with climate.

2.1.2 Ecotypic variation in *Hordeum leporinum* Link (barley grass) - P.S. Cocks, K.G. Boyce & P.M. Kloot

Barley grass is an important component of pastures. Although never sown it has volunteered over the whole range of agricultural environments in South Australia. This project is designed to measure the adaptation of the species since it was introduced from the Mediterranean basin over a century ago.

2.1.3 Pasture renovation in the Murray Swamps -
M.V. Smith, P.S. Cocks & K.G. Bicknell

Paspalum dilatatum and P. distichum are summer growing perennial grasses common on the Murray Swamps. In the cooler months they grow very slowly. This results in low milk production or alternatively high levels of hay or concentrate feeding, in the winter. The implications on the overall dairy farm system of renovating these pastures with winter growing species are being explored.

2.2 Continuing Programmes

2.2.1 Productivity of a grazed pasture at
Kybybolite - P.S. Cocks

2.2.2 Sulphur-coated urea compared with urea and
ammonium nitrate as a source of nitrogen
for pasture grasses - D.J. Maschmedt &
P.S. Cocks

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

2.2.4 Evaluation of two perennial grass cultivars
at Mt. Alma - P.R. Gibson

2.2.5 Grazing of dryland lucerne pastures on deep
sands in the Upper South East of South
Australia - M.V. Smith

3. STAFF:

Dr. P.S. Cocks attended the Australian Soil Science Conference in Melbourne.

Mr. P.R. Gibson visited New Zealand. He had discussions with scientists at the Ruakura Animal Research Centre, the D.S.I.R. Research Station at Palmerston North, the New Zealand Department of Agriculture Station at Invermay near Mosgiel and the Lincoln University near Christchurch. He also attended a symposium on "Developments in the design, analysis and interpretation of large field experiments" at the University of New England.

Mr. M.V. Smith returned from two years at the University of New England. He has submitted a dissertation entitled "The profitability of resowing rundown pastures" for the degree of Master of Economics.

4. PUBLICATIONS:

Cocks, P.S. (1973) - "The influence of temperature and density on the growth of communities of subterranean clover (Trifolium subterraneum L. cv Mt. Barker). Aust. J. Agric. Res. 24, 379-95.

- Cocks, P.S. (1974) - "The influence of density and nitrogen on the outcome of competition between two annual pasture grasses (Hordeum leporinum Link and Lolium rigidum Gaud)". Aust. J. Agric. Res. 25, 247-58.
- Cocks, P.S. (1974) - "Response to nitrogen of three annual grasses". Aust. J. Exp. Agric. An. Hus. 14: 167-72.
- Cocks, P.S. (1974) - "Potential production of grass and clover monocultures in a Mediterranean type environment - an experimental approach". Aust. J. Agric. Res. 25 (in press).
- Smith, M.V. (1973) - "The profitability of resowing rundown pastures". M.Ec. dissertation, University of New England, Armidale, N.S.W.
- Smith, M.V. (1974) - "Stochastic influences on the profitability of resowing rundown pastures with perennial species". Proc. XIIth International Grasslands Congress (in press).

5. VISITORS:

The Section was visited by Dr. Ing. Miguel Granda and Ing. Agr. Gerando Merelles from Spain between 22nd October and 9th November, 1973.

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. (Study Leave)

TECHNICAL OFFICERS:

Mr. B.C. Bull, L.D.A.

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

LABORATORY OFFICERS:

Miss B. Martin

Mrs. S. McLean

PLANT BREEDING SECTION

1. INTRODUCTION:

During 1973-74 the Plant Breeding Section continued its investigations with annual medics, lucerne and perennial grasses with the object of improving these species for utilisation as pasture and fodder plants.

The major effort in the annual medic programme during the year was the establishment of large field experiments to evaluate a collection of introductions of the following species:- Medicago polymorpha, Medicago scutellata, Medicago rugosa, Medicago tornata, Medicago truncatula. Some crosses were also included in these trials, which were sown using newly developed methods of computerised experimental programming.

The preliminary results of this work indicate some introductions have winter vigour and seed yield which compare favourably with current commercial cultivars, and therefore, these introductions require further evaluation.

The crossing programme with annual medics has concentrated on combining soft-seeded types (that is, seeds which will take up water in the next growing season and not remain impermeable) with cultivars which have other characteristics suitable for adaptation to specific environmental conditions and current agricultural practices.

The screening of the State collection of annual medics for resistance to Sitona weevil (Sitona humeralis) was continued. Eight tolerant lines were found in 441 introductions. These were from the following species:- Medicago rigidula (5), Medicago arabica, Medicago aculeata, Medicago turbinata (each 1). These were included with previously discovered tolerant forms in seed increase for further study.

The lucerne breeding programme continued to work towards a number of major objectives. In a programme of assessment of yield under irrigation, a number of lucerne varieties have given yields which are 30% higher than the standard Australian variety, Hunter River. These high yielding introductions have come from diverse origins including Algeria, Morocco, the U.S.S.R., India and Portugal. These experiments will be continued for a number of years to determine whether new introductions can be used for lucerne fodder production in South Australia.

Flooding experiments with lucerne have indicated that a number of introduced varieties are more tolerant to flooded soil conditions than our current commercial types. Because these introduced tolerant types do not have all the favourable agronomic characteristics which are required in South Australia, a crossing programme was initiated and glasshouse experiments have shown that it is possible to combine together more favourable agronomic performance and flooding tolerance.

Hybrid populations between high yielding commercial cultivars of lucerne and a wide range of introduced and varied morphological forms were planted during the year. These hybrids express the high yield of one parent, and also the varied morphological forms of the alternate parent. The objective of these studies is to develop a high yielding form of lucerne which can be grazed continuously as some of the introduced morphological forms were in their place of origin.

A large number of seedlings derived from introduced varieties and various crossing programmes were screened for resistance to Sitona weevil. From approximately 20,000 seedlings, 40 were selected which showed a high level of tolerance to Sitona in cage experiments, in which up to 10,000 weevils were placed on 2,000 seedlings. The selected plants were highly tolerant of Sitona because they maintained some leaf production under intense pressures of some thousands of weevils per plant, after all other plants within a cage had been eaten.

In the perennial grass breeding programme, a comparison trial was established at Woodside in the Adelaide Hills. In it introductions and cultivated varieties are being compared from the following four species:- Festuca arundinacea, Lolium perenne, Dactylis glomerata, Phalaris tuberosa. This is the first time that all the major perennial grass cultivars are being assessed in the Adelaide Hills in densely sown swards for forage production. At this stage the highest forage yields have been obtained from two varieties of Phalaris tuberosa, Sirosa and an experimental line named Special Select. One line of fescue from Tunisia is also extremely high yielding. This trial will be continued for a number of years to determine which perennial grass would be most suitable in that region for forage production. During the summer seed was produced in polycross blocks from a wide range of introduced fescues, in autumn this seed was also sown in the Adelaide Hills with the long term objective of selecting plants which combine the useful attributes from many different introductions.

2. RESEARCH PROGRAMMES:

2.1 Breeding of Annual Medicago Species - M.J. Mathison

2.1.1 Evaluation of introductions, parents and progeny from various crosses.

2.1.2 Screening annual Medicago species for resistance to adult Sitona humeralis.

2.2 Breeding of Lucerne - I.D. Kaehne

2.2.1 Lucerne introduction and quarantine.

2.2.2 Selection of lucerne for high yield and persistence under irrigated and dryland conditions.

2.2.3 Selection of lucerne for adaptation to waterlogged and poorly drained soils.

2.2.4 Selection of lucerne for persistence under continuous grazing.

2.2.5 Selection of lucerne for resistance to stem nematode (Ditylenchus dipsaci).

2.2.6 Selection of lucerne for resistance to adult feeding by sitona weevil.

2.3 Perennial grass breeding - G.W. Lawton

2.3.1 Comparison of perennial grass varieties and introductions under irrigated sward conditions.

2.3.2 Selection within hybrid populations of tall fescue for superior agronomic type.

3. STAFF:

During the year Mr. M.J. Mathison and Mr. I.D. Kaehne commenced overseas study tours which will take them to western Europe, the U.S.S.R. and countries in the Mediterranean and Middle East. The objectives of these overseas study tours are to investigate plant breeding activities in Europe and to undertake a number of plant collection missions in Central Asia, Asia Minor and the Mediterranean region.

4. PUBLICATIONS:

Lawton, G.W. (1974) - "Tall Fescue". Journal of Agriculture, South Aust., Vol. 77, No. 1, 26-29.

Kaehne, I.D. (1974) - "Breeding Lucerne (Medicago sativa L.) for tolerance to Waterlogged Soil". Proceedings of the XIIth International Grasslands Congress, Moscow.

PLANT INTRODUCTION SECTION

SECTION LEADER:

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

PARAFIELD PLANT INTRODUCTION CENTRE:

Mr. B.G. Nankivell, R.D.A., Technical Officer
(Agriculture)

Mr. P.L. Blesing, Field Assistant

Mr. L.K. Ramsay, Farm Assistant

\ Mr. S.H. Kelly, Farm Assistant

Mr. K.S. Roberts, Farm Assistant

Mr. W.R. Porter, Farm Assistant

PLANT INTRODUCTION SECTION

1. INTRODUCTION:

The most important achievement of the Section in 1973 was the completion of the new office, laboratory and store complex at the Parafield Plant Introduction Centre.

Classification of the annual Medicago collection has continued with assessment of 613 new introductions and selections in the main nursery.

A comprehensive seed production programme of all available lines of annual Trifolium (except T. subterraneum) and many other annual legume genera was effected.

Regional experiments were established on Eyre Peninsula to compare the performance of the early flowering barrel medic cultivar, Ghor, with that of Harbinger and Cyprus medics.

Demonstration sowings of Paravivo lucerne were established throughout the State.

2. RESEARCH PROGRAMMES:

2.1 Indexing of Introduced Plants

During the year 898 new introduction or selections within previous introductions were indexed.

2.2 Classification of Annual Species of Medicago

The morphological and agronomic classification of 613 lines of annual Medicago species represented 21 species from 29 countries. Of these, 112 lines exhibited better seedling vigour than their control cultivars.

Within the largest main group (viz. 154 lines of M. polymorpha), 19 lines were earlier flowering than Cyprus barrel medic, 14 of which originated from Chile.

Similarly, 143 lines exceeded the winter production of Jemalong barrel medic.

In the next largest main group (viz. 60 lines of M. truncatula), 15 lines exhibited better winter production than Jemalong. Seed production was good throughout.

2.3 Sward Trial Evaluation of the M. rugosa Group

A repetition of the summer rainfall pattern of 1972 was experienced in 1973 with 55 mm of rainfall in early February resulting in a somewhat variable but dense regeneration of some lines, 11 of the M. rugosa lines plus Borung barrel medic exceeding 1,000 plants per M². Nearly all died before further

useful rains of 20 mm in mid-March. As a result of this and good April rainfall, 24 of the 51 M. rugosa lines plus Borung and Jemalong₂ barrel medics regenerated with greater than 1,000 plants per M², the best being an Israeli line with 1,700 plants per M².

Herbage production was measured on this surviving population at four weekly intervals from the end of May.

Although 10 lines plus Borung barrel medic were higher yielding than the mean of the experiment at the first harvest, none were significantly better than Paragosa. A similar pattern followed recovery after cutting, few significantly exceeding Paragosa.

A repetition of summer rainfall conditions in late January/early February, 1974 when 113 mm were recorded over a week, resulted in dense regeneration and subsequent death with the hot dry conditions that followed.

After considering all data produced on this trial in association with some of the data from a similar trial established simultaneously at Turretfield Research Centre, 5 lines have been selected for advanced regional evaluation.

Four of these lines have a relatively low incidence of regeneration with summer rain followed by a good regeneration with late autumn rainfall and relatively good early winter production.

The fifth line has shown some tolerance to sitona weevil when screened along with the whole collection under isolated conditions.

2.4 Sward Evaluation of Ghor Barrel Medic

Two of the three trials sown in 1973 established well under the cereal crop whilst the third established poorly in association with a great deal of volunteer annual medic.

The former, viz. at Mudamuckla and Buckleboo seeded well, Ghor being the best yielding cultivar at 390 kg per hectare followed by Cyprus, 340 kg per hectare and Harbinger, 240 kg per hectare at Mudamuckla and Ghor 150 kg per hectare, Cyprus 130 kg per hectare and Harbinger 100 kg per hectare at Buckleboo. Stubble sowing treatments were sown in autumn with excellent establishment of Ghor in particular at Pygery in competition with dense volunteers.

Re-sowings were made in the three environments in 1974.

2.5 Screening of Annual Legumes for Resistance to Clover Scorch Caused by the Fungus, *Kabatiella caulivora*

Several Trifolium species which showed no symptoms of K. caulivora in 1972 and 38 additional lines were established

on the Kangaroo Island Research Centre in 1973. Several species, viz. T. cherleri, T. israeliticum, T. vesiculosum, Lotus angustissimus, Ornithopus perpusillus and O. sativus showed no symptoms of K. caulivora.

Six additional Trifolium species made good growth and showed little symptoms of Kabatiella and warrant further evaluation for dry matter and seed production.

3. SEED PRODUCTION & EXCHANGE:

During the year 828 different lines of essentially annual Medicago, Trifolium, Astragalus and Trigonella species were grown for seed production for use in future evaluation trials in South Australia and for despatch to interstate and overseas organisations. In all, 91 samples were despatched to interstate Departments and 4 overseas countries.

4. PUBLICATIONS:

"Annual Medics - Establishment, Management and General Utilisation". With contributions from Agronomy Branch Officers. Agronomy Branch Report No. 51.

"Paravivo - A Long Lived Winter Growing Lucerne". Agronomy Branch Report No. 54.

5. EXTENSION ACTIVITIES:

Bureaux, Conferences, Seminars	10
Student, Industry Group Visits	6
Field Days	3
Visitors - Overseas & Interstate	31

PLANT PATHOLOGY SECTION

SECTION LEADER:

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

RESEARCH OFFICERS:

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

Miss J.S. Johnsson, B.Ag.Sc.

LABORATORY OFFICER:

Mrs. C. Rix

PLANT PATHOLOGY SECTION

1. INTRODUCTION:

Research programmes of the Section have been markedly affected by two problems encountered by farmers. These were stem rust of wheat and seed dressing phytotoxicity.

1.1 Stem Rust of Wheat

A serious outbreak of stem rust occurred during the 1973-74 growing season as a result of the following factors:-

- * Sufficient rain over summer to allow a good carry over of rust on self-sown cereals
- * A long wet spring
- * The extensive growing of rust susceptible varieties, particularly Halberd.

Losses caused by stem rust were estimated at 0.6 million tonnes (at \$100/tonne) valued at \$60M. As well as this rust caused an increase from 1% to 20% in the delivery of off-grade wheat. The serious losses sustained by the wheat industry in southern Australia led Professor I. Watson of the Plant Breeding and Genetics Institute of the University of Sydney to propose a National Rust Prevention programme. This programme was discussed by the Section and the plant breeders from Roseworthy College of Advanced Education and the Waite Agricultural Research Institute and found to be unsuitable for South Australia. An alternative programme was suggested and accepted in principle by Professor Watson and its suitability for southern Australia will be discussed in September, 1974. Following discussions with Professor Watson changes were made in co-ordination and collection of rusted samples for strain identification and occurrence in South Australia. These changes will ensure better coverage of the wheat growing areas and an even sampling throughout the year.

1.2 Phytotoxicity of Mancozeb Based Cereal Seed Dressings

During 1973 a few reports of poor emergence were received from Maitland and Tumby Bay. Testing of grain from these areas indicated that there was a problem of emergence caused by Mancozeb based seed dressings. Concern was expressed that in the following year the problem might extend to many farms because of:-

- *Pinched grain from rust attack
- * Greater length of time that pickled grain was stored (mercury was used until the 1st of March, 1973)
- * The possibility of poor seasonal conditions.

Further research indicated that pickled grain stored from one sowing season to the next was most likely to have emergence problems when sown. Knowing some of the factors involved with the problem it was decided to invite farmers who had "carry over" pickled wheat to have it tested by the Plant Pathology Section because they may have emergence problems. These tests were useful to farmers, enabling them to avoid sowing poor seed. About 170 samples were tested.

2. RESEARCH PROGRAMMES:

2.1 Management Control Methods of Annual Ryegrass Toxicity

2.2 Management Control Methods of Cereal Eelworm (involving resistant cereal varieties)

2.3 Barley Leaf Scald Project

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

2.4 Smuticide Assessment

- * Assessment of the efficacy of smuticides on wheat, barley and oats
- * Assessment of phytotoxicity under various storage conditions.

2.5 Clover Leaf Scorch

- * Race identification
- * Over summer survival.

3. SERVICES:

3.1 Diseases Identification

During the year 159 specimens were identified. Two new recordings for the State were made:-

- * Ditylenchus dipsaci (stem nematode) was recorded on oats at Curramulka on Yorke Peninsula
- * Psuedomonas glycinea, a seed-borne disease of soyabeans was recorded at Struan.

3.2 Quarantine

Dr. Dube inspected the German lucerne variety, Luna, at Warrabri in the Northern Territory.

Luna lucerne was released from quarantine and sown in the South East.

3.3 Rust Survey

One hundred and four samples were forwarded to Professor Watson for strain identification.

3.4 Extension

Four addresses were given at Agricultural Bureau Conferences. Three addresses to Bureau meetings. Two prepared replies were given to Bureau Conferences. One address was given to the Agronomy Branch Conference.

Two exhibitions were presented, one at the Royal Adelaide Show and the other at Northfield open day. Four radio interviews were given. Replies were made to the Stock-owners' Association and the Research Liaison Committee on cereal seed dressings.

4. VISITORS:

Professor S.D. Garrett, University of Cambridge.

Dr. R. Boyd, Western Australian Institute of Agriculture.

Dr. K. Helms, C.S.I.R.O. Division of Plant Industry.

Professor P.A. Van der Laan, Editor of Nematologica.

Dr. S. Yamanaka, Tohoku University, Japan.

5. CONFERENCES:

Two members of the Section attended the National Plant Pathology Conference held in Sydney.

Two conferences on Cereal Seed Dressings were attended by Dr. Dube one at Horsham and one in Sydney, convened by the Australian Department of Agriculture.

Mr. Mayfield attended a workshop on Barley Leaf Scald in Perth.

6. STAFF:

Mr. A.H. Mayfield has been accepted as a candidate for the degree of Doctor of Philosophy in the Faculty of Agricultural Science, continuing his project on Barley Leaf Scald.

The position of field assistant has been created for the Section to aid in the field trials conducted by the Section.

SEED PHYSIOLOGY SECTION

SECTION LEADER:

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

RESEARCH OFFICER:

Vacant

TECHNICAL OFFICER:

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

LABORATORY ASSISTANT:

Miss A.M. Kelly

PLANT PHYSIOLOGY SECTION

1. INTRODUCTION:

The work of the Section continued to be directed towards the generation of technical information relating to production, processing, storage and utilisation of herbage seeds.

Agronomic research projects in progress include the assessment of nitrogen fertiliser-grazing management interaction on final seed yield, and the timing of harvest in perennial grass crops. Results will be analysed, particularly in terms of seed quality.

Other field projects include evaluation of seed production, potential of herbage cultivars of European origin and the testing of activated carbons for establishment of perennial grass crops by the carbon banding technique.

All field experiments will be harvested by a new self-propelled tractor unit designed and built by Section members at the Northfield Laboratories. Samples will be thrashed and cleaned on a new large capacity belt-thresher also built at Northfield.

In the laboratory and controlled environment units, studies of growth and development of herbage seeds are being made. Particular emphasis is being given to the study of certain aspects of seed quality. With the use of a two dimensional thermogradient germination plate, studies have been initiated to characterise germination responses of herbage seeds in relation to a number of temperature parameters.

2. RESEARCH PROJECTS:

- 2.1 Grazing Management - Nitrogen Fertiliser for Perennial Grass Seed Production - K.G. Boyce, C.M.J. Williams & E.S. Hogg
- 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, E.S. Hogg, W.O. Coleman, I. Simons
- 2.5 Evaluation of Activated Carbons for Grass Seed Crop Establishment - K.G. Boyce, E.S. Hogg
- 2.6 Influence of Temperature on Germination in Herbage Grass and Legume Seeds - K.G. Boyce

2.7 Ecotypic Variation in Barley Grass (*Hordeum leporinum* L.) - K.G. Boyce, P.S. Cocks, P.M. Kloot

3. STAFF:

Mr. E.S. Hogg joined the Section in November, 1973 as Technical Officer responsible for technical operation of the research programme. His immediate task has been the design and construction of equipment to facilitate field research, i.e. the tractor unit and belt thrasher.

Miss Kelly successfully completed the first year of a Biology Laboratory Technician's Course at the Levels Campus of S.A.I.T. in December, 1973 and is continuing on to the second year.

Mr. C.M.J. Williams is expected to take up the position of Research Officer in September after completion of his Ph.D. studies.

4. PUBLICATIONS:

Boyce, K.G. (1973) - A scientific approach to grass seed production:-

1. Plant establishment, growth and development.
Aust. Seed Review, July, 1973, p.6-9.
2. Harvest and post-harvest management.
Aust. Seed Review, October, 1973, p.13-14.

5. VISITORS:

Dr. Atsushi Adachi from Hokkaido National Agricultural Experiment Station, Sapparo, Japan, visited on 7th December, 1973 to discuss matters relating to testing of Japanese herb-age species for seed production in South Australia.

Dr. L.J. Cook, Seed Research Officer, Victorian Department of Agriculture, visited to discuss seed research programmes in Victoria and South Australia.

SEED PRODUCTION SECTION

SECTION LEADER:

Mr. D.C. Ragless

EXTENSION OFFICERS:

Adelaide Office

Mr. G.E. Cooper, Seed Production Adviser

Mr. C.A. Schubert, Seed Production Adviser

Struan Regional Headquarters

Mr. W.O. Coleman, R.D.A., Seed Production Adviser

Mr. T. Prance, R.D.A.T., Seed Production Adviser

Mr. I. Simons, Seed Production Adviser

TECHNICAL ASSISTANT:

Miss C. Dodson

SEED PRODUCTION SECTION

1. INTRODUCTION:

Three aspects of the Section's work have developed during the year. Firstly, the full scale plot testing programme has been resumed with the appointment of Mr. C.A. Schubert. Secondly, formal programme planning has been phased in for all major extension activities. Thirdly, the Section is now responsible for maintenance of breeder seed of the Currie cultivar of cocksfoot and has taken over the parent plants from the Waite Agricultural Research Institute who were previously responsible for the cultivar.

Other work of the Section continues in much the same way as outlined in last year's report.

2. EXPERIMENTAL PROJECTS:

- 2.1 Measure the affect of nitrogen fertiliser on seed yield of Demeter fescue, sown by charcoal banding technique, in year of establishment
- 2.2 Evaluate the effectiveness of Kerb and Kerb and Balan mixed with Tribunil(R): 2,4-DB, Bromoxynil, Prometryne and MCPB to control weeds in annual medic seed crops. Applied post-emergent in autumn, 1974.
- 2.3 Evaluate a range of post-emergent herbicides for control of King Island melilotus and wild mustard in medic and subterranean clover seed crops. Interim results indicate that 0.7 litre per ha of amine 2,4-D may give best results.
- 2.4 Determine the ability of both diuron and paraquat to control annual grasses and subterranean clover in strawberry clover and Tama white clover
- 2.5 Determine the effect of I.P.C. diuron and atrazine on seedlings and crop plants of Perma perennial ryegrass. Interim results indicate that 0.5-1.0 kg/ha of atrazine give best results. Rate depends on size of seedlings.
- 2.6 Control of capeweed by:- (1) Strategic grazing; (2) Chemical spraying. Results indicate that grazing has beneficial effects but is difficult to manage. Chemical control is effective and easier to manage.
- 2.7 Affect of moisture content at harvest on machine damage and germination of commercial lots of Phalaris tuberosa seed. In conjunction with the seed testing laboratory, hand harvested and commercially harvested samples have been collected from all commercial fields and are being analysed for moisture content and germination.

- 2.8 Development of an automatic seed sampler for use in seed certification schemes.
- 2.9 Control of broad leaved weeds in a Perma perennial ryegrass seed crop. Amine 2,4-D plus Banex, Diquat, Bucril MA were compared for sorrel, dock, and wireweed control. One pint of amine 2,4-D plus $\frac{1}{3}$ pint Banex gave best results.
- 2.10 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.
- 2.11 Annual legume seed as part of the routine check on the effectiveness of certification procedures. All lines were within the 5% tolerance. Sixty-two lines were tested for varietal authentication before they were released for sale. These consisted of a large proportion of Mt. Barker subterranean clover from fields entered late in the season.

3. EXTENSION OBJECTIVES:

The following table gives a statistical summary of the advisory services provided.

Extension Activity

Farm visits	520
Office interviews	340
Letters written	417
Phone calls received	1,918
Phone calls out-going	1,754
Radio talks given	4
News items	18
Field days organised	4
Conferences & meetings attended	28
Seed processing plants visited	20
Television programmes	1

3.1 Stock Seed for Certified Crop Establishment

Designed to create a greater awareness of the need to plant true to type seed of annual legumes intended for seed production.

3.2 Lucerne Seed Crop Pests

To educate more seed growers to:-

- * Recognise lucerne pest damage
- * Identify pests
- * Adopt effective control measures.

3.3 Weed Control in Annual Legumes

To obtain more effective weed control in annual legume seed crops through:-

- * Publicise existing recommendations
- * By planning and conducting trials to obtain information for control of weeds currently hard to control with current recommendations.

3.4 Bulk Handling of Certified Seed

The majority of South Eastern seed is bulk handled from harvests to seed cleaners. This programme is designed, through education, to help prevent loss of identity or contamination of seed during bulk handling.

3.5 Overseas Seed Multiplications

The objective is to publicise the extent of the potential overseas market for seeds and potential for South Australia to contract-produce new seeds.

3.6 Costs of Seed Production

To establish a basic, detailed schedule of costs of seed production, to assist in farmer decision making, regarding multiplication of both domestic and foreign cultivars.

4. STAFF:

4.1 Staff Changes

Mr. M.C. Jongebloed resigned in December, 1973 and was replaced by Mr. T. Prance.

Mrs. D. Rattray resigned in March, 1974 and was replaced by Miss C. Dodson.

Mr. C.A. Schubert joined the Section in May, 1974 to fill the vacancy caused by Mr. T. Usher's resignation in August, 1972.

4.2 Conferences

Mr. D.C. Ragless attended the Australian Seed Industry Advisory Committee meeting and Co-ordinating Committee for Seed Certification meetings in Canberra, August, 1973.

Mr. D.C. Ragless addressed a conference of Algerian and Tunisian Government administrators and agronomists in Adelaide, August, 1973.

Messrs. Simons, Coleman and Jongebloed attended the annual symposium of the Seed Producers' Association at Naracoorte in September, 1973.

Mr. D.C. Ragless attended a Branch conference on "Medics" at Wallaroo in September, 1973.

Mr. D.C. Ragless participated in the training programme for Colombo Plan students in Melbourne, October, 1973.

Messrs. Ragless, Cooper and Mrs. Rattray attended the annual symposium of the Seedgrowers' Co-operative in Adelaide, November, 1973.

Mr. T. Prance attended an in-service training school at Roseworthy in February, 1974.

Messrs. Ragless, Cooper, Coleman and Simons attended the Branch Conference in Adelaide in April, 1974.

Mr. Ragless addressed the visiting Libyan trade delegation in Adelaide in June, 1974.

5. PUBLICATIONS:

Coleman, W.O. & Mulligan, D. - "Costs of Seed Production".
Journal of Agriculture (in print).

Coleman, W.O., Fairbrother, P.D. & Marrett, P.L. -
"Oil and Legume Seed Crops of the South East".
Special bulletin.

Dodson, C.M. - "Monthly Statistical Summary of Seed Production".
March, 1974-June, 1974.

Jongebloed, M.D. - "A Guide to Herbicides for Weed Control
in Pasture Seed Crops". Special Bulletin No. 1.74.

Ragless, D.C. - "Growing Prospects for Seed Export", R.M.O.
November, 1973.

Ragless, D.C. - "Seed Production, the Key to Profitable
Medic Pastures". Journal of Agriculture, November,
1973.

Ragless, D.C. - "Herbage Seed Production Seasonal Report",
1972-73. Agronomy Branch Report No. 48.

Ragless, D.C. - The Future of Seed Markets. Farming Forum.

Ragless, D.C. - "Production of Certified Seeds", 1960-1972.
Agronomy Branch Report No. 51.

Ragless, D.C. - "Marketing of Seed of New Pasture Varieties". Australian Seed Review.

Ragless, D.C. - "Medic Seed Production as an Adjunct to Mixed Farming". Proceedings Branch Conference, September, 1973.

Rattray, D.E. - Monthly Production Reports, July, 1973 to March, 1974; Annual Seed Production Statistical Report, 1972-73, September, 1973; Seed Production Individual Growers' Performance Report, October, 1973.

5.1 Special Reports

Coleman, W.O. - "Monthly Production Reports for South East.

Prance, T. - Supervision of Crop Establishments, 1971-72 and 1973-74.

Simons, I. - Charcoal Banding of Demeter Fescue Crops Yield Report. Production of Seeds Contaminated with Dock Seed. Lucerne Seed Production Estimates, 1973-74. Monthly Yield Estimates for South East.

6. VISITORS:

During the year the Section had eighteen overseas visitors and fourteen interstate visitors. The length of stay varied from weeks training period for Mr. P.J. Muiyi of Uganda and Mr. P. Somkid of Thailand to short visits of half a day.

7. REGULATORY & DIAGNOSTIC SERVICES:

<u>Activity</u>	<u>Total No. of Visits</u>
Certification inspections, farm & warehouse	1,125
Inspections on behalf of Seed Testing Laboratory	93
Sampling seed on behalf of Victorian Department of Agriculture	12
Quarantine inspections	3
Weed plant identifications	68
Insect pest identifications	43
Disease identifications	27
Seed identifications	59

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.

Mr. L.T. Jacobs, R.D.A., Dip. For.

Mr. P.M. Kloot, B.Ag.Sc.(Hons.)

RESEARCH ASSISTANT:

Mr. D. Carter

LABORATORY ASSISTANT (part-time):

Mrs. M. Carmichael

EXTENSION OFFICERS:

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

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

Mr. S.J. Garrick

Mr. J.N. Hannay, R.D.A.T.

Mr. D.I. Murrie, R.D.A.

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 (part-time):

Mrs. M. Hill

WEED SCIENCE SECTION

1. INTRODUCTION:

The past year has been most successful for the Weed Science Section. The regional officers have become firmly established in their respective centres and have made a positive contribution to weed control in their areas. At the same time, the regional officers have handled enquiries which in the past, have been directed to Head Office and this has reduced pressure there.

The publication of extension literature continues to increase and its distribution has been streamlined by the appointment of a part-time office assistant.

The preparation of a draft Bill for the new Pest Plants Act and the subsequent presentation of this draft to regional meetings of Local Government bodies has been a major task during this year. At the conclusion of the period under review it was hoped that most of the work had been concluded and that only some minor matters were yet to be resolved. It is confidently anticipated that the implementation of the new Act will be a most progressive step in weed control in South Australia.

The research group has concluded a number of useful projects and some interesting work is in progress. The commission of a glasshouse and potting shed/laboratory complex in the near future should ensure a continuation of the valuable work carried out by this group.

During the past year herbicide shortages have continued to cause difficulties although the particular problems have varied from time to time and from place to place. The interest aroused in early post-emergence herbicides by the shortage of phenoxyacetic type herbicides will have long term benefits by removing weed competition earlier and reducing the possibility of off-target damage.

The metrication of the industry is proceeding smoothly although there is some natural resistance to the innovation. The revision of herbicide labels has, in many cases, made a substantial improvement to them.

2. WEED SCIENCE RESEARCH:

2.1 Concluded Research

Ten research projects were concluded during 1973-74.

2.1.1 Comparison of diuron formulations - M.J. Catt

No differences were found in the performance of all commercial formulation of diuron in cereals.

2.1.2 Tolerance of Clipper barley to diuron -
M.J. Catt

Clipper barley was found to be tolerant to diuron to at least the rate of 1.7 kg a.i./ha.

2.1.3 Stale seedbed-glyphosate (MON 2139) compared
to "Sprayseed" - M.J. Catt

The treatment was found to be effective.

2.1.4 Control of ivy-leaved speedwell in cereals -
M.J. Catt

Tribunil(R) and Igran(R) at 1.4 and 1.6 kg product/ha respectively, gave the most economical results.

2.1.5 Control of Apple of Sodom with herbicides -
M.J. Catt

A mixture of 0.2% 2,4,5-T in water, applied in November-December, thoroughly wetting the foliage and stems was found to be most effective.

2.1.6 Control of tufted honeyflower - P.M. Kloot

This weed was found to be quite susceptible to 2,4-D and 2,4,5-T.

2.1.7 Chemical control of Calomba daisy - P.M. Kloot

The bipyrityls were found to be effective. "Spray-grazing" is also effective.

2.1.8 Chemical control of African daisy - P.M. Kloot

Bromoxynil is suitable for warm weather but during winter and early spring amitrole must still be used.

2.1.9 Distribution, taxonomy, ecology & control
of small-fruited pheasant's eye - P.M. Kloot

These long term projects were successfully concluded during the year. Treatment with bromoxynil appears to be satisfactory where a chemical control is required.

2.2 Continuing Research

Eleven approved projects are in progress at the close of the year under review. Experiments mentioned in last year's report are only listed here.

2.2.1 Control of soursob in pastures and cereals -
M.J. Catt

2.2.2 Control of silver-leaved nightshade - M.J. Catt

- 2.2.3 Biological control of skeleton weed - M.J. Catt
- 2.2.4 Control of yellow burr weed in cereals - M.J. Catt, and lucerne pasture - P.M. Kloot
- 2.2.5 Management of Calomba daisy - P.M. Kloot
- 2.2.6 Control of perennial peppergrass, nutgrass & African rue with glyphosate - P.M. Kloot

Trials indicate that this new herbicide gives satisfactory control of these weeds. Split applications may be more effective.

- 2.2.7 Control of phalaris on roadsides - L.T. Jacobs
- 2.2.8 "Krenite" on some native species & woody weeds - P.M. Kloot

This new product is being assessed on seven species of Eucalyptus, four Acacia spp. and six woody weeds.

- 2.2.9 Taxonomy of weedy Hordeum spp. - P.M. Kloot

In association with the Pasture Section project examining the ecotypic variation of Hordeum spp., particularly the murinum group, the taxonomy of the annual Hordeum spp. is being revised.

3. WEED CONTROL ADVISORY & EXTENSION SERVICES:

3.1 Identification & Information Services

With the five regional centres now staffed, the number of personal enquiries and those handled by letter increased some 60% over the previous year, 1972-73. Personal enquiries amounted to 3,650 whilst 650 letters were despatched.

3.2 Farm Visits

Some 321 farm visits were made by regional officers, almost threefold the number recorded during the previous year.

3.3 Bureau Meetings & Conferences

Officers attended 34 Agricultural Bureau gatherings during the year and addressed members on a variety of topics. Generally, the subject was specific weed problems within the area concerned.

3.4 Field Days

Thirty-five field days were attended, eight being conducted by regional officers in demonstrating a variety of subjects, including the calibration and operation of spray equipment and roadside, pasture and crop weed control.

3.5 Industrial Weed Control

It is pleasing to note that apart from the rural industries, industrial companies in the Adelaide metropolitan area are now making more use of our technical advice in relation to weed control in and around factory areas. We believe this should be encouraged for two reasons:-

- * The eradication and control of unsightly vegetation leads to a subsequent reduction of fire hazard
- * Many of the chemicals used in such situations can, if incorrectly used, cause severe damage to adjoining properties.

3.6 Regulatory Work

An important part of regional officers' work is to contact district councils and advise council weeds officers on all aspects of noxious weed control, including programming. Visits to councils by regional officers amounted to 255 and of these 95 were of regulatory nature.

3.7 Special Extension Programmes

The most important of these conducted during the year were:-

3.7.1 Continuation of the off-target prevention programme, particularly as related to horticultural crops in the South Eastern and Central Regions.

3.7.2 Identification, control and eradication of skeleton weed in areas relatively free of infestations - Western and Central Regions.

3.7.3 Identification and control of caltrop - all regions.

3.7.4 Cereal weed control using alternative herbicides to the hard-to-procure phenoxy acetics - all regions.

3.7.5 The completion of the computer survey on the distribution of silver-leaf nightshade throughout the State. Briefly the results were as follows:-

- * Total acreage infested; 13,555 hectares
- * Number of infestations reported: 875
- * Total area infested on roadsides: 45 hectares
- * Number of infestations reported on roadsides: 407
- * Total area infested in paddocks: 13,511 hectares
- * Number of infestations reported in paddocks: 468
- * Number of property owners reporting infestations: 288

A further survey on the distribution of bladder campion is now under way.

4. REGULATORY SERVICES:

Liaison and service to councils in respect to regulatory issues has improved considerably through the regional technical officers. The posting of these officers to strategic centres throughout the State has been most opportune in providing a direct service to meet the increased activity against proclaimed weeds at local government level. Nevertheless, the local government liaison officer visited councils on 44 occasions during the year, apart from his assistance on numerous occasions with other extension matters.

As a result, more councils and landholders are now adopting progressive and more efficient weed control procedures.

Four displays and demonstrations and a two day Local Government Weeds Officers' Conference were held during the year.

The inadequacies of the current Weeds Act are now apparent and the proposed Pest Plant Bill, designed to meet changing needs and concepts, introduce a more realistic approach in regulatory weed control and will ensure more efficient use of resources.

Expenditure of Government funds on regulatory services in the control of proclaimed weeds totalled \$142,000 of which \$136,400 was paid directly to 83 councils as subsidies on the salaries of 48 weeds officers, and proclaimed weed control on unoccupied Crown lands and half roadsides adjoining Crown lands. There has been a substantial increase in the work involved in processing returns from councils and allocation of subsidy funds.

There are 72 authorised weeds officers employed by 92 councils. The shortage of qualified weeds officers is acute and currently 23 councils are being subsidised on the salaries of 16 unqualified officers. Experienced officers continued to be attracted away from local government by higher salaries and better conditions.

Inspection services against proclaimed weeds has been maintained but are proving to be inadequate. Stock inspections are confined almost entirely to detection of Noogoora burr. In this respect regular inspections shared with the Victorian authorities are made at Yelta and appear satisfactory.

However, stock movement over the border from New South Wales and Queensland is not being adequately policed. Spot checks at various sale yards indicate that stock infested with Noogoora burr is coming into this State, in some cases with false declarations.

The patrol of certain infestations of proclaimed weeds outside local government boundaries has been continued. Some new problem areas have been included for the first time. Previous spray control programmes, mainly outside local government areas, have been maintained and some new areas included in the scheme.

Assessment of established Noogoora and Californian burr infestations show that these weeds, aided by two wet summers, are very tenacious and there is an urgent need to intensify our activity against these weeds.

The spreading of cochineal insects to patches of Opuntia from Paringa to Quorn has been continued and appears to be effective.

5. WEEDS ADVISORY COMMITTEE:

The Weeds Advisory Committee has continued throughout the year with the Minister's terms of reference on the specific task of drafting a replacement for the current Weeds Act, 1956-1969.

Over twenty organisations have been contacted and particular regard has been given to the wishes of local government, primary producer organisations, other Government departments and private people. Many submissions from local government were assessed and the good points adopted.

A draft Pest Plants Bill has been produced and this was released by the Minister of Agriculture in April at a meeting of the Local Government Association, and on the following day at the Local Government Weeds Officers' Conference.

Subsequently, the Weeds Advisory Committee and officers of the Weeds Section held eighteen conferences with groups of councils throughout the State. The draft Bill was discussed in detail and councils were asked to contribute to the work in finalising the draft Bill.

As a direct result of the conferences the Committee carried out a "tidying-up" process and now, a realistic draft Bill has been submitted to the Parliamentary Counsel for final drafting.

The conferences generated substantial support for the Bill, the main features of which are:-

- * The Pest Plant Commission, a statutory body responsible for the administration of the Act, through Pest Plant control boards, and direct responsibility outside local government area.
- * Compulsory Pest Plant Control Boards charged with the responsibility of administering the Act within an area.

- * Increased Government subsidy designed to assist in general but more particularly to further subsidise low rate revenue areas where currently weed control is somewhat ineffective.
- * The addition of a new schedule to cover Community Pest Plants.
- * The good features of the present legislation have been retained although tidied up; Pest Control Boards will take more responsibility for decisions under the new legislation.

It is believed that the Royal Commission on Local Government Boundaries report has not cut across this intended legislation. In fact, it will in some important areas support the proposed legislation.

6. STAFF:

6.1 Staff Appointments, Movements

Two part-time female assistants were appointed during the year. Mrs. M. Hill is responsible for the routine re-printing and despatch of the Section's extension literature from Head Office. Mrs. M. Carmichael has assisted the research officers at Northfield. Both ladies have made a significant contribution to the routine activities of the Section.

All regional officers are now in their centres. Mr. K.R. Smith was transferred to Struan Regional Centre on 13th August, 1973. Mr. J.N. Hannay was transferred to Jamestown office on 26th March, 1974.

6.2 Staff Training

Mr. S.J. Garrick completed Plant Pathology, Propagation and Plant Identification courses at the Botanic Garden.

Mr. M.J. Catt is attending a Business Administration course conducted by the Institute of Technology.

Messrs. M.J. Catt and D.I. Murrie attended the Training Course for workers in Weed Science conducted by the University of Sydney at Camden, New South Wales in August, 1973.

Mr. P.M. Kloot qualified for admission to the Degree of M.Ag.Sc. at the University of Adelaide.

7. PUBLICATIONS:

Officers of the Section produced 36 extension publications, including a new edition of the widely known handbook "Herbicides for Weed Control", and three issues of the publication for Local Government "Weed Scene".

7.1 Special Bulletins & Miscellaneous Publications

- Alcock, C.R. (1973-74) - "Weed Scene", Issues 12-14.
- Catt, M.J. (1974) - "Prickly
- Catt, M.J. (1974) - "Cereal Spraying Chart, 1974"
- Department of Agriculture (1973) - "Herbicides for Weed Control 1974-75"
- Department of Agriculture (1973) - Caltrop poster
- Jongebloed, M.C. & Kloot, P.M. (1974) - "Pasture Seed Crop Spraying Chart".

7.2 Articles, Journal of Agriculture

- Britton, R.S. (1973) - "Onion Weed - Good Management Can Help". S.A. Journal of Agriculture 76: 100-104.
- Hannay, J.N. & Lewis, A.W. (1974) - "It's Time to Get Your Boom Spray Ready". Ibid. 77: 45-49.
- Kloot, P.M. (1973) - "Perennial Peppergrass". Ibid. 76: 72-73.
- Murrie, D.I. & Garrick, S.J. (1974) - "Two Leaf Cape Tulip". Ibid. 77: 21-25.

7.3 Colour Plates

7.3.1 Journal of Agriculture - C.R. Alcock

Cut leaf mignonette	August, 1973
Hoary cress	August, 1973
Bladder campion	November, 1973
Caltrop	November, 1973
Creeping knapweed	February, 1974
Bindweed	February, 1974
Bathurst burr	May, 1974
False caper	May, 1974

7.3.2 Issued separately

Nasella tussock	June, 1974
Ragwort	June, 1974
Alkali sida	June, 1974
Noogoora burr	June, 1974

7.4 Weed Control Notes

Alkali sida - K.R. Smith	July, 1973
Spiny emex - J.A. Dickinson	August, 1973
Kikuyu - R.S. Britton	September, 1973
Horehound - D.I. Murrie	October, 1973
Caltrop - J.N. Hannay & K.R. Smith	November, 1973
Skeleton weed - M.J. Catt	November, 1973
Artichoke thistle - K.R. Smith	March, 1974
Marihuana - D.I. Murrie	March, 1974
Yellow burr weed - M.J. Catt	March, 1974
Crow garlic - J.A. Dickinson	March, 1974
African daisy - P.M. Kloot	March, 1974
Small fruited pheasant's eye - P.M. Kloot	April, 1974

7.5 Research Publications

- Catt, M.J. (1973) - "Skeleton Weed in Cereal Crops".
Proceedings 2nd Victorian Weed Society Conference
(in press).
- Catt, M.J. & Kloot, P.M. (1973) - "Weed Control in Medics"
in E.J. Crawford (Ed.) Annual Medics - Establishment,
Management and Utilisation, S.A. Department of
Agriculture Agronomy Branch Report No. 51.
- Cullen, J.M., Kibbe, P.F. & Catt, M.J. (1973) - "Epidemic
Spread of a Rust Imported for Biological Control".
Nature 244.
- Kloot, P.M. (1973) - "Studies in the Ecology of Pheasant's
Eye (Adonis microcarpus DC.)", M.Ag.Sc. thesis
University of Adelaide.
- Kloot, P.M. (1974) - "Weed Control in Temperature Pasture
Seed Crops". Invited paper for J. Swarbrick (Ed.)
Australian Weed Control Handbook 1974. Toowoomba.

8. VISITOR:

Mr. Jack Forbes, Chief of the Weed Control Section,
Manitoba State Department of Agriculture, Canada, visited the
Section on 27th February, 1974.