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DEPARTMENT OF AGRICULTURE AND FISHERIES, SOUTH AUSTRALIA

# Agronomy Branch Report

"AUSTRALIAN DEMONSTRATION FARM"

EL MARJ

LIBYAN ARABIC REPUBLIC

REPORT ON OPERATIONS FOR 1975/76 SEASON

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Report No. No. 80

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# INTRODUCTION

In June 1974 the Government of the Libyan Arab Republic and the Government of South Australia agreed jointly to develop a 1 000 hectare demonstration farm at El Marj. The South Australian Government had the responsibility of recruiting staff and the Government of the Libyan Arab Republic accepted the responsibility of paying all salaries and operating expenses.

The average annual rainfall of the area which the demonstration farm was to serve varied from 300 to 400 mm, with the majority of this rain falling during a five month period.

The soils of the area to be served by the demonstration farm generally consisted of deep clay loams which were alkaline.

The soils and climate of the region indicated that the cereal-medicago pasture rotation, which has proved to be successful for the alkaline soils in South Australia, should also prove to be successful in this region.

In November 1974, 500 hectares of medicago pastures and 56 hectares of Gabo wheat were sown on the demonstration farm site under the supervision of two representatives of the South Australian Seedgrowers Co-operative Limited.

Also in November 1974, Mr. Henry Day and Mr. Trevor Dillon arrived at El Marj. They took up duties as Officer in Charge and Cereal Agronomist respectively. They made preparations for the other members of the team.

In January 1975 a further four officers from the South Australian Department of Agriculture and one farmer from Kangaroo Island joined the advance party at El Marj.

Subsequently in 1976 additional staff joined the team.

The team members involved in the 1975/76 programme were:-

| | |
|---|---|
| Henry Day | Officer in Charge |
| Trevor Dillon | Cereal Agronomist |
| Keith Bicknell | Pasture Agronomist |
| Jack Blencowe | Soils Officer |
| Allan Pullman | Livestock Specialist |
| Gavin Young | Soils Officer |
| Maurice Hayes | Shearing Instructor |
| John Riggs | Farm Operations Supervisor |
| Bill Kelly | Farm Operations Supervisor |
| Graham Pfeiffer | Farm Operations Supervisor |

## CEREAL CROPPING

### PLANNING OF CULTURAL OPERATIONS:

When deciding on the cereal cropping programme for 1975/76, the first consideration was that it should aim at demonstrating a pasture/crop rotation. Consequently, half the area should be sown to cereal each year and the remaining half to medic pasture.

One paddock of 60 hectares (EURO) which was sown to wheat the previous year was continued on a permanent wheat programme to give a comparison between pasture/crop rotation and continuous cropping with wheat.

The total area of cereal sown was 454 hectares. This consisted of 370 hectares of wheat, 39 hectares of oats for hay and grain, 37 hectares of two row barley and 10 hectares of trials.

In previous season (1974/75), seeding was impracticable during December and early January because of almost continuous rain. In fact, local farmers' crops were sown after mid January and produced poor yields.

After studying rainfall records and taking into account drying "giblie" winds which occur in March and April, it was decided that all seeding for season 1975/76 should be completed by about December 7. This meant that much of the pre-seeding cultivation would be carried out under dry conditions and that there would be little likelihood of controlling weeds by cultivation. Therefore, one tonne of Dosanex (R) herbicide was purchased to control the expected growth of ryegrass, wild oats and numerous species of broad leaved weeds.

To spread the heavy work load which would result from the weed spraying programme in January, it was decided to sow one paddock with early maturing Gabo wheat and Clipper barley at least a week after the main seeding programme had been completed. In fact, the presence of large numbers of sheep meant that this paddock was not sown until 23/12/75 and another paddock was not sown until mid January because clearing of bush growth was not completed before that time.

### SEASONAL CONDITIONS:

The rainfall distribution for cereal growing during 1975/76 was favourable and together with mild temperatures provided good growing conditions.

Monthly Recordings (mm)

| Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May. | Total |
|---|---|---|---|---|---|---|---|---|
| 9.5 | 31.0 | 51.0 | 164.5 | 64.0 | 58.5 | 3.5 | 14.5 | 396.5 |

More rain before mid November, during mid December and in April would have increased yields. Germination of weeds did not commence until 25th November and plant residue from the previous season did not begin to break down until then. During mid December, soil moisture was barely sufficient to sustain wheat seedlings. Tillering may have been limited by lack of rain during this period. No rain was recorded between 2nd April and 18th May. There was a week of hot weather at the beginning of May. This pattern of weather also may have limited wheat yield

SEED-BED PREPARATION:

All initial cultivations were carried out with a Shearer cultivator, in most cases in dry soil. This left several paddocks rough and cloddy. To break down these clods and level the ground a railway iron was pulled over the area.

All paddocks had another cultivation with a Shearer Fieldspan prior to seeding. A shearer Wideseeder (40 row) and two 24 row Horwood Bagshaw combines were used to sow the crops. Levelling harrows were used behind each seeding machine.

WHEAT VARIETIES:

For the main sowing Australian varieties were used. A small trial in 1974/75 indicated that these varieties may outyield the locally grown varieties Florence x Aurore and Mahmoudi by up to 50%. Gabo, Halberd and Condor were chosen. Gabo is reliable, early and a good quality bread wheat. Halberd has been the main South Australian variety for some years. Condor is a new rust resistant bread wheat of good quality that h yielded well under similar conditions in Australia.

SEEDING RATES:

The seeding rate for wheat decided upon was 70 kg/ha. Both the Shearer Wideseeder and Horwood Bagshaw combines were calibrated to sow at this rate, but when seeding was carried out the rate was in fact 80 kg/ha. The wheat did not tiller well probably because of lack of Nitrogen and moisture. The higher seeding rate may have compensated for this poor tillering. Barley was sown at 50 kg/ha and Oats at 55 kg/ha.

FERTILISER APPLICATION:

After studying soil test detail it was evident that Phosphorus and Nitrogen were the main elements lacking in these soils.

A rate of 18 kg/ha of phosphorus i.e. 200 kg/ha of 20% $P_2O_5$ superphosphate was used and it was thought that this amount would meet the requirements of a cereal crop.

Most of the area sown to cereals in 1975/76 had had one year of medic pasture and should have had some build up of nitrogen but perhaps not sufficient for a cereal crop. Considering the possible harsh ripening conditions, the application of too much nitrogen at seeding could give a depression of grain yield. Considering these points, it was decided to use ten kilograms of nitrogen per hectare at seeding. As a check 30 hectares which had medic pasture in the previous year, was sown without Nitrogen.

The fertilisers available were 20% $P_2O_5$ (Superphosphate) and 18:46:0 (Di Ammonium phosphate). It was decided to apply 18 kg/ha of phosphorous and 10 kg/ha of Nitrogen. 85 kg/ha Superphosphate (7.7 kg/ha of phosphorous) was broadcast before seeding and the crop was sown with 55 kg/ha of 18:46:0 (11 kg/ha of phosphorous and 10 kg/ha of Nitrogen).

It was estimated that the superphosphate would supply enough sulphur for the cereal crop should this element be deficient.

HARVEST DETAILS AND YIELDS:

Yields were satisfactory although may have been higher if weed control had been more successful. The light rains during November and December probably limited tillering especially where trash remained from last year's crops and pastures.

This trash only commenced to break down at seeding time. This could have used up available soil nitrogen and thus restricted the number of tillers.

I - Euro - 60 hectares

1974/75 cropped with wheat

1975/76 cultivated twice and levelled with railway iron. Halberd wheat sown in damp soil from 29/11/75 to 1/12/75.

Fertiliser used was 90 kg/ha of 18:46:0 (10 kg/ha of N and 18 kg/ha of P).

The wheat in this paddock grew well and looked as though it would yield well over 2 tonnes/hectare.

Average yield per hectare obtained was 1.9 t/ha.

II - Wombat - 1974/75 medicago pasture - variable

1975/76 sown in 3 sections. All were cultivated twice after being fire harrowed.

1) 40 hectares Halberd with Nitrogen - sown 26/11/75 to 28/11/75 into damp soil with 85 kg/ha of superphosphate broadcast and 55 kg/ha of 18:46:0 with seed.

Average yield - 1.7 t/ha.

The trash was removed from this area before cultivation. Weeds were sprayed early with Dosanex and weed control was good.

2) 15 hectares - Halberd without Nitrogen - sown 23/11/75 to 25/11/75 into a damp soil.

200 kg/ha of superphosphate sown with the seed.

Average yield - 1.45 t/ha.

This area was well cleaned of trash but no weed-kill was obtained at seeding. Spraying with Dosanex was carried out too late to obtain good weed control.

3) 15 hectares - Condor - sown 25/11/75 to 27/11/75 into damp soil. 200 kg/ha of superphosphate sown with the seed.

Average yield 1.46 t/ha.

Well cleaned of trash and again no weeds were killed at seeding. Sprayed with Dosanex, too late and weed control was very poor.

III - Bandicoot - 53 hectares Halberd wheat

1974/75 - medicago - variable

1975/76 sown 23/11/75 to 25/11/75 into dry soil following two cultivations. Residue from previous season was not removed.

85 kg/ha of 20% superphosphate broadcast and sown with 55 kg/ha of 18:46:0.

Weed control was not obtained at seeding and spraying was carried out far too late and weeds reduced wheat yield. The wheat grew very slowly and did not tiller well. This poor growth may have been due to the lack of available nitrogen caused by decomposing plant residue.

Average yield - 1.5 t/ha.

IV - Emu - 1974/75 medicago pasture (variable) and self-sown oats.

1975/76 sown with 3 varieties (Halberd, Condor and Gabo)

85 kg/ha of 20% superphosphate, broadcast, and sown with 55 kg/ha of 18:46:0.

The soil condition at seeding was good following 2 cultivations, 1 harrowing and a levelling with the railway iron.

Sown into damp soil between 27/11/75 and 1/12/75. Weed spraying with Dosanex was carried out on the 30th and 31st December. The rate of Dosanex used was only 2 kg/ha which did not give good control.

Average yield - Condor - 30 hectares - 0.9 t/ha
Halberd - 20 hectares - 1.0 t/h
Gabo - 10 hectares - 1.1 t/ha.

V - Echidna - 1974/75 medicago - variable - part cut for hay.

1975/76 - sown into good soil conditions on 21/12/75 to 24/12/75 with Halberd and Gabo wheat and Clipper barley.

85 kg/ha of 20% superphosphate broadcast and 55 kg of 18:46:0 sown with the seed. Seeding of this paddock was delayed, consequently an excellent weed kill was obtained at seeding.

1) Halberd - 14 hectares Av. yield = 1.7 t/ha.
2) Gabo - 42 hectares Av. yield = 1.25 t/ha.
3) Clipper Barley - 32 hectares Av. yield = 2.1 t/ha.

The barley was badly damaged by a hailstorm during late January but recovered very well.

VI - Magpie - 40 hectares - Halberd.

1974/75 Wheat - some areas still bush.
1975/76 Cleaned with bulldozers and rootcutters.
Sown very late due to cleaning operation.
Seeding was completed on 14/1/76.
Sown with 90/kg/ha of 18:46:0.
Average yield - 1.4 t/ha.

OATS: 39 hectares.

Oats were sown very early into dry soil and weed competition was severe. 14 hectares were harvested for grain and the remainder cut for hay.

Average yield (grain) - 14 hectares - 0.9 t/ha.

OVERALL YIELDS:

Average yields:

242 hectares Halberd = 1.59 t/ha.
52 hectares Gabo = 1.22 t/ha.
45 hectares Condor = 1.08 t/ha.

Total area of Wheat = 367 hectares.
Total yield = 525 tonnes
Average yield = 1.43 t/ha.

HERBICIDES:

During the 1974/75 season close observations were made of the weed populations on the Australian Farm and in the area as a whole. It was felt that the major weed problems would be:-

Lolium (ryegrass)
Gallium (cleavers)
Brassicas (wild turnip etc.)
Phalaris (annual phalaris) and
Avena spps. (wild oats)

Experience in Australia indicated that under a medic-pasture cereal rotation, lolium would become more serious but Avena spp. would be less of a problem.

Phalaris could also become a problem where Lolium was controlled by a herbicide such as Dosanex which does not control phalaris. This had been the experience in Tunisia.

The broad leafed weeds would require herbicide treatment.

Good grazing management can reduce weed problems. If grazing, with sheep, during the pasture years is well timed and heavy enough it will reduce the seed set of most of these major weed species. Some herbicide treatment could still be necessary in the crop year.

The major problem with weed control in cereal crops in Libya is the lack of effective control by cultivation. If cereals are to be sown in late November or early December it is very unlikely that weeds will be killed by cultivation.

With this background a search was made for a herbicide which would control these weeds.

In Australia, the main control of Lolium and Avena has been by the use of two pre-emergent herbicides viz. Avadex and Treflan. These are very effective but require a fine well worked seed-bed for their application. With cultivations being carried out in dry soil, this is not possible in Libya. In any case, these herbicides do not control a wide spectrum of broad leafed weeds and a second spray to control Brassicas and Gallium is often necessary.

A herbicide with the trade name Dosanex (R) which controls most of these weeds was used for the first time in Australia in 1974.

In April 1975 Mr. Trevor Dillon visited Tunisia where an extensive herbicide research programme had been carried out. Excellent results had been achieved with Dosanex (R) and a closely related herbicide Dicuran. Four kilograms per hectare were used, this rate is very expensive and showed slight cereal crop phytotoxicity. These rates are used under European conditions and with European wheat varieties. The rate of Dosanex recommended in Australia is 1.7 kg/ha. The Tunisian workers were queried regarding the efficiency of the herbicide at reduced rates. In their experience, Dosanex (R) gave good control of Lolium, Avena and broad leafed weeds at 2 kg/ha but Dicuran gave poor results at these rates. At these low rates the Lolium and Avena must be sprayed at the 2 leaf stage, or earlier, if good control is to be obtained. It was also found that when Lolium was controlled, Phalaris became a serious weed requiring treatment with another specific herbicide (Tok).

It was decided that because of the limited knowledge regarding the sensitivity of the wheat to be grown and for economic reasons, Dosanex (R) at 2 kg/ha should be used. The cost of chemical was $6-25/kg.

On 28/12/75 test strips, of 2, 3 and 4 kg/ha of Dosanex in 110 l/ha of water were sprayed. This area of Halberd wheat was sown on 23/11/75 and contained a serious infestation of annual ryegrass (lolium), brassica weeds and medicago. Due to the mild December weather the weeds had matured quickly but much of the Lolium was still at the two leaf stage. Control of these weeds was satisfactory at 2 kg/ha and almost complete eradication of weeds was obtained at three and 4 kg/ha. These strips were harvested separately and the following yields were obtained:

| Rates of Dosanex (kg/ha) | Yield of Wheat (t/ha) |
|---|---|
| 0 | 0.23 |
| 2 | 0.56 |
| 3 | 0.61 |
| 4 | 0.58 |



The yields were low but the increase in yield was dramatic. The sprayed strips yielded approximately 150% more than the unsprayed control strip.

The main area of wheat to be sprayed was sown during the last week of November and the first paddock treated (Emu) had a self-sown oat crop in 1974/75 and from this crop enough seed had been shed to contaminate the current year's wheat crop. It was decided to use 2 kg/ha of Dosanex (R) and spraying was carried out on 30/12/75 and 31/12/75. The oat plants were damaged and the medicago was suppressed but both species recovered and the humid weather conditions in spring encouraged continued growth, providing serious competition to the wheat.

General spraying was commenced on 5/1/75 using 3 kg/ha of Dosanex (R). Weed control on the first 70 hectare paddock was generally satisfactory but the maturity of the weeds was very important. A variation of 3 or 4 days in the date of sowing (last cultivation) made a marked difference to the degree of control of weeds.

On 8/1/76 spraying was commenced on a paddock (Bandicoot) that was sown on 23/11/75 and 26/11/75. Spraying in this paddock was completed on 13/1/76. On 14/1/76 a light rain was recorded and then heavy rain from 16/1/76 to 21/1/76 inclusive (total 150 mm). The control of weeds, in the portion sprayed between 8/1/76 and 11/1/76, was only fair due mainly to the maturity of weeds. No control was obtained on the area sprayed on 12/1/76 and 13/1/76 presumably because the heavy rain had washed the Dosanex from the leaves and out of the root zone. This area was resprayed with Brominil plus (rate 1.4 l/ha) but this too had little effect on the medicago.

Another area was sprayed with two and three kg of Doxanex in 55 litres of water but light rain fell the following evening. Results were poor and respraying of brassica weeds with Brominil plus was necessary.

The following day another area was sprayed with 3 kg in 55 litres of water. Although the flag appeared to be dry, it must have been damp because the wheat was damaged in the process of eradicating the weeds.

CONCLUSION ON HERBICIDES USAGE:

1) Where ryegrass (Lolium) is present, Dosanex is effective if used early enough, that is at the 1 to 2 leaf stage of Lolium (ryegrass). The rate of 2 kg/ha of Dosanex is effective, if weed maturity and soil conditions are exactly correct. 3 kg/ha is a more reliable rate.

Spraying is no longer effective when most of the ryegrass plants have 3 or more leaves. In such cases, resowing of the crop may be worthwhile, and is practicable until mid-January.

Dosanex (R) will also control Gallium, Medicago and Brassica weeds if sprayed before the 8 leaf stage.

2.) Where only broad-leafed weeds are present, Bromoxinyl based herbicides are very effective against brassicas (Mustard), Gallium and Medicago. Spraying should still be carried out before the 8 leaf stage using a rate of 2 l/ha.

GENERAL CONCLUSIONS:

Results from cereal crops were satisfactory. During this first cropping season 1975/76, all operations were carried out by the Australian Demonstration Farm personnel. Some changes may be necessary in future seasons - for example seeding of cereals perhaps should be delayed and carried out between 23/11 and 14/12.

The main cereal varieties used, Halberd and Condor both performed well. Condor did not grow as well as Halberd and was thus less able to compete with weeds.

It will be necessary to use some Nitrogen fertiliser following only one year's medicago pasture.

## MEDIC SOWING PROGRAMME

LAND PREPARATION:

Deep ploughing for cereal crops has been practised for many years on the area allotted to the Australian Demonstration Farm. This has left the ground with troughs and ridges, most unsuitable for sowing medics. To obtain a good medic stand it is desirable to have a flat surface and a shallow fine seed bed. For these reasons it was decided to cultivate the whole area to be sown at a shallow depth (3-4 cm) with scarifiers which would have some levelling effect. This operation was followed by dragging a railway iron to break down clods and give additional levelling. The two operations gave some levelling and produced a reasonably fine seed bed. It was impossible to completely remove the ridges and hollows. Future cultivations with tyned implements will gradually level the surface of the soil.

Cultivation with Shearer Scarifiers commenced on 25/8/75. All cultivation was followed by railway iron and carried out while the soil was dry.

Paddocks sown to medics were Kookaburra, Possum, Galah, Koala, Brolga, Kangaroo and part of Platypus. The total area seeded was 355 hectares. Seeding was done with a 40 row Shearer Wideseeder on which low tension springs were fitted before seeding of medics started. Medics were sown through the main grain box and the machine was set to sow at a depth of approximately 2 centimetres. Because the ground was very uneven, some seed was sown too deep and some on the surface. Light covering harrows were used behind the wideseeder to help cover the seed. All sowing was done when the soil was dry.

VARIETIES AND SEEDING RATES:

| | |
|---|---|
| Jemalong | 6 kg/ha |
| Paragosa | 2 kg/ha |
| Borung | 2 kg/ha |
| Clare (subterranean clover) | 1 kg/ha |
| TOTAL | 11 kg/ha |

Sowing started on 21/10/75 and was completed on 16/11/75.

FERTILISER:

The whole of the area of 355 hectares, was topdressed with 120 kg/ha superphosphate (20% $P_2O_5$) prior to sowing. An additional 80 kg/ha was sown with the seed.

GENERAL COMMENTS:

Seven millimeters of rain was recorded on 24/10/75 followed by 2.5 mm on 25/10/75. A small percentage germination may have taken place following this rain but was not enough to affect the final stand.

Further rain was not recorded until 16/11/75. Rainfall during late November and early December was sufficient to give a good germination.

Excellent first year medic pastures became established in all paddocks. Sheep numbers were not high enough to give grazing control of the new pastures so large areas were overgrown. Despite undergrazing all first year medic pastures set large quantities of seed.

All the new pasture in the southern part of Brolga was topped with a rotary slasher to remove mustard and bulky medic growth to allow better seed set. A small area of Galah was cut for hay. Self sown (volunteer growth) wheat was a problem in Galah, Koala, Possum and Kookaburra. Grazing of Koala to control wheat growth was heavy during January but the good season gave a satisfactory seed set.

Kookaburra and Possum will be left to regenerate in the 1976/77 season. The other paddocks, Galah, Koala, Brolga, Kangaroo and Platypus will be sown to cereals in 1976/77.

Medic seed was not innoculated.

SECOND YEAR PASTURE:

Dingo and part of Platypus were left for a second year to build a seed bank. Dingo was heavily grazed until the end of January when all stock were removed. The pasture was allowed to grow on for a hay cut and a small area was cut for hay. The remainder of the paddock grew too much bulk for maximum seed set, although seed set was satisfactory.

# CROP TRIAL PROGRAMME 1975/76

## GENERAL:

The 1975/76 crop trial programme was formulated to give information on the most urgent cultural practices such as time of seeding and fertiliser rates. Also it was necessary to test improved cultivars of wheat and barley, and assess the value of new crops such as grain legumes and oil seeds.

These trials were sown on an area that had good medic growth in the 1974/75 season. The level of available nitrogen in the soil should have been sufficient for crop growth so only phosphate fertilisers were applied.

Trials were sown with 4 replicates. Plot size was 50 metres x 1.8 metres.

## WHEAT - TIME OF SEEDING TRIAL

The growing season is relatively short and ripening conditions can be harsh so it was felt that time of seeding was important.

In the 1974/75 season, local farmers did not sow wheat and barley crops until mid January and the resulting yields were very poor. A range of sowing dates from 1/11/75 until 23/1/76 were planned. At least one of these seedings would be carried out without the opportunity for the killing of weeds by cultivation, prior to seeding.

The whole area of this trial was cultivated twice and levelled with a railway iron before treatment "1" was sown and all cultivated again after treatment "1" was seeded. All these cultivations were carried out in dry soil. On 27/11/75 treatment "2" was sown. On 13/12/75 as well as seeding treatment "3" a further cultivation was carried out on treatments "4" and "5".

On 6/1/76 treatment "4" was sown and treatment "5" was cultivated again. Treatment "5" was sown on 26/1/76.

Treatment "1" sown into dry soil did not germinate until after mid-November, and all other treatments were sown into damp soil in excellent seeding conditions.

Results were:-

| | Treatment Sowing Date | Yield kg/ha Mean of 4 Replicates |
|---|---|---|
| 1. | 2/11/75 | 1 458.3 |
| 2. | 27/11/75 | 1 997.2 |
| 3. | 13/12/75 | 2 308.3 |
| 4. | 6/ 1/76 | 1 922.2 |
| 5. | 26/1/76 | 1 577.7 |

Poor weed control in the first two treatments, which were sprayed with Bromonyl Plus, probably reduced the yields. The two late treatments were favoured by the good ripening conditions.

WHEAT VARIETY TRIAL:

This trial was planned to test the performance, on the Australian Demonstration Farm, of some of the numerous Middle East and Australian cultivars in relation to the common Libyan cultivars.

Seed was obtained of eight cultivars (including two durums) from Tunisia where an extensive breeding programme has produced some promising cultivars. A small quantity of seed of one cultivar was obtained from Egypt. Ten cultivars from Australia were also included in the trial. All these cultivars are relatively early maturing and were tested against the standard Libyan cultivars.

This trial was sown under excellent conditions on 9/12/75. It was sprayed with BROMINIL PLUS (R) to control a slight infestation of broad-leafed weeds.

In a small trial in 1974/75 the yields of the two common cultivars for the area, Florence X Aurore and Mahmoudi, yielded only 70% of the yields of the three best yielding Australian cultivars.

## RESULTS

| Variety | Rank | Mean Plot Yield kgs | kg Per Hectare | Hectalitre Weights | Origin of Seed | REMARKS | |
|---|---|---|---|---|---|---|---|
| | | | | | | Plant Growth | Grain Sample |
| Condor | 1 | 21.97 | 2 441.7 | 72.60 | Australia | Satisfactory | Grain small but well filled |
| Fath | 2 | 21.75 | 2 416.7 | 74.1 | Tunisia | Good | Good sample |
| Soltane | 3 | 21.5 | 2 388.9 | 70.8 | Tunisia | Excellent | Red Grain, High % shrivelle |
| Egret | 4 | 20.35 | 2 261.1 | 71.55 | Australia | Poor | Biscuit Wheat |
| Carthage | 5 | 20.12 | 2 236.1 | 71.80 | Tunisia | Good | 50% shrivelled |
| Inia 66 | 6 | 19.97 | 2 219.4 | 74.45 | Tunisia | Good | High % Shrivelled |
| Kite | 7 | 19.55 | 2 172.2 | 74.35 | Australia | Satisfactory | Good Sample |
| Inrate 69 | 8 | 19.32 | 2 147.2 | 74.7 | Tunisia | Good | Grain satisf. early Durum |
| Badri | 9 | 19.25 | 2 138.9 | 79.15 | Tunisia | Excellent. | Excellent Sample, " " |
| Oxley | 10 | 18.92 | 2 102.8 | 69.1 | Australia | Poor | Not Well Filled |
| Mahmoudi | 11 | 18.42 | 2 047.2 | 78.4 | Libya | Good | Excellent Sample Durum |
| Eagle | 12 | 18.37 | 2 038.9 | 69.25 | Australia | Satisfactory | Poor Sample |
| Halberd | 13 | 18.32 | 2 030.6 | 76.0 | Australia | Satisfactory | Good Sample |
| Sanduz Mahmoudi | 14 | 17.77 | 1 975.0 | 77.5 | Tunisia | Excellent | Good Sample Durum |
| Siete Cerros | 15 | 16.75 | 1 861.1 | 70.5 | Tunisia | Satisfactory | Poor Sample |
| Gamenya | 16 | 16.52 | 1 836.1 | 69.05 | Australia | Satisfactory | Poor Sample |
| Gabo | 17 | 16.40 | 1 822.2 | 67.9 | Australia | Satisfactory | Poor Sample |
| Madden | 18 | 16.27 | 1 808.3 | 67.75 | Australia | Good | Poor Sample |
| Sidi Misri | 19 | 16.12 | 1 791.7 | 71.00 | Libya | Satisfactory | Poor Sample |
| Gambee | 20 | 15.72 | 1 747.2 | 72.45 | Australia | Satisfactory | Poor Sample |
| Florence Aurore | 21 | 12.60 | 1 400.0 | 68.0 | Libya | Satisfactory | Poor Sample |

REMARKS:

FATH is a promising early bread wheat. Seed will be multiplied for use on the Australian Demonstration Farm. Condor and Halberd have performed well on the farm and will be used for the main sowing in 1976/77.

CARTHAGE and KITE should be used in future trials to further assess their potential.

Of the DURUM wheats, BADRI (early) is most promising because of early maturity and excellent grain appearance.

MAHMOUDI was probably favoured by the good ripening conditions. FLORENCE X AURORE should be replaced in the Jabel El Akhdar area as soon as possible.

SA 42 was sown in only one replicate and germination was very poor due to insect damaged seed.

The trial was sown following a good season of Medicago pasture and nitrogen was not added. 215 kg/ha of (20% $P_2O_5$) superphosphate was placed in the furrow with the seed.

WHEAT - PHOSPHATE TRIAL

This trial was planned to determine the optimum rate of phosphate application for the Australian Demonstration Farm. While it was sown on an area that had a good medic pasture the previous season, it was not certain that nitrogen levels would be sufficient for a wheat crop. Consequently two extra replicates were sown with a basal dressing of 15 kg/ha of N. This was planned to give some indication whether response to phosphorous application was limited by the level of available N in the soil.

This trial was sown under excellent conditions on 6/12/75. Plant growth was slow in the whole trial and the subsequent yield level was not high.

Yield results of the Phosphate trial:-

| P kg/ha | Yield kg/ha Mean of 4 Replicates |
|---|---|
| 0 | 1 572.2 |
| 5 | 1 797.2 |
| 7.5 | 1 797.2 |
| 10 | 1 900.0 |
| 12.5 | 1 911.0 |
| 15 | 1 875.0 |
| 20 | 1 975.0 |

This section of the phosphate trial was sown without any basal Nitrogen dressing but was sown following one year of very good Medicago pasture. The two replicates that were sown with a basal dressing of 15 kg/ha of N were harvested but the yields are not shown as the increase in yield over the above replicates was not significant.

While this trial does show an increase in yield for up to 20 kg/ha of P it is unfortunate that a higher rate (e.g. 30 kg/ha of P) was not included. This may have shown an increase up to this higher level.

The phosphorus was applied as 20% $P_2O_5$ superphosphate. Fertiliser was placed in the furrow with the seed.

WHEAT - NITROGEN TRIAL

This trial was aimed at determining whether the level of available N in the soil, following one season's good medic pasture is sufficient for a wheat crop.

A heavy basal dressing of phosphate 20 kg/ha of P was applied to all plots to ensure that plant performance would not be limited by lack of phosphorus.

The nitrogen was in the form of urea and it was applied immediately preceeding seeding. It was placed 1 cm below the seeding depth.

The basal dressing of phosphorus was placed in the furrow with the seed.

Results:

| Rate of N kg/ha | Yield kg/ha |
|---|---|
| 0 | 2 561.1 |
| 10 | 2 638.9 |
| 15 | 2 566.7 |
| 20 | 2 683.3 |
| 30 | 2 663.9 |
| 40 | 2 736.1 |

No worthwhile increase in yield was obtained with applied Nitrogen fertiliser. It must be remembered that this trial was sown on an area that had had one year of very good medicago growth in the previous season.

This trial was sown on 6/12/75 under excellent seeding conditions.

FEED GRAIN TRIAL:

The production of grain for stock feed is important in Libya so a trial including two row and six row barley and oats was sown to determine the best producing cultivars.

Ketch, Weeah and Clipper are two row barley cultivars which are grown extensively in Australia. 2231, 2269 and 2197 are new crossbreds from South Australia. 2197 has yielded very well in F.A.O./ALAD Regional Barley Yield trials. Beecher, a six row barley which was bred in U.S.A. and has been grown extensively in Australia, has also yielded well in these trials. Giza 120, a six row barley, is an Egyptian cultivar.

Swan oats is the most widely grown oat cultivar in Western Australia and South Australia.

This trial was sown on 9/12/75 under excellent seeding conditions. 215 kg/ha of 20% $P_2O_5$ was placed in the row with the seed.

| Variety | Yield/ha (kg) |
|---|---|
| 2269 | 3 152.7 |
| Athenaeas (6 row barley) | 2 988.8 |
| Beecher | 2 891.6 |
| 2197 | 2 888.9 |
| 2231 | 2 763.8 |
| Weeah | 2 561.1 |
| Swan Oats | 2 536.1 |
| Clipper | 2 341.6 |
| Ketch | 2 211.1 |

Yields in this trial were very good. The straw strength of Athenaeas and Ketch was not good and some broken straws were evident in these two varieties, nevertheless very little grain was lost at harvest.

2231 made very poor growth and is late in maturity. Swan Oats made slow growth and may have benefited by an earlier sowing date.

ALTERNATIVE CROP TRIAL

The aim of this trial is to evaluate any alternative crops that may be grown by farmers in the region. The grain legumes, peas, lentils, lupins and chick peas can all be used for human consumption and are an excellent source of protein for stock feeds. Oil seed rape has been included because world demand for vegetable oil is very strong.

When analysing the results of this trial, yields by themselves are of little importance. The cash return from one hectare of the crop must be compared with the cash return from one hectare of cereal crop.

This trial was sown on 9/12/75 but was not harvested. The oil seed rape plots were damaged by insects and were badly infested with wild mustard.

The lentils grew quite well but the resulting yield appeared to be low. The field peas grew and set seed very well.

The lack of nodulation of the lupins caused very poor growth. The seed used for the chick peas was not well cleaned and did not flow through the seeder. The resulting establishment was very poor. The remaining plants did not grow well.

WHEAT - PURE SEED PRODUCTION:

These sowings were intended to produce cereal seed. In the case of Halberd, Condor and Gabo this will be for use on the Australian Demonstration Farm in the 1976/77 season.

Seed will be kept from only those other cultivars that show promise in the 1975/76 trials.

## RESULTS 1975/76

SUMMARY:

The results obtained on the Australian Demonstration Farm during the 1975/76 season have been exciting. All medic pastures made excellent growth and the average cereal yield was at least double the district average. This was the first season when all crops and pastures were managed from sowing to harvest by the South Australian Department of Agriculture and Fisheries team. It is reasonable to expect that experience gained in 1975/76 will be used to produce better results in future seasons.

Weed control in cereal crops should be improved by better timing of seeding and spraying operations.

Cereal yields may be improved by the use of better adapted varieties. Details of seasonal conditions, which were gleaned from the local farmers, indicate that harsh ripening conditions are common.

The authors wish to acknowledge the efforts of all members of the team, in making these results possible.

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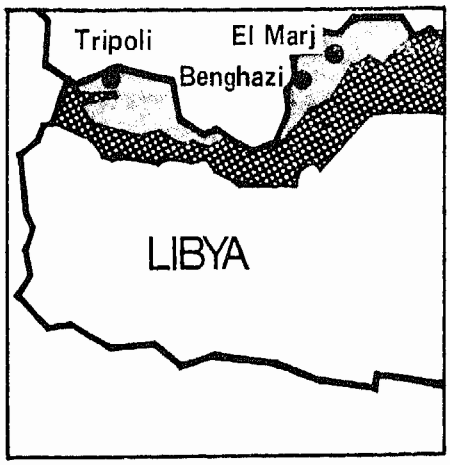
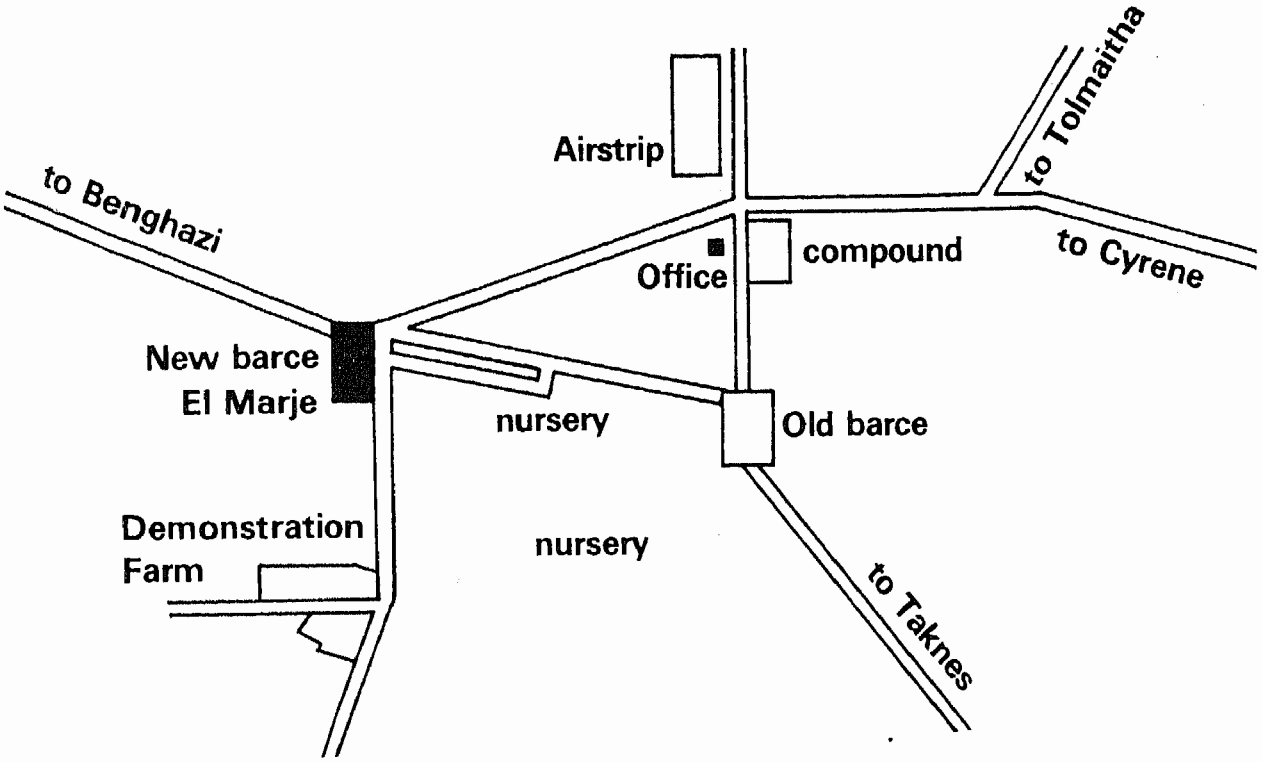
# El Marj, LIBYA

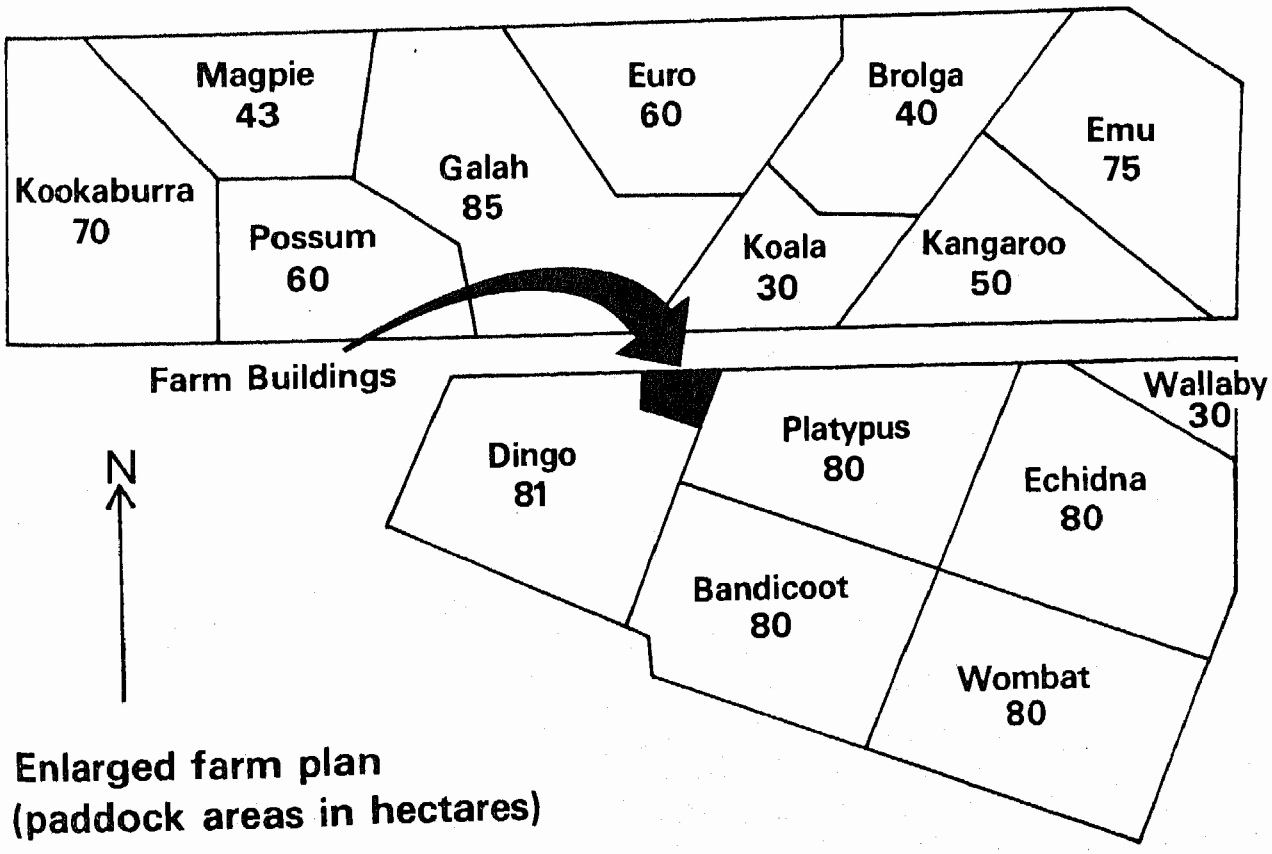



Steppe

Cereal

## Australian Demonstration Farm




Enlarged farm plan
(paddock areas in hectares)