C.S.

MISCELLANEOUS.

No. 44/32.

193.

C.S.O.

SUBJECT.

1932.

8th February.

INTRODUCTION OF ALGERIAN OATS INTO FALKLAND ISLANDS.

Previous Paper.

MINUTES.

1. Despatch to Secretary of State No. 25 of 8:2:32.

Vet. Offrs.

To Col.

J.L. 10.2.32.

9.2.32.

L.f. 9.7.32.

9.2.32.

Subsequent Paper.

Despatch of 19th April, 1932. No. 56 2 -3

Y.P.

Submitted with a draft letter to the Minister of Agriculture, New South Wales.

30. 5. 32.

Hon. C.S.

Draft of letter approved

J.P.C. 31. 5. 32

Letter to Min. of Agriculture. New South Wales. 4:6:32. 4.

6.f. 4. 10. 32.

4. 6. 32.

6.f. 12. 12. 32.

10 10. 32

C.S.O. No. 44/32

Inside Minute Paper. *Sheet No. 1*

5-15 Letter from Dept. of Agriculture. New South Wales. 29/8/32.

G.L.

Submitted. Re sample of seed does not appear yet to have been received. On receipt I will acknowledge and 15 and enclosures will thanks etc. etc.

2. In the meantime I will pass this paper to the Vet. Off. to see and consider.

Hon C.S.

Noted & Agreed 15. 11. 32.

J.G. 15.11.32

Vet. Officer.

According please.

15.11.32.

Hon Sec. Secy.

Seen Thank you.

Jh.
16. 11. 32.

bf 9/12/32.

Letter from Dept of agriculture 1/9/32 a.d.f. 16/11/32

16-17

A.C.S.

The seed has not yet been received.

a.d.f.
13/12/32.

b.f. 3, 1, 33.

pmf 13, 12, 32

Letter to Under Secretary Department of Agriculture, 9/1/33. 18.

J.L. The seed has now been received. Vet. Officer should submit proposals as to the trial to be

C.S.O. No. 44/32.

Inside Minute Paper. *Sheet No. 2*

Made.

2. Letter to the N.S. Wales Department of Agriculture submitted for H.E.'s approval before sending.

9.1.33.

Hon C.S.

Approved

9-1-33

Secretariat Officers.

According, please.

10.1.33.

Hon Col. Secy.

In order to give the samples a fair test I am of the opinion that the seed should not be planted before the beginning of Feb-ober.

I would suggest that a small area be mapped out West of Sullivan House between the Rock Camp Road and the beach and the seed planted in two lots.

One lot to have the ground turned over and a seed bed made, the other lot to be broadcast.

J. Martin.
V.O. 16. 1. 33.

Y. L.

Submitted.

16. 1. 33.

Hon C. S.

What I would like done in the matter is to send a parcel of the seed to Pole-Evans for the purpose of experiment on his good land, and the other parcel as Martin suggests, broad-casted on poor soil, & let the sheep run over it a few times to stamp it in after rain.

16-1-33

C.S.O. No. 44/32

Inside Minute Paper.

Sheet No. 3

Vet Offr.

Please see about arranging with Mr. P.G. Evans regarding when he is next in Hong at the time of the Centenary celebrations.

17. 1. 33.

Hon. Col. Secy.

Noted. Thank You

17. 1. 33.

6/f. 7. 2. 33.

/£ 19. 1. 33

Vet. Off.

You have now seen

Mr Pole-Evans, please?

24. 2. 33.

Lieut.-Col. Grey.

I discussed the matter with Mr Evans. He suggested that I should retain his sample if need until he returned from leave.

J. Thornton.
V.O.
1. 3. 33.

b.f.
3. 10. 33.

2. 3. 33.

Inspector of Stock.

Will you please give this matter your attention in due course.

C. I. F.
for C.S.
2/10/33

C.S.O. No. 44/32

Inside Minute Paper. *Sheet No. 4*

Hon. Col. Secty.

I have today handed over to Mr. Evans approx. ½ lb. Algerian Oats for experimental purposes.

W. H. Clement.
31/10/33.

C. 1. 28/2/33.
C. 2. 28/2/33.

C. 1. 30/6/34.
C. 2. 28/2/34.

19. Letter to Mr. R. Cole Evans. of 30/6/34.

(30) Letter from Mr. R. Cole-Evans 29/7/34

P. A.
WCH
13. 8. 34.

44/32

GOVERNMENT HOUSE,

FALKLAND ISLANDS.

STANLEY.

No. 25.

8th February, 1932.

Sir,

I have the honour to state that I have had under consideration the possibility of introducing into this Colony Algerian oats, which I understand can be scattered broadcast over soil of the poorest description with profitable results.

2. I should be grateful for expert advice in regard to this proposal and also, if it is thought to be worth practical experiment, in regard to the manner and cost of obtaining a suitable supply of seed.

I have the honour to be,

Sir,

Your most obedient
humble servant

JAMES O'GRADY.

THE RIGHT HONOURABLE
SIR PHILIP CUNLIFFE-LISTER,
G.B.E., P.C., M.C., M.P.,
SECRETARY OF STATE FOR THE COLONIES.

FALKLAND ISLANDS

NO. 56

DOWNING STREET,

19 April, 1932.

Sir,

Red 1.

I have the honour to acknowledge receipt of your despatch No.25 of the 8th February, and to transmit to you, for your information, a copy of a letter from the Director of the Royal Botanic Gardens submitting his observations regarding the proposed introduction of the Algerian Oat into the Colony.

I have the honour to be,

Sir,

Your most obedient

humble servant,

(Sgd.) P. CUNLIFFE-LISTER.

GOVERNOR

SIR JAMES O'GRADY, K.C.M.G.,

etc., etc., etc.,

COPY

(2)

ROYAL BOTANIC GARDENS,

KEW, SURREY.

1st April, 1932.

Sir,

With reference to Colonial Office letter No.96140/32 of March 30th regarding the proposed introduction of the Algerian Oat into the Falkland Islands, I beg to furnish the following information and observations.

The Algerian Oat has been grown in Australia for a number of years and was introduced from there into South Africa shortly after the end of the Boer War. In the latter country it was held in high esteem as a variety suitable for oat-hay, on account of its resistance to rust.

Early trials with this variety in Australia showed that in comparison with others it was a heavy cropper on certain classes of soil. It is one of the varieties which have been grown at the Welsh Plant Breeding Station, but under Welsh conditions it has not shown any promise.

Whether the original Algerian Oat of Australia is still under cultivation in that country is not known. Several new varieties have been bred from this stock, which from their resemblance to the original Algerian Oat are called by this name. In variety trials carried out in New South Wales and reported in the N.S.W. Agricultural Gazette in 1928, it is stated that the Algerian Oat of to-day, which is

adopted

The Under Secretary of State

Colonial Office,

LONDON, S.W.1.

adopted as the standard variety in these experiments, is really a hybrid between Algerian and Red Rust-proof, though it is indistinguishable from the genuine Algerian in appearance. This hybrid is claimed to be the best late variety for hay as well as the best late grain variety. In experiments carried out in Victoria the Algerian Oat is still among those which have yielded best, but whether it is the original oat known by this name or a hybrid is not known.

It should not be a difficult matter to procure seed of what are now known as Algerian oats from the Agricultural Departments of New South Wales and of Victoria. Whether it will succeed in the Falkland Islands or not is a matter for trial. Oats when grown under new conditions will often give unexpected results and there is not means of determining beforehand how they will succeed.

I am, etc.,

(Sgd.) Arthur W. Hill.

DIRECTOR.

44/32

4th June 32.

Sir,

I am directed by the Governor to inform you that His Excellency has in mind a proposal to attempt the introduction into the Falkland Islands of the Algerian Oat and has been advised to seek your help in this connection.

2. I am to say that His Excellency understands that the Algerian Oat can ~~by~~ be scattered broadcast over soil of the poorest description with profitable results.

3. I am to add that your opinion in the matter will be highly valued and, if the proposal is considered to be worth a practical experiment, your advice as to the manner and cost of obtaining a suitable supply of seed will be gratefully received.

I am,

Sir,

Your obedient servant,

Colonial Secretary.

The Minister of Agriculture,
Sydney,
New South Wales.
Commonwealth of Australia.

U1/32 17

ST 8123

NEW SOUTH WALES.

DEPARTMENT OF AGRICULTURE,

BOX 36A, G.P.O., SYDNEY,

C.S.

September 1st, 1932.

IN YOUR REPLY, PLEASE GIVE THIS NUMBER.

I.32-5554.

COLONIAL SECRETARY'S OFFICE 8-DEC.1932 FALKLAND ISLANDS

Dear Sir,

I desire to advise you that, as promised in my letter of the 29th ultimo, 2 lb. of Algerian seed oats were posted yesterday, for trial purposes. The original "Freedom from Disease" certificate is attached to the parcel, while a copy of same is forwarded herewith.

Yours faithfully,
G. D. Ross,
Under Secretary,
per.....

The Colonial Secretary,
Colonial Secretary's Office,
Stanley.
FAULKLAND ISLANDS.

(16

DUPLICATE

NEW SOUTH WALES.

Export and Import Branch, No: 21150
Department of Agriculture,
Day-street,
Sydney, 21. 8 1932.

THIS IS TO CERTIFY that the undermentioned Seed Oats have been examined and found to be, apparently, free from plant diseases or pests.

St 791

Marks.	Description.	No. of Packages.
Addressed	Seed Oats	Two lbs (One pcl)

Shipped by Dept of Agriculture Wales. to Col Secretary
of Stanley per
Falkland Islands

[signature]
Inspector, Plants Diseases Act, 1924.
per [signature]

A. J. KENT, I.S.O., Govt. Printer.

ST 8123

NEW SOUTH WALES.

DEPARTMENT OF AGRICULTURE,

BOX 36A, G.P.O., SYDNEY,

C.S.

August 29th 19 32

IN YOUR REPLY, PLEASE GIVE THIS NUMBER.

I.32-5554.

Your 44/32

Dear Sir,

Red 4

In response to your request of the 4th June last, addressed to the Minister for Agriculture, I have pleasure in forwarding herewith a leaflet on the growing of oats, and also a cutting from the "Agricultural Gazette" with regard to Algerian oats. I might state that this variety responds well to good soils and adequate cultivation, but it will not give profitable yields on very poor soils in this State.

If desired, I can arrange to supply seed of the variety mentioned, but it would not be available in any quantity until March next. In the meantime I am arranging for a couple of pounds of seed to be forwarded to you, with which it may be possible to carry out an early trial.

Yours faithfully,
G. D. Ross,
Under Secretary,

per.....

The Colonial Secretary,
Colonial Secretary's Office,
Stanley.
FALKLAND ISLANDS.

NEW SOUTH WALES

DEPARTMENT OF AGRICULTURE

GROWING OF OATS,

With Specifications for a Galvanized-iron Silo for Storage.

Oats are not cultivated to the same extent in New South Wales as in New Zealand and Tasmania, for the simple reason that the climatic conditions and rainfall of this State are much more adapted to the growing of wheat. The conditions that favour the successful cultivation of oats cannot be considered altogether satisfactory from a wheat-growing point of view. Speaking generally, the best oat-producing countries have a cold climate associated with a high average rainfall, whereas with wheat the best results are usually obtained in comparatively warm countries, with only a moderate or even a low average rainfall. United States of America is the greatest oat-producing country of the world, the proportion of oats to wheat grown being as three to four—in other words, 3 acres of oats are sown to every 4 acres of wheat.

Apart from the climatic conditions and rainfall required for the successful cultivation of this crop, the demand for the grain for making oaten meal is never very strong, as this commodity is only used to a limited extent, whereas from wheat the principal food of the human race is manufactured. Oats, therefore, are never likely to be grown on anything like so extensive a scale as wheat in this State.

In recent years, however, the advisability of growing oats in rotation with wheat has been clearly demonstrated. The crop is not subject to attack by ilag smut, foot rot, or take-all, and if a year of bare fallow follows the oats before the wheat crop is sown, the fungous spores are given an opportunity to germinate, and to perish in the absence of a host. Moreover, the newer varieties of oats produced by the Department can be grown successfully throughout the wheat areas—even in the drier districts the earlier-maturing sorts will succeed. The crop can be used for many purposes, though it would soon cease to be profitable if large areas were sown for the sole purpose of producing oats for market.

The grain is one of the best concentrated feeds for stock, and can be stored as a reserve against drought. Oats are most valuable as a hay or green fodder crop and can be conserved in the form of silage. They are especially valuable as feed for horses on the wheat farm, because, as already mentioned, the crop is not liable to certain fungous diseases that attack wheat, and there is no danger, therefore, of the spores being distributed on the fallows from season to season, as is the case with wheaten hay.

An early-maturing oat, such as Mulga, provides an excellent winter fodder crop on which to graze sheep, and is of special value for lambing ewes and for fattening lambs for market.

There is no world's market for oat grain as there is for wheat, and thus the oat crop is for local consumption. Oats yield 50 per cent. more grain than wheat on an average, and the crop can be harvested by sheep or

† 71223

machinery just as it pays the farmer best. It can be fed off continuously at intervals until the soil is ploughed, or it can be conserved as silage, hay, grain and straw.

The coastal dairy-farmer keeps up the milk flow by growing oats to feed in the winter and spring months; the wheat grower finds oats enable him to increase his flock of sheep and make them more or less a permanency; while the pastoralist will find a paddock of early-maturing oats a great stand-by to supplement the natural pasture.

Some idea of the area devoted to oats each year may be gained from the following figures, taken from the Government Statistician's reports:—

AREA under Oats in New South Wales.

Year.	Grain.		Hay.		Green Fodder.	Total Area.
	Area.	Production.	Area.	Production.		
	acres.	bushels.	acres.	tons.	acres.	acres.
1924	86,693	1,570,300	242,416	299,571	30,901	360,010
1925	123,517	2,511,400	275,334	400,431	29,498	428,349
1926	101,097	1,615,650	210,271	244,520	44,517	355,885
1927	105,115	1,898,750	218,351	293,659	37,173	360,639
1928	114,988	1,654,560	200,872	212,535	55,259	371,119
1929	126,743	2,183,880	214,137	242,740	62,687	403,567
1930	181,354	2,528,610	226,025	223,847	88,973	496,352
*1931	176,659	3,241,980	278,865	370,158	not available.	not available.

* Figures for 1931 are approximations.

Climate and Districts.

Oats may be grown with a fair amount of success under a diversity of climatic conditions, but they thrive best in a cold climate, associated with a good rainfall that is evenly distributed throughout the crop-growing season. As previously indicated, the climate of this State, taken on the whole, is much more adapted to wheat-growing, but in some of the colder districts oats may be grown almost to perfection. In a general way, it can be said that a good potato district will, as a rule, prove suitable for growing oats, as these crops require similar conditions of climate. As an example of this, we may take portions of the Northern Tablelands of the State. Some of our very best potato districts are situated there, and at the same time some of our best oat districts. Glen Innes, in particular, is a district where the climatic conditions are favourable to the production of potatoes and oats of the highest quality, and there are other portions of the State that are similar in their suitability for the two crops.

On the Central Tablelands, from Blayney to Orange, is the pick of the oat country, although some exceptionally good returns have been obtained in the Bathurst district. On the Southern line, the best oat districts are situated in the vicinity of Goulburn, Taralga, and Crookwell; and some excellent crops have been grown in the country between Junee and Albury. The districts mentioned can be classed as about the best for oat-growing, but good crops can be grown in any wheat district by choosing varieties adapted to the local climatic conditions. So that to-day the position is far different from what it was when Algerian was the only variety grown in the warmer districts.

In districts with a lower average rainfall than 25 inches the short, white oat favoured for oatmeal cannot be grown to perfection, but in such districts oats may be largely grown if proper early-maturing varieties are employed.

Soils.

Oats may be grown successfully on soils entirely unsuited to wheat, and also on low-lying situations where it would be extremely inadvisable to sow wheat. They may be sown on land that is too strong and rich for wheat, and also upon heavy, wet soils, that have a natural tendency to be cold and sour. The red basaltic soils met with in the best potato-growing districts produce excellent crops of oats, but the crop will do well on practically any soil, provided it is worked into good tilth previous to planting and the rainfall is not too low. Oats are often grown on new land which has not been sweetened after clearing of timber. Although yielding a better crop on undrained soil than wheat and barley, oats respond well to drainage and good cultivation.

The Preparation of the Land.

Land intended for oats should be prepared in a similar manner to that intended for wheat, except that in the more favoured oat districts slightly deeper ploughing may prove advantageous. In the drier districts fallowing is essential to obtain the best results, and in regard to the time the operation should be commenced, the same general remarks apply as to wheat, and the implements to use for working the fallow are also the same. Clean cultivation paddocks are very necessary to the growing of prime oaten hay, as nothing detracts so much from its general appearance when placed on the market as the presence of weeds, thistles, burrs, &c. When oats are grown for green feed on the coast, the land should always be prepared early, say, about two months prior to sowing, provided, of course, the weather conditions will permit. It is wonderful how great is the effect on the resulting crop of a short fallow. A good, moist seed-bed is a great aid to success for the reception of the seed, and every farmer who wishes to obtain the best results with this crop must do all in his power to bring this about by careful methods of cultivation before planting.

In wheat districts where the rainfall is fairly good, the practice now being largely adopted by farmers is to sow portion of the wheat stubble land with oats for hay. This enables them to make more use of their land than would be the case if it were all fallowed; furthermore, there is a risk of oats lodging badly if the land is fallowed in these districts.

Varieties Recommended.

The varieties recommended by the Department for the various portions of the State are as follows:—

North Coast.—Algerian (for grazing), Sunrise, Mulga, Buddah.

South Coast.—Algerian, Guyra, Sunrise, Mulga, Buddah.

Central Tableland.—Algerian, Guyra, Belar, Mulga.

Northern Tableland.—White Tartarian, Algerian, Guyra.

Southern Tableland.—Algerian, Guyra, Sunrise, Mulga, Buddah.

Monaro.—White Tartarian, Algerian, Mulga.

South-Western Slopes and Riverina.—Algerian, Guyra, Belar, Mulga.

Central-western Slopes.—Algerian, Guyra, Belar, Mulga, Buddah.

North-western Slopes.—Algerian, Guyra, Belar, Sunrise, Mulga.

Under Irrigation.—Algerian, Guyra, Sunrise, Mulga.

Western Plains.—Sunrise, Gidgee, Mulga, Buddah.

Oats may be grouped according to their stooling or tillering capacity, and with this their period of maturity coincides. Algerian is the best stooler and one of the latest of the varieties, and Buddah is the earliest to ripen and produces the smallest number of stalks.

Although Algerian is a good drought-resister, a plump sample of grain cannot be expected under dry conditions. On the other hand, Guyra will yield a good plump grain, though the bulk of hay produced may not be quite equal to that of Algerian. Should a farmer's land grow too much straw and the crops go down easily, they should be fed back, or a variety like Guyra should be grown, which will safely stand until stripped or cut. Should Algerian grow rather too short to make good sheaves in a dry district, Mulga is recommended in its stead. Mulga, Guyra, and Algerian are excellent varieties for feeding off with stock. The firstnamed is a good general purpose oat for late sowing, or it may be sown early, when it produces early fodder for grazing and can be fed off till July or early August and then allowed to mature a crop for grain or hay. Sunrise has proved the most suitable variety for the production of heavy yields of green fodder in coastal districts.

Descriptions of Varieties.

Algerian.—This is more widely grown than any other variety, and is a most useful oat for green feed, hay, silage, and grain. It is rather drought-resistant. Although a profuse stooler, spreading over the ground for a considerable time after planting, it has fairly fine stems, purplish straw, and should be sown early to get the best results.

Belar is a selection from Sunrise; an early to midseason variety with tall, rather strong but not coarse straw, which shows a purple tint when ripe. The grain is brown with rather coarse awns, but it threshes readily and grows a plump sample: it is not very liable to shed. Belar is a good general-purpose oat.

Buddah is a selection from Sunrise, and it is more rust-resistant and comes into head several days earlier. Though remarkably early it grows to a good length; the straw is similar to that of Mulga and the grain is creamy white.

Gidgee is a crossbred resulting from the mating of two strains of White Ligowo x Algerian. It seems more adapted to inland than to coastal conditions, and should be sown late or else fed off if sown at all early. It is of the same season as Sunrise, than which it stools rather less, and has stout, medium-coarse straw, which is purple and in some seasons inclined to be brittle. The awned grain is remarkably plump, brown, and of medium length, and suitable for feeding to sheep in drought, as it is easily picked up.

Guyra.—This variety matures in about the same time as Algerian, with straw about equal in height to that variety, but rather coarser, though not as coarse as the late ripening white oats. It may be called a moderate stooler, has a compact head, and dark-brown grain with a fairly strong awn, like its parent (White Ligowo). The grain is plump, and the husk fairly thin. Guyra will be found suitable to typical oat districts.

Mulga is a selection from Sunrise oats, made at Cowra in 1915. The young growth is erect and sparse, and the leaves are of medium breadth. It heads a few days before Sunrise; the straw is tall with a purple tint. Mulga stools rather less than Sunrise which gives a greater bulk of fodder. Mulga is a heavy grain yielder, the seed being creamy to pale brown, plump, with thin husk and somewhat stout awn.

Sunrise.—A sport discovered in Algerian oats. It is very early, sparse stooling, with tall, medium coarse straw, which shows only a trace of purple colour. The grain is greyish-white, of large size, has a thin husk, and is borne in a head resembling Algerian, but larger. The awn is rather stout, but comes off in threshing. Sunrise stands feeding-off well, and requires to be sown more thickly than Algerian, being a shy stooler.

White Tartarian.—This is a side-bearing variety worthy of special mention. It is supposed to be very bitter, and not so palatable as other varieties, particularly if cut on the green side. It is late in maturing, has a good length of straw, and a long, thin, white grain. This variety is particularly suited for late planting on the tablelands. Excellent crops of hay are obtained on the Northern Tablelands from sowings made as late as the end of August.

When to Sow.

This will depend upon a number of factors, the chief being the object of the grower—whether for green feed, hay, or grain—the district, and the season of the variety it is intended to sow. If Algerian is sown on the coast for green fodder, it should be put in in February, as it covers the ground, growing slowly for some time before it is fit for feeding off or cutting. Earlier varieties, however, can be sown with good results in March or April, and be ready for the cows in July and August. On the tablelands and in some of the large wheat districts oats are sometimes sown after wheat seeding is finished. This is sound practice with an early maturing variety of oats, but if Algerian be employed the crop must be sown before the commencement of wheat sowing. Like wheat, the longer the growing season of the variety, the earlier it should be sown, and *vice versa.*

In the colder parts of the Northern Tablelands, particularly in Glen Innes and higher country, it has been found in recent years that, owing largely to the depredations of rabbits, it is advantageous to sow oats about August or early September. Sown then the crop comes along at a time when grass is becoming plentiful, and when it is not therefore so liable to the particular attentions of the rabbits. On account of being able to sow oats thus late, the farmer finds it a very suitable crop to follow maize, ample time being available to prepare the land after the maize is off. For such sowings the variety must be selected with care. The most suitable is White Tartarian. Algerian and similar sorts are liable to run to head too quickly.

In some districts the farmers sow any oats they intend growing as early as in the first and second week in March before the wheat planting commences. In individual localities the circumstances will be altered, but for the majority of districts in this State Algerian oats should be sown between the last week in March and the last week in April, for both hay and grain.

If sown before this, and the weather conditions are very favourable to growth, they may grow too rank, and are apt to lodge unless the growth is checked by feeding-off. Where sheep are of more importance to the grower than his grain crop, February sowing of Algerian oats for feeding off may be quite justified.

From a hay point of view, very early sowing has a tendency to induce a heavy growth of flag, which in wet seasons may turn brown and much detract from the quality of the resultant crop.

Selection of Seed.

As with all crops, the first of the essential points in the successful growing of oats is the selection of a good sample of seed. The grain chosen should be plump, and well cleaned and threshed so that it will run freely through the drill without clogging. The threshing is even more important

than grading, for a dirty, half-threshed sample causes patchy and uneven sowing. Oats may be graded with a blower or winnower to separate the light and empty kernels. The latter can be used for feeding stock, and the heavy grains for seed, so as to ensure a uniform, vigorous stand. Where an area not very extensive is to be sown, a good way of preparing a sample of seed that is not too well threshed, *i.e.*, contains too much tail or oats not separated, is as follows:—Put 1 bushel of seed in a bag at a time, choosing hot weather or a warm day; tie the mouth and beat the bag a few seconds with a flail or heavy stick. When sufficient seed has been so treated, put it through a blower or winnower, and a good sample for sowing will result.

Cultivated oats are supposed by some to have originated from the wild oat (*Avena fatua*), and there are farmers who believe that they throw back to the original wild strain; this idea has arisen from the appearance of dark-coloured grains in a sample having a hairy end or point. These are retrogressive mutations which occur in cultivated oats, but are not derived from the wild oat, as breeding tests have proved. There are scores of instances where wheat paddocks are overrun with this pest, though oats have never at any time been sown in them. Farmers need have no fear that by growing oats in their wheat paddocks they are likely to introduce black oats on to their farms, unless, of course, the seed contains seed of that pest. As a matter of fact, the cultivated oat is botanically quite a different plant from the wild or black oat.

Experiments have shown that change of seed is more beneficial with oats than in the case of wheat. It has also been noticed that seed taken from a cool district to a hot one has a tendency to become paler in the colour of the husk; brown oats raised in New England have a darker tint than the same variety raised in the western or Riverina districts. The thickness of the husk varies too with the climate.

In growing oats in the warmer districts it often pays to get the seed from cooler country, the resultant growth being taller and more vigorous. For instance, a Trundle grower should, if possible, get seed from Bathurst, Orange, or even Cowra. There is an element of risk in changing seed, however, and unless a grower is sure of his source of supply it is safer to practise plant selection and to raise one's own seed on the farm. An alternative course would be to obtain small supplies of pure seed at regular intervals from one of the Government farms, and to keep the increase as seed for a larger area the following year.

Treatment of the Seed for Smut.

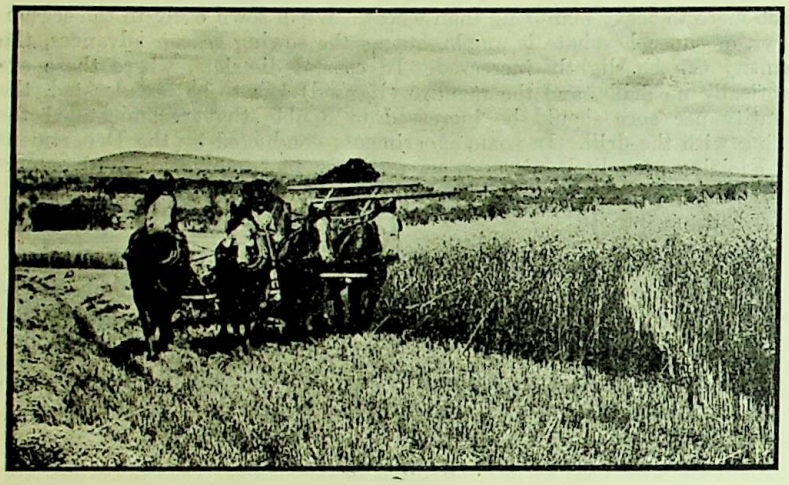
If the crop is sown for green feed, treatment of the seed is unnecessary; but if it be intended for hay or grain, the seed should always be treated or there will be a great risk of smut appearing in the crop. Some farmers will argue that a little smut in the hay is of no consequence, but smutty heads always detract from the appearance, reduce the value from a feeding point of view, and if the infection is serious, lower the prices obtained on the market. Cases have been reported where stock have actually refused to eat hay that has been badly smutted.

The same remarks apply to the grain. Large quantities of oats are purchased to feed racehorses and animals doing fast work, and trainers and agents authorised to buy will not touch grain that contains smut in any quantity. Methods of prevention must be employed if a clean crop is to be harvested and top market prices obtained.

Seed treatment with copper carbonate is not completely effective in the control of oat smut, apparently because some of the spores are protected by the enclosing husks of the oat grain. The formalin treatment is more effective and should be used whenever seed is obtained from a somewhat smutty crop. This treatment is described in Plant Diseases Leaflet No. 50, "Oat Smuts."

Quantity of Seed per Acre.

This depends upon a number of circumstances, the chief among which are the method of sowing (whether broadcast or with the drill), the use to which the crop is to be put (whether for green feed, hay, or grain), the time of sowing, the district, and the habit of the variety (whether it is a scanty or profuse stooler).



A Good Crop of Oats, Cowra Experiment Farm.

On the coast, where oats are largely grown for green feed, and where the sowing is usually done broadcast, from 2 to 2½ bushels per acre should be sown. If sown too thickly, and heavy rain or showery, windy weather is experienced, the crop is liable to lodge, and as a result it may be partially or totally spoilt before it can be cut. A few farmers on the South Coast have seed drills, and where this method of sowing is adopted the amount of seed can be reduced to half that recommended for broadcasting. No matter what the crop may be intended for, drilling will always give the best results.

For hay on the tablelands, 1½ to 2 bushels per acre is ample when sowing is done with the drill. Like wheat, oats may be sown a little earlier for hay than for grain, but the season of the variety must not be overlooked. In the drier wheat districts, 1 to 1¼ bushels per acre is sufficient for a hay crop, provided the variety being sown is not too coarse in the stem. Very coarse-stemmed varieties should always be sown thicker than varieties with comparatively fine stems such as Algerian, as the thicker the sowing the finer the stems will invariably be in the resultant hay. Where the rainfall is sufficient, thick seeding is preferable, especially for hay, as the finer stems make better quality hay and a better sample of chaff. This is a very important point, as there is always considerable waste in feeding hay with

coarse stems or chaff that has been cut from coarse-stemmed varieties. Under certain climatic conditions, and with certain varieties, 3 bushels of seed per acre might not be an excessively heavy seeding for hay.

Oats for grain on the tablelands should be sown at the rate of 1 to 1½ bushels per acre, according to the time of sowing and the variety. In the drier districts, a bushel to the acre is ample for grain; from 30 to 60 lb. is about the best range for these districts.

Manuring.

Oats, like wheat, require manuring under most conditions, and respond bountifully to the application of superphosphate. On most soils, from 40 to 56 lb. per acre will be found sufficient, but on poorer lands the quantity can be increased up to ¾ cwt. with beneficial results. They appear to respond much more to heavy manuring than wheat. When sown early in the season, ½ cwt. of superphosphate is ample, but as the sowing season advances, the quantity can be slightly increased. In coastal districts, where there are practically no drills, and the manure (if used) has to be broadcasted, the quantity per acre should be increased to double that recommended for sowing with the drill. In some experiments conducted by the Department the addition of a little nitrogenous fertiliser in combination with superphosphate has resulted in slightly higher yields.

The Sowing Depth.

Oats take a little more moisture to germinate than wheat, and while 2 inches is a good depth in a moist seed-bed, the seed should be put down 3 inches in a dry seed-bed, provided the soil is moist at that depth. If the soil is dry to a depth of 3 or 4 inches it would be wiser to plant 2 inches deep and wait for rain. Although wild oats will come up from a depth of 4 to 5 inches, the plants are not so strong as if they had germinated nearer the surface.

Feeding-off.

Feeding-off oat crops is always a safe practice; it reduces the risk of lodging, lessens the damage from rust should the disease appear, and if done judiciously, will always pay the farmer who has stock. Sunrise and Mulga give a good plump sample of grain after feeding off in an average season. In most years with early sowing, oats can be fed off three or four times till August; the crop may then be allowed to mature for grain or else eaten off with sheep till the ground is ploughed.

While a variety of feed, such as natural pasture, lucerne, and field peas, is always desirable, we cannot deny that oats are the most useful fodder for the man with a relatively small property. If sowing is started in March and continued till the end of April the sheep would be supplied with a green picking in May, provided an early variety, such as Sunrise or Mulga, is sown and the soil had sufficient moisture at the start.

The year's feed bill might be worked out as follows:—

December to April.—Grazing stubbles, supplemented with grain if necessary.

May to August.—The grazing of the green crop, subdivision fences being necessary for this to be done economically.

September, October, and November.—The paddocks shut up for hay and grain crops, the sheep having access to silage and grain to top off the lambs.

Grazing should be the main feature, crops being continuously fed off at intervals till the soil is ploughed. In this way the stock-carrying capacity of the farm would be very greatly increased. With some farmers who make sheep their main source of income, the rotation wheat, oats, oats, fallow is gaining favour; half the area is then under oats, quarter fallow and a quarter wheat each year.

Palatability trials with oat varieties seem to indicate that Mulga, Guyra, and Sunrise are most liked by sheep, but Algerian finds less favour. Symptoms of poisoning are reported in good seasons, particularly where sheep are put in to feed off crops, but this also occurs on natural pastures with very succulent herbage and grass. Care must be taken not to put hungry sheep on, and to watch for signs of sickness. At certain stages the growth is more dangerous to stock than others, but with judicious changes of paddock and feed the trouble can be fairly well controlled.

Algerian Oats on Farmers' Experiment Plots, Stewart's River.

Left.—Manured with 1½ cwt. superphosphate per acre. Yield: 11 tons 4 cwt. 1 qr. 6 lb. per acre.

Right.—Unmanured. Yield: 5 tons 10 cwt. 0 qrs. 4 lb. per acre.

Harvesting Methods.

The mode of harvesting will partly depend on the season, but chiefly on the number of sheep kept by the farmer. If the number is negligible the crop will be cut for hay or stripped for grain and sold off the farm. This, of course, means a drain on the fertility of the soil which will have to be faced sooner or later, as wheat-growers have found to their cost. Where sheep are relied upon for about half the income and wheat for the other half, the crop will probably be grazed once and the oats eventually cut for hay and a portion stripped to provide seed.

If the grower is making sheep the main issue, the handling of the crop might well take the following form:—Graze off successive sowings; turn a proportion of the crop into pit silage, and strip a section for grain, leaving an area for hay sufficient to feed the working horses. In this way the crop is sacrificed for the benefit of the stock.

Oats for Hay.

For hay purposes, oats should be left till nearly ripe, and not cut on the green side as in the case of wheat. In fact, some farmers have had disappointments with oaten hay on this account, for when cut green it has a bitter flavour that is disliked by stock and that makes it unsaleable on the market. The best stage to cut oats for hay is when the upper tips of the heads turn white; at this stage the grain is fully formed, but only in the dough stage. The presence of grain in oaten chaff is absolutely essential for the Sydney market, and the chaff should be of a nice purplish-green colour. In selecting varieties for hay, those that ripen from the top should be selected.

There is always a good demand for oaten hay on the Sydney market, and if the sample is bright and clean, and has fine stems, not too long, and of a nice purplish-green colour, good prices are assured. It should be pressed in bales about 1½ cwt. in weight, but certainly not heavier than 2 cwt. The bulk of this commodity is utilised by horse-trainers for rack purposes, and from these men the best prices are obtained. They prefer hay that has been cut with the mower and cocked in the field, as it is usually more evenly made. Algerian is the variety in greatest favour. The hay, if cut with the binder, should have the bands taken off the sheaves, and should be shaken up before being put in the press. On no account should the hay be pressed with the butts showing all the one way at the ends of the bale. The bales should have three wire bands of No. 8 or No. 10 gauge. The hay should not be pressed with a derrick press.

Oaten Chaff.

Prime oaten chaff also sells well on the Sydney market. It should be about ¾ of an inch in length, clean cut, of pleasant odour, free from mustiness, and of a nice, purplish-green colour. Like oaten hay, the bulk is used by horse-trainers or for horses doing fast work. Unlike wheaten chaff, oaten chaff is preferred with a fair quantity of grain. It should be put up in new bags, weighing from 85 to 112 lb. Algerian or a sample showing a purple tinge is preferred to "white oaten" on account of its generally being sweeter.

Harvesting for Grain.

In the cool, moist districts, where the binder is usually used for harvesting, the crop should be cut when the heads are well whitened, of a nice even colour, and the grain firm. It is very necessary to harvest before the chaff opens, as otherwise a considerable quantity will be lost through shedding. The harvester is not at all an ideal machine, but it is perhaps the best where sheep are kept and turned in when the crop is off. It is estimated that no more than 60 bushels per acre of grain can be harvested with the stripper or harvester, whereas by cutting and threshing, up to 80 bushels per acre can be bagged from a heavy crop.

No variety of oats can be relied upon to stand long when the grain is ripe. The crop soon begins to shatter, and bushels or even bags to the acre are lost if stripping is delayed in windy weather. Oats may be stripped a little greener than wheat; the dry grains will take up the moisture of the immature ones. The main stalks should have their grain ripe when the crop is stripped; lower heads may be a trifle green, but there is no need to wait for them to ripen. If it is the intention to strip a considerable area of oats, it is wise to grow an early and a mid-season sort, and to make two or three sowings, so that the losses at harvest time may be minimised.

Diseases of Oats.

The different diseases to which the oat crop is subject are discussed in separate departmental leaflets, available free on application.

STORING OATS ON THE FARM.

Oats are cheap early in the year, but advance considerably in price towards the end of the year. Whether the grower subsequently markets the grain, or uses it for feeding stock at a time when grass is scarce, the cost of storage will be easily recouped. Rats and mice always have to be reckoned with, and the farmer might well ask himself whether it would not be more profitable to make fewer oat stacks, and erect a grain bin or two instead. On a ration of straw and oat grain, both horses and sheep do well, and straw stacks are not so likely to be fouled by vermin as hay stacks. New South Wales does not produce nearly all the oats consumed, and consequently there should be a safe market if the grain can be stored until prices are satisfactory.

Galvanised-iron silos are becoming very popular for the storage of oats, and are giving great satisfaction. These are best erected on a wooden platform or decking, 3 feet off the ground. Sawn timber makes for easy construction, but if it can be had only at great expense there is no reason why round timber should not be used as long as the silo is given a good flat surface on which to stand; this may be provided by roughly adzing the round timber and afterwards laying a bed of pug or clay. It is important to have sufficient support in the centre, because the greatest weight occurs there, and any great settlement will break the soldered floor joints.

Posts make for easy construction and are very necessary supports to large tanks, particularly when they are of 24-gauge corrugated iron. There is a limit to the dimensions of a tank in which 24-gauge iron can be safely used without supports. If fixed to round posts, 24-gauge iron will be quite strong enough for all capacities up to 12 feet in diameter, or, say, 1,500 bushels.

The following table gives the quantities of curved and plain iron required for silos of various dimensions, together with their capacities in bushels:—

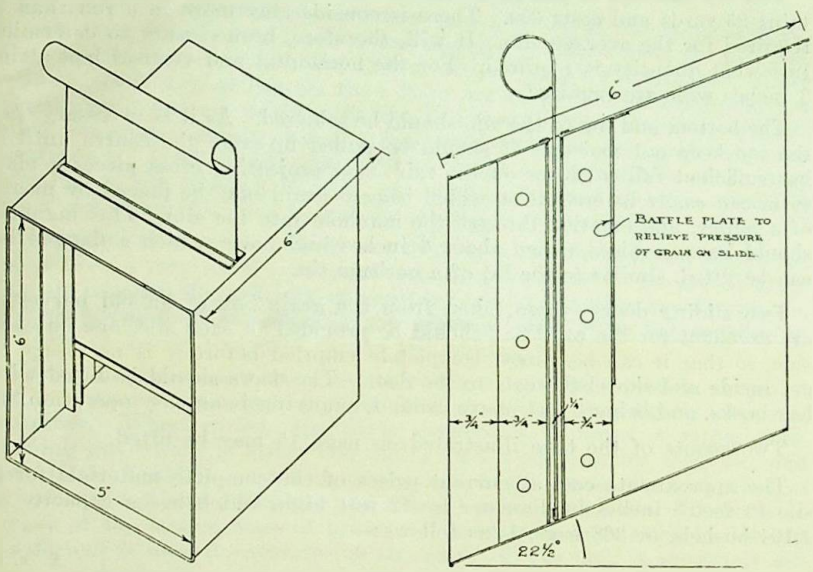
Diameter.	Height.	Bushels.	Materials required.	Sydney Prices.
ft. in.	ft.			£ s. d.
7 0	8	240	16/6, 24-gauge cor. iron, each curved to ¼ circle; three sheets 72″ x 36″ x 24-gauge plain iron (bottom); 3 sheets 72″ x 36″ x 26-gauge plain iron (top).	5 6 0
8 3	8	334	16/7, 24-g. cor. iron, each curved to ¼ circle; 5 sheets 72″ x 36″ x 24-g. plain iron (bottom); 5 sheets 72″ x 36″ x 26-g. plain iron (top).	6 15 4
8 3	10	417	20/7, 24-g. cor. iron, each curved to ¼ circle; 5 sheets 72″ x 36″ x 24-g. plain iron (bottom); 5 sheets 72″ x 36″ x 26-g. plain iron (top).	7 17 6
9 9	8	466	16/8, 24-g. cor. iron, each curved to ¼ circle; 7 sheets 72″ x 36″ x 24-g. plain iron (bottom); 7 sheets 72″ x 36″ x 26-g. plain iron (top).	8 6 8
9 0	10	583	20/8, 24-g. cor. iron, each curved to ¼ circle; 7 sheets 72″ x 36″ x 24-g. plain iron (bottom); 7 sheets 72″ x 36″ x 26-g. plain iron (top).	9 12 0

Diameter.	Height.	Bushels.	Materials required.	Sydney Prices.
ft. in.	ft.			£ s. d.
9 9	12	700	24/8, 24-g. cor. iron, each curved to ¼ circle; 7 sheets 72″ x 36″ x 24-g. plain iron (bottom); 7 sheets 72″ x 36″ x 26-g. plain iron (top).	10 17 4
11 0	10	742	20/9, 24-g. cor. iron, each curved to ¼ circle; 8 sheets 72″ x 36″ x 24-g. plain iron (bottom); 8 sheets 72″ x 36″ x 26-g. plain iron (top).	10 18 0
11 0	12	890	24/9, 24-g. cor. iron, each curved to ¼ circle; 8 sheets 72″ x 36″ x 24-g. plain iron (bottom); 8 sheets 72″ x 36″ x 26-g. plain iron (top).	12 6 8
12 3	10	920	20/10, 24-g. cor. iron, each curved to ¼ circle; 10 sheets 72″ x 36″ x 24-g. plain iron (bottom); 10 sheets 72″ x 36″ x 26-g. plain iron (top).	12 11 8
12 3	12	1,104	24/10, 24-g. cor. iron, each curved to ¼ circle; 10 sheets 72″ x 36″ x 24-g. plain iron (bottom); 10 sheets 72″ x 36″ x 26-g. plain iron (top).	14 3 4
13 6	10	1,118	20/11, 24-g. cor. iron, each curved to ¼ circle; 13 sheets 72″ x 36″ x 24-g. plain iron (bottom); 13 sheets 72″ x 36″ x 26-g. plain iron (top).	14 13 0
13 6	12	1,342	24/11, 24-g. cor. iron, each curved to ¼ circle; 13 sheets 72″ x 36″ x 24-g. plain iron (bottom); 13 sheets 72″ x 36″ x 26-g. plain iron (top).	16 7 4
14 9	12	1,602	24/12, 24-g. cor. iron, each curved to ¼ circle; 15 sheets 72″ x 36″ x 24-g. plain iron (bottom); 15 sheets 72″ x 36″ x 26-g. plain iron (top).	17 18 0

NOTE.—Small quantities of No. 0 tinman's rivets and soft solder (equal parts lead and tin) are required for the bottom and top of the silo; also 1¼-inch galvanised screws and steel washers for fixing curved iron to posts. In addition, a lid to manhole and two grain spouts are required.

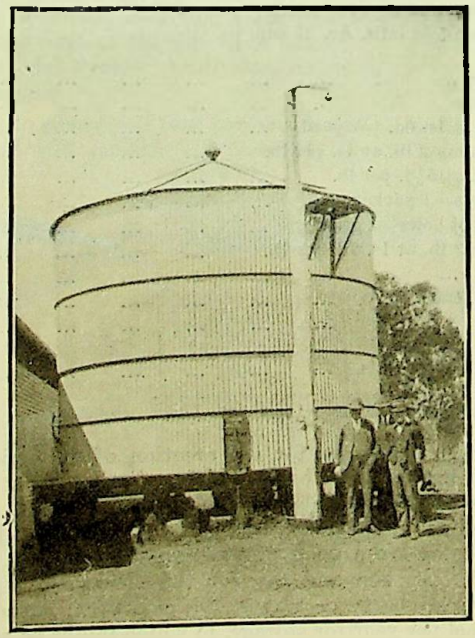
This table of capacities is for silos of diameters that call for four sheets of curved iron to each ring, so that in ordering the material for them it is only necessary to order the required number of sheets of corrugated iron curved to a quarter circle. Thus, for a silo which is 12 feet 3 inches in diameter and 12 feet high, there being four sheets to a ring and each ring measuring approximately 2 feet, the number of curved sheets required will be twenty-four. The order will then be for twenty-four sheets of 24-gauge corrugated galvanised iron, each 10 feet long, and curved to a quarter circle. Most country plumbers who make tanks have a machine for curving iron, and the charge made for curving will be something like 9d. or 1s. per sheet. For the bottom, 24-gauge plain iron is needed, and for the top, 26-gauge.

The making of corrugated galvanised-iron water tanks is described in detail in a separate pamphlet obtainable free on application, and the methods there described for putting the sheets of iron together are applicable to the erection of a grain silo. The curved iron is fixed to the wood posts with 1¾-inch galvanised screws in the same manner as roofing iron, except that steel washers may be used in lieu of the lead washers ordinarily used for roof work. It is not necessary to rivet and solder the joints and laps in the curved iron as is done for water tanks. A good grain storage silo may be made by inserting felt packing in the laps and screwing up tight with ½-inch galvanised roofing bolts.



A Useful Type of Spout for Grain Silos.

On the left.—An Isometric Sketch. On the right.—A section.



A Suitable Type of Oat Grain Silo.

It has a capacity of 1,100 bags of oats, and cost £100 to erect.

Felt for the laps is put up in rolls 2 feet 6 inches wide. Each roll contains 25 yards and costs 35s. There is considerably more in a roll than is required for the average silo. It will, therefore, be necessary to determine just what quantity is required. For the horizontal and vertical laps strips 3 inches wide are required.

The bottom and top of the silo should be soldered. As it is necessary that the top keep out moisture it should be pulled up from the centre until it has sufficient fall to throw off the rain. By projecting cross pieces a platform can easily be erected on which bagged grain may be placed by means of a pulley, and emptied through the manhole into the silo. This manhole should have a raised flange about 3 inches high, over which a flanged lid can be fitted, similar to the lid of a garbage tin.

Two sliding doors—those taken from the grain box of an old harvester are excellent for the purpose—should be provided in each silo, one on each side, so that it can be almost completely emptied before it is necessary to get inside and shovel the oats to the door. The doors should be fitted with bag hooks, and being 3 feet above ground, emptying is an easy operation.

Two spouts of the type illustrated on page 15 may be fitted.

The approximate cost at current prices of the complete materials for a silo 12 feet 3 inches in diameter by 12 feet high, which has a capacity of 1,104 bushels, or 368 bags, is as follows:—

		£	s.	d.
Round posts (6-inch diameter at small end)—six 19 feet long and two 23 feet long, at 9d. per foot		6	0	0
Stumps (10-inch diameter)—eleven, 9 feet long, at 9d. per foot		2	1	3
7-in. x 3-in. H.W. bearers—150 sup. feet 5-in. x 2-in. H.W top bearers—25 sup. feet 4-in. x 2-in. H.W. decking—200 sup. feet 4-in. x 2-in. H.W. top plates—30 sup. feet 4-in. x 2-in. H.W. scaffold rails, &c. 23 sup. feet.	428 sup. feet H.W., at 33s. per 100.	7	1	3
Bolts and nuts—say		0	5	0
Curved and plain iron		14	3	4
Felt—say 15 yards at 1s. 6d. per yard		1	2	6
Galvanised screws—say 2 lb. at 1s. per lb.		0	2	0
Steel washers—2 lb. at 5½d. per lb.		0	0	11
No. 9 Tinman's rivets—1 packet		0	1	3
½-inch galvanised roof bolts—1 gross		0	3	4
Solder (50/50)—say 3 lb. at 1s. 7d. per lb.		0	4	9
Spirits of salts		0	3	6
Spouts—two at 10s. each		1	0	0
Lid		0	7	6
Total cost of materials		£32	16	7
Add for freight and labour.				

A number of firms contract for the erection of galvanised-iron silos of large capacity, a bin of 1,100 bags capacity costing about £100. Silos of this type usually have a conical roof, and are stayed with angle iron. An elevator is sometimes used to lift the grain into them. Even erected by this method oat silos are a good proposition financially. Taking the cost as £140 (£100 for the silo and £40 for the elevator), 7 per cent. would represent an interest charge of £9 16s. for, say, 3,300 bushels, which is less than 1d. per bushel per year for storage, to which might be added another 1d. per bushel for depreciation of the silo over a period of, say, ten years.

Fumigation for Weevil.

The possibility of weevil infestation should be taken into consideration. In order that weevils may increase and multiply in stored oats the presence of a certain degree of moisture (about 10 per cent.) is essential. Under ordinary conditions at harvest time there are no weevils in the grain, nor does the grain contain nearly sufficient moisture for their development, and unless moisture actually gains access from without the grain remains weevil-proof. Care should therefore be taken to protect the grain from infection by the weevil and from becoming moist, and there is no better way of achieving this than by making the tanks quite air-tight.

Sometimes it may be difficult to carry out these precautions effectively, and if even a very small number of weevils gain access to the stored grain they are capable, if conditions of moisture and temperature are favourable, of multiplying very rapidly. In the event of infestation the weevils can be killed by fumigating with carbon bisulphide.

Carbon bisulphide is a heavy liquid which is completely volatile, evaporating on exposure to the air. It must therefore be kept in a tightly stoppered container. When carbon bisulphide evaporates it forms a rather foul-smelling gas which is about two and a half times heavier than air, and thus, if the liquid is poured on to the oats at the top of the tank, the gas at once diffuses and penetrates the mass of grain completely. There is no danger of the largest mass of grain not being fully penetrated by the gas if sufficient is used to saturate the air space. If the tank is absolutely air-tight, the fumigant may be used at the rate of 3 lb. per 1,000 cubic feet of space, regardless of the amount of space occupied by the grain (1,000 cubic feet will hold rather more than 800 bushels of grain), and the fumigating process should last for twenty-four hours. If there is any doubt as to the tank being air-tight, the quantity of carbon bisulphide will require to be increased to 12 lb. or even more per 1,000 cubic feet.

Fumigation as described does not injure the grain for food. It is best done in the warmer part of the day if in winter. Not only are the weevils more active under the warmer conditions, but they are more susceptible to the effects of the gas.

It is important to remember that carbon bisulphide is a very inflammable liquid or gas, and will explode like benzine if a naked light is brought near it.

Sydney: Alfred James Kent, I.S.O., Government Printer—1932.

cross, made at Wagga Experiment Farm, between Algerian and Red Rustproof. The Red Rustproof parent is closely related to Algerian and morphologically very similar. The progeny from the cross showed very little variation, and the new strain evolved therefrom could not be distinguished from the old Algerian except in performance; for this reason the old name was retained. This evidence explains to a large extent why growers of Algerian remark on differences between crops grown from seed of different origins. The Departmental strain is recognised as superior to all others under New South Wales conditions.

It was unfortunate that the same name was retained for the improved strain, even though it was botanically identical with the original Algerian. Whilst it is quite impracticable to name the strain now, it is proposed to multiply the seed of the Departmental Algerian in future under the number W. 1093, and growers will be well advised to confine their attention to this particular strain.

In early growth Algerian is prostrate, and this feature, together with its very narrow leaves and high tillering co-efficient (4 to 4½), gives it a somewhat grass-like appearance. At no stage in its growth is Algerian very flaggy, and, except for a few hairs along the margins of the lowermost leaves, the foliage is glabrous. The leaf-sheaths develop a decided purple tinge just prior to ripening; this is most pronounced on the sheaths surrounding the middle of the culm.

The straw is medium-strong to strong and can usually be depended upon to stand very well. It is medium-tall, slender and of good quality, with no colour immediately below the panicle, but very purple in the vicinity of the nodes, especially just below.

The panicle is of medium size, and of the open pyramidal type; the rachis inclines slightly to one side at the tip; the branches are long and leave the rachis at right angles and droop over. The spikelets, though distributed throughout the panicle, are usually concentrated towards the end of the branches; they are large and hang over in pectinate fashion (see Fig. 9).

The grain is brown, rather long and pointed, of only medium quality. A prominent feature of the variety is the nature of its awns, the first and second grains of each spikelet invariably bearing a weak awn. A definite basal scar of the semi-articulating (intermediate) class is well defined on the primary grain of the spikelet; it is accompanied by numerous long brown hairs which are arranged in two tufts on either side. The rachilla is never left on the primary grain after threshing; it fractures at the base and is retained on the second grain. The general grain characters are illustrated in Fig. 10.

Threshed grain samples of Palestine, Belar and Algerian are very similar. Studied direct from the panicle, however, Palestine possesses, as a general rule, three grains per spikelet, and the grain itself has a few long hairs

on the flowering glume or lemma, especially near the base of the awn; Belar is readily distinguished by its strong awn on the first grain only, and the absence of basal hairs.

Although classed as early to mid-season in other countries, Algerian marks the standard of late maturity in New South Wales. Undoubtedly its greatest attribute is drought resistance, for it can be cultivated where no oat of the English type would survive. Its agronomic acceptance has not only contributed much to the benefit of the farmer, but has formed a basis for the plant breeder as well, many of our principle varieties possessing Algerian factors in their constitutions. The breeding objective has been to reduce the tillering capacity of Algerian, but increase the yield per panicle, thereby producing a more thrifty type for dry conditions. This has been accomplished to a large extent in the varieties Guyra and Gidgee.

On account of their earlier maturity, varieties such as Belar, Mulga, Gidgee, &c., have increased in favour at the expense of Algerian, especially in the drier western districts, but Algerian is still a general favourite as a dual-purpose oat in the tableland districts and on the western slopes. It is particularly suited for grazing on account of its excellent powers of recovery, but should be sown in early autumn on account of its comparatively slower early growth during cold weather. Its one drawback as a grazing oat is that it is somewhat unpalatable or bitter to stock during its young growth.

Algerian is very susceptible to loose smut, and although susceptible to stem rust, it has a field resistance to crown rust.

Several varieties conform closely in morphological characters to those of Algerian, described above. Most of these can be distinguished on the basis of early-growth habit, maturity, and minor characters. Algerian, however, is sometimes sold under the names of Mortgage Lifter and Million Dollar, fanciful names artfully employed by seedsmen.

Belar.

Belar was selected from the variety Sunrise at Glen Innes in 1918, and probably owes its origin to a natural cross between that variety and Algerian. It resembles Algerian in colour and shape of grain, and Sunrise in that it bears a strong awn on the primary grain only. It is characterised by stronger, though much finer, straw than Sunrise, and consequently is much better adapted for hay.

The early growth of Belar is not as prostrate as Algerian, nor does it tiller so profusely: it is classed as semi-erect with a tillering capacity of 3 to 3½ (scale 5). The plants grow compactly with medium-wide foliage, bearing no hairs on the leaf-margins except for a few on the first leaves. The leaf-sheaths turn to a very deep purple as the plants mature: the colour is less marked and may be absent from the sheath of the last leaf, and it increases in intensity towards the base of the plant: this is in contrast with Algerian where the colour is most intense around the middle of the plant.

Varieties of Oats in New South Wales.

[Continued from page 17.]

ALLAN R. CALLAGHAN, D.Phil., B.Sc. (Oxon.), B.Sc.Agr., Assistant Plant Breeder.

In the previous issue a brief review of the morphological basis for the description of oat varieties was given. It is proposed now, to deal with the varieties separately, and incorporate in each description the most important agronomic and morphological characters. The varieties will be described in the order of their importance, or as near as this can be judged.

Algerian.

Originally introduced from Algeria, Northern Africa, this variety quickly established itself as the most useful of all varieties under Australian conditions. In comparison with other varieties introduced about the same

Fig. 9.—Panicle of Algerian.

Note the rachis leaning slightly to one side at the tip, and the drooping branches.

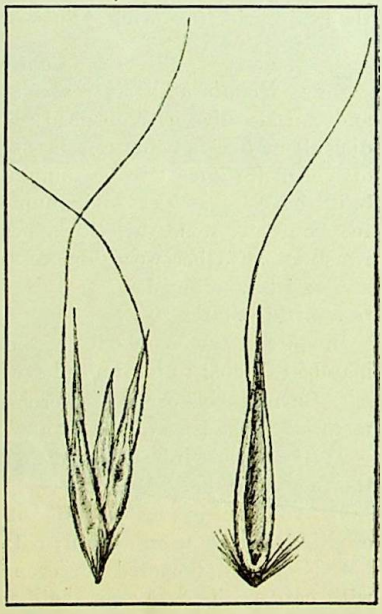


Fig. 10.—Spikelet and Grain of Algerian.

The weak awns on the first and second grain of the spikelet, the well-defined basal scar and abundant basal hairs are typical characters of the variety.

time it was unusual, in that it combined good tillering ability and general prolificacy with drought resistance and suitable maturity. The variety under this name at present grown and recommended by the Department, is an improved line of the original type, and was actually evolved from a

30th April, showed 24 per cent. seedling-blight as compared with 16 per cent. when sown on 19th May.

Data in respect of the effect of soil moisture on the disease is not yet complete. A study of the relationship of rainfall to the incidence of foot-rot is still in progress, and all that can be stated now is that the disease has been observed to assume epidemic form in both very wet and very dry seasons. It is of interest to note that preliminary controlled experiments in the glasshouse have shown that the severity of seedling-blight of wheat in soils maintained at 30 per cent. and 65 per cent. of the water-holding capacity was the same throughout.

Fertilisers; Fungicidal Dusts.—For some years past field and glasshouse experiments have been conducted to ascertain whether the application of superphosphate to the soil or of certain mercury dust fungicides to the seed would limit the development of foot-rot in wheat. Space does not allow of the incorporation of the results in this article, but the results show that the amount of seedling-blight, at least, is markedly reduced by increased applications of superphosphate or by applying certain dust fungicides to the grain prior to sowing. Further work is in progress.

Control Measures.

Since *Helminthosporium sativum* can attack many cereals and grasses, and can also live over on dead plant remains in the soil, it is obviously a difficult matter to bring the disease completely under control. No varieties of wheat are known to be immune to the disease, but grades of susceptibility have been observed in numerous wheats under field conditions in a foot-rot year; some varieties appearing extremely susceptible, others fairly resistant. Further work is necessary to ascertain whether there really are any resistant or moderately resistant wheats amongst the varieties under test in this State.

In spite of the complexity of the foot-rot problem the following measures may be expected to minimise losses from the disease:—

1. Burn stubble of affected crops; this destroys a good deal of the fungus material at the base of the plants.

2. Bare-fallow infested land and keep down grasses; this helps to starve the fungus in the soil.

3. Avoid continuous cropping of land to wheat and introduce a resistant crop into the rotation system; oats usually are very resistant to foot-rot.

4. New land prepared for cropping should, where practicable, be sown with oats as the first crop; both foot-rot and take-all are often serious in wheat grown as the first crop on land which has been under grass for several years.

5. Adopt the standard methods for preparation of the seed-bed and use the varieties recommended for different districts: apply superphosphate.

6. Always use sound, plump grain for seed purposes; grain showing discolouration at the tip should be rejected. "Black point" at the embryo end of the grain is sometimes caused by the foot-rot fungus.

7. As far as possible, avoid feeding-off all wheat crops grown for grain.

44/32.

9th January, 33.

Sir,

I am directed by the Governor to acknowledge the receipt of your two letters No. I.32-5554 of the 29th of August and the 1st of September, 1932, and also of the enclosed package of Algerian oats seed and relative literature.

2. I am to express to you His Excellency's warm thanks for your kind assistance in this connection as well as for your offer to supply a further quantity of seed, if desired.

3. I am to add that I shall not fail to communicate with you in due course in regard to the results achieved from the trials which are being made.

I am,

Sir,

Your obedient servant,

Colonial Secretary.

The Under Secretary,
Department of Agriculture,
Box 36A, G.P.O., Sydney,
NEW SOUTH WALES.

44/32.

30th June, 34.

Sir,

I am directed by the Acting Governor to request you to be so good as to furnish, in due course, the result of your experiments with the Algerian Oats which were handed over to you for experimental purposes.

I am,

Sir,

Your obedient servant,

MCH

Acting Colonial Secretary.

R. C. Pole Evans Esq, J.P.
Port Howard.

(20)

Port Howard,

West Falklands.

23rd July 1934.

Sir,

I beg to acknowledge receipt of your No 44/32 of the 30th ultimo.

I regret to say the sample of Algerian Oats (about two handfulls) were in no way satisfactory, and were an outstanding failure when compared with three other classes of Oats, which they were sown along side of.

The above was reported to the Chief Inspector of Stock, who saw them growing.

I am,

Sir,

Your obedient servant,

R B Rob Evans.

The Honourable

H. Craigie-Halkett

Acting Colonial Secretary

Stanley.