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Seed quality

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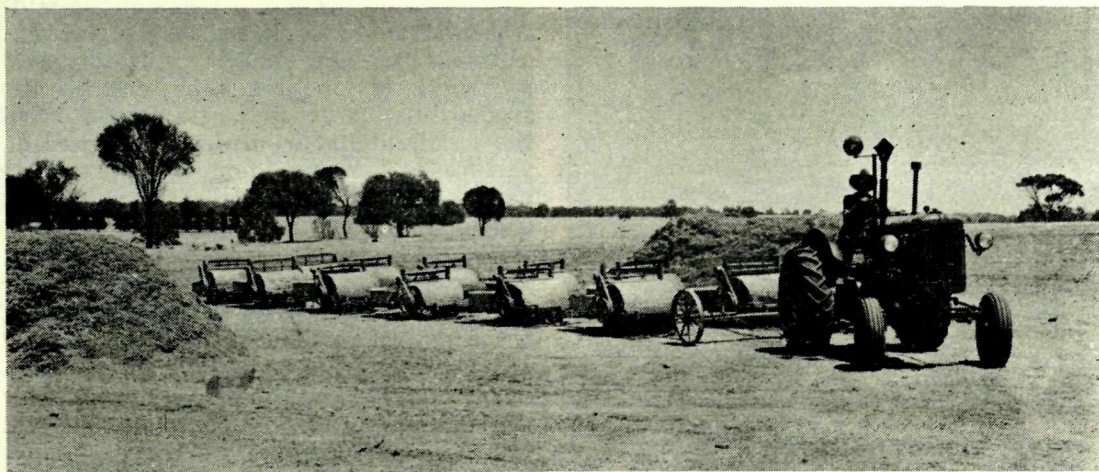


Fig. 1.—A battery of sheepskin-covered rollers being used for subterranean clover seed harvesting.

SEED QUALITY

By G. R. W. MEADLY, M.Sc., Officer-in-Charge, Weeds and Seeds Branch

ON many farms in Western Australia, the rolling, threshing and grading of subterranean clover seed is an important and lucrative sideline. An industry that was in its infancy 20 years ago, now employs thousands of men on hundreds of properties in the Great Southern and South-West during the summer months. Last season 2,000 tons of cleaned seed approximating £500,000 in value was produced. Besides the important export trade, clover seed is essential for the establishment of pastures within the State, large quantities being required for the extensive land development at present in progress.

There is quite a deal of confusion in the minds of many purchasing farmers and also some producers regarding the factors that decide the quality of seeds and the requirements of the Seeds Act, particularly as it applies to subterranean clover. In this talk I propose discussing those aspects together with the implications of the certification scheme.

PURITY

The quality of seed is influenced by three main factors—purity, germination and strain. In contrast to the other two, some idea of the pure seed content of a line can be obtained from its appearance, although an analysis must be carried out before it can be expressed in terms of a percentage. The impurities may be either harmless such as grit, broken seeds and stick fragments, or components of real

significance such as weed seeds, eggs of insect pests or spores of fungal diseases. Two per cent. of grit sounds only a small proportion but amounts to more than two pounds in every hundredweight and is costly buying at any price. An even smaller percentage of the live impurities can prove much more costly. Agricultural seeds have been responsible for the distribution of weeds to a greater extent than any other medium. The risk is least in thoroughly graded lines but even these should be examined for seed impurities. It is the rule rather than the exception to find seeds of troublesome weeds in poorly graded lines and on occasions such serious species as Cape tulip have been found in thresher samples of subterranean clover seed. Soil particles present can also carry the eggs of red mite and lucerne flea, two of the most troublesome pests of pasture legumes.

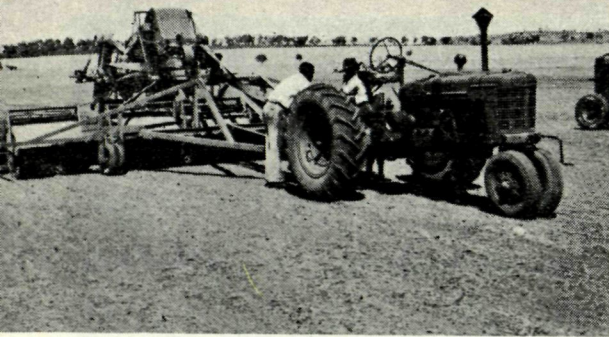


Fig. 2.—Gathering and threshing subterranean clover seed in one operation. Sheepskin-covered rollers pick up the burrs and feed them into the threshing machine.

VIABILITY

Although it is important to ensure that no harmful impurities occur in seeds, it is equally important that the seeds are capable of producing strong seedlings. Different species retain their vitality for varying periods. Native wattles have germinated after storage for more than 100 years, while best results cannot be expected with some other plants if sowing is delayed longer than 12 months after harvesting.

The normal life expectancy of seeds can be influenced by a number of factors of which the conditions of storage are not the least important. A dry cool atmosphere is most favourable, and the difficulty of retaining the vitality of stored seeds in tropical countries is due to the high temperature and humidity. Faulty germination may be caused by harvesting immature seed, and mechanical injury giving rise to damaged seedlings is often the result of incorrect adjustment of machinery during threshing and grading. Diseases such as ergot, and insects, including weevils and cutworms, also play their part.

The most widely sown pasture species in this State is subterranean clover and low germination usually can be traced to one of two causes. The burning of the midseason strain to remove the trash before gathering the burrs is likely to damage a proportion of the seed, especially if the dry herbage is abundant and the paddock contains inflammable material such as sticks, manure and rushes. Most of the early Dwalganup burrs are matured in the soil and are seldom damaged by burning

but a high proportion of burrs of the mid-season strain is located on the surface. It is not unusual for such burning to kill 50 per cent. of the seeds present in the graded line. Most producers are aware of the risk and little burning of midseason pastures is now carried out but any sample having a smell of burnt seeds should be regarded with extreme caution.

The second cause is associated with a natural phenomenon. Subterranean clover seeds as they occur in the soil contain a large number of dormant or "hard seeds" usually amounting to at least 75 per cent. Even under favourable conditions they will not germinate immediately but will give rise to seedlings at varying times over a period of years. With efficient machining this dormancy is broken and a satisfactory immediate germination is possible. A high hard seed content is almost invariably associated with so-called "thresher" or "coaty" lines which have not been subjected to the scarifying process of the "decoater."

An indication of the quality of some subterranean clover seed offered for sale is given by the figures resulting from a test carried out on a sample submitted to the Department by a purchasing farmer. The pure seed content was 78 per cent. with 21 per cent. of inert matter and nearly 1 per cent. of weed seeds. The germination was 34 per cent. with 65 per cent. of hard seeds. Besides the inert matter consisting of sticks, fragments, pebbles and soil particles the sample contained an estimated number of 90 Guildford grass seeds and 45 Cape tulip cormils per pound. The percentage of pure germinable seed was one third that of a satisfactory line and the Cape tulip cormils could well

Fig. 3.—Seed inspection in progress at a seed-cleaning plant.





Fig. 4.—The final stage of seed certification at a metropolitan seed-cleaning plant.

prove a very costly supplement. The seed was offered at 8d. per pound when Government Certified Seed was available for 1s. per pound. It was in fact worth less than 4d. per pound.

THE IMPORTANCE OF STRAIN

The third, but by no means the least important consideration is the strain, especially as seldom can any indication be obtained from the appearance of the seed. Strain variants of the same species can differ in palatability, leafyness, yield, maturity and many other features. Extensive areas in Western Australia have a short growing season and in consequence early maturing strains are essential. In more favoured districts later types—usually more leafy—are desirable.

While purity and germination can be determined in the laboratory, this is seldom the case with the strain, and certification schemes are necessary to define this characteristic of seeds. In Western Australia we are mainly concerned with subterranean clover, and the development of the seed industry in this State has been linked closely with the certification scheme inaugurated in 1934. In that season 70 tons of seed was certified compared with 1,616 tons last year—by far the largest production of any State.

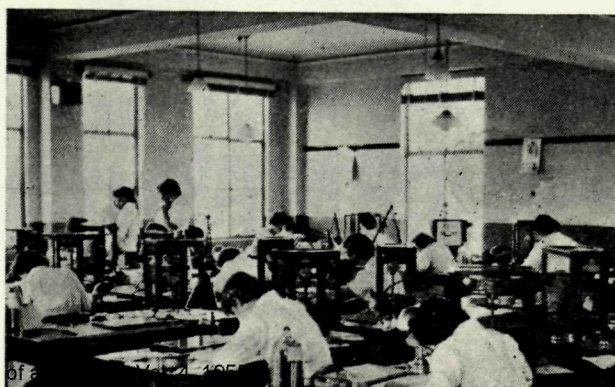
The schemes operating in other States of Australia and also in other countries, vary somewhat in detail but follow the same general pattern. Since its inception, the West Australian scheme has undergone a number of modifications and now includes five strains—Dwalganup, Bacchus Marsh, Yarloop (white seeded), Mt. Barker (midseason) and Tallarook.

Following applications from producers, pasture inspections are made during the growing season in order to define areas free from noxious weeds and of a uniformity of strain satisfactory for the production of Government Certified Seed.

Following harvesting, cleaning and grading, a declaration regarding the origin of the seed is obtained from the producer and a purity analysis is carried out on a sample taken from each sack. If the line contains at least 98 per cent. pure seeds, and is free of serious weed seeds, the sack is sewn and “temporary sealed” with a lead seal, except in the case of the Dwalganup strain to which the permanent coloured metal seal is fixed immediately.

Samples are forwarded to the seed testing laboratory where they are tested for germination and the seedlings examined under ultra-violet light. A trained analyst can detect the difference in fluorescence of the radicle or young root of the two main strains and this observation serves as a further check on the field inspections. If the germination reaches the required figure of 70 per cent. and the ultra-violet light examination is satisfactory the field inspector is authorised to attach the permanent seals to the appropriate sacks. A slip bearing a certificate number and giving details concerning the origin of the seed is included within the sack and a tag bearing similar information attached to the outside. The seed is then ready for disposal and is classed as Government Certified while the sewing twine and seals remain intact.

Fig. 5.—Portion of the large seed-testing laboratory at Palmerston North, New Zealand.



Samples corresponding to the sacks sealed are held for a period of 12 months as referee samples in the event of any disputes regarding quality.

Earlier in this talk I mentioned that seed quality is governed by purity, germination and strain. No doubt you have noted that all three aspects have been considered when standardising seed by means of certification.

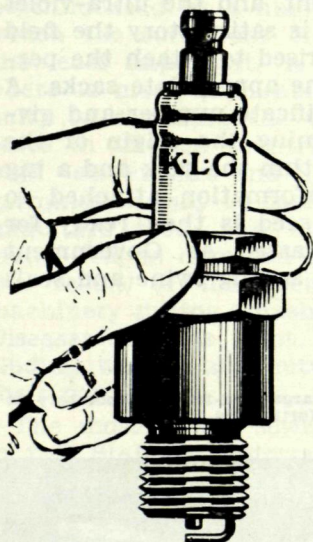
The scheme is voluntary but the high proportion of seed now being certified is indicative of its importance to producer, merchant and purchasing farmer.

Let us clarify the position relative to the requirements of the Seeds Act. Although certified seed is specified by most farmers, subterranean clover seed does not have to be certified in order to be sold legally. All seed offered for sale, however, must consist of at least 96 per cent. pure seeds and have a minimum germination

of 70 per cent. There are also restrictions on the weed seeds, some being totally prohibited.

It is obvious that there can be many pitfalls when making seed purchases and farmers are urged to buy up to quality rather than down to price. Seeds of all pasture and crop plants are not certified but advantage should be taken of certified lines when they are available. Most merchants are keen to sell high-grade seeds and have their stocks tested for purity and germination at the Department's seed testing laboratory. Ask for these figures when contemplating purchases. Avoid so-called "bargain lines" as, with few exceptions, these are defective in some respect and often prove very costly buying.

(From a broadcast script made available by courtesy of the Australian Broadcasting Commission.)



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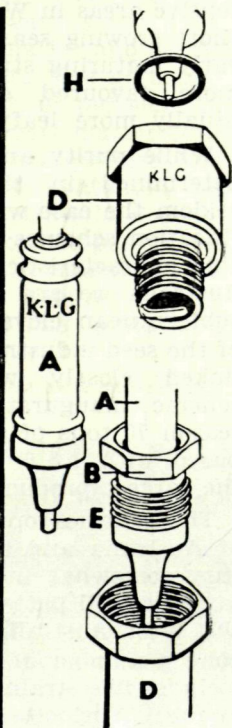
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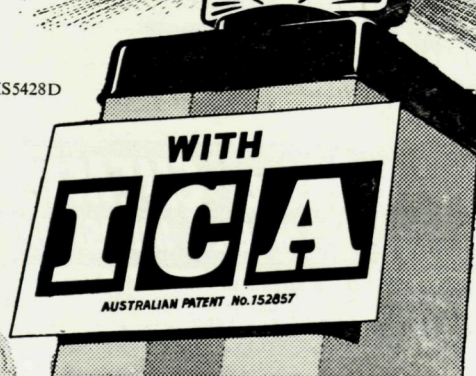
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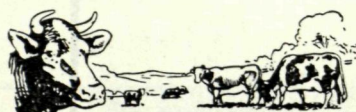


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