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THE MAKING OF A NEW PASTURE VARIETY

By The State Herbage Plant Liaison Committee

FARMERS who attend field days at Department of Agriculture research stations are reasonably familiar with the procedure for producing a new cereal variety. It involves a painstaking and tedious process of crossing, followed by many years of segregation, selection and testing for yield, disease resistance, and other characters.

Although there are many pitfalls, the procedure for the creation of a new cereal variety is at least fairly well systematised.

Until recently the making of a new pasture variety was far from a systematic undertaking. There was, and still is to some extent, diversity of opinion about what is needed in a successful pasture plant. The development and "release" of new pasture varieties has rested mainly on observation, the final decision often being based largely on personal preference.

There have been some outstanding successes with pasture varieties produced in this way. Woogenellup subterranean clover and Cyprus barrel medic are two of these. But there have also been some failures.

Fifteen years ago the character considered most important in the selection of annual pasture legumes was flowering date. In fact, little was known about most other characters which might have been important for pasture legumes. Subsequent research, mainly in Australia, elucidated other important differences between species and varieties in oestrogenic activity, rate of seed development, seed dormancy and nutritional requirements. Such knowledge made possible a more purposeful and systematic approach to the selection and breeding of pasture plants.

Herbage Plant Liaison Committees

The question soon arose as to how to make use of this new knowledge about pasture plants in the best interests of farmers.

How should the breeding and selection of new pasture varieties be systematised to ensure that there was no waste in research effort and that the varieties produced were suitable? How should the seed increase programme be organised for a new variety to ensure a suitable rate of increase, and what system should be used to release the seed?

To provide answers to these and other questions the Australian Agricultural Council in 1964 recommended the establishment of Herbage Plant Liaison Committees in each State, the membership to consist mainly of agronomists from the the various research organisations.

Herbage Plant Register

The committees found that they had inherited a chaotic situation. To start with, many of the existing pasture plants had two common names in different parts of Australia; some had three or four. Sometimes a single common name was used to describe two distinct species.

To bring some order to the situation the committees established in Canberra a central system of plant registration known as the Australian Herbage Plant Register. Accurate descriptions of all existing pasture species and varieties were obtained and each was given a standard common name to operate throughout Australia.

The Register is open also to possible new pasture varieties. If there is some prospect that they may eventually become commercial they may be registered, thus helping to avoid confusion about names during the testing process.

Registration in itself does not mean that the variety is recommended to farmers, nor does it necessarily mean that it will become a successful pasture species.

Testing of new pasture varieties

The Herbage Plant Liaison Committee in Western Australia has made suggestions for testing new pasture plants. These are determined to some extent by the actual species or variety under consideration and also by the quantity of seed available. For example a potential new variety of a successful and long-established species such as subterranean clover does not always require the scope and detail necessary in testing a variety of an entirely unknown species.

So far, the Herbage Plant Liaison Committee in Western Australia has concerned itself only with annual legumes. Grasses will eventually also be considered.

While seed is scarce and the new variety is still in the early "test row" stage, characters which have been considered include growth habit, flowering pattern, general maturity and seed dormancy, including hardseededness in legumes. The plants are also checked to ensure that they are relatively free of oestrogenic and other substances likely to cause difficulties with grazing stock.

Many of the potential new varieties are discarded for one reason or another after the initial testing, and those that pass the test are carried a stage further. In small plot trials at different centres their performance in terms of drought resistance, topgrowth production and seed yield is measured against standard varieties. If they still show promise they are included in large grazing experiments which are run for several years.

Release and recommendation of new varieties

If a new pasture species or variety performs well under test its release and possible recommendations for its use are considered.

The release of a new variety does not necessarily mean that it is automatically recommended for immediate and wide scale sowing as a pasture.

Not all releases are made by or through the Herbage Plant Liaison Committee. Some new varieties are in fact developed by private farming and seed producing organisations. In these instances the variety may have been described and listed in the Herbage Plant Register, and it may also have been tested to some extent.

However, it would not be recommended for sowing by the Committee or by Department of Agriculture advisers unless they were satisfied that there was sufficient evidence to warrant such a recommendation.

Cross pollinating subterranean clover plants to produce a new variety. The small size of the flowers makes this a painstaking and difficult task

Crossbreds and other selections are grown out in small plots for a few years next to stands of standard commercial varieties. During this stage their growth habit, flowering pattern and other characteristics are compared

With new varieties developed by the University Institute of Agriculture, CSIRO and the Department of Agriculture and subsequently released through the Herbage Plant Liaison Committee, the position is somewhat different. In these cases it is normal to carry testing at the time of release to the stage where it is possible to make reasonably specific recommendations. Even so, such initial recommendations invariably require modification in the light of subsequent farmer experience, for while current knowledge on what is required in a pasture plant is well advanced on that of earlier years it is still far from complete.

The final and critical test for a pasture species comes where it is grown on farms.

Seed increase and certification

Seed increase of new "official" varieties up to the stage of release is a relatively simple and uncomplicated task, for it is normally undertaken by the Department of Agriculture on behalf of the Herbage Plant Liaison Committee. However, subsequent seed increase by seed producers is anything but uncomplicated; it is virtually impossible to satisfy everyone and at the same time ensure a rapid increase in commercial stocks.

To formulate policy on distribution procedures the Herbage Plant Liaison Committee has a sub-committee on which seed producers and merchants are represented. The policy adopted has been to release equal quantities of seed to experienced seed producers with suitable land in climatic zones favourable for seed production.

When seed is supplied to the selected producers, safeguards are sometimes applied to ensure that the new variety becomes available to the farming commuity with the minimum delay and at a reasonable price.

When the most recent subterranean clover releases were made, a condition of release to each grower was that he would sell a given proportion of the seed produced in the first year at a specified price. The price was set to give the seed producer a reasonable return for his effort and to cover the risk of producing seed of a new variety for which the commercial demand was uncertain.

With most recent new varieties, seed certification schemes have been started at the time of release to seed producers. However, such schemes are not confined to promising or "recommended" varieties. The basic aim of seed certification is to help farmers obtain good quality seed of the varieties they want, whether the particular type is recommended or not.

With new species or varieties there is obviously no established demand on which to base certification, but if they have real potential and are to be recommended to farmers, a future demand can be expected.

Current members of the State Herbage Plant Liaison Committee are:—Mr. E. N. Fitzpatrick, Department of Agriculture (Chairman); Prof. W. R. Stern, University Institute of Agriculture; Dr. J. S. Gladstones, University Institute of Agriculture; Dr. R. C. Rossiter, C.S.I.R.O. Regional Laboratory; Dr. G. W. Arnold, C.S.I.R.O. Regional Laboratory; Mr. B. J. Quinlivan, Department of Agriculture (Convener).

SKELETON WEED AGAIN FOUND

The discovery in April of skeleton weed at Maylands increased concern about this weed and set off a big search—fortunately with little result.

Spread over less than an eighth of an acre, the Maylands outbreak consisted of fourteen mature plants, some of which had seeded, and some new young plants in the tiny rosette stage.

It was one of the State's worst outbreaks of the weed in that seeding had occurred. The fact that the plants had grown for two seasons in between sets of railway lines in the metropolitan area and were found by Mr. Gary Green, an Agriculture Protection Board operator with previous experience of the weed, when he was inspecting the lines for caltrop weed, emphasises how easily skeleton weed can remain undetected.

It increases concern that in more remote places stands of skeleton weed might be growing unrecognised.

"Farmers and country people must be the first line of protection in our fight against the introduction of skeleton weed," said Mr. A. R. Tomlinson, Chief Weed Control Officer of the Agriculture Protection Board. "A future free of skeleton weed will depend on plants being noticed, reported and treated and the site watched in following years."

Skeleton weed is a very serious weed of cereal crops and can reduce yields by half. It robs the crop of moisture and nutrients during the growing period and its tough, wiry stems jam harvesting machinery.

It can be spread by small root fragments being shifted by cultivation or earth disturbance such as fencing or road-making and this makes the plant almost impossible to eradicate by grubbing once it is reasonably established.

Its tiny, parachute-equipped, wind-borne seeds are the greatest risk in Western Australia at present and these can produce new stands of plants several miles away from parent plants.

After the Maylands discovery, all nearby gardens and street verges were searched and will be searched again in spring. The outbreak plants were removed and destroyed, their positions pegged and quarantined and the soil treated with a sterilant.

Agriculture Protection Board Staff then searched the whole of the metropolitan railway system and all the standard gauge sidings, station yards and marshalling yards from Perth to, and including, Kalgoorlie. Only two more plants were found at Forrestfield. Searching will continue progressively over the rest of the State's railway system after winter when plants can be readily recognised.