KNOWLEDGE GAPS IN HERBAGE SEED PRODUCTION IN N.Z.

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ABSTRACT

Herbage seed production has always been an important part of New Zealand's agricultural economy. Current seed production techniques are reviewed and specific problems associated with herbage seed production are identified and suggestions for research made.

DISCUSSION

Herbage seed production was undertaken early in New Zealand's agricultural history. The first farmers considered none of the native grasses and legumes suitable for intensive pastoral use and introduced "English" herbage species. After the initial importations, seed of "English" grasses and clovers was produced locally.

After plant selection and breeding got underway, it became apparent that procedures to ensure regular supplies of good quality seed of known origin would be necessary if advantage was to be gained from the plant breeders work. The establishment of seed certification procedures was accorded high priority by State departments and resulted in a seed certification system which at the time was probably the most advanced in the world. It provided for the identification of cultivars developed by the plant breeders and the multiplication of seed of known origin through a range of grades to ensure adequate supplies of pure seed for commercial use. At that time New Zealand was the only country able to supply buyers with seed of guaranteed origin and purity which could be purchased with confidence.

In New Zealand herbage seed production has largely been associated with the renewal of pastures on arable farms. In districts experiencing a favourable climate, herbage seed crops became established as valuable cash crops and the practice of harvesting herbage seeds from recently established weed free pastures maintained supplies of seed for domestic use and sale on overseas markets. For many years the practice of taking herbage seeds as a "catch" crop within the normal arable rotation worked well, but within recent years local and overseas developments have posed problems which require solution if the local herbage seeds industry is to retain its position in overseas markets.

The maintenance of cultivar purity and the prevention of crop contamination have always been problems in the production of herbage seeds but in recent years these have become more acute. For many years only a limited number of cultivars of each herbage species was grown on New Zealand seed producing farms. In the case of ryegrass there were three cultivars. Moreover, these flowered at widely different times and generally only one was grown for seed on any single farm. Today, seven ryegrass cultivars, five locally bred and two overseas cultivars are included on the Schedule of Acceptable Herbage Cultivars. Also several overseas cultivars have been brought into the country solely for the production of seed for export. In the case of red clover there were two cultivars, but for seed production each was restricted to specific districts. In the case of white clover, cocksfoot and timothy, there was only one cultivar of each species and there was no problem in the maintenance of cultivar purity.

Recently, new white and red clover cultivars were released for multiplication and distribution. As a consequence of the increase in the numbers of herbage cultivars, the seed industry is now faced with problems of maintaining cultivar purity of a vast range of material. Some cultivars are difficult if not impossible to distinguish between in the field. Others, particularly clovers, leave a legacy of hard seed in the ground. At present the seed industry has no way of dealing with these problems in order to make it possible to grow new cultivars without the certain risk of contamination. Contamination from ground keeping seed is one of the most important problems facing the seed industry and there is a need for the development of a cheap efficient technique to rid the soil of herbage crop seeds.

There are wide knowledge gaps in most aspects of the management of the herbage seed crop from seeding through to harvest.

The first operation in the establishment of a herbage seed crop is the sowing of the seed. Little is known of the particular seeding requirements of herbage seed crops. Most seeding investigations have been concerned with the establishment of pastures. The question arises whether herbage seed crops should be sown at the same rate as pastures or do they require either higher or lower rates? Wide row spacings would be helpful for crop inspections and would permit inter-row cultivation and weed control, but little is known about their effect on seed yields.

The coating of seeds to facilitate precision seeding and the application of fungicides and insecticides has potential in herbage seed production. Where a maximum rate of multiplication of seed is desired, the precision sowing of single seeds would allow a larger area of crop to be established from a limited quantity of seed. This sort of thing has not been attempted, but requires investigation.

It is common practice to sow ryegrass and white clover together in anticipation that after ryegrass and white clover seed crops have been harvested the resultant pasture may be used for grazing. However, the effects of inter specific competition on seed yields are not well established and require investigation. It may be better to sow only one species. In the absence of clover a second ryegrass seed crop may yield as well as the first crop.

Normally herbage seed crops are sown at the time considered best for the establishment of pastures. Should

herbage seed crops be sown at the same time pastures for grazing are sown?

The New Zealand seed industry is compelled to comply with the minimum standards of herbage seed crop isolation laid down by the O.E.C.D. if the seed produced is to qualify for O.E.C.D. certification. There is considerable doubt regarding how much cross pollination occurs between adjacent ryegrass seed crops and investigation into this may lead to a review of the stringent regulations now in force.

On most arable properties herbage seed crops are not considered special pastures which should be grazed at particular times or at specific growth stages.

The effects of grazing herbage seed crops on seed yields are not well known and it may be possible to improve yields by a reduction in grazing.

The time herbage seed crops are closed is often related to the availability of feed for livestock rather than to that best suited for the production of seed. The little work already done in the field has shown that the time of closing may affect both quality and yield of herbage seed.

In districts where the bulk of this country's herbage seeds are produced summer drought is a common hazard. In some of these districts irrigation is available or may be available in the near future. The potential effects of irrigation on herbage seed yields are substantial but comparatively little is known regarding the best time and optimal quantities of water to apply. Efficient application of water should ensure high yields of seed and may show a better financial return than alternative uses for irrigation.

The old trick of brushing one's hat through the near mature ryegrass crop in order to estimate its fitness for harvest has serious limitations. Overseas techniques based on measurement of seed moisture contents have been developed but there is a need to appraise the standards established overseas for a range of local crops in local conditions.

Considerable losses of herbage seed may occur in the interval between the time the crop is mown and the time of threshing. Some early work has shown that seed losses of up to 50% are possible even under relatively favourable weather conditions. These losses are likely to be reduced if the crop could be threshed earlier at a higher moisture level and subsequently dried to a level suitable for bulk storage. Seed drying and bulk storage are now considered important harvest techniques nevertheless, additional work is required to establish optimal drying techniques for a wide range of crop seeds.

Perhaps its early success has been responsible for the current lack of interest in research in herbage seed production. Reliable supplies of high quality seed have always been available and have come to be taken for granted. Research was diverted into several new exciting fields such as soil fertility and management systems which gave spectacular results. Apart from some work with nitrogenous fertilisers practically no investigational work has been carried out in recent years to improve either quality or yield of herbage seed crops.

In 1971 the value of herbage seeds sold overseas amounted to $9,000,000. If export values are placed on herbage seeds used in New Zealand then the value of the total New Zealand herbage seed crop in 1971 must be reckoned at $25,000,000. In 1971 the value of herbage seeds sold overseas was equal to that of the value of exported apples and pears while the value of herbage seeds used locally was substantially greater than the value of local fruit consumed by New Zealanders.