
Handling herbage seed from the grower to the consumer

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ABSTRACT. The high costs of harvesting and cleaning herbage seed are emphasized and the advantages of bulk handling are stressed. The three main methods for machine-cleaning herbage seed are (1) aspirators, (2) screens, and (3) cylinders.

Key words: Seed cleaning, seed handling, seed harvesting.

INTRODUCTION

Seeds as they come from the field are never pure. They have to be processed **so that** pure live crop seed can be obtained. This removal of impurities can be achieved by mechanical devices which remove unwanted seed from crop seeds by the physical differences within the mixture. Seed-cleaning machines have the ability to remove these impurities, but only when used by skilled operators. It is well recognized that the operation of seed cleaning is 10% machine and 90% operator's "know-how".

Unfortunately, as **in** many industries today, ever-increasing costs, both growers' and merchants', are affecting profitability. The costs of handling seed after harvest from the paddock to the consumer can be identified as follows:

1. Freight to the plant.
2. Cleaning charges.
3. Certification and testing charges.
4. Packaging.
5. **Storage.**
6. Delivery charges.

Added to these are many smaller charges such as retesting, interest, etc.

There is no doubt that bulk handling, whether in boxes or bulk truck, saves man-

handling bags on headers, loading and unloading, etc. Some merchants' stores are able to receive and process grass seed in bulk, but owing to the number of cultivars, grades of certification, lack of guarantee of good germination, and the average size of each line it is nearly impossible in a commercial store to cater for complete bulk handling. We thus still **have** boxing or bagging of individual lines, and this increases cost.

In Oregon, U.S.A., where large quantities of ryegrass seed are produced, they bulk seed from many fields, as they are assured of good germination. Clovers, owing to the size of lines, do not lend themselves to be bulk-stored in merchants' stores, but many farmers handle lines of clover seed in boxes.

CLEANING

This is the largest single cost after heading, and again the cost of dressing small lines with all the necessary documenting of inward returns, certification entries, dressing returns, debits, etc., increases the overall cost of the cleaning operation. Testing charges recently reintroduced by the Government certainly highlight the cost per kilogram of testing small lines of seed, with a purity and germination test costing the same for 500 kg as for 10 000 kg.

Packaging will continue to cost more per tonne as the price of sacks 'increases. With the use of containers, serious thought must be given to using much lighter-weight bags for grass seed. This has been done with clover, reducing the charges on growers.

I believe there is no doubt New Zealand will have to find some way of eliminating the multitude of small lines being delivered to overseas buyers if we are to compete successfully with other producing countries. In other words, when a buyer purchases 10 tonnes of grass seed or white clover, he expects to receive

one, or possibly two, lines, not five, six or seven as are now often delivered to him.

So much for charges. How is the seed cleaned, and how does New Zealand compare with other producing countries? Firstly, in New Zealand herbage seed is produced in fields which at some time have been grazed by stock. After threshing, most straw is baled or used by grazing stock. These methods allow weed infestations to compete, and cause increased costs by slower processing to achieve good purities. Overseas the production of seed crops is more specialized, with field-burning of straw and spraying of weeds to produce cleaner seed. Processing costs are lower where specialized production methods are used.

SEED-CLEANING PRINCIPLES

There are three main methods used for machine-cleaning herbage seed. These machines are called air screen cleaners and can vary from small units with a small throughput per hour to very large high-capacity machines. The methods used are:

1. Aspirators for removing light trash from the heavier seed. Aspirators remove empty glumes, lightweight straw, etc. Huskers or brushers are usually used in grass-seed cleaning in conjunction with an aspirator to ensure perennial ryegrass meets the desired weight of 34 kg per hectolitre.

2. Screens which separate seeds of different diameter. Screens come in many sizes and shapes and include —

Square-mesh woven wire screens.

Oblong-hole woven wire screens.

Slotted-oblong punched screens.

Round-hole punched screens.

3. Cylinders or length separators separate components of a seed lot which are different in length. Cylinders remove the following from grass seed:

Avena fatua L., wild oat.

Bromus mollis L., goose grass, with awns unbroken.

Vulpia spp., hair grass, with awns unbroken.

Sherardia arvensis L., field madder.

Rumex spp., docks.

Clovers.

Rumex acetosella L., sheep's sorrel.

Trifolium striatum L., knotted clover.

T. glomeratum L., clustered clover.

Plantago lanceolata L., ribgrass.

Carduus nutans L., nodding thistle.

Cirsium vulgare Ten., Scotch thistle.

C. arvense Scop., Californian thistle.

Chenopodium album agg., fathen.

Phalaris minor Retz, canary grass.

Straw.

Air screen cleaners are usually all that are required to clean ryegrass satisfactorily.

More sophisticated machinery is used for cleaning clovers and lucerne, and the following are usually added to air screen cleaners:

Specific Gravity Tables

These remove from clover such impurities as fathen, shelled sorrel, field madder, chickweed (*Stellaria media* Vill.), catch fly (*Silene gallica* L.), nassella tussock (*Nassella trichotoma* Hack.), earth particles, and cracked, broken, damaged crop seed.

These machines are widely used for small seeds dressing, and can accomplish separations to a very fine degree in the hands of a good operator. They are used where only a very small weight difference is apparent, and can remove heavier and lighter seeds and impurities at the same time over the table. Ryegrass species (*Lolium* spp.) can be removed from cocksfoot (*Dactylis glomerata* L.) on a specific gravity table. The ryegrass seed, being heavier, travels along the backing edge of the gravity table. Cocksfoot seed can be removed from ryegrass because it is lighter.

Velvet Roller Mills or Dossers

These machines are for the extraction of rough-skinned weed seeds from smooth-skinned crop seed. They will also remove a seed with sharp edges, such as dock, or sheep's sorrel, from white clover.

Efficient as seed-cleaning machines are, they are not perfect. Almost all lines of seed contain weed seeds which resemble the crop seed closely in shape, length, and weight. These troublesome weed species still often defy the machine and the skill of the operator, and remain in small quantities in machine-dressed lines.

Today, most agricultural seeds are purchased and sold on a maximum of 0.5% weed

seed content, with a tendency for the trade to ask for lines with weed content as low as 0.1%.

HARVESTING METHODS

Problems are often created by poor harvesting methods—many weeds are easily damaged in heading. If weeds such as *Bromus mollis* L. and *Vulpia* spp. (hairgrass), which are common in ryegrass and cocksfoot crops, are threshed hard, the awns are broken off, which means that those weeds are then the same length as ryegrass and have to be removed on screens, with a resultant loss of good crop seed. Ryegrass seed containing *B. mollis* seed damaged severely during harvesting is often impossible to clean to a desired test. It is not uncommon to find these seed lines finishing with up to 3% of *B. mollis*. This, of course, reduces the value to the farmer. Droughts similar to those to which Canterbury is prone tend to open up pastures, allowing greater contamination by weed species.

Sheep's sorrel and dock are very common weed seeds in lines of white clover (*Trifolium repens* L.) and are often damaged in harvesting. Sheep's sorrel seed, if threshed lightly, has a very rough coat and generally is not difficult to remove, from white clover seed. When sheep's sorrel is threshed hard, however, the outer rough seed coat is removed, leaving it with a shiny brown surface. It is then also smaller and 'most difficult to remove. To add to the problem,' England, which is a big buyer of white clover seed, requires white clover to be free of *Rumex* spp. in the working sample. A large percentage of lines of machine-dressed white clover contain a small amount of sheep's sorrel.

PACKAGING

The packaging of seed in New Zealand has not changed. Overseas, our seed is poorly presented and does not compare with the presentation of European packaged seed. Attractive packaging is a strong marketing tool. In New Zealand our presentation of seed to consumer could be greatly improved by attractive packaging. I think this will develop with competition between proprietary cultivars, with a greater use of colourful advertising on multi-wall

paper bags. Prepackaged pasture mixes are another concept of marketing which will develop in New Zealand.

There is no doubt the presentation and packaging of all products is important in selling, and this trend should develop and be encouraged by all in the seed trade.

CONCLUSION

New Zealand has many advantages in producing herbage seed of good quality, among these being first-class agricultural land and a favourable climate, complemented by our grassland farming. Our ability to produce good-quality seed has ensured a demand which is worldwide.

Problems continue to arise in overseas markets, and while New Zealand grass seed is not in great demand for pasture sowing in the United Kingdom and Europe, some developing countries are using our cultivars for re-seeding pastures. One disadvantage to our exports is the continually rising freight charges, which have a marked effect when exporting to countries situated close to Northern Hemisphere production areas.

Domestic consumption is also important to the seed industry, with approximately 50% of our ryegrass seed production being used in New Zealand. This varies slightly with cultivar. Very small amounts of cocksfoot and timothy (*Phleum pratense* L.) are exported, although approximately 50% of the crested dogstail (*Cynosurus cristatus* L.) production is sold overseas. White clover seed continues to be exported to many countries, and in recent years, mainly because of increased production, up to 75% of our production is sold overseas. Small tonnages of red clover are exported, but we import lucerne.

There is a tendency for our sheep farmers to sow cheap inferior-quality seed, of low germination, and contaminated by weeds. This, I believe, is a short-sighted policy.

Greater emphasis should be placed on superior new cultivars when they are released, for often farmers are reluctant to change from an established cultivar, and thereby are not taking advantage of the efforts of our plant breeders.