
HERBICIDES AND FERTILISERS

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Herbicides

In the battle against weeds one can either try the Father Christmas approach -hoe, hoe, hoe, ... or try herbicides. However, before beginning on the herbicide approach it must be stated that with increases- in the price of herbicides, and awareness of associated problems including weed tolerance, hoeing and spot-spraying should be a more common practice.

The weed problem is such that one in ten ryegrass seed crops are rejected or downgraded because of weeds. This is a massive mortality rate. Seventy-five percent of all rejections and downgradings are because of weeds; they are a major problem in seed production. Wild oats are a major contributor to the problem, also soft brome (also known as goosegrass) particularly when over-threshed; bearing this in mind headers should be adjusted to' keep awns intact.

Crops may be rejected from certification after field inspection. Of those that reach Seed Testing, wild oat contamination results in 5.5% of perennial ryegrass crops being rejected and 10-11% of annual ryegrass crops being rejected. If 'undesirable' weeds, of which thirteen are specified, are found within a seed crop, financial penalties ensue. The undesirable weeds include barley grass, wild oat, and winged and nodding thistle.

An analysis of 1800 seed lots using Ministry of Agriculture and Fisheries' seed testing records indicate that after dressing 77% of all ryegrass seed crops contain goosegrass, 40% contain hair grass (*Vulpia* spp.), 40% contain annual poa, 35% contain chickweed and 29% contain field madder.

The range of herbicides actually registered for use in seed crops is extremely small. In the United States unregistered products cannot be used; in New Zealand legislation is loose but becoming tighter. Of the six herbicides that are registered for use in grass seed crops four are for broad-leaf weeds and two are for wild oats, i.e., there are no chemicals registered for use against grass weeds, which are the major problem in grass seed crops. Nortron or Trammat (ethofumesate) is very effective but very expensive - at over \$200 ha⁻¹ it is not considered to be economic. Preliminary trial results for TCA (one of the oldest herbicides) or TCA dalapon mixtures (e.g., Teedal) are promising in terms of being able to control annual grasses, but the chemicals are unregistered (and now unavailable). Furthermore, most research work has been done in the North Island. As environmental conditions do influence the effect of herbicides they should be applied only in small amounts initially (i.e., on test strips) in order to avoid the possibility of destroying the crop. Test strips of the herbicide at

different rates and times will allow the grower to get a feel of the chemical in his own environment.

Many broad-leaved weeds are developing a tolerance to common herbicides such as 2,4-D and MCPB. On grass seed crops most of the hormone sprays registered for cereals can generally be used safely (but dicamba cannot be used on browntop seed crops without detrimental effect). Non-hormone sprays cannot generally be used (e.g., Glean used on ryegrass seed crops can result in severe damage).

Eighty to 90% of ryegrass seed crops are sown with white clover. Although this practice may reduce the amount of nitrogen required by the crop, it creates limitations in terms of what herbicides may be used. Most sprays that will tackle problem weeds such as nodding thistle and yellow gromwell will be extremely damaging to the clover. In order to have a more flexible spray programme clover should not be sown with ryegrass seed crops. A further consideration is that white clover is extremely competitive, and it probably decreases seed yield from the ryegrass crop.

There is more flexibility in herbicide use in established crops, i.e., those more than one year old (e.g., tall fescue, cocksfoot and second year ryegrass crops). Atrazine is used widely in Palmerston North but it is an unpredictable chemical and results can be spectacularly good or bad - it is very easy to destroy a crop completely. The chemical works because the crop is deeper rooting than the weeds that are being sprayed out. Atrazine, simazine and diuron are root-absorbed. When a small dose of chemical is applied, shallow roots absorb more than deep roots, thus tall fescue, which is deep rooting, can survive. Atrazine is applied in late autumn/early winter when low light intensity means the plant is less active than otherwise but soil moisture is present to activate the chemical. Use of these products must be timed with irrigation or to coincide with rain (they can even be applied during rain) so that the chemical is washed off the leaf into the soil. If allowed to sit on the leaf for a long time, particularly when morning dews are followed by bright, sunny days, crop damage and even crop failure will occur. Thus the products are difficult to use effectively and require familiarisation. For instance on light sandy soils atrazine rates must be reduced considerably. In fact, as atrazine water solubility is 40 ppm and simazine water solubility is only 5 ppm, simazine is safer to use on light soils than atrazine. The drawback is that established weeds will not be killed. The difficulties with atrazine use cannot be over-stressed. In Oregon, where the product was developed, an uncommon winter drought (which meant that spray was not washed off leaves) resulted in 70% of the ryegrass crops being damaged. Since then the registration for use of Atrazine and Simazine in ryegrass crops has been withdrawn in Oregon, This has resulted in problems with maintaining quality of grass seed, and in increased research on alternative measures.

Volunteer **ryegrass** is a serious problem in tall fescue and can be in cocksfoot. **Hoegrass** or Hoegrass-atrazine mixtures has been effective in cocksfoot and the mixture has proved more effective than Hoegrass alone. Atrazine can be effective if the timing is right. Kerb has been used successfully by some people, but is not a recommended chemical. Alloxol or Fusilade can be used on Chewings fescue as they kill almost all other grasses. **Ryegrass** control in tall fescue is very difficult and 100% control is impossible to achieve. However, the correct use of atrazine can achieve some control.

In all this it should be remembered that planning a crop and herbicide rotation can alleviate some build-up in a weed problem. Ultimately this forward planning can reduce expenditure on chemicals and increase profitability.

Fertilisers

Talking about the use of fertilisers in seed crops opens up a snakepit as there is much divergence of opinion. Many of the problems lie in interpreting research data because in the past researchers have not defined the site being worked upon. This was particularly the case in early nitrogen (N) trials as the residual N status of the soil was not known.

In general it is possible to say that autumn N applied to first year **ryegrass** does not result in increased seed yield but does produce winter grazing for sheep. No more than 20-25% of the total N for a seed crop should be applied in the autumn. Spring N is important for increased seed yield. It should be applied in the three to four week period between the period of spikelet initiation and stem elongation. A split application is not necessarily important in terms of increased seed yield, but does spread the risk in terms of leaching loss (in the event of high rainfall). Elongation is controlled by photoperiod and, to a lesser extent, temperature. This means that calendar date can be used to determine when N should be applied: For **ryegrass** it should be applied in mid-September. Annual **ryegrass** is late flowering and N should be spread later. **Browntop** flowers much later and so N can be delayed. Applications of N after flowering are not generally effective but may increase thousand seed weight.

The estimated total N requirements for a seed crop is 130 kg ha" (equal to 280 kg urea ha"). The amount applied as fertiliser should be the difference between soil N and 130. Traditionally, Oregon and Denmark have used more N and achieved higher seed yields than New Zealand. Over recent years more nitrogen has been used in New Zealand, too, and more growers are taking soil tests to give them an indication of residual N.

In general the type of N that should be used is the cheapest. However it should be remembered that there are limitations-to the use of urea particularly on very dry soils or if soil temperatures are above 15°C (when volatilisation losses occur).

Potassium is removed from seed crops in large quantities and so growers must be aware of their soil type. Fifty percent potassic serpentine super matches losses in seed crops more closely than ordinary super, but in most cases potassium and phosphorus applied to seed crops do not result in increased seed yields,

Soil acidity is not usually a problem in seed production except with prairie grass; the biggest problem is overliming leading to trace element deficiencies, e.g., in zinc.
