

Seed Selection

Background

LandWISE has noted crop failures during strip tillage trials that are unlikely to be the result of cultivation methods. In poor seasons especially, some batches of seed simply do not perform. LandWISE trials have found this more often with weaker seed lines such as super sweet corn varieties.



Evidence of seedling failure – germination rates were reasonable but growing conditions were cool and wet

When planting crops it can be worthwhile to reserve a small sample of seed from each field. Make sure it is stored correctly – away from excessive temperature or temperature variation, keep the sample seeds dry and in the dark. If the crop then fails to germinate or if germination is poor, the seed can be sent for testing. This will help prove or eliminate seed quality as a cause of the problem.

Selecting Seeds

New Zealand is one of the few countries in the world that has no seed laws. This means that seed of any quality can be sold, although reputable seed companies, with in-house quality assurance systems, strive to ensure that only high quality seed lots are available for purchase.

Seed quality refers to a collection of seed properties that affect the value of a seed lot for sowing. These properties include germination, purity, genetic purity, vigour, health and size. It is the purchaser's right to ask for, and receive from the vendor, information on the quality of the seed lot, and this is found on a Seed Analysis Certificate (SAC). A SAC is issued by a Seed Testing Laboratory after the seed lot has been sampled and the seed tested using internationally agreed methods.

Seed lots for sowing should have at least the first two quality attributes:

Germination – a germination result $\geq 90\%$ (the closer to 100% the better). For temperate species, a germination result lower than 85% indicates a potential performance problem with the seed lot, usually because it has started to deteriorate physiologically.



Another example of seedling failure – good germination but cold germination tests on the seeds showed very poor results

Purity – as close to 100% as possible. Purity refers to the percentage of the seed lot which is pure seed of the species concerned. Seed lots will also contain other seeds (crop species and/or weed seeds),

and inert matter (straw, soil). A low purity (<99.7%) generally means the presence of weed seeds (which will be named on the SAC). Note that purities will usually be higher in large seeded species (e.g. peas) than small seeded species (e.g. clover) because the weed seeds are easier to remove from large seeds.

Additional factors to consider include:

Genetic purity – for all herbage and most arable crops, this is assured through the New Zealand Seed Certification scheme. For any variety in the scheme, the buyer is assured that the seed lot available for purchase does not differ in its genetic make-up from the seed originally produced by the plant breeder. The SAC will state whether a seed lot is certified or uncertified. Vegetable species are not included in the New Zealand Seed Certification scheme.

Vigour – a vigour test result will normally not appear on the SAC, but a Seed Testing Laboratory will conduct vigour tests on request. Seed vigour is an assessment of the ability of a high germinating seed lot to perform in environmentally stressed situations (e.g. cold and/or wet soils). Two high (>90%) germinating seed lots of the same variety may have different vigour test results (e.g. high and low vigour), which means that the high vigour lot is more likely to emerge and establish in a stress environment than the low vigour lot

Health – seeds may carry fungi/bacteria/viruses that cause plant diseases. Seed lots for domestic use are not routinely tested for pathogens, but can be tested on request. The New Zealand approach (for arable crop species) has been to use fungicide seed treatment as ‘insurance’ i.e. all seed lots are treated. Seed treatment is a cost-effective method for controlling fungal pathogens (systemic products give protection for up to 6 weeks after emergence), but no one product controls all pathogens. Insecticide seed treatment also offers good control of certain soil-borne pests.

Size – seed size may be reported on the SAC as thousand seed weight (TSW), and this information is useful if sowing rates to achieve target plant populations are to be calculated. The answer to the question of whether big

seed is better than small seed depends on the comparison being made. Within a seed lot, large seeds tend to outperform small seeds because they have greater stored food reserves. When comparing seed lots however, one with a higher TSW than another seed lot may not necessarily be of higher quality.

Seed coating - offers advantages, as trace elements, growth regulators, fertilisers and beneficial micro-organisms, in addition to fungicides and insecticides, can be packaged around the seed. Seed coatings can be formulated to suit specific client needs and can be advantageous for species which have small and irregularly shaped seeds (e.g. many vegetable species), as seed coatings can produce a uniform product suitable for precision sowing.

Finally, a SAC (Seed Analysis Certificate) can be likened to an Automobile Association report on a used car. Most of us would not purchase a used car without seeing some form of independent report. Purchasing seed without knowing its quality is not the wisest move. The SAC can provide that information!

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