

## “IT’S THE LITTLE THINGS THAT COUNT”

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*[ed] This article was first published at the National Crisping Potato Workshop in Toowoomba 1997. At this time, Tony was the Industry Development Officer for the Victorian Potato Crisping Research Group. Tony was highly regarded in the Australian Potato Industry and made a significant contribution to the potato industry. In learning of his recent passing, we acknowledge his contribution and pay tribute to his success as an industry leader. His message in this article produced some 17 years ago is just as relevant today, showing that he had true vision and leadership. Our thoughts and well wishes go to the Myers family who have provided permission to reprint Tony’s original article. [end]*

**W**hether we grow potatoes in Tasmania, on the Atherton Tablelands or overseas there are a set of management practices that apply across all regions. These practices or “guidelines” are the result of combining the experimental work of scientists and the practices of farmers and industry to develop “best management practices” for growing potatoes.

Integrated Crop Management is about using the principles of these best practices of potato crop management to grow healthier crops, maximise profits and protect the environment.

While the emphasis of a principal will not change, the practices of the principal may alter to suit different environmental conditions or the individual needs of growers. For example, cutting seed in tropics may require more emphasis on cooling temperatures and increased air flow for curing, than Victorian conditions where warmer temperatures and a moderate air flow is often required.

By concentrating on fine tuning the important little things and getting them right, it’s possible to avoid the larger problems.

### FINE TUNING CROP MANAGEMENT

Fine tuning many crop practices does not necessarily cost extra money. It may involve a little more attention to detail, a little more time spent planning and evaluating or by being more efficient in one particular area. It could also mean spending money on a piece of equipment, such as tensiometers to improve irrigation efficiency, to gain improvements in water use and better yields.

At the onset I’d like to say, I don’t believe we should consider improving productivity without also improving quality, or at the expense of quality. Many of the factors that reduce yield also reduce quality.

### SEED

Seed, handling, storage and crop establishment are among the major areas where many potato growers can fine tune management to improve productivity, quality and reduce growing costs.

High quality seed is the first step in achieving yield and quality, but it doesn’t just happen. It’s the result of a lot of hard work by many people, including seed growers, certification agencies, laboratories, associated back-up services and buyers, all combining to produce and obtain the right seed for individual

requirements.

People frequently complain about the high cost of buying seed and, admittedly seed costs can be high in the open market situation. However in many cases, having paid good money for that seed, they neglect to give the seed the care and consideration it needs to get the best return on their investment. Losses due to damage caused by poor transport, inadequate storage and rough seed cutting and poor seed care after cutting, dramatically reduce yields and increase growing costs.

As seed customers and seed producers, I believe we should always be looking to buy the highest quality seed at a price that ensures both parties remain viable. The industry relies on both seed growers and buyers to survive.

One very successful way of containing costs and obtaining a reliable supply of seed, is to forward contract seed supplies.

## SEED CONTRACTS

Seed contracts stabilise your potato operation by ensuring you get:

- **QUALITY:** Contracting should give you access to some of the best seed available to meet your specific needs. Some seed growers are prepared to supply higher quality, specific grades or earlier generation seed under contract.
- **SUPPLY:** Contracting assists the buyer to obtain the quantity of seed needed
- **PRICE:** Contracts take out the yearly price variations, allowing both parties to budget costs and income.
- **STABILITY:** Contracting seed introduces stability to both seed buyer and seed grower, making it easier for both parties to make longer term production plans.

Contracts are available from most forward thinking seed growers, who are looking for better ways of stabilising their business operation.

Seed contracts usually lead to better communication between the seed buyer and seller. They help both parties understand each other's business commitments, and avoid the disappointments of non-supply or poor quality in the open seed market situation.

## SEED STORAGE

To obtain maximum production from seed, it must be stored and handled carefully, from when it is first harvested through cutting and planting. Poor seed storage or inadequate seed protection is still responsible for causing some of the largest losses in seed potatoes and crop failures.

Among the basic principles for storing potatoes to maintain quality, reduce weight loss through transpiration and heal or cure harvesting damage are:

- **Air**
- **Temperature**
- **Humidity**

These same principles apply to any stored potatoes – either for seed, processing or cut seed held ready for planting. The principles of air, temperature and humidity vary to suit individual conditions. Generally, temperatures for curing cut seed range from 12-15°C for 7 days with high humidity (80-90%) with a good air flow.

## SEED CUTTING

For high yields and subsequent tuber quality, it is essential to plant seed accurately to obtain a uniform plant population. This means that the seed has to be cut within the size range and seed-piece shape necessary to suit the specific potato planter.

Seed spacing, is dependent on the uniformity of the cut seed and the adjustment and operation of the planter. A seed size range of 45g to 65g is generally the acceptable aim, depending on the variety being cut and the desire number of eyes per seed piece required. It is important to eliminate small size cut seed (less than 28g) and slithers as these do not produce viable plants.

Ideally, seed-piece shape should be blocky to provide the lowest surface area/weight ration and this shape is easiest to pick up onto cups or needles. Long banana shaped seed are usually overweight and cause misses and doubles when planting.

One of the most important ways to improve the quality of cut seed is to monitor the cut seed by checking seed weight and the type of cut surfaces. This will provide information needed to adjust the seed cutter to achieve the desired seed pieces.

A properly adjusted seed cutter will evenly distribute the manual work load to all cutting sections, however this will depend on the size distribution of the seed line.

Close examination and adjustment of sizing rollers when changing varieties or seed lines will improve the quality of cut seed.

It may be advisable with some varieties such as Atlantic, because of the scarcity of eye numbers, to actually look at buying seed to 200g and only cutting into three.

Careful handling of whole and cut seed is essential to minimise bruising and avoid changing the physiological age of the seed piece to the rest of the seed.

In cooler climates, or for cool stored-seed seed it is important to warm the seed (12-15°C) before cutting and providing adequate storage and handling before planting.

To obtain smooth even cuts surfaces, the cutting blades or knives must be kept sharp, installed properly.

It is important to disinfect the seed cutter between seed lots and especially whenever a disease problem occurs. Disinfection means – washing all soil, starch and debris off the machine and then using an appropriate disinfectant.

Closer attention to the above mentioned details will improve plant population, quality, and yields with minimal extra costs but considerable returns to the grower.

Under adverse planting conditions it is usually advisable to use a fungicide on cut seed before planting or use whole or round seed.

## ROUND SEED

Round seed will:

- out yield cut seed, providing more tubers with a smaller tuber sample.
- produce multi-stemmed plants that produce more smaller sized tubers, provided the seed is treated accordingly to the planting conditions.
- emerge more evenly than cut seed and the plants will reach maturity together, which is a major advantage for processing crops.
- reduce the risk of spreading potato diseases when cutting seed.

It can:

- be planted into more adverse planting conditions than cut seed with less risk of seed-piece rotting.
- be held for some considerable time if the weather conditions are completely unfavourable for planting.
- usually be planted at faster speeds than cut seed, because it picks up better on the planting mechanism.

It is:

- usually planted at wider spacings, using less seed sets per hectare but producing more stems per hectare.

To obtain the best value from round seed especially if multi-stemmed and a smaller tuber sample are required, it may be necessary to physiologically age the seed, to break apical dormancy.

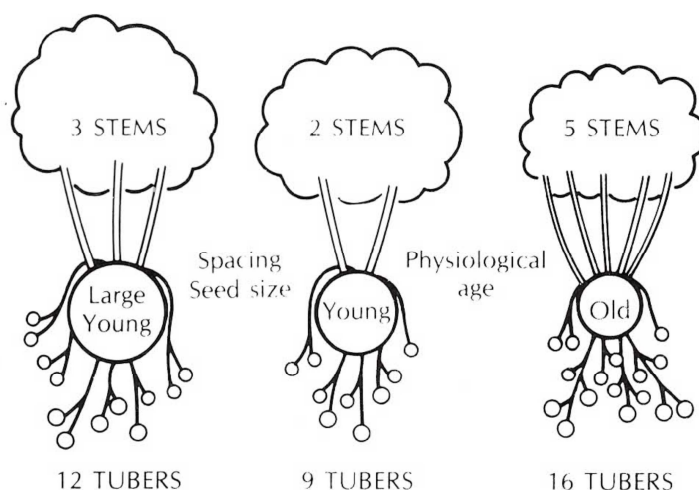
## USING P Age AS A MANAGEMENT TOOL

It's possible to manipulate seed performance either by planting physiologically aged seed that produces more sprouts with a higher number of tubers, but smaller sample, or by planting young seed that produces less stems, more vigorous plants and a larger tuber sample but with less tubers.

It depends on the time of planting, the variety and final crop use.

**Control of Stem and Tuber Number (Figure at right)**

**Illustration of seed size, spacing and physiological age which influence stem and tuber numbers per unit growing area.**



**Table 1: Characteristic behaviour of physiologically young and old seed tubers.**

YOUNG SEED	OLD SEED
Slow emergence	Rapid emergence
Apical Dominance	Multiple main stems
Few main stems	Increased stem branching
Vigorous, large plants and root system	Smaller, weaker plants and root systems
Fewer tubers set per hill	Relatively many tubers per hill
Long bulking period	Rapid bulking
Long tuberization period	Relatively uniform tuber set
Larger tubers at harvest	Smaller average size tubers
High yields	Early senescence, and lower yields

## PLANTING

Potato planter management is another important step in maximising field output and income through uniform plant stands. It doesn't matter how good the seed, or how well the fertiliser program is, if you don't get a good strike, you won't get a good crop.

A properly set-up planter using correct adjustments, frequent maintenance and properly operated will provide accurate placement of seed pieces and fertiliser. While the equipment dealer may provide initial pre-delivery set-up instructions, it is up to the grower to check the operators' manual, so he can understand and check the calibration and adjustments.

Planter performance is affected by such things as seed-piece size and shape, soil conditions, planter set up, maintenance and calibration, constant level of seed in the pick-up area. Operating speeds must be regulated and adjusted for different spacings and conditions.

Fine tuning planter performance by using the available adjustments, frequent maintenance, monitoring of seed spacing and placement combined with fertiliser placement in the paddock, will result in maximising planter performance for yield and quality.

## AVOID STRESS

If a crop is stressed at some time during its growth or storage period, the potential production and quality of the plant or tubers.

Stress can be in anything that influences the performance of the seed potatoes during the previous growing season, in storage, when cutting and planting, when the crop is growing, or it may even occur later during harvesting or storage.

It may be caused by environmental growing conditions, an inadequate fertiliser program, poor irrigation management or lack of water. Stressed plants are more susceptible to potato diseases and succumb more easily to pests. Anything that causes plant stress will affect yield and quality.

A stressed crop is a non-profit crop and a vital role in fine tuning crop production is to make sure the

management is appropriate and on time.

## CROP MONITORING

An important factor in crop management control is spending time in the field, observing just how the crop is growing and identifying pests and diseases, or current and likely future crop needs. It's important to look at both the foliage and root systems, when checking development.

Petiole testing is an excellent management tool, to see how your fertiliser program is running in the light of the current environmental conditions and may indicate possible changes for the next crop.

Knowing and understanding the difference and being able to correctly identify between diseases, pests, nutritional excesses and deficiencies and environmental problems will prevent pest and disease establishment and wasteful spray programs.

The technology is available for monitoring environmental conditions to forecast, pest and disease outbreaks. This equipment is resulting in better and more timely chemical application for pest and disease control.

A range of green manure crops, bio-technology and chemicals are available or being explored to control diseases such as Rhizoctonia, Powdery Scab and Target Spot. Some potato varieties are more susceptible to these diseases and should be treated accordingly.

Every area has it's dumps of waste potatoes and self sowns, left waiting to create major problems. We can no longer afford to pay farm hygiene, the lip service it has received in the past, and I believe we need to do something about this now before a major catastrophe occurs.

## IRRIGATION

"The aim of water management is to maintain adequate soil moisture throughout the growth of the crop, while avoiding extremes and excessive fluctuations".

Deficiencies or excesses of water affect tuber yield and quality. A deficiency will limit fertiliser availability and growth, tensiometer, DRW system, Gopher System, rain gauges or even plain old fashioned jam tins. The most important thing, is to use some form of water measurement, to see just how much water is going on, and where.

Irrigation equipment needs regular checking to ensure water application is correct and is going where intended.

## HARVESTING AND STORAGE

The techniques are now available for growers to damage test during harvesting and handling operations.

The Instrumented Sphere has highlighted some areas on equipment that need extra protection. Chemicals (inc. catechol) are available for growers to use for more "on farm" damage assessments.

Special rubber and padding that is suitable for cushioning material during harvest and handling is available, to protect delicate tubers.

Quality Assurance Systems are moving into the industry in all areas of production to ensure that customers are able to purchase a quality, safe product. A QA program identifies the hazards which occur during the management cycle and specifies the management steps needed to produce the desired quality article.

## CONCLUSION

For those who want to do it – very little is impossible. The tools are there for fine tuning – it depends on the will of the individual to do it. The industry has changed and will continue to change, and if you don't want to be part of it, rest assured someone else will.

The key to profitable production is consistent yields of high quality potatoes. Some growers here today are well on their way to achieving this aim by paying attention to the little things that count, Are you?

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