



# Managing Tuber Damage at Harvest

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*The act of harvesting and processing potatoes can physically damage tubers which results in economic losses to growers. Damaged tubers increase the risk of disease and shrinkage loss in storage, increase the cost of labour required for sorting, and reduce the quality and value of stored tubers. Damage susceptibility while harvesting potatoes depends greatly on a wide range of factors - many of which occur well before harvest. The following is a list of best management practices which can help reduce tuber damage.*

## Pre-planting

- choose fields with optimal soil conditions where soil is not compacted, water holding capacity is not an issue, and where planting depth and drill profile are consistent
- cultivate in fall to break up hard pans
- remove rocks before planting
- cultivate in spring under dry soil conditions, especially in heavy clay and break up clods using appropriate machinery
- choose varieties which are least susceptible to bruising. Agata, Dakota Pearl, GemStar Russet, and Red La Soda are a few varieties with some bruise resistance
- if planting susceptible varieties avoid sandy soils
- handle and transport seed carefully

## Planting

- choose dates to ensure sufficient time for crop maturity
- plant when soil temperature at seed depth is at least 9°C (48°F)
- plant with sufficient fertilizer, especially calcium and potassium
- plant up and down slopes rather than across them and design planting to reduce machinery turning during harvest
- ensure planting of straight rows and proper row spacing
- ensure even spacing and depth between seed
- check that clods are not being brought into seed bed

## Growing Season

- sufficiently irrigate and fertilize fields to avoid stress
- do not spray, irrigate or go through field unless necessary in order to reduce compaction and clod formation
- do not excessively fertilize as this will delay plant maturity and then increase skinning, blackspot bruising and shatter bruising (see Table 1)
- assess petiole nitrate-nitrogen levels. Levels should be down to 15 000ppm or lower by mid-August

## Vine Kill

- kill a minimum of two to three weeks before harvesting but consider weather conditions as skins mature slower under cool or wet soil conditions
- guarantee vine destruction so tubers easily separate from stolons during harvest
- keep soil moisture greater than 60% from the time vines are killed to harvest
- irrigate one week prior to harvest if soil is dry and tubers are dehydrated

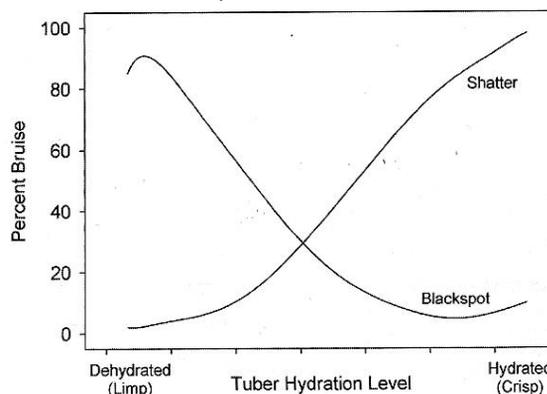


Figure 1. Blackspot (dry conditions) and shatter bruise (wet conditions) susceptibility potential as they relate to tuber hydration of Russet Burbank Potatoes, adapted from Thornton et al.

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## Harvest

- assess a row or two of each field for bruising and skinning the day before intended harvest using a harvester
- ensure tubers are not overly hydrated or dehydrated
- harvest when tuber pulp temperature is between 10°-16°C (50°-61°F)
- if applicable correctly align diablo rollers over hills so as to not cut or crush tubers
- angle digging blades so that tubers do not bump into primary chain
- base conveyor speeds on ground speed
- chains can be coated with soft materials if this will not affect soil elimination requirements for a given field
- maintain a flow of soil up to the second chain
- minimize tuber rollback on second chain
- avoid using chain shakers if possible
- ensure vine fingers prior to multi-sep table are well padded
- aim to remove not more than 60-70% of vines coming through harvester as removing more may cause excessive damage to potatoes
- if applicable use tank water above multi sep table on red, yellow and white potatoes especially
- keep drop from boom end to truck as low as feasible

## Truck

- avoid stepping on potatoes in the truck when covering with tarp

## Piling

- maintain minimum distance between boom end and potato pile, no greater than 15cm (6')
- pile potatoes in a step manner

## Storage

- complete wound healing within one to two weeks
- ideally 95% humidity and temperatures between 13°-16°C (55°-60°F) would be maintained

- maintain high humidity unless disease concerns require drying

## Washing, Grading and Packing

- prior to handling tubers coming out of storage, warm potatoes to 7°C (45°F)
- ensure potatoes are not bagged while wet or when condensation can form inside of bags

## All harvesting and washing and packing equipment

- ensure drops are kept below 15cm or 6'
- install padding wherever potatoes may be damaged
- run machinery at full capacity

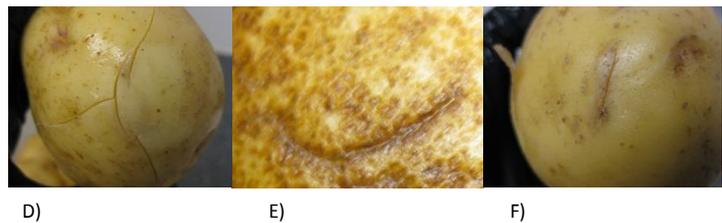
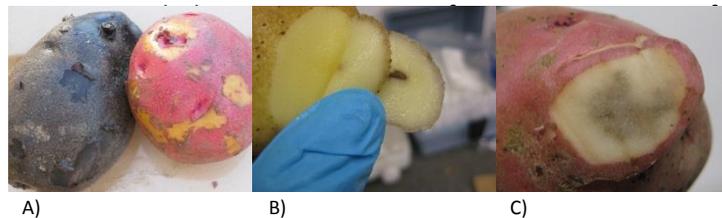


Table 1. Types of tuber damage and causes

Image	Damage Type	Cause
A	Skinning	Poor skin set and or excessive physical pressure
B	Slight and severe bruising	An impact which breaks the skin
C	Blackspot bruise	An impact which does not break the skin
D	Shatter bruise	An impact causing the potato to split or crack
F	Thumbnail crack	Likely due to changes in temperature and impact
G	Fine and large cuts	The digging blade or sharp edges along the harvesting or processing line

*Regular assessment of potatoes during harvest and post-harvest handling is a good way of reducing problems which cause bruising or other types of damage. Ensuring all employees understand their role in producing damage-free potatoes is key in an effective quality control management system on your farm.*

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