EARLY STORAGE MANAGEMENT: CAN DMN HELP?

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Decco Post-Harvest

When do your field management decisions begin?

Considerations

- Field selection
  - Soil quality, water availability, yield goals
- Inputs
  - Fertilizer, chemical
- Seed buying
  - End use/market, cultivar, plant health certificate
- Planting/harvest dates

When does your storage management begin?

- After harvest when everything is loaded and closed up?
- When you begin loading a storage?
- Vine kill/harvest?
- Planting?
- Year before when making field, cultural, and seed decisions?

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Growing season-
3-5 months
Storage season-
Up to 12 months

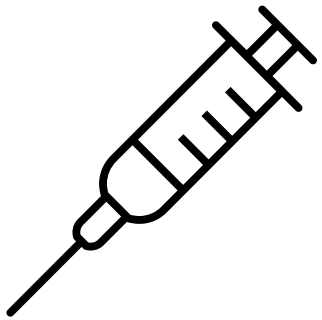
Storage is hard, why not avoid thinking about it until harvest?

Storages are not hospitals

- Focus of prolonging the decay process

Chemicals are not medicines

- We cannot cure problems, only manage



Can we incorporate storage principles early on?

- Field selection
  - Soil type- how will they store, proximity to quality storages, irrigated vs dryland
- Growing conditions and Inputs
  - In-season disease prevention, putting quality over yield goals
- Seed buying
  - Dormancy length, optimal storage temps and length, disease tolerance
- Planting/harvest dates
  - Planting in cool wet conditions
  - Harvesting in too hot or cold conditions

Objectives of Storage

Preserve tuber quality for as long as possible

- Manage weight loss/shrink
- Control disease
- Maintain end-use qualities
  - Color, sugar content, starch content, skin appearance
- Control sprout development

Exercise

- Stand up, shake/jump in place, trade places with the person next to you, sit down

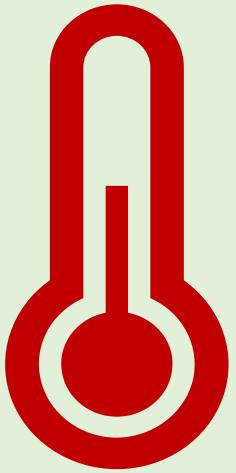
What did we just simulate?

What are you experiencing?

- Stress
- Increased body temperature
- Increased breathing

Early storage management is key

- Need to remove field heat immediately
  - Ventilation while loading the pile
- Harvest operations increase respiration rates
  - Tubers expelling heat, moisture, CO_2
- Stabilizing the pile to an even temperature
- Fresh air circulation- eliminate CO_2 buildup
- Humidity- avoid dehydrating the potatoes



Did you prepare your storage properly before harvest?

- Test functionality of mechanical systems
  - Airflow, humidification, air conditioning
- Clean and sanitize all surfaces
- Run air and humidity through storage prior to loading
  - Takes time to build a baseline humidity level
    - Storages absorb a lot of moisture

What tools are there to manage quality in storage?

Sanitizers and disinfectants

- Peroxyacetic acid, chlorine dioxide
  - Clean storages before loading
  - Reduce pathogen load in storage

Proper storage management

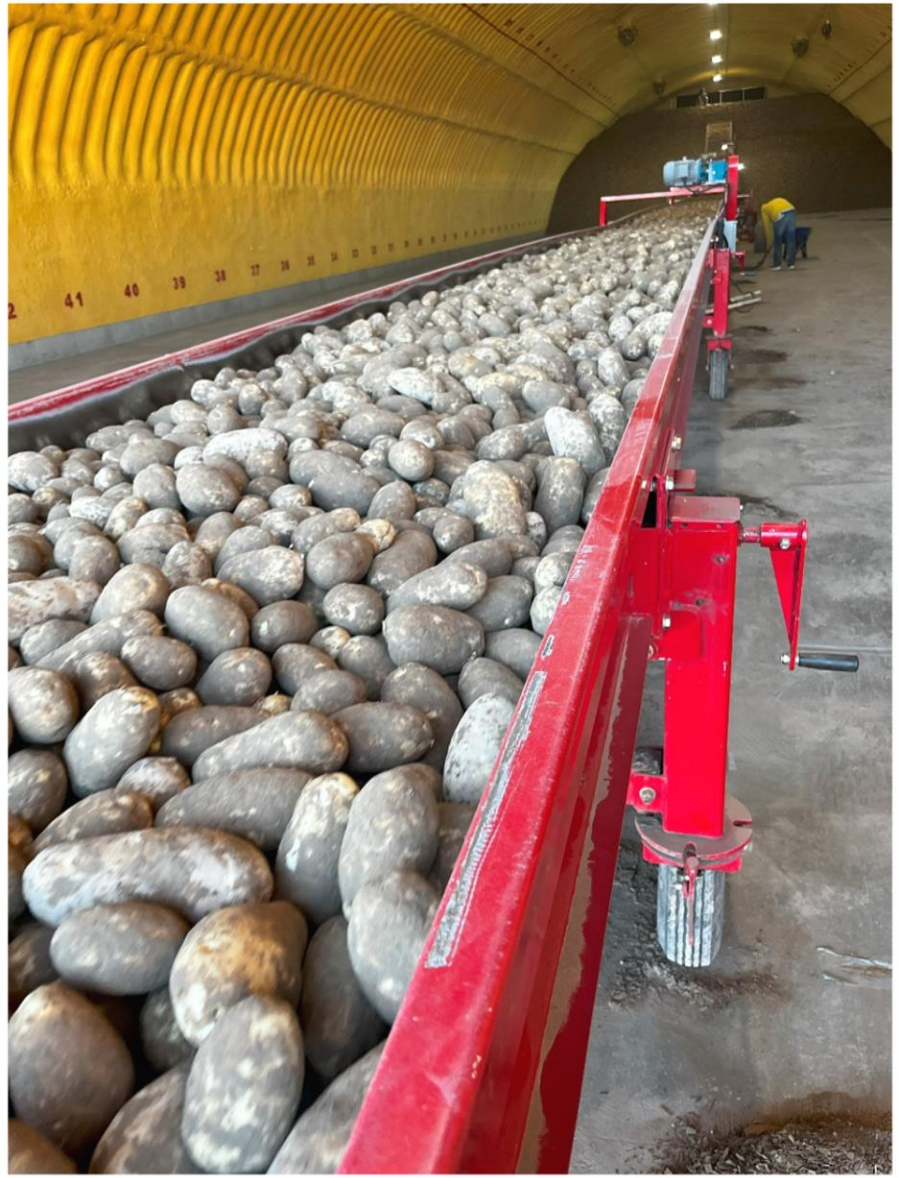
- Manage temperature, moisture/humidity, CO2, Oxygen
- Provide adequate airflow

Fungicides

- Azoxystrobin, Fludioxonil, Phosphite
  - Protect healthy tubers from being infected

Sprout inhibitors

- Maleic Hydrazide, Essential oils, CIPC, DMN
  - Reduce sprout development
  - Slow storage losses



These tools need to be planned out ahead of time

Sanitizing and disinfecting

- PAA and Chlorine- Done prior to storage loading (sanitation); shortly after harvest (disease control)

Fungicides

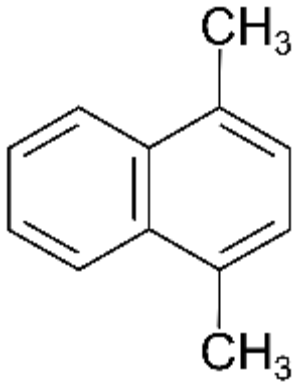
- Phosphite, Azoxystrobin, Fludioxonil- Applied to tubers going into storage

Sprout inhibitors

- Maleic Hydrazide- Applied to healthy growing crop in-season
- CIPC- applied after wound healing
- Essential oils- applied when sprouting occurs

New tools for the toolbox

1,4-Dimethylnaphthalene (DMN) Another tool?



Molecule was naturally derived from the skin of potatoes

Mode of action- believed to up/down regulate hormones involved in cell division

Aides in preventing sprout development

May be used in seed and/or commercial production

May provide additional storage benefits

DMN: the new kid on the block

We still do not fully understand what DMN can do, nor the mode of action.

- Know that it has sprout suppressing capabilities
- Anecdotal evidence states:
  - May reduce coloration of blackspot bruise
  - May slow respiration
  - May reduce weight loss
  - May improve turgidity

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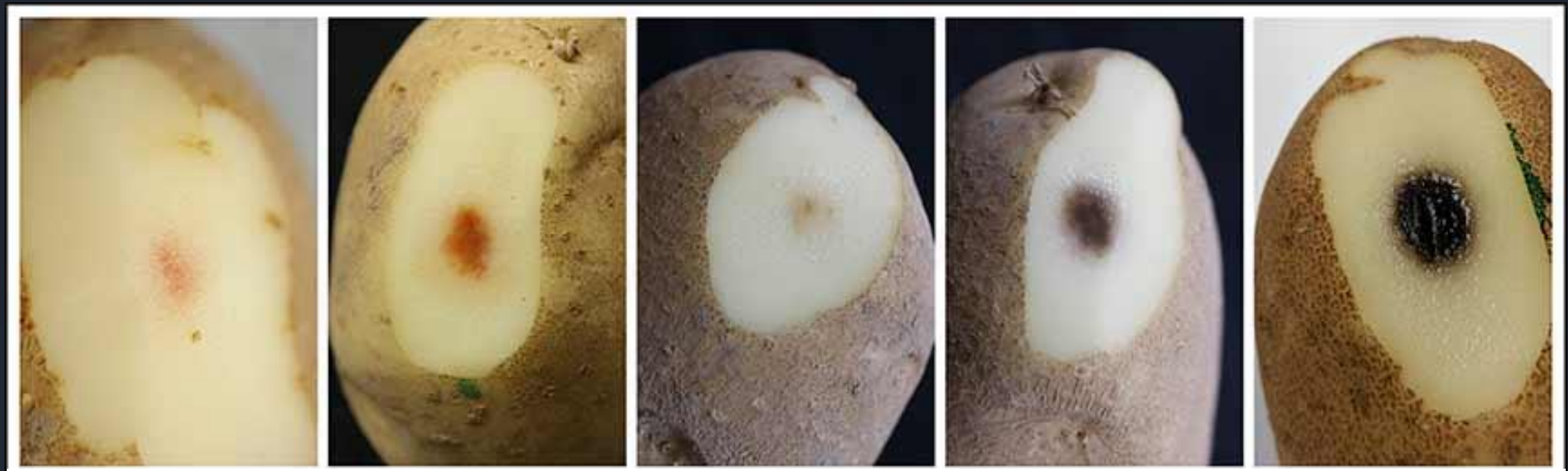
DECCO partnering with AGRINOVA RECHERCHE ET INNOVATION EN AGRICULTURE to conduct research trials on DMN



Picture: University of Idaho, 2020, A. Hollingshead, N. Olsen, R. Hendricks, M. Thornton. Bul 966

The How? Why? When? of DMN

- Study initiated with Agri-Nova research group harvest 2023
- Thermally applied DMN
  - 24-48 hrs of harvest
  - 7-10 days after harvest
  - 20-30 days after harvest
- Three cultivar classes
  - Table, Chip, Process
- Evaluations
  - Sprout development, blackspot bruise, weight loss, turgidity

There is still much we do not understand about DMN, but we do know:

- Is DMN a cure all for your storage problems?
  - Absolutely not!
- Does using DMN fix the problems you had going into storage?
  - Nope
- Does applying DMN allow you to forget about basic harvest/storage principles?
  - Not a chance

- Is DMN a tool that can be used on quality potatoes in a well managed storage program?
  - Absolutely yes!

There is still much we do not understand about DMN, but we do know:

- Is DMN a cure all for your storage problems?

Do we need to have a storage management plan ahead of time?
Definitely!

Talk to a local dealer to learn how and when DMN can fit into your current storage strategy.

storage program?

- Absolutely yes!

Questions?

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