



University
of Idaho

Agronomics of leasing land for potato production workshop

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Agronomics of Leasing Fields for Potato Production

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Introduction

LEASING OR RENTING FIELDS for potato production facilitates greater access to available acreage, locations, and opportunities. These fields may come with historical knowledge on yield potential, previous crops, water availability and irrigation capacity, irrigation method, soil properties, pest prevalence, and pesticide use history, all of which make agronomic and management decisions simpler. Unfortunately, not all leased or rented fields have this background information and many unknowns need to be identified and risks considered prior to preparing the fields for potato production.

The purpose of this bulletin is to identify agronomic considerations in leasing or renting fields for potato production and to facilitate further discussions regarding





Agronomic decisions and discussions

- Economics not discussed
- Leasing = leasing and renting
- Collecting information prior to leasing
 - What if information not available? How mitigate risks
- Communication between landowner and lessee
 - Establishing roles and obligations
 - Irrigation maintenance, weed control, stipulations
 - Background information
 - Water availability, previous crops and management, foreign material

Agronomics of leasing

Herbicides and
weeds:
Albert Adjesiwor

Nematodes:
Mike Thornton and
Jeff Miller

Soilborne diseases:
Jeff Miller and
Phill Wharton

Insects:
Erik Wenninger

Management and
variety selection:
Rhett Spear

Foreign material:
Nora Olsen



Herbicides and weeds

Things to know:

- Previous crop and herbicide use history
- Common weeds present
- Herbicide-resistant weeds
- Standards for weed control
- Weed control in field borders

Some basic questions about weeds and past weed control practices



- What were the previous crops in the past 3–5 years and which herbicides were used for weed control in those crops?
 - What are the most common weeds on the land?
 - Some weeds (e.g., nighshade, lambsquarters, kochia) are more difficult to control than others (e.g., annual grassy weeds)
 - Are there any herbicide-resistant weeds? If so, which weeds and what herbicides are they resistant to?
 - Are there any standards for weed control or are there any herbicides prohibited on the property?
 - Who is responsible for controlling weeds in field borders, roadsides, fence lines, etc.?
-

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These are easy, right?

Know herbicide use history for the past 3 to 5 years

Examples of commonly used herbicides in Idaho and rotational restrictions to [potatoes](#)

Herbicide group	Use crop and herbicide	Rotational interval (months)
Small grain:		
2	metsulfuron-methyl (Ally [®] XP)	34
2	thiencarbazone-methyl (component of Huskie [®] complete)	18
Sugarbeet:		
4	clopyralid (Stinger [®])	18
8	ethofumesate (Nortron [®])	12
Alfalfa, dry beans, and other crops:		
2	imazethapyr (Pursuit [®])	26
3	norflurazon (Solicam DF [®])	24

- Some herbicides can stay in the soil for 3 or more years and injure your potatoes
- Ask for herbicide use history (past 3 to 5 years)
- Consult the herbicide label to determine if its safe to plant potatoes

[Always advisable to:](#)

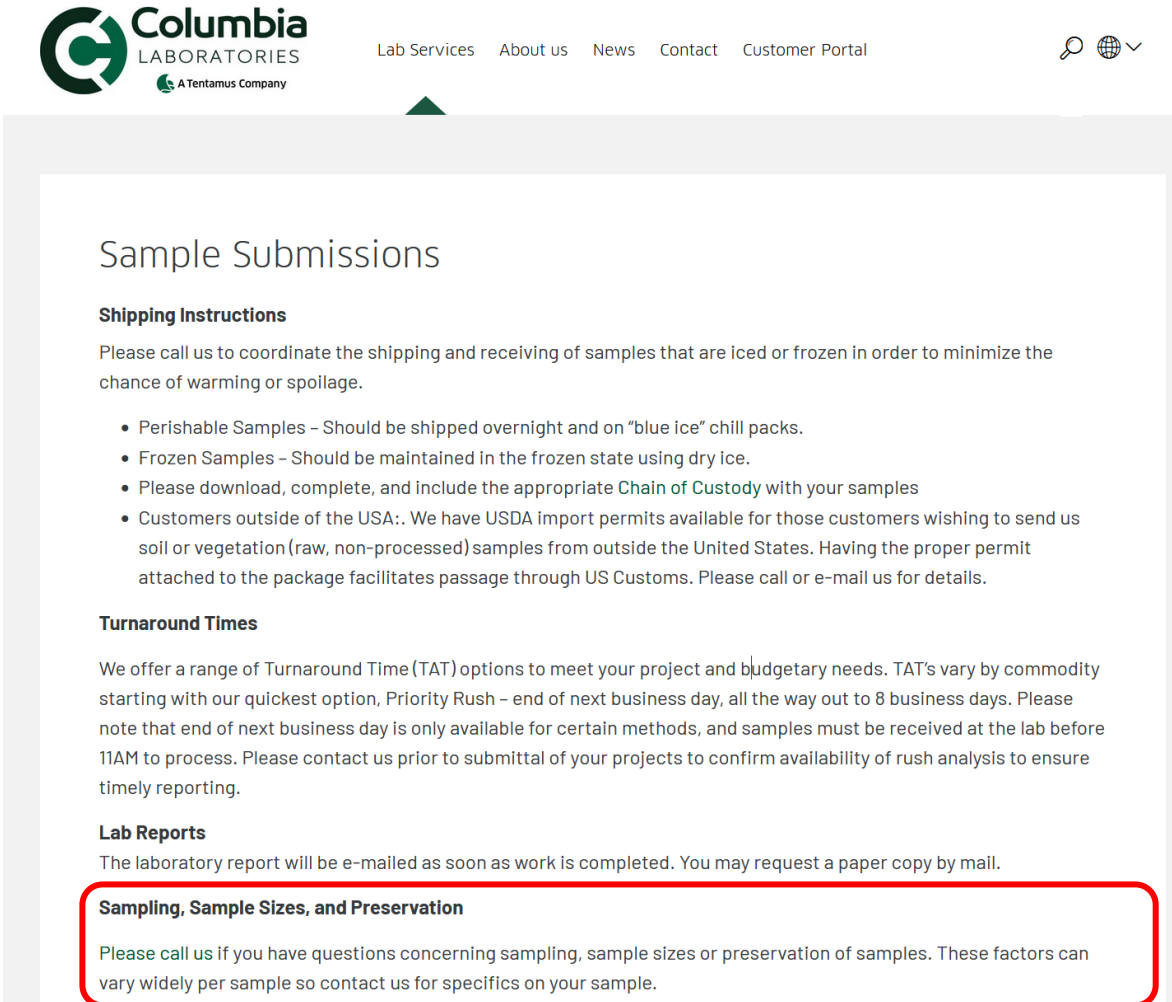
- Send soil samples to the lab for residue analysis
- Conduct bioassay

Bioassay

1. Collect soil samples from the top 1 foot at the worst parts of the farm (lowest organic matter, eroded, poorly drained, etc)
 2. Collect about 5 pounds of soil (about an ice-cream bucket full) and mix it thoroughly
 3. Collect an equal amount of soil from a field not treated with any herbicides (e.g., your backyard)
 4. Place the two soil samples (one from the farm that had herbicides and the other from non-herbicide treated soil) in wooden boxes or pots
 5. Plant 6 to 10 seeds (e.g., indicator spp like lettuce) in each soil.
 6. Place the pots in a sunny location and water as needed to enable the seeds to emerge.
 7. Observe the living plants in the herbicide-treated soil for signs of herbicide damage.
-

Lab test

- Contact the laboratory for directions on sampling and sample submission



The screenshot shows the Columbia Laboratories website. The header includes the logo (a green 'C' with a circular arrow) and the text 'Columbia LABORATORIES' and 'A Tentamus Company'. Navigation links include 'Lab Services', 'About us', 'News', 'Contact', and 'Customer Portal'. There are also icons for a magnifying glass, a globe, and a checkmark.

Sample Submissions

Shipping Instructions

Please call us to coordinate the shipping and receiving of samples that are iced or frozen in order to minimize the chance of warming or spoilage.

- Perishable Samples – Should be shipped overnight and on “blue ice” chill packs.
- Frozen Samples – Should be maintained in the frozen state using dry ice.
- Please download, complete, and include the appropriate [Chain of Custody](#) with your samples
- Customers outside of the USA: We have USDA import permits available for those customers wishing to send us soil or vegetation (raw, non-processed) samples from outside the United States. Having the proper permit attached to the package facilitates passage through US Customs. Please call or e-mail us for details.

Turnaround Times

We offer a range of Turnaround Time (TAT) options to meet your project and budgetary needs. TAT's vary by commodity starting with our quickest option, Priority Rush – end of next business day, all the way out to 8 business days. Please note that end of next business day is only available for certain methods, and samples must be received at the lab before 11AM to process. Please contact us prior to submittal of your projects to confirm availability of rush analysis to ensure timely reporting.

Lab Reports

The laboratory report will be e-mailed as soon as work is completed. You may request a paper copy by mail.

Sampling, Sample Sizes, and Preservation

Please call us if you have questions concerning sampling, sample sizes or preservation of samples. These factors can vary widely per sample so contact us for specifics on your sample.

Just as an example!

Lab test

- Contact the laboratory for directions on sampling and sample submission
 - Know what you are testing for...
 - Generally, pesticide residues are most present in the soil's top layers (~ 3 to 6 inches)
 - Take a representative sample
 - Mix samples thoroughly to come up with a composite sample
-

Nematodes infestations do not have a lot of visible above ground symptoms

- **Soil samples and historical records are your best tools for not leasing a problem field**



MOST COMMON NEMATODES IN POTATO FIELDS

Root-knot (Meloidogyne species) –
throughout North America

Root lesion (Pratylenchus species) –
throughout North America

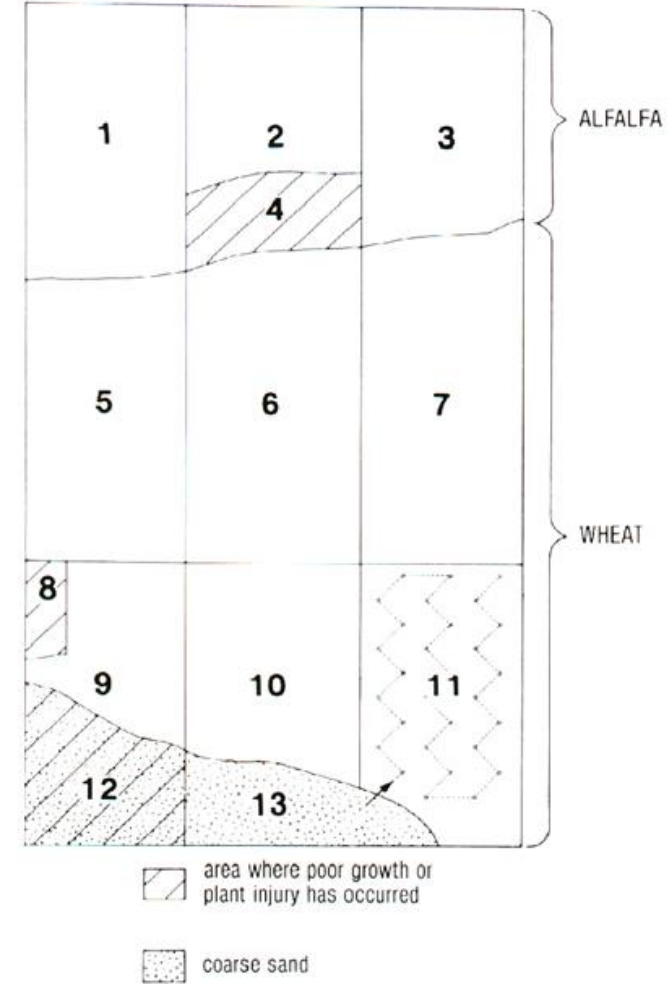
Stubby root (Paratrachodorus species) –
isolated regions

**Seed and soil are two primary means of
movement

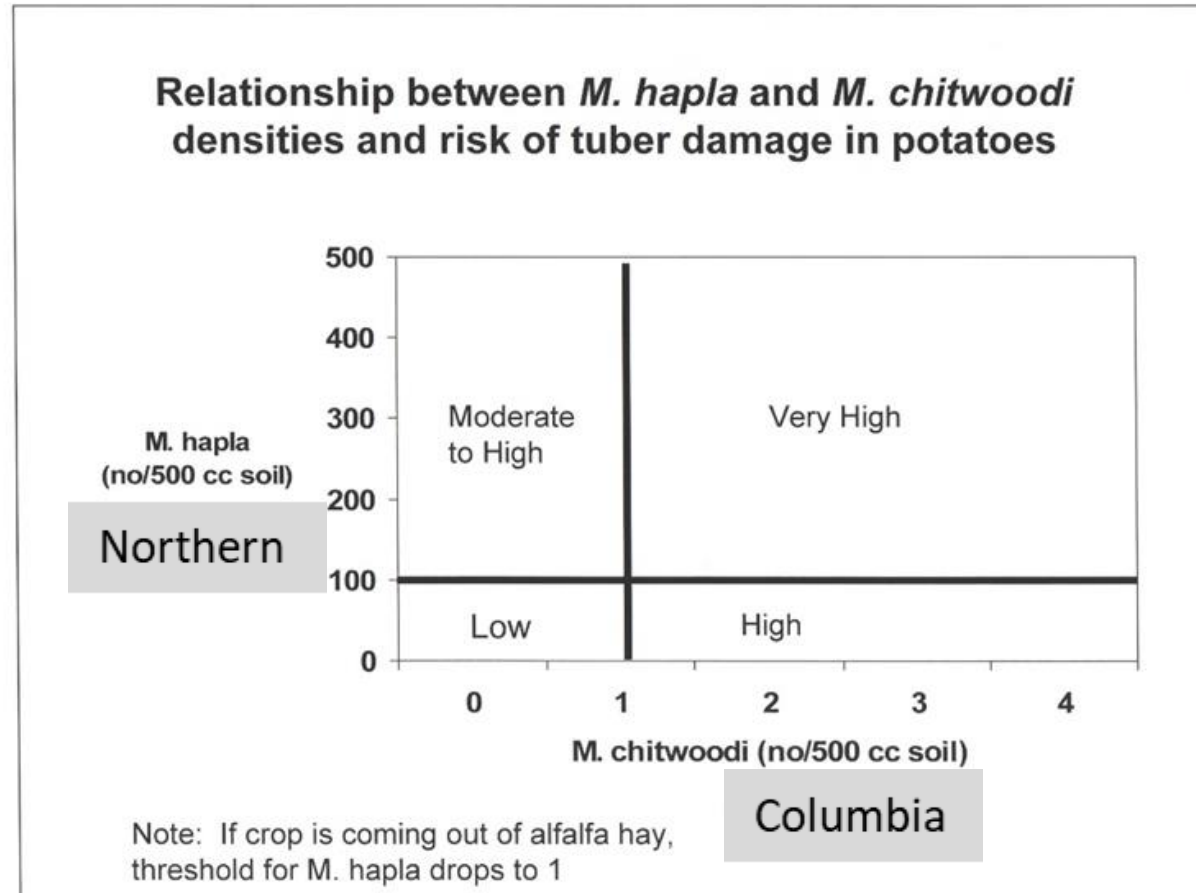


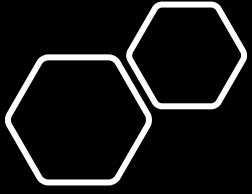
NEMATODE SAMPLING

- ✓ Requires intensive sampling
- ✓ Across soil types
- ✓ Within and/or below root zone
- ✓ Samples handled properly
 - moisture maintained
 - no temperature extremes
 - no direct sunlight



DAMAGE THRESHOLDS – NEED TO KNOW SPECIES AND POPULATION LEVEL





- Past use, results, restrictions on products or application methods.

CHEMICAL CONTROL OPTIONS

✓ Nematicides

- Fumigant

Ex. Telone, Metam

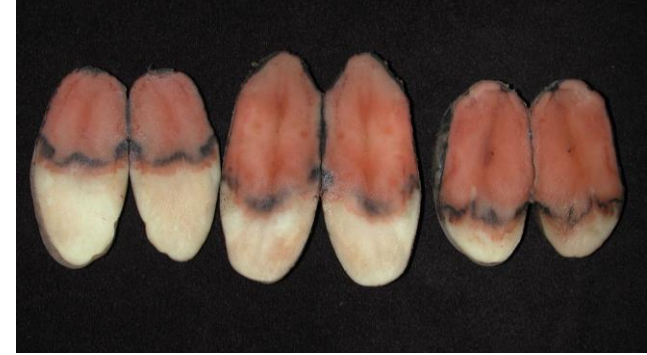
- Non-fumigant

Ex. Vydate, Mocap, Movento, Velum Prime



Soilborne Diseases

- Verticillium wilt
- Powdery scab
- Common scab
- Pink rot
- White mold
- Rhizoctonia



Verticillium Wilt

- Fumigation
 - Metam products and chloropicrin
 - Fall is most effective
- Alternatives?



Powdery Scab

- Yield limiting?
- Vector for PMTV
- Chemical control not cost effective
- Variety selection



Rhizoctonia Canker and Black Scurf

- Soil- and seed-borne
- Fungicide options at planting
 - In-furrow
 - Seed treatment
- Applications after planting not effective



Pink Rot

- Soil pH – disease favored at lower pH
- Proper irrigation
- Variety
- Fungicide selection
 - Mefenoxam
 - Phosphorous acid
 - Orondis
- Field drainage



Things to Know

- What was the crop rotation?
- Previous disease problems
- Pathogen populations
- Pesticide history
- Pesticide use restrictions



Wireworms



- Favored by grass-heavy rotations
- Live for up to 6 years in soil
- Monitor with bait stations
- Insecticide options mostly at-plant



Wireworms – IPM

- **Resistant varieties** – none known
- **Cultural control** – crop rotation; deep plowing July/August; avoid following grasses; consider field history
- **Biological control** – birds and ground beetles
- **Chemical control** – at-plant treatments; “rescue” treatment options limited; decision to treat based on scouting and crop history

other arthropods favored by certain rotations



arthropod

risk factors

insect- icides

cutworms



after grasses (crop,
pasture, weeds)

many

white grubs



after grasses, pasture;
high organic matter

few

garden symphylan



high organic matter

few

seed corn maggot



cool, wet spring;
high organic matter

none

leather jackets /
crane flies



after spring plowing of
alfalfa

none



2022 potato fields

desert

lower elevations

other hosts (crops, weeds...)

Agronomic Management & Variety Selection



Potatoes & Stress



Rotation

- Residual fertility
- Foreign material
- Pest host
 - Insects, nematodes, weeds, mites
- Disease
 - Bacteria, virus, fungi
- Herbicide carryover

Possible Rotations

Grain → Potatoes

Grain → Grain → Potatoes

Grain → Sugarbeets → Grain → Potatoes

Grain → Alfalfa (2+ years) → Grain
→ Potatoes

Facilitate Tillage, Planting, Harvest and Post-harvest Activities & Quality with Crop Rotation

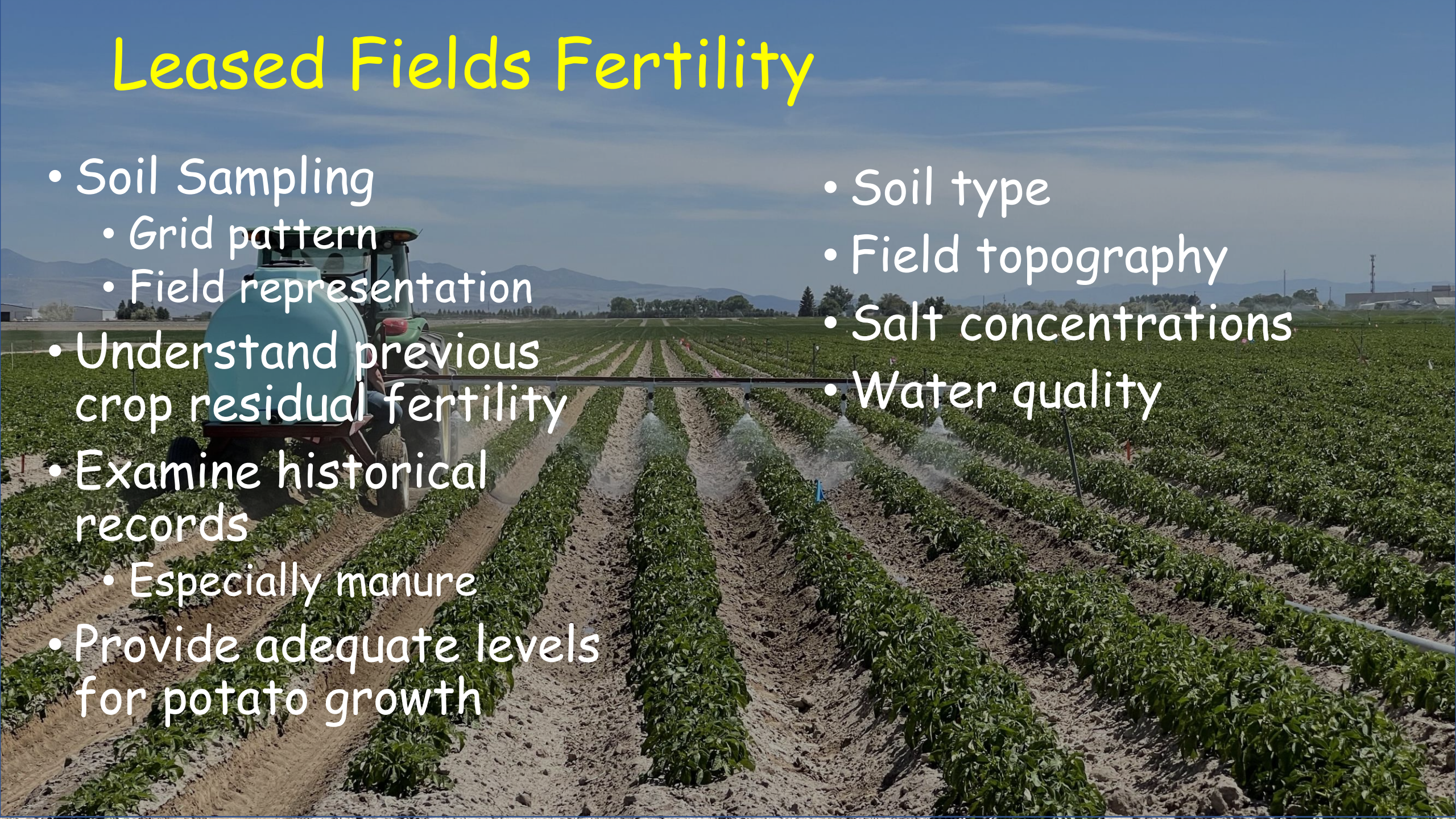
- Consider current crop will influence the next crop

Examples

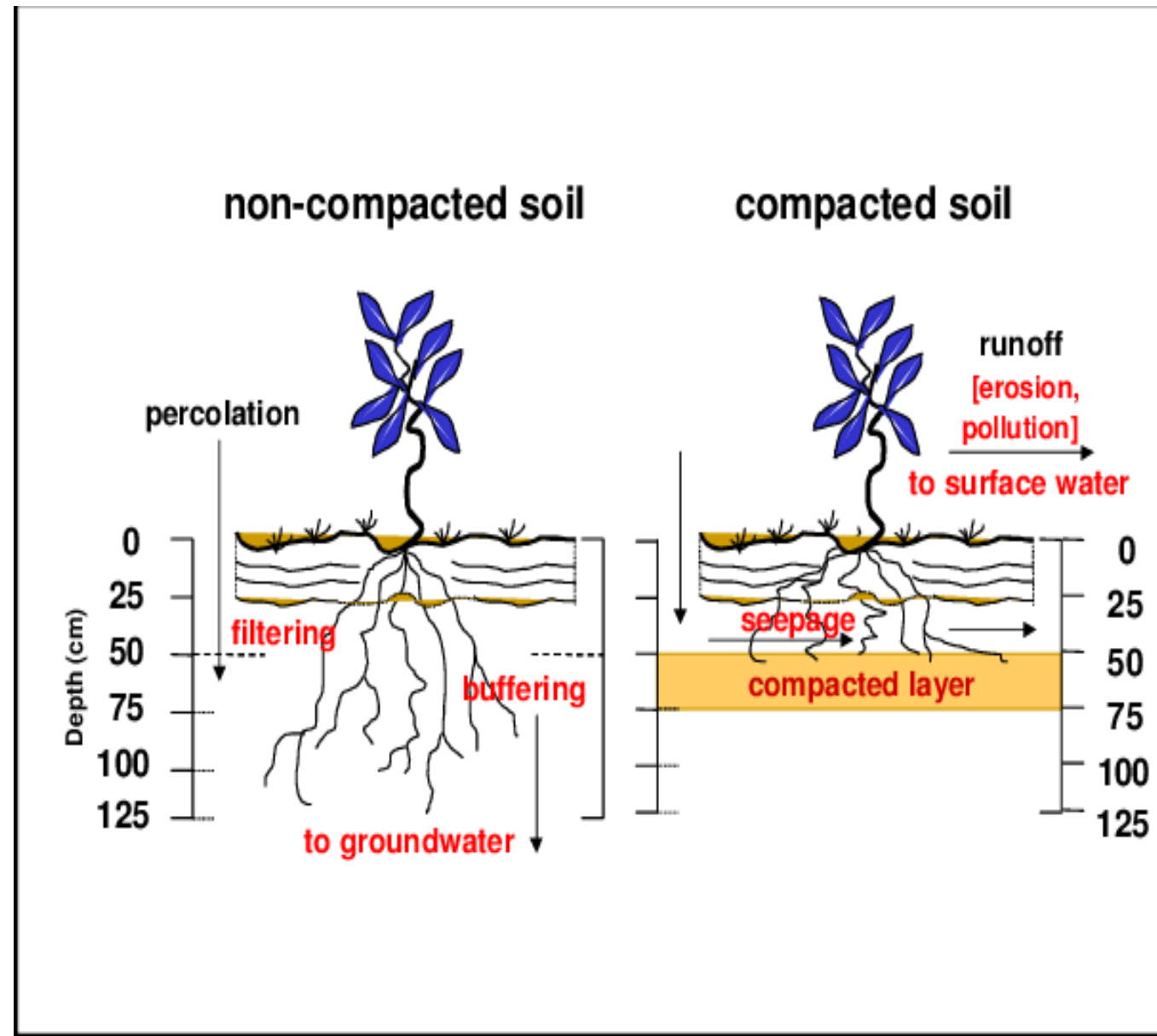
- Corn ears in harvested potatoes
- Alfalfa roots complicating planting or early season tillage
- Residue complicating bed or row formation

Leased Fields Fertility

- Soil Sampling
 - Grid pattern
 - Field representation
- Understand previous crop residual fertility
- Examine historical records
 - Especially manure
- Provide adequate levels for potato growth
- Soil type
- Field topography
- Salt concentrations
- Water quality



Compaction



Water Stress

- Rot
- Sugar ends
- Hollow heart
- External & internal defects
 - Hollow heart
 - Growth cracks
 - Enlarged lenticels
- Season length
 - Early season vs. late season varieties

Potato Variety Maturity	
Early-Medium	Medium-Late
Blazer R.	Alpine R.
Classic R.	Clearwater R.
Teton R.	La Belle R.
Ranger R.	Umatilla R.
Shepody	Western R.
Pomerelle R.	R. Burbank
R. Norkotah	Alturas
Caribou R.	Dakota R.

Irrigation Questions to Ask

- Procedures for making water requests (surface water)
 - Responsibility for making water requests
 - Maximum volumes/flow rates
- Pump location & capacity (ground & surface water)
 - Fields serviced
- Water storage availability
- Age of pumps & other irrigation equipment
- Availability of variable frequency drives on pumps

General Questions to ask Landowner

- Rotation
 - Last time field was in potatoes
 - Number of years between potato crops
- Previous crop
 - Fertilizer & pesticide application records
- Rotation & tillage practices
- Irrigation equipment
 - Age
 - Maintenance schedule & responsibility
- Accessibility for fertilizer delivery
- Surrounding area obstructions/limitations
 - Aerial applications
 - Wide/large fertilizer spreaders
 - Planting, cultivation, & harvest equipment





Use the QR code to evaluate the Idaho Potato Conference and be entered to win a \$100 gift card!



How to Use a QR code...

1. Open the camera app on your smartphone.
2. Line up the camera viewer on your phone with the QR code you want to scan and hold the phone steady until the app can read the code in front of it.
3. After a moment, a web link will appear on the phone screen, usually near the top.