

A man wearing a light-colored t-shirt, blue jeans, and a wide-brimmed hat is walking away from the camera through a field of tall, dry grass. In the background, there are rows of young, green trees planted in a field, with a fence line visible. The scene is set in a rural, agricultural area with some buildings and more trees in the distance under a clear sky.

Establishment and Early Care of Montana Fruits

Katrina Mendrey
September 8, 2018

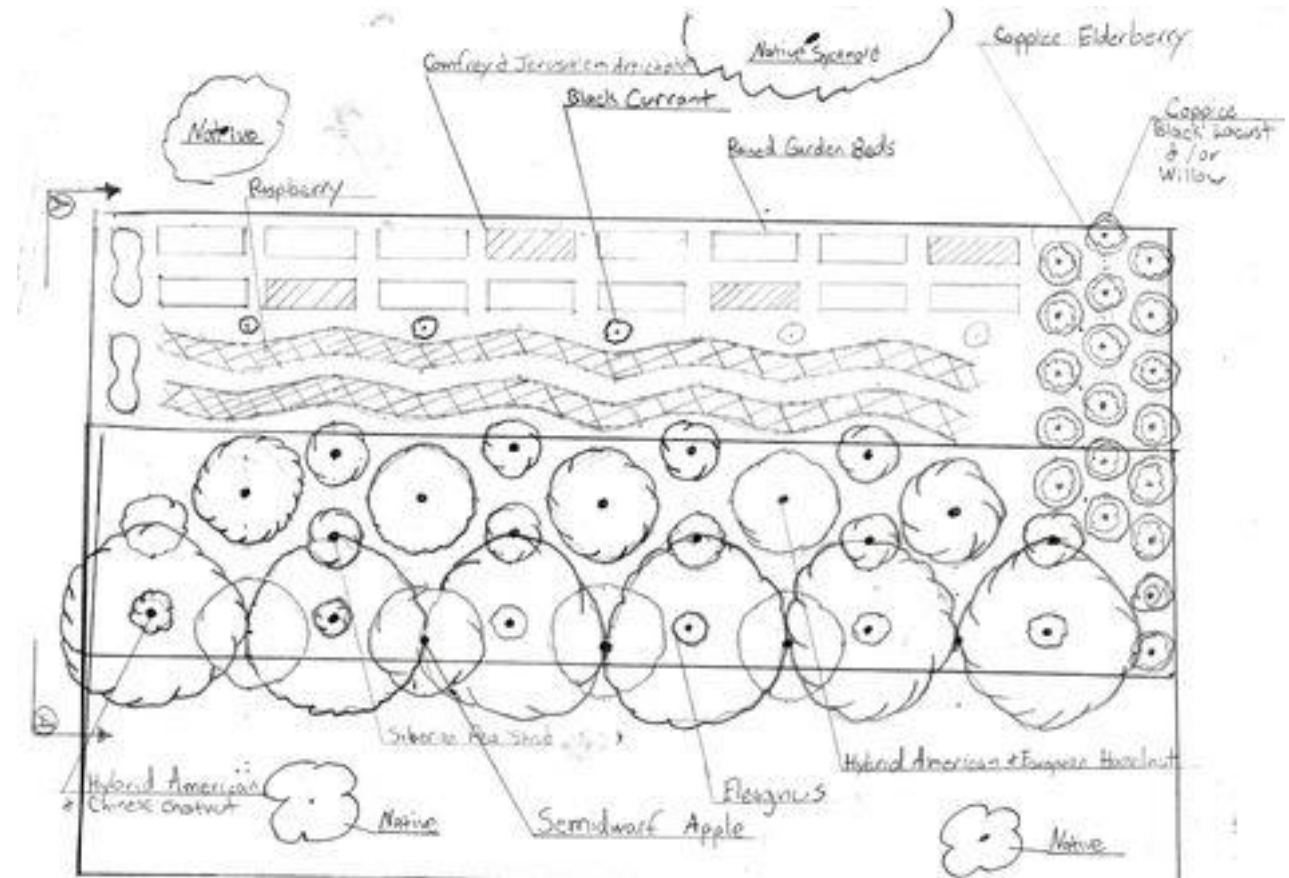
Presentation Overview

- Orchard design and Infrastructure
- Site Preparation and Planting
- Early Care
- Pests



Orchard Design

- What are you growing and what are you growing for?
- What can you personally manage and sell?
- What equipment will you use?
- How will you harvest your fruit?
- Fencing, bird netting, frost protection?
- Where is your water and how will you irrigate?



Row Spacing

- Row Spacing
 - Consider mature height, row orientation and potential shading
 - Slopes (12'-13') vs flat ground (10'-11')
 - Size of equipment used for mowing, spraying and harvesting
- Row length 500' max

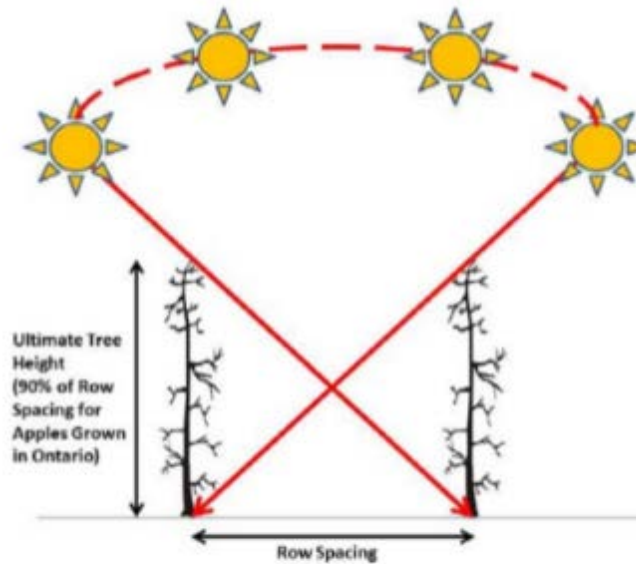


Figure 3. North-south tree rows are recommended for Ontario (42° - 45° latitude) to maximize sunlight interception. Tree height should be a maximum 90% of the row spacing.
(Schematic: Hugh Fraser)

10 ft rows = 9 ft trees
11 ft rows = 10 ft trees
12 ft rows = 11 ft trees

In row spacing of plants

- Depends on plant + cultivar and/or rootstock
- Consider mature size of the plant

	Mature Heights	Planting Distances
Grapes	5-20ft(depends on trellising)	3-8ft
Apple Trees on Ottawa 3 Rootstock	10-12ft	5-10ft
Apple Trees on Crabapple Rootstock	20-30ft	15-20ft
Plums	15-20ft	7-13ft
Currants	3-4ft	3-5ft
Sour Cherries	6-8ft	4-6ft
Saskatoons	5-12ft	3-6ft
Haskap	3-4ft	3-5ft
Pears	15-25ft	15-20ft
Strawberries	4-8"	10-18"
Raspberries	3-6ft	2-3ft

Source:

<http://www.fruit.usask.ca/growinginfo.html>

Orchard Infrastructure

- Fencing
- Bird Netting
- Trellis



What are you Fencing For?

- Deer 6ft fence minimum
- Elk 8ft fence minimum
- Bear: electric fence rated to 0.7joules



Fencing Materials, Cost and Design

- Posts
 - **Pressure Treated Wood** Minimum 5"
 - Steel 2 7/8" or 3 1/2"
- Panel fencing material strength varies
- A square is less expensive than a rectangle
- 16 foot opening for machinery to move in and out
- Costs will vary, but don't cut corners!



Really, don't cut corners!

- Use the right materials
 - 5" posts are 50% stronger than 4" posts
 - 1 3/4"-2" staples not 1" staples
- Be sure to install posts at least 1/3 their length deep
- Better to pound posts than auger
- Install anchors in undisturbed soil

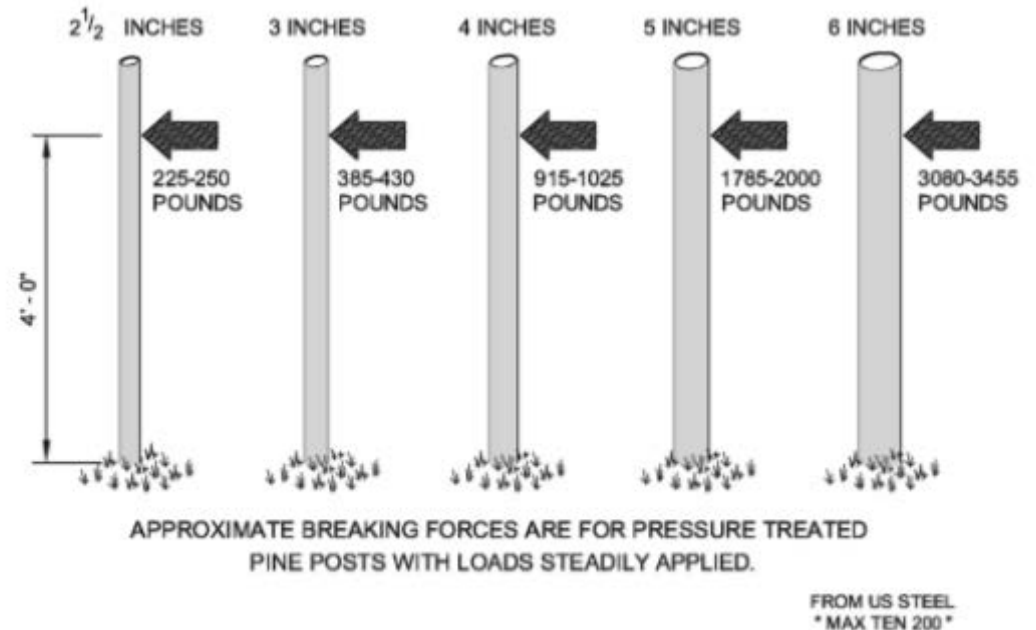


Figure 1

Pine Fence Post Strength

Fencing Fact Sheet BC Ministry of Agriculture Order No. 307.110-1

Trellis

- Needs to support a lot of weight (especially for apples)
- Terrain, soil, fruit, irrigation, and climate will influence the strength of the system
- Build it strong from the start.
- [Best Management Practices for Building Trellis Support Systems for High Density Ontario Apples](#)



Photo credit: Karen Lewis, WSU, <http://www.growingproduce.com/fruits/apples-pears/dont-underestimate-the-importance-of-a-solid-foundation-in-your-orchard/>

Bird Netting

- For soft fruits and berries
- Overhead crop netting for full orchard enclosure vs in row netting
- Snow



Orchard Equipment

- Tractor or ATV?
- Mower
- Sprayer or weeding equipment
- Spreader
- Pruning Equipment
- Harvest Equipment



Source: UVM, Tree Fruit Practical Guide For Organic Apple Production

Ready to plant? Protect your investment



Thank you Zach!

First Years: Prep, Planting, Care

- PREP: Weed control, Soil Assessment and Management
- Planting
- Care: Minimize stress
 - Weeds
 - Herbivores
 - Disease
 - Water/Nutrients
 - Prevent Fruiting



Thank you Zach!

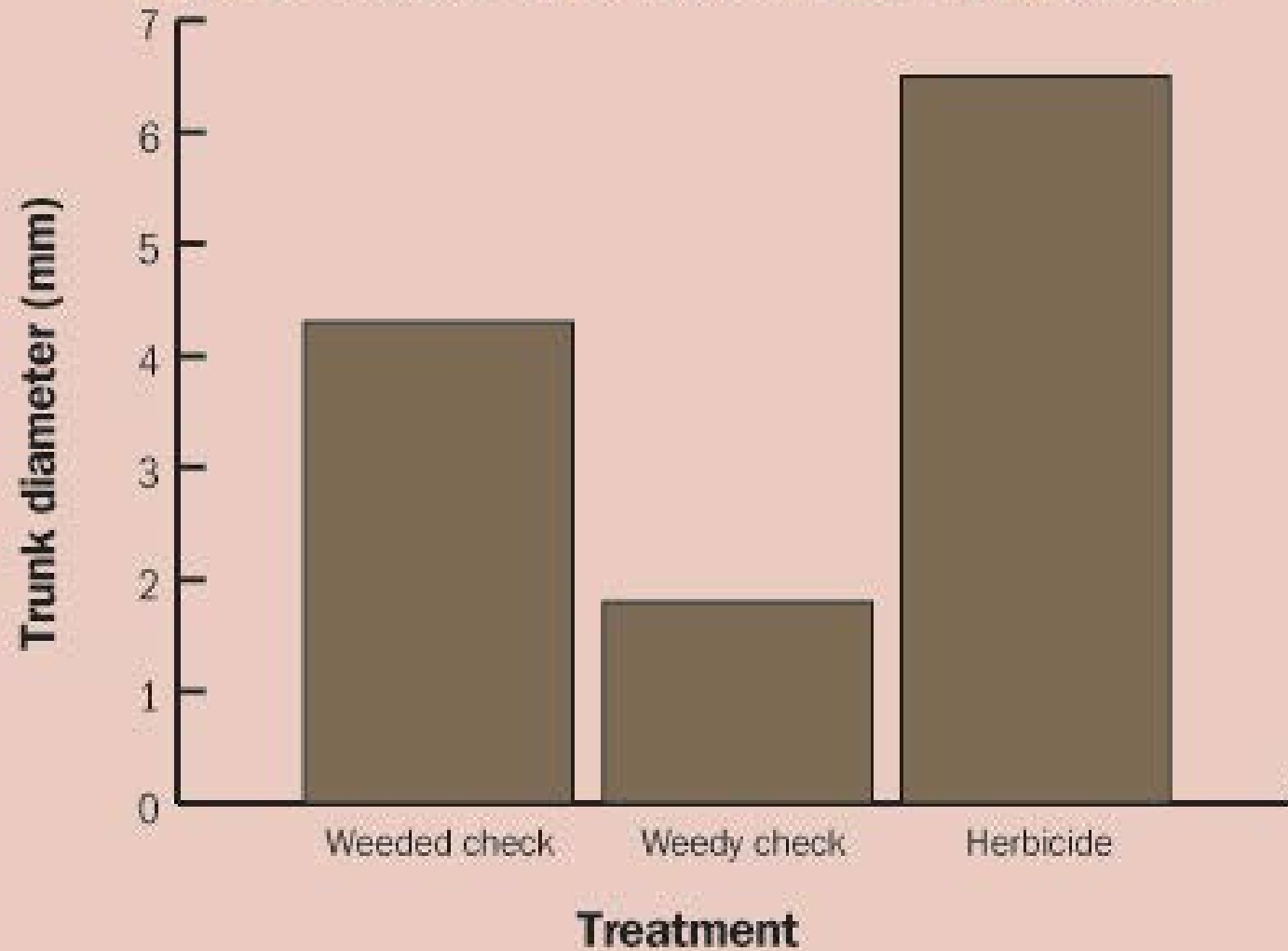
Prioritize weed control

- Identify and address perennial weeds like quack grass, Canada thistle, bindweed, etc.
- Systemic herbicides effective and cheap. Organic will require frequent tillage and cover cropping
- Addressing early pays...



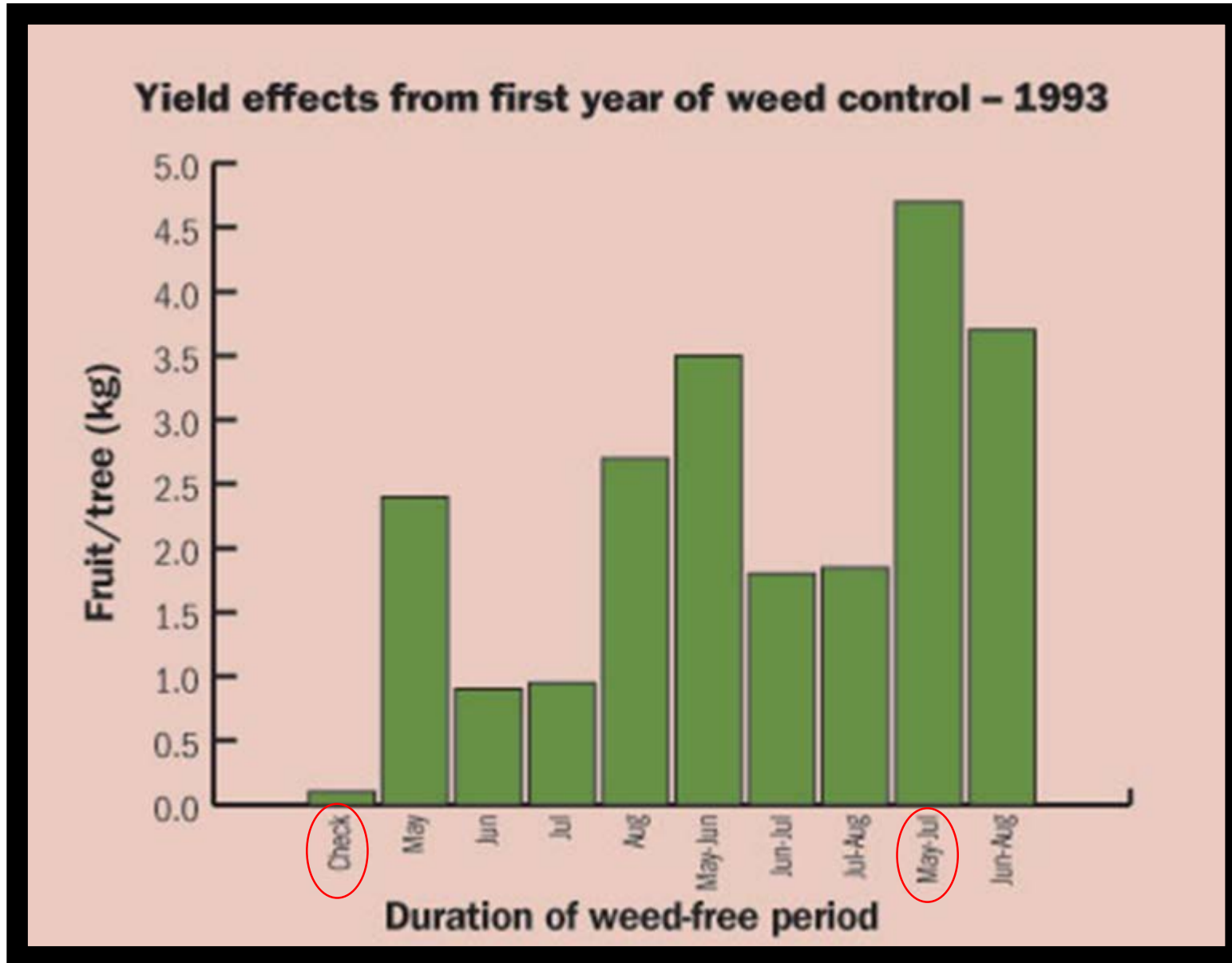
Thank you Zach!

Weed competition effects on new apple trees



Thank you Zach!

Early weed control is critical



Thank you Zach!

Pre-plant soil and site prep

- Consider existing vegetation
- If you don't have to till the entire area DON'T
- Soil structure: hard pan
- Opportunity to amend soils with immobile nutrients and organic matter
- Establish rows, alleys and set irrigation backbone



Thank you Zach!

Planting objectives

- Maximize growth-plant as soon as conditions allow in the spring
 - Fall planting risks cold injury
 - Plant early (before bud break of mature trees)
 - Roots grow once ground is thawed (soil temp >45) and before bud break
 - Early root growth results in improved first season growth
 - Moisture
 - Cool, moist spring
 - Irrigation system (on-orchard and distribution system) must be ready



Thank you Zach!

Holding plants prior to planting

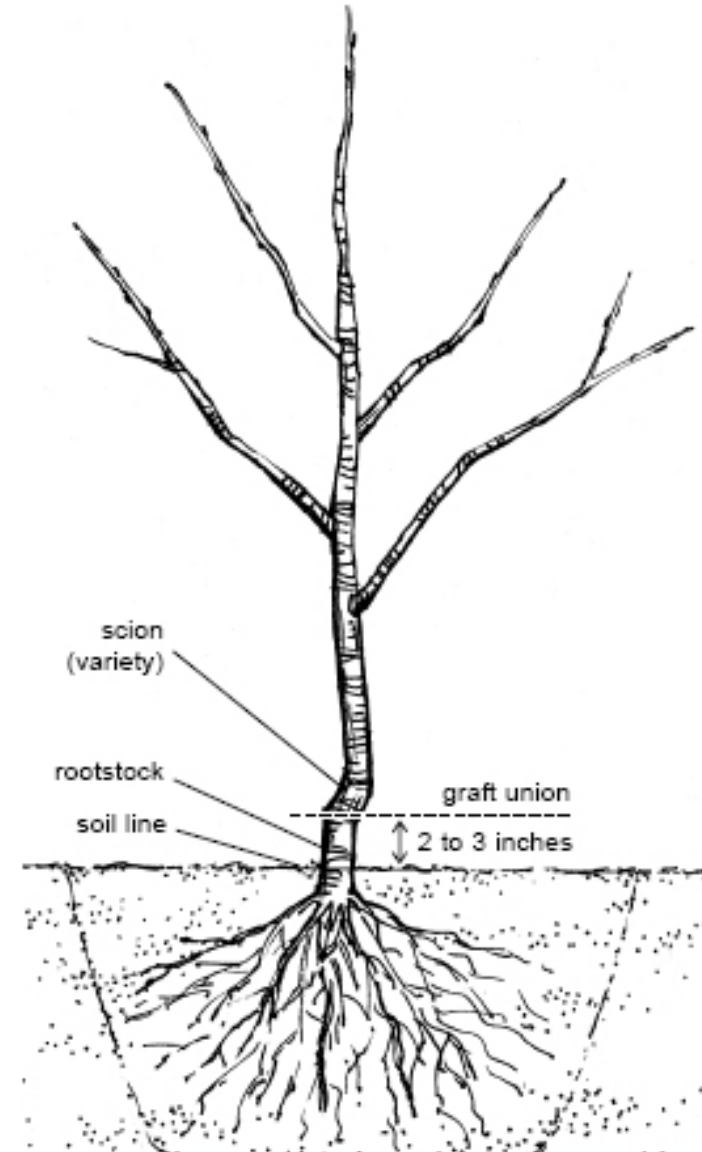
- Keep cool and moist
- Check that roots are moist, buds dormant, healthy, as ordered.
- Store:
 - Away from ethylene
 - 34-40 F
 - If extended storage (>few days)-Heal in trench
- Soak roots for 6-12 hours prior to planting



Thank you Zach!

Planting

- Hole
 - Slightly larger and deeper than roots
 - Avoid glazing, settling.
- Placement
 - Depends on plant
- Tamp down to remove air pockets
- Fill-loose, top soil if possible
- Create basin around tree to soak
- Water-in: removes air pockets



Thank you Zach!

Post-planting Care

- Maximize growth, minimize stress
 - Weeds
 - Vertebrates
 - Disease
 - Bloom removal
 - Resources: Nutrients/Water
- Cold injury
 - Sun scald
 - Hardening off-Encourage dormancy



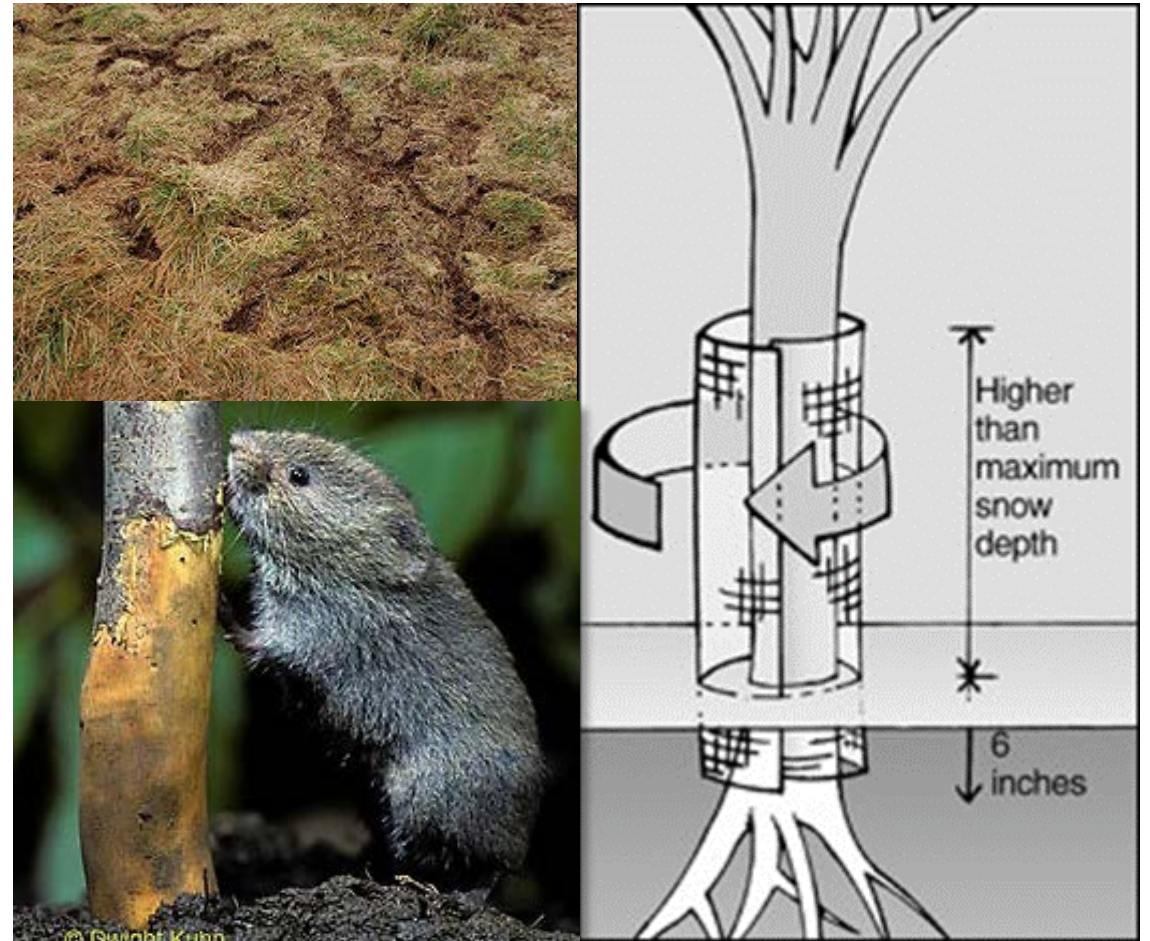
Pests to know about

- Animals
- Insects
- Bacteria and Fungi



Rodent Control

- Alter Habitat
 - Reduce food and cover (vegetation/snow)
 - Remove vegetation around trunks
 - Mow or till
 - Avoid plants favored by gophers
 - Encourage predators
 - Cats, Snakes, Raptors, Foxes
- Protect Young Trees- tubes or paint
- Bait/Trapping



Birds Berries



Insects and diseases

- More crop specific
- Management depends greatly on prevention and timing of controls
- Use IPM and keep in mind thresholds for damage



Pome Fruits: Apple, Pear, Saskatoons and Aronia

- Codling moth
- Aphids
- Thrips
- Pear sawfly
- Fire blight
- Scab
- Powdery Mildew
- Cedar/Juniper rusts



Dwarf Sour Cherry

- Pear sawfly/Cherry Slug
- Western Cherry Fruit Fly
- Spotted Wing Drosophila??



Currants

- Cane Borer
- Gooseberry Sawfly
- Currant aphid
- Thrips, spider mites



Grapes

- Leafhoppers
- Spider mites
- Powdery mildew
- Downy mildew
- Black rot



Haskaps

