

GROWING BERRIES in Vermont

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UNIVERSITY OF
VERMONT

EXTENSION

CULTIVATING HEALTHY COMMUNITIES

tonight's outline

- introduction
- soil / site preparation
- strawberries
- blueberries
- raspberries
- 'other'
- SWD

We'll take breaks for you to collect questions

I work primarily with commercial farmers
Norma Norris Berry Farm, Monkton



Adam's Berry Farm, Burlington



Paul Mazza's Fruits and Vegetables, Essex



Cherry Hill Farm, Springfield



some data on Vermont berries

- **~350 farms with \$8 million sales (2007)**
- **Strawberries: 5,000 lb/A* \$2.75/lb**
- **Blueberries: 3,000 lb/A \$3/lb**
- **Raspberries: 1,300 lb/A \$5.50/lb**

Increases expected for 2012 Census data!

* 3x these yields are possible

I'm also a home fruit grower







cover crop trials at my office





UVM Extension youth agriculture project





‘small fruits’



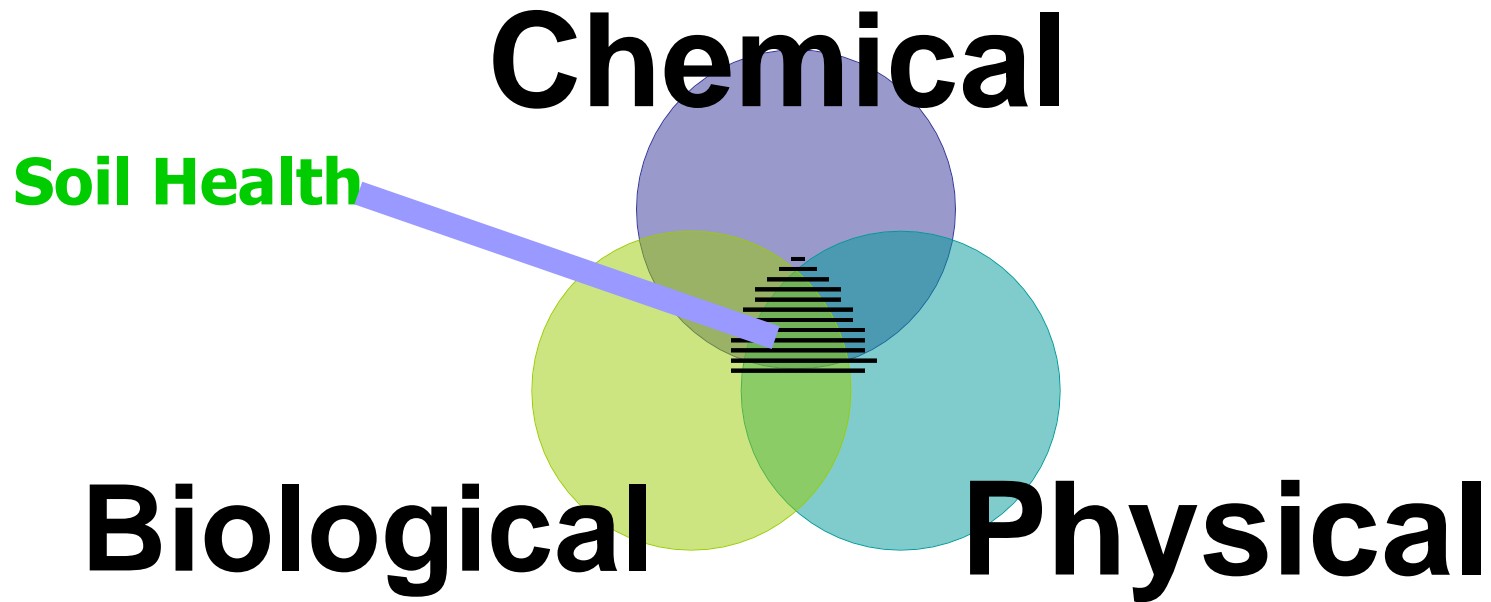
Pre-Plant Preparation

- **Turn under sod / clear area of growth**
- **Soil test, add amendments, organic matter**
- **Cover crop for a year if possible**
- **Repeat soil test, fertilize before planting**



Soil Health is Key to Success

Three Aspects of Soil Health



SOIL TEST RESULTS

pH (salt)		5.3
Available Phosphate (1b P ₂ O ₅ /A)	44	
Potash (1b K ₂ O/A)	420	
Magnesium (1b Mg/A)	159	
Reserve Phosphate (1b P ₂ O ₅ /A)	748	
Aluminum (1b Al/A)	83	
Calcium (1b Ca/A)	1600	
Effective CEC (meq/100g)	5.1	
Zinc (medium) (ppm Zn)	0.6	

LOW

MEDIUM

LIME AND FERTILIZER RECOMMENDATIONS

Alfalfa or alfalfa with grass, Seeding down
Dairy or beef manure at 5 tons per acre

LIME
TONS/ACRE

NITROGEN (N)
lbs./ACRE

PHOSPHATE (P₂O₅)
lbs./ACRE

POTASH (K₂O)
lbs./ACRE

LIME & NUTRIENTS NEEDED:

3.0

0

0

0

CONTRIBUTION FROM MANURE:

24

13

44

BALANCE NEEDED FROM FERTILIZER:

3.0

0

0

0

Rate of lime recommended is to raise soil pH to 6.5

Broadcast lime before or during seeded preparation and harvest

H

soil test = chemical / nutrient status

N contribution from manure was adjusted for past manure application at



many soil options for adding nutrients



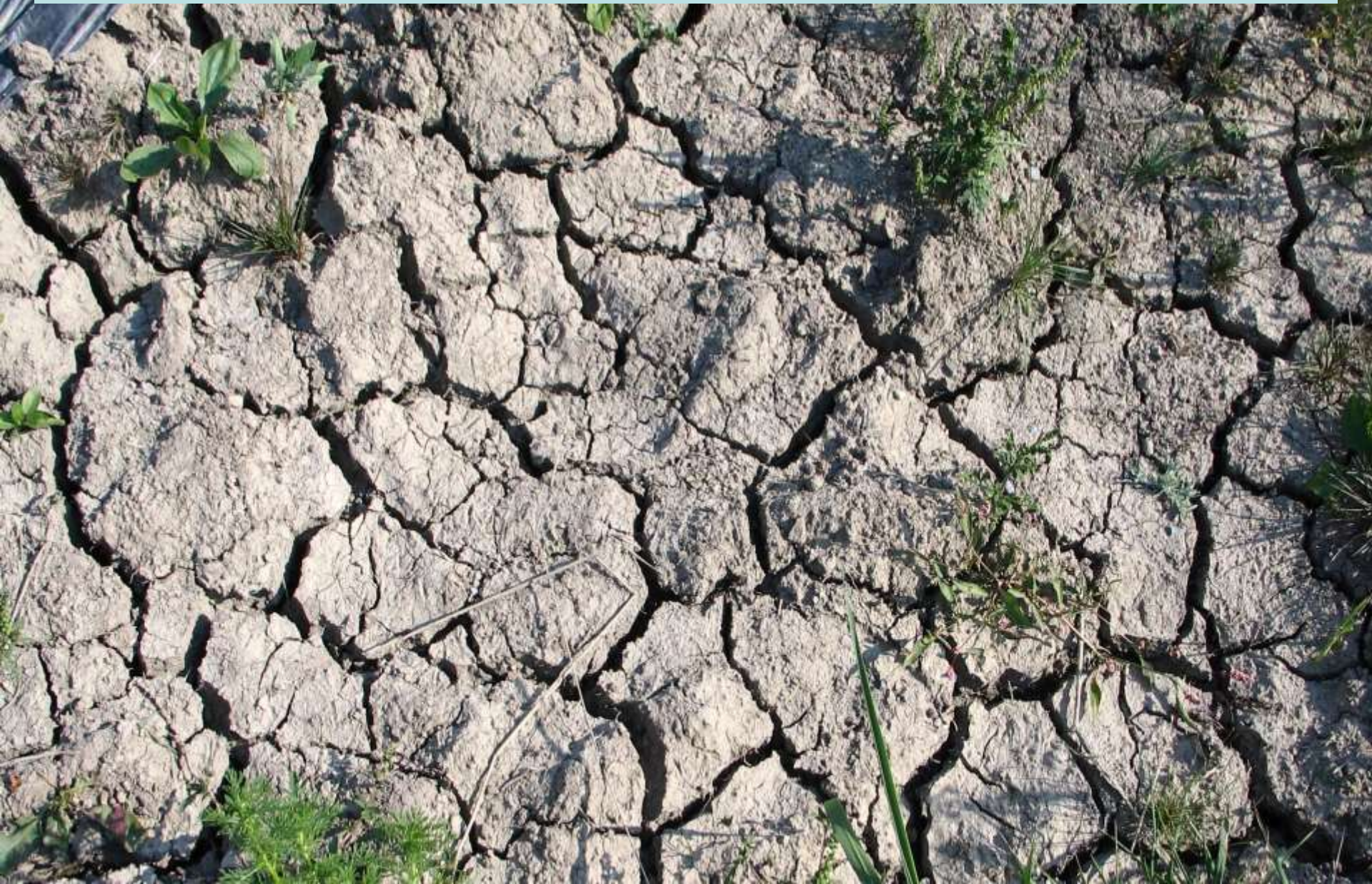
leaf analysis is best for perennial fruit nutrient management

Table 27. Critical nutrient values for blueberry tissue analysis.

Element	Deficient	Below Normal	Normal
N (%)	1.65	1.70	1.90
P (%)	0.05	0.06	0.10
K (%)	0.35	0.40	0.55
Ca (%)	0.35	0.40	0.60
Mg (%)	0.18	0.20	0.25
Mn (ppm)	45	50	250
Fe (ppm)	65	70	200
Cu (ppm)	4	5	11
B (ppm)	29	30	40
Zn (ppm)	14	15	25

Source: PennState University

soil physical health - soil structure



soil physical health: compaction, drainage



raised beds, subsoiling, cover crops...



**carbon feeds the biology and helps improve
soil physical condition: mature compost**



aged manure: not quite compost



fresh manure: more available nutrients, weeds



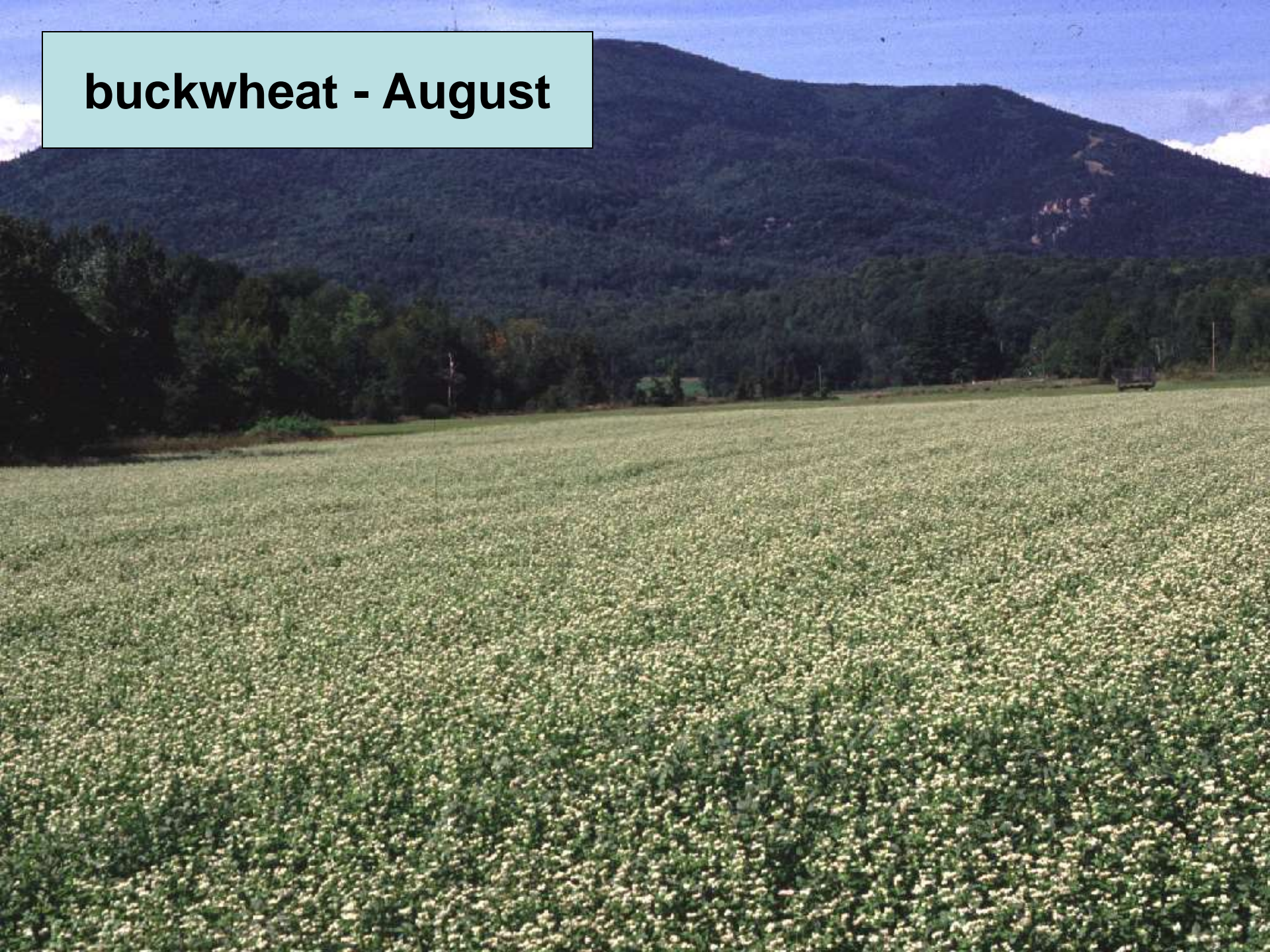
cover crops: oats - October



winter rye - April



buckwheat - August



Small Fruit Success Depends On

- **a location that receives 'full' sunlight**
- **well-drained soil at least ~12 inches deep**
- **plants adapted to the location = winter hardy**
- **managing diseases, insects, weeds, wildlife**
- **providing adequate nutrition, water, pruning**
- **ability to do what's required in a timely manner**

	<u>years to bearing</u>	<u>lb of fruit per plant</u>	<u>harvest period</u>	<u>cultural demands</u>
Blackberry	2	2-3	late July - Aug.	Moderate
Blueberry	3-6	3-10	late July - Sept.	Low
Currant	2-4	6-8	July	Low
Elderberry	2-4	4-8	Aug. - Sept.	Low
Gooseberry	2-4	2-4	July - Aug.	Moderate
Raspberry	2	1-2	July or Sept.	Moderate
Strawberry (June)	2	1-3	June – early July	Moderate
Strawberry (DN)	1	1	June - Oct.	High
Grapes (Amer.)	3	20	early Sept. - Oct.	Moderate
Grapes (Vinifera)	3	10	early Sept. - Oct.	High

Why Plants May Fail to Fruit

late spring frost

winter injury

cold or rainy weather during bloom

inadequate pollination

disease, insect damage to buds

poor plant nutrition

lack of cross-pollination if needed

Strawberries



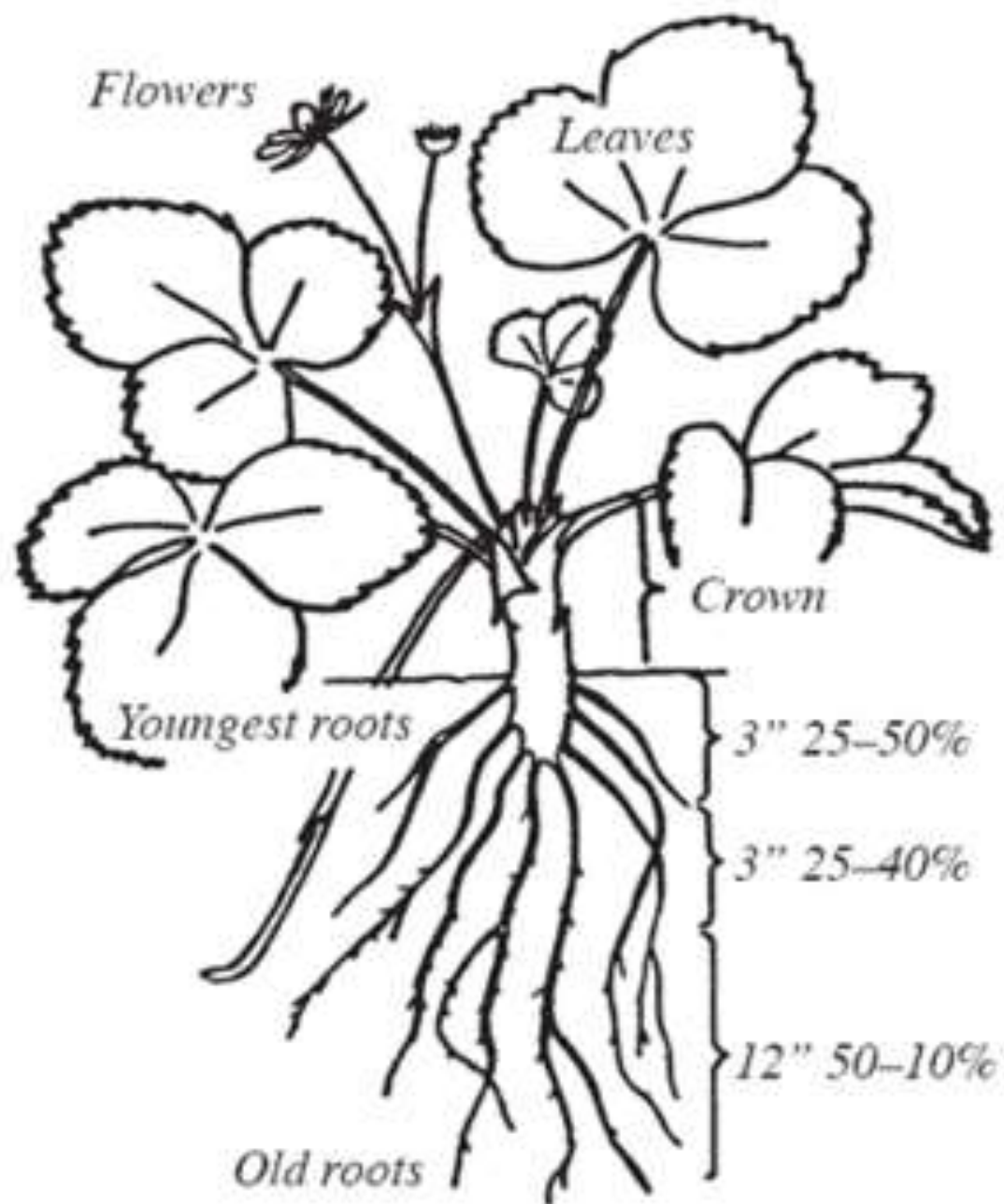
Strawberry basics

- **High maintenance & risk, but high reward**
- **Fruit year after planting (June-bearers)**
- **Tend to decline thereafter = replant often**
- **Require 'renovation' to keep productive**
- **May be affected by many insects and diseases**

Planting Strawberries

- Set plants at 'root line', 1-2 ft. apart, in 4 ft. rows
- Remove flowers first year, keep weeded, watered
- Let runners fill out 16-24" wide, mulch between rows
- Mulch plants with 6" of straw around Thanksgiving
- Harvest fruit next summer
- Renovate promptly after harvest, or turn under















renovating strawberries



strawberry renovation

- mow off old leaves – above crowns
- spread 1 inch of soil on plants
- narrow the rows back to 12-18 inches
- hand weed in the rows
- apply N fertilizer (1 lb N/1,000 sq. ft.,)
- irrigate throughout summer
- mulch for the winter

Remove old leaves



Apply layer soil/compost



Some strawberry varieties for VT

- Earliglow
- Annapolis
- Cavendish
- Cabot
- Mesabi
- Jewel
- Sparkle

See: www.noursefarms.com “comparison chart”

small fruit variety traits

- harvest period (early, mid, late season)
- flavor
- berry size
- disease resistance
- yield
- firmness
- suitability for freezing



common strawberry pests

- TPB
- spider mites
- slugs
- spittle bug
- fruit rots
- root rots
- leaf spots
- birds, deer, etc.

frost damage





winter injury





root rot complex



Tarnished Plant Bug damage





‘scouting’



cyclamen mites

Questions?



blueberries



blueberry basics

- **must have acid soil with pH 4.5 – 5.2**
- **long-term crop, take time to prepare site**
- **mulching and pruning are required**
- **birds, winter injury may be a problem**
- **mummy berry, SWD are concerns**

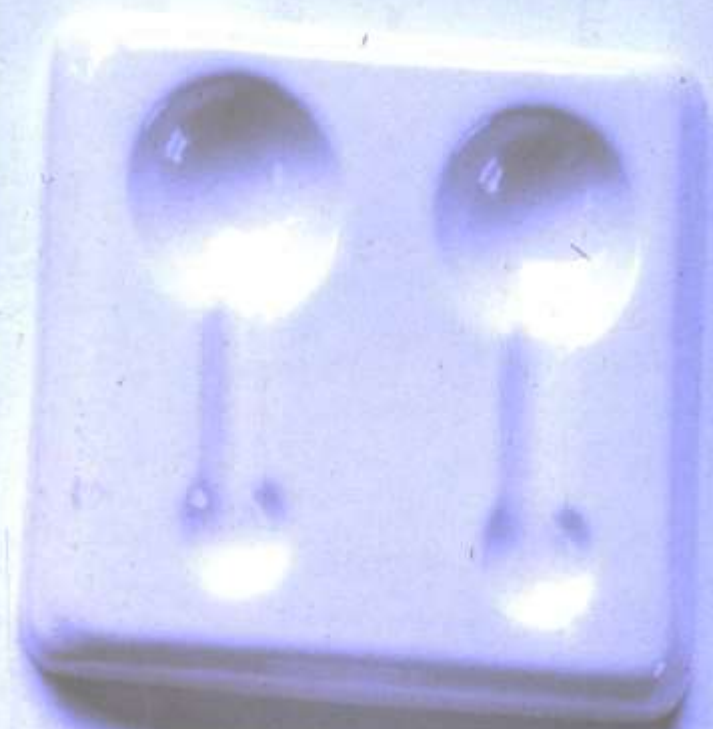
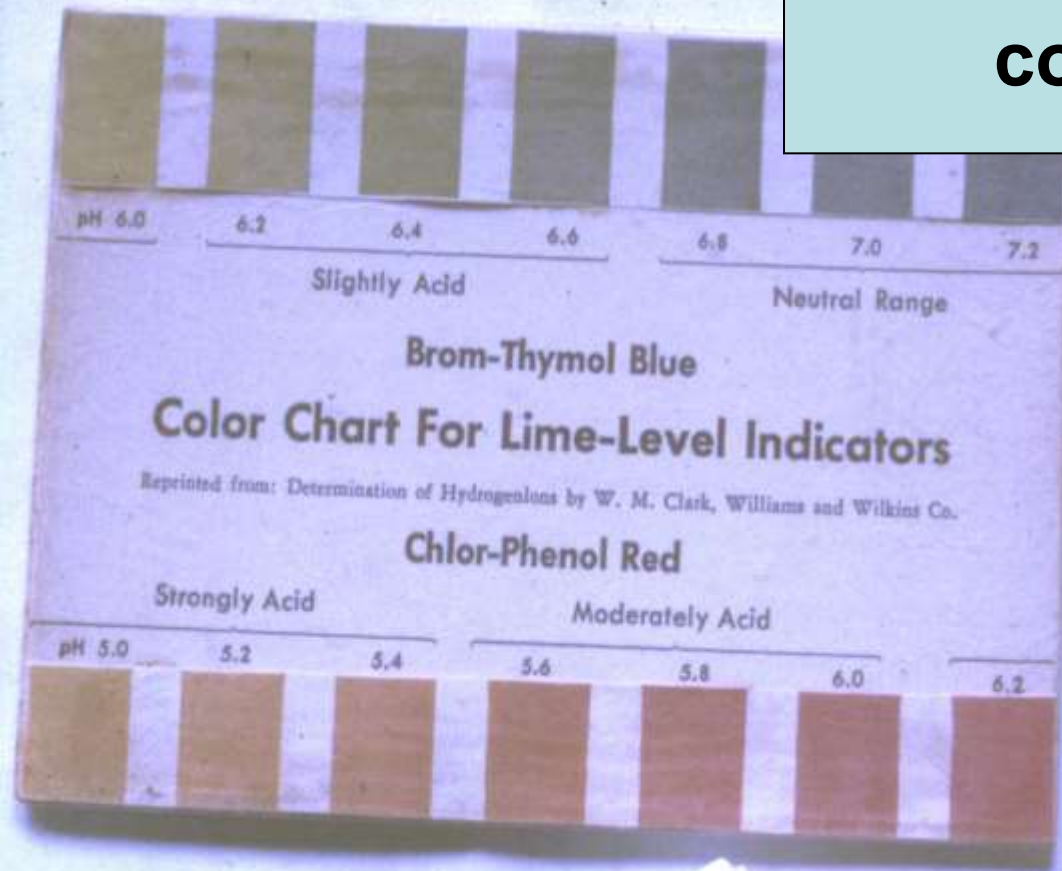
planting blueberries

- **test soil a year in advance – pH!**
- **add nutrients, organic matter, sulfur?**
- **till wide rows spaced 8-14 ft. apart**
- **set plants 6 - 8 ft. apart in the row**
- **mulch around the plants**
- **irrigate during dry periods**

iron deficiency = high pH



color dye test kits



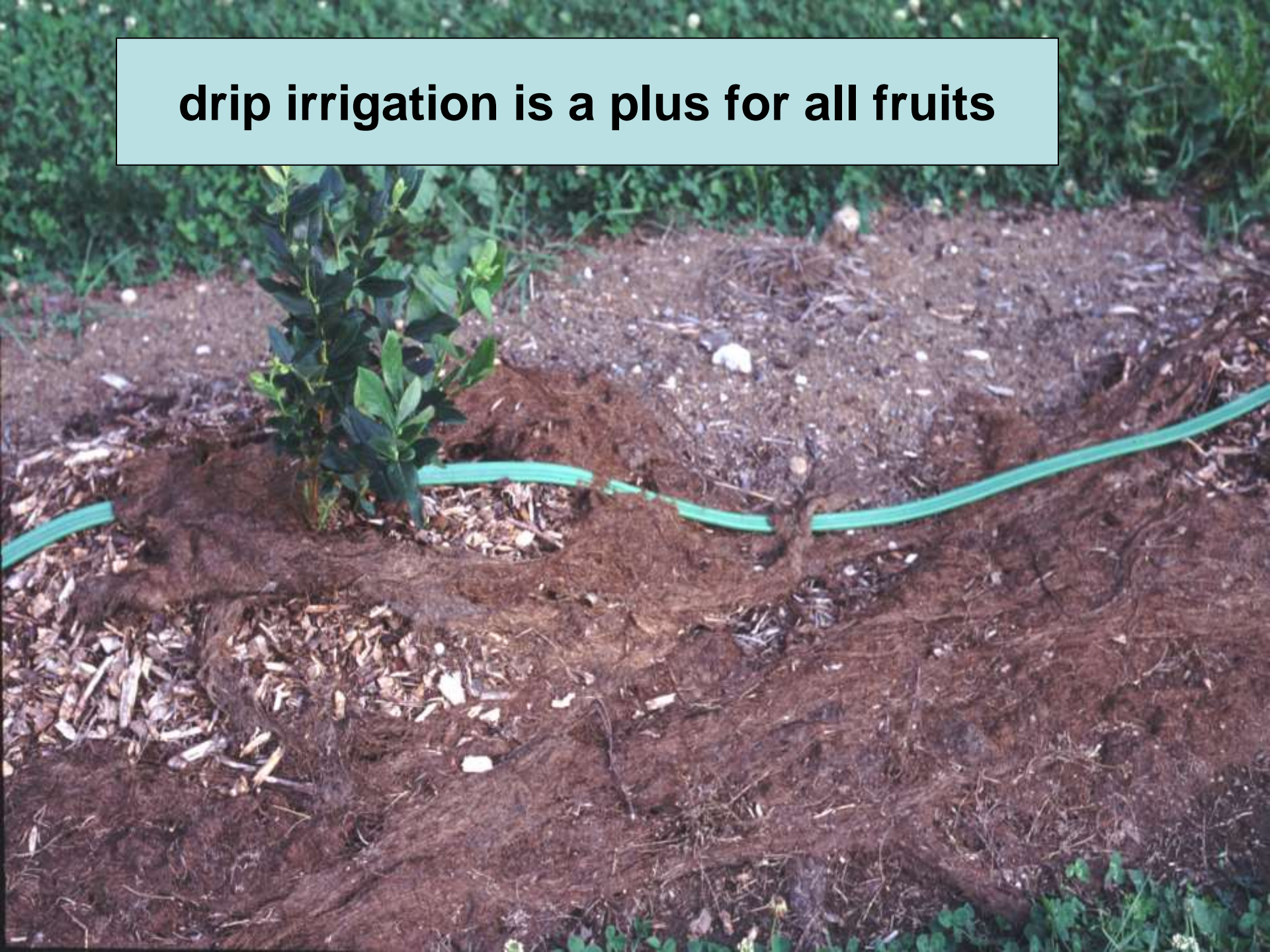
**Sulfur rate depends on pH and soil texture:
It's a lot easier to add before planting!**



wood is the best mulch – any type if aged a little



drip irrigation is a plus for all fruits



the plants start small, live a long time



Perennial grasses (ryegrass and fescues) are good for walkways. Sow in September, if possible. Keep mowed



Annual pruning is critical!
Here canes are mostly one age



blueberries fruit on second year growth



pruning blueberries

- prune yearly; ideally leave 2-3 new canes
- early years: want few strong upright canes
- always remove dead, diseased canes
- cut off low or spindly growth
- remove oldest canes after 6-8 years

Blueberry varieties for VT

- **Bluecrop**
- **Blueray**
- **Patriot**
- **Nelson**
- **Jersey**
- **Northland***
- **Spartan***



common blueberry pests

- birds
- mummyberry disease
- cane blights
- fruit rots
- fruit worms
- witches broom
- SWD

Bird netting pays back fast



Diseases must be prevented not cured



mummy berry twig blight



mummy berry 'mushrooms'



blueberry 'fruit worm' trap





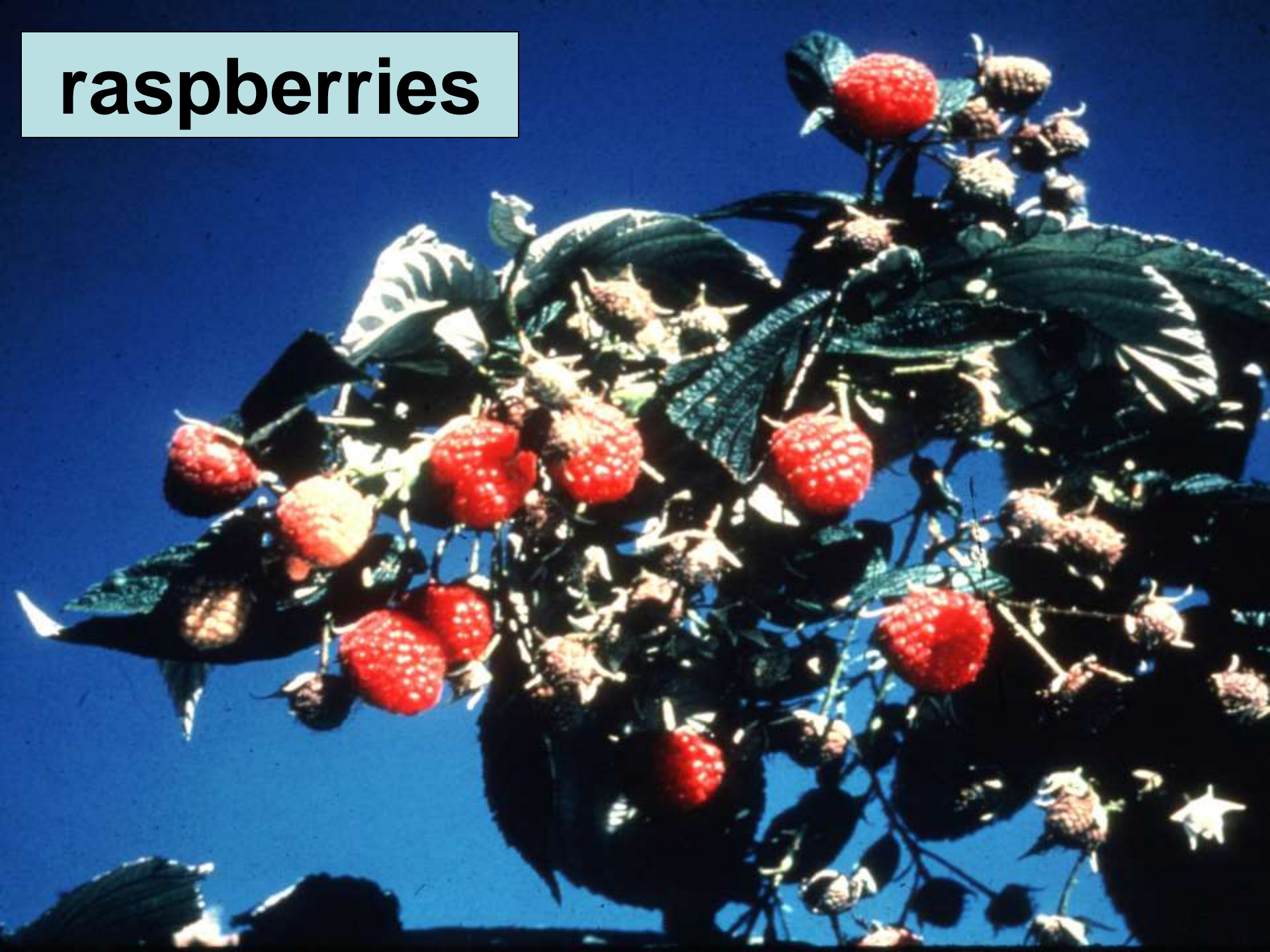
Blueberries

\$5.75 / pt

from our fields

Questions?

raspberries



raspberry basics

- **highly perishable, highly desirable fruit**
- **summer or fall-bearing types**
- **individual canes fruit once then die**
- **plantings decline in 5-10 years due to virus**
- **summer red raspberries most suited to VT**

planting raspberries

- soil test and amend with nutrients, OM
- set plants 1 inch deeper than in nursery
- space rows 8+ ft. apart, plants ~2 ft. apart
- mulch edge of rows or cultivate to contain
- remove canes annually; tip back or trellis
- avoid over-fertilizing, especially at planting





pruning summer raspberries

- Remove spent, diseased, weak canes
- Thin to 4 or 5 strongest canes per sq. ft.
- Tip back canes over ~5' tall or trellis
- Remove canes growing outside the row



common raspberry pests

- Viruses
- Fruit rots – Botrytis
- Cane blights
- Root rots
- Japanese beetles
- Cane borers
- SWD

virus symptoms



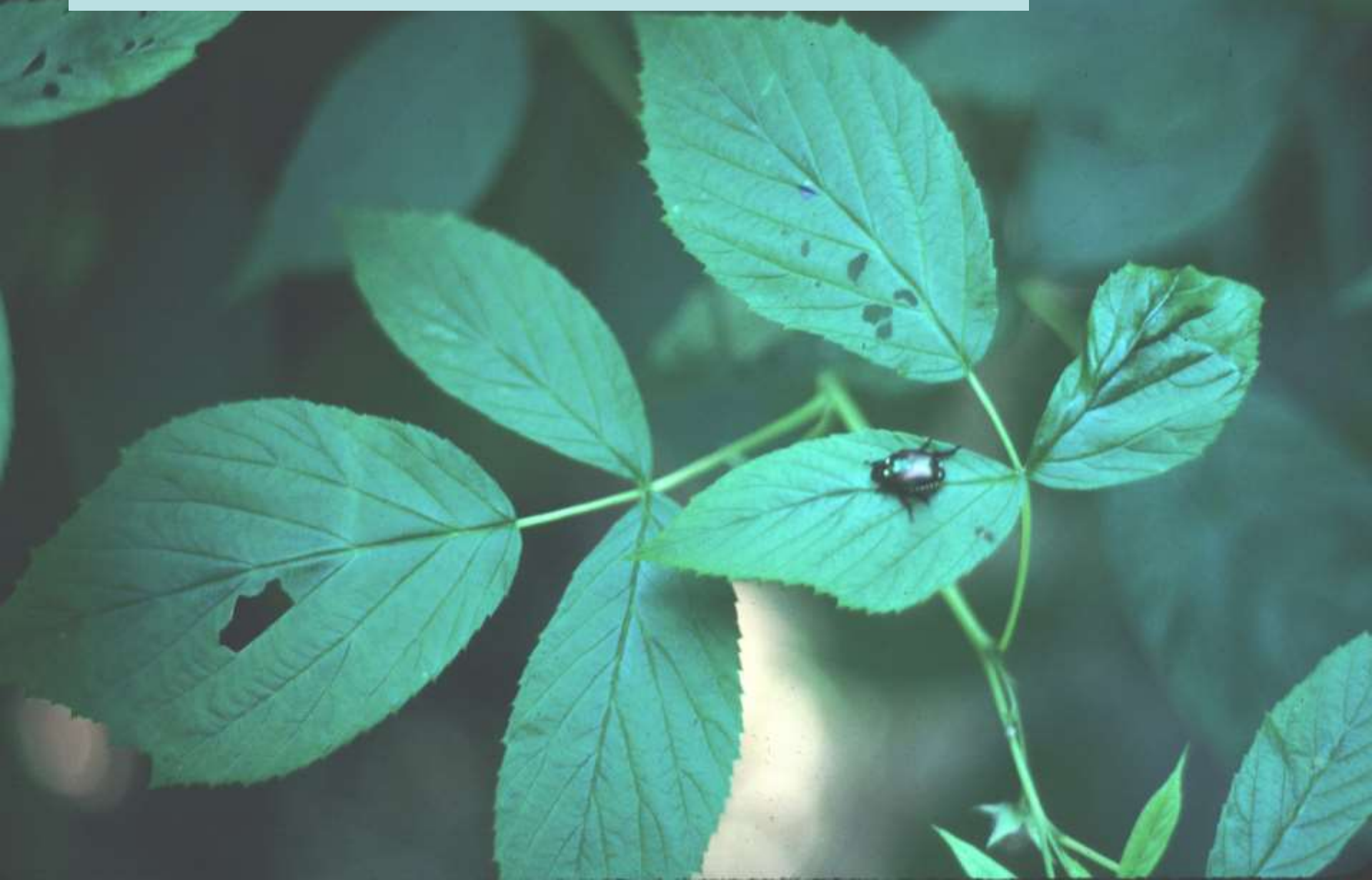
tissue culture plants



cane blights



Japanese beetles



Japanese beetle management

If use traps: 100 ft. away to pull beetles out of crop

Knock beetles off by hand into soapy tray

Cover crop with insect netting

Apply kaolin clay to crop

Apply entomopathogenic nematodes to soil

bird deterrents may be needed



red raspberry varieties for VT

Summer:

Boyne

Killarney

Newburgh

Latham

Prelude

Encore

Fall:

August Red

Autumn Bliss

Polana

Caroline

Questions?



currants and gooseberries



Spotted Wing Drosophila

Relatively new pest – still spreading?

Attacks firm ripe fruit in late summer and fall

Fruits rot rapidly

All fruits with soft skins are susceptible

Overwinters in cold climates

Spotted Wing Drosophila (*Drosophila suzukii*)

2 mm

Spots →



Female



Male

SWD management

Harvest all ripe fruit promptly

Refrigerate all harvested fruit

Remove all rotten / dropped fruit

Consider insect netting for exclusion

traps for monitoring SWD



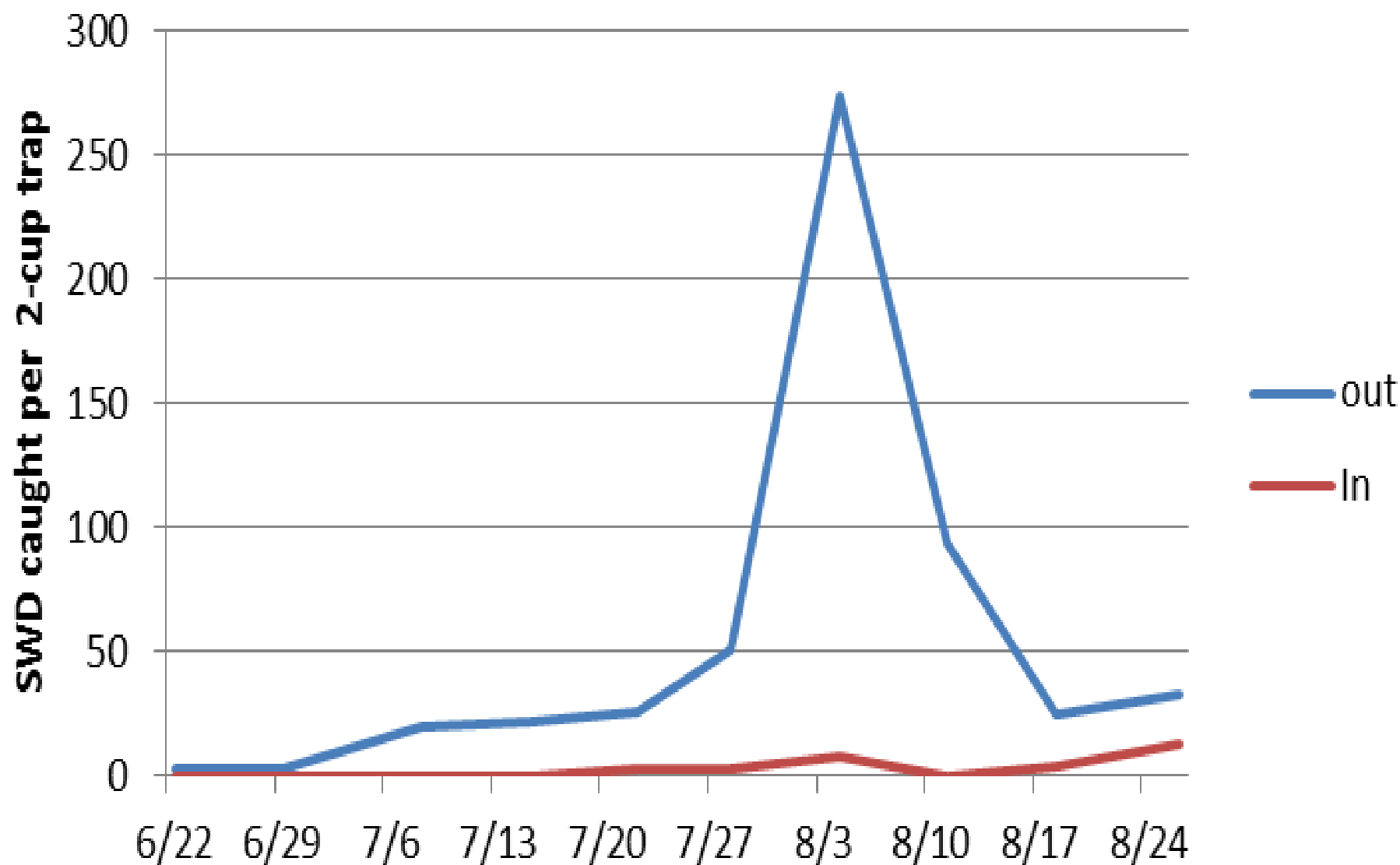
insect netting





Effect of ProTek 80 Netting on SWD Catches in Blueberries

Grubinger's Blueberry Patch, Dummerston VT

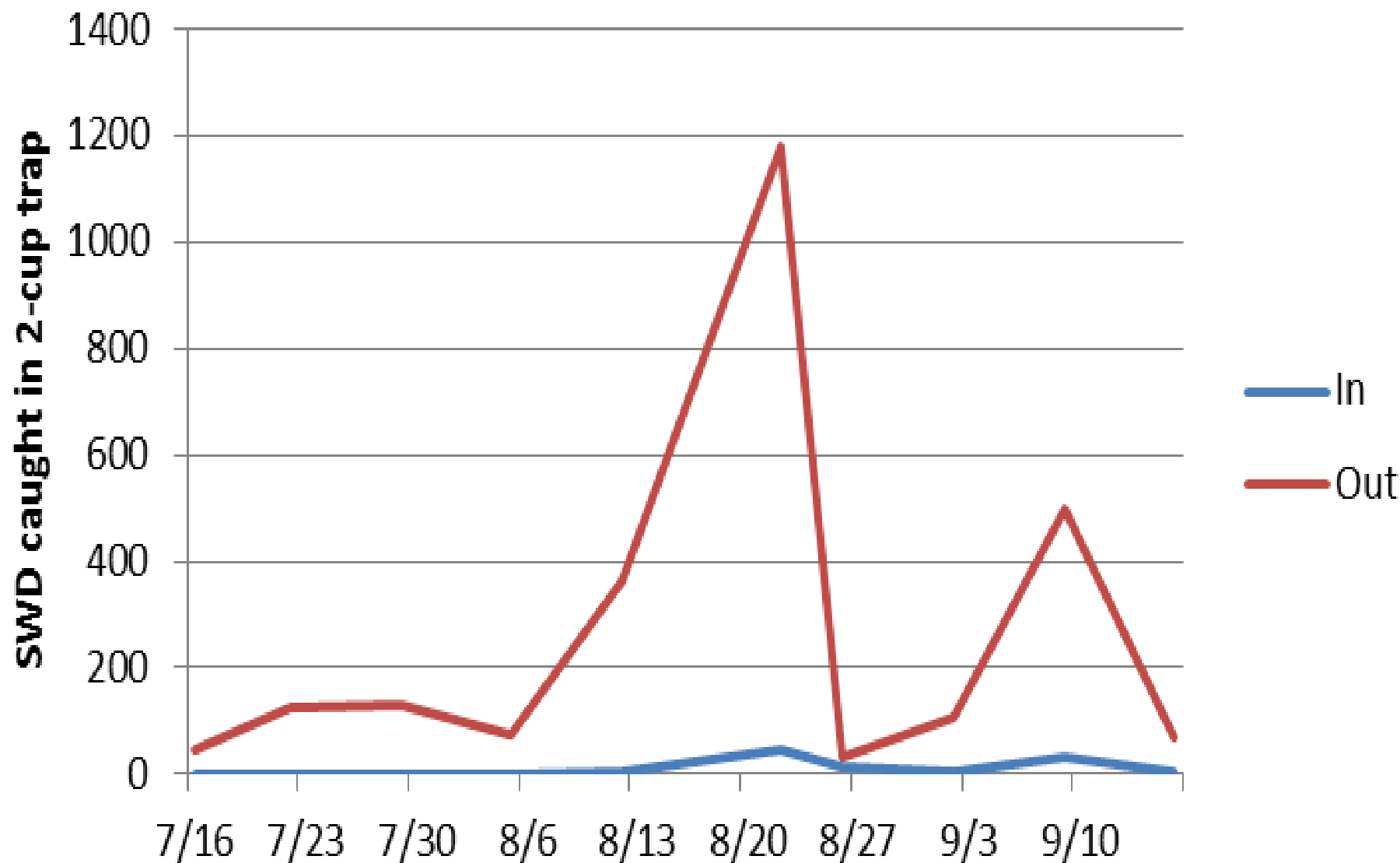






Effect of ProTekNet 25 on SWD in Raspberries

Deer Ridge Farm, Guilford VT







**Trapping Out:
no evidence it works**

bulk batch yeast/flour/sugar b



insect netting details

ProTekNet 80gr has 1 x .85 mm mesh

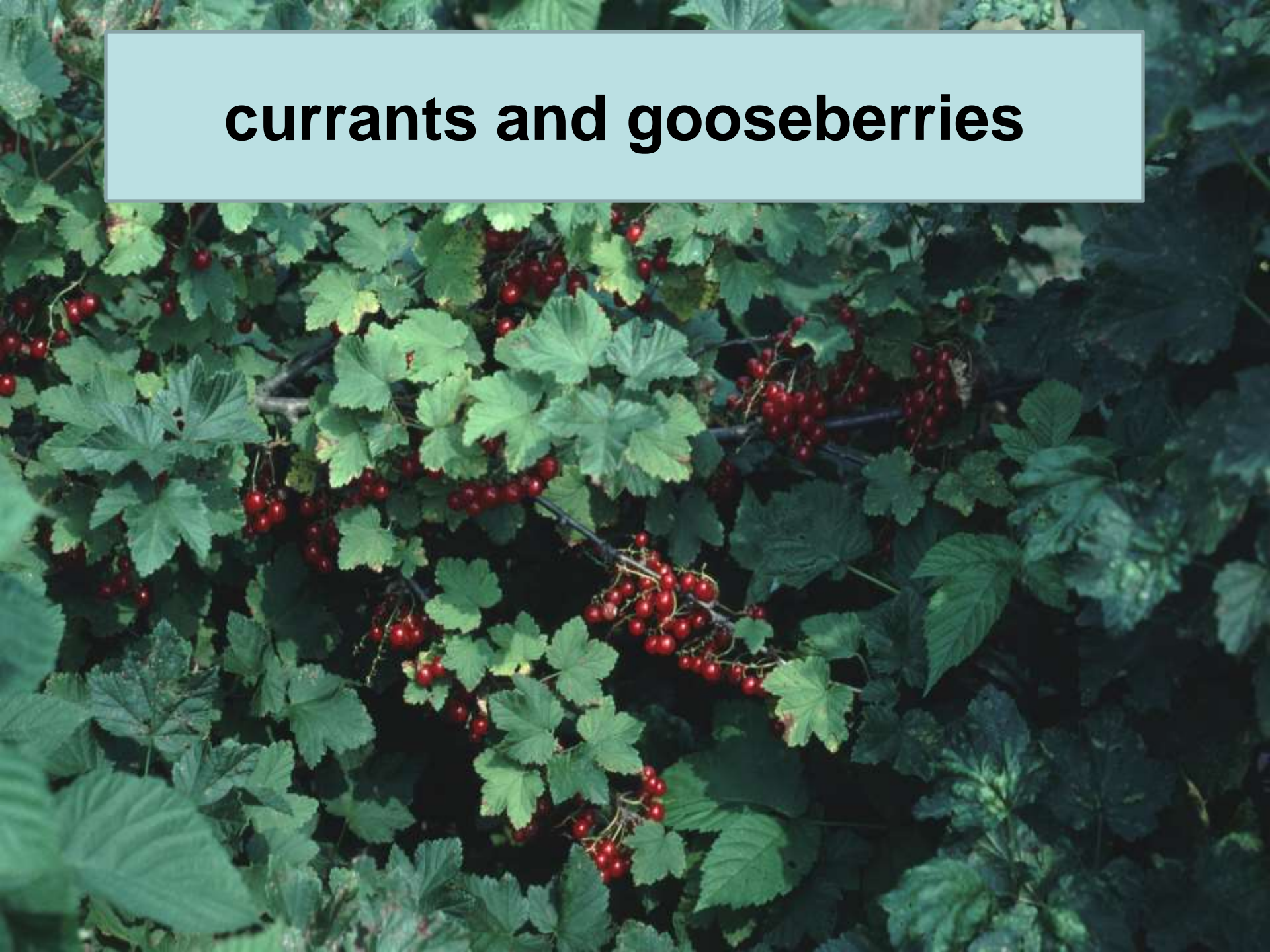
- 13' x 328' = \$553
\$5,649/acre @ 7 yrs = **\$807/acre/yr.**

ProTekNet 25gr has .35 x .35 mesh

- 20' x 820' = \$1,618
\$4,298/acre @ 3 yrs = **\$1,433/acre/yr.**

<http://www.duboisag.com/en>

currants and gooseberries



currants and gooseberries

- **Hardy and easy to grow**
- **Like cool, moist locations, rich peaty soil**
- **Some shade OK**

- **Legal, but may host white pine blister rust**
- **Black currants pose the most risk**
- **Many varieties - look for WPBR resistance**

currants, gooseberry basics

- **Heavy feeders, mix in manure pre-plant**
- **Fertilize, and mulch annually**
- **Prune to leave 8 strong canes, from 1-4 yr old**
- **Keep an eye out for WPBR, PM**
- **Wait for fruit to turn color before harvesting**

white pine blister rust



grapes



grape basics

- Choose hardy, disease resistant varieties
- On a site with full sun and good drainage
- Remove 90% of new growth each year
- Train or trellis vines

grape types

- *V. labrusca*: Concord, Niagara (American)
- *V. vinifera*: not very hardy
- Hybrids: intermediate hardiness
- Table grapes: seedless/seeded

“New” Cold-Hardy Wine Grape Cultivars



St. Croix



Frontenac

La Crescent



www.uvm.edu/vtvegandberry