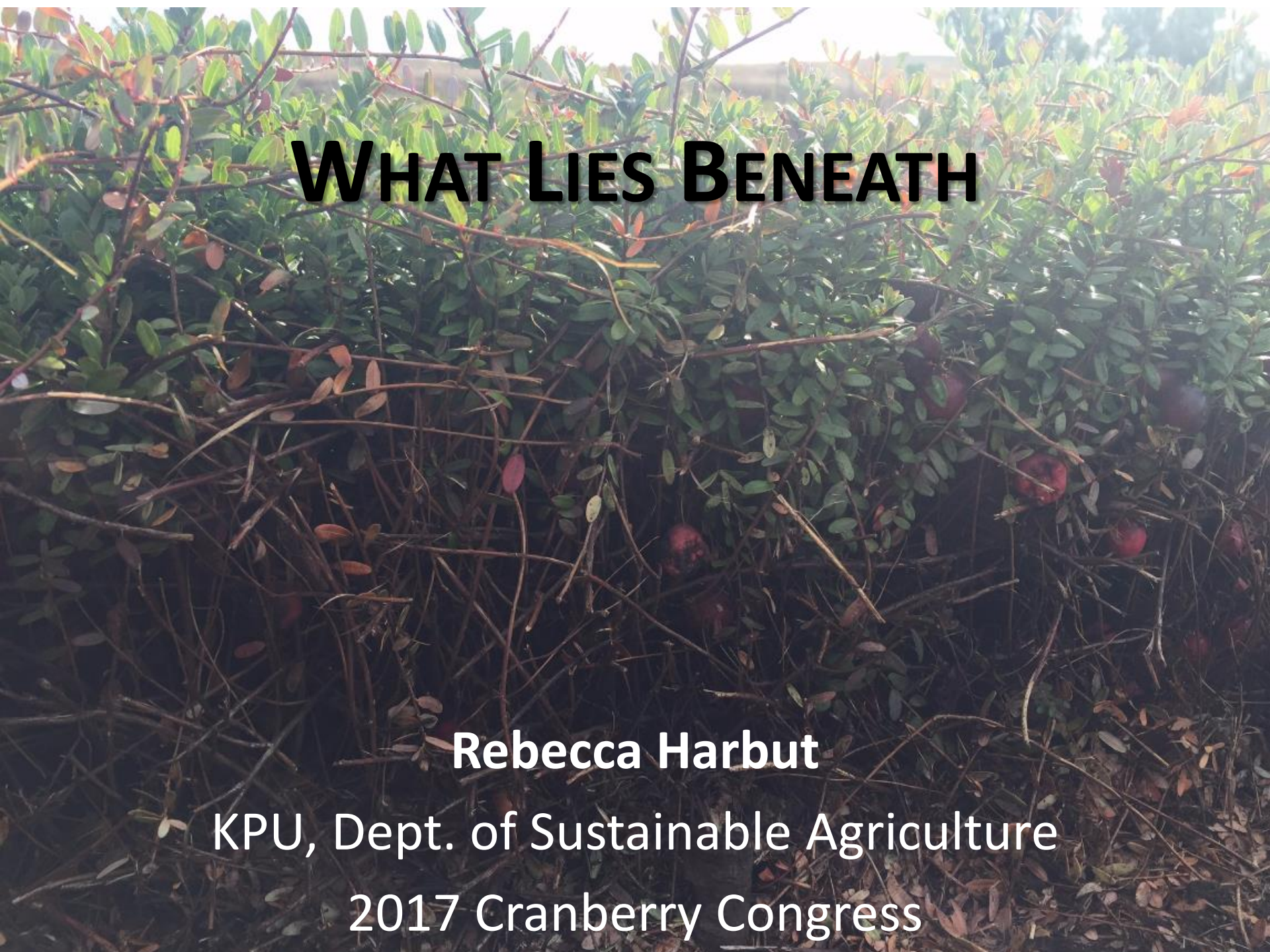


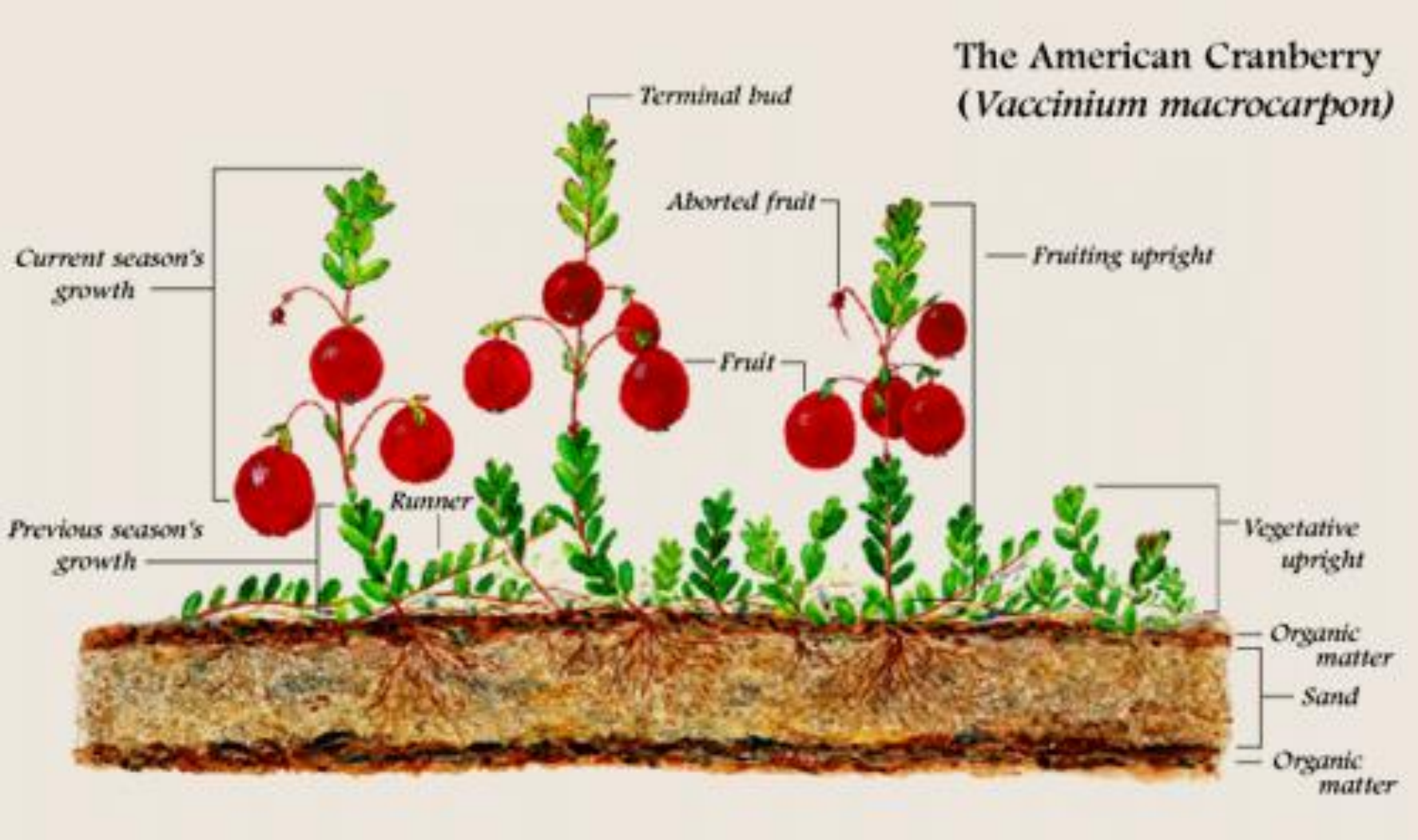
What Lies Beneath

Rebecca Harbut

KPU, Dept. of Sustainable Agriculture

2017 Cranberry Congress

Cranberry Vine



Defining The Ideal Cranberry Canopy

Goals Of Canopy Management

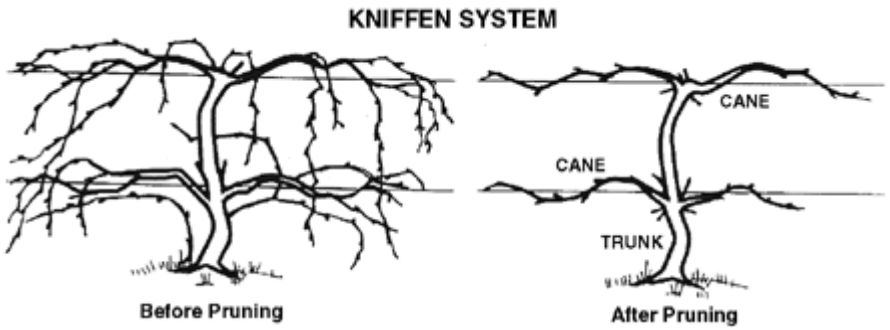
- Optimize root:shoot and fruiting:non-fruiting
- Encourage good air movement through the canopy
- Stimulate upright growth (yield potential)
- Regenerate rooting
- Optimize light interception
  - Improve fruit color development
- Optimize spray coverage
- Manage humidity in the canopy

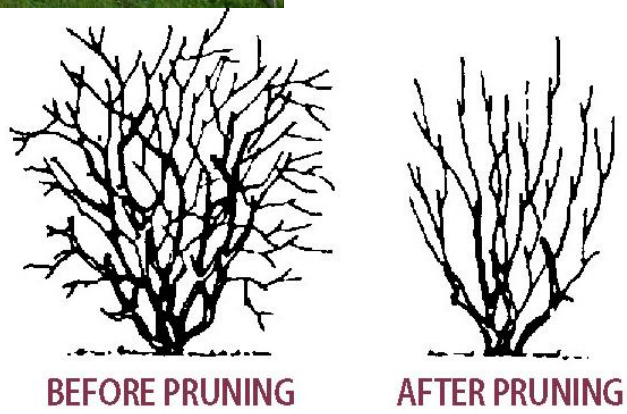
The 'Unmanaged' Canopy

- Excessive vegetative growth (little yield potential)
- 'Floating' vines – poor rooting
- Lumpy, uneven growth
- Dense canopy
  - Poor air movement
  - Poor light penetration
  - Poor spray penetration

Woody Perennial Fruit

- Woody perennial fruit crops are managed to maintain a balance between fruiting and non-fruiting wood
  - Pruning
  - Trellising
  - Sanding
  - Limb positioning





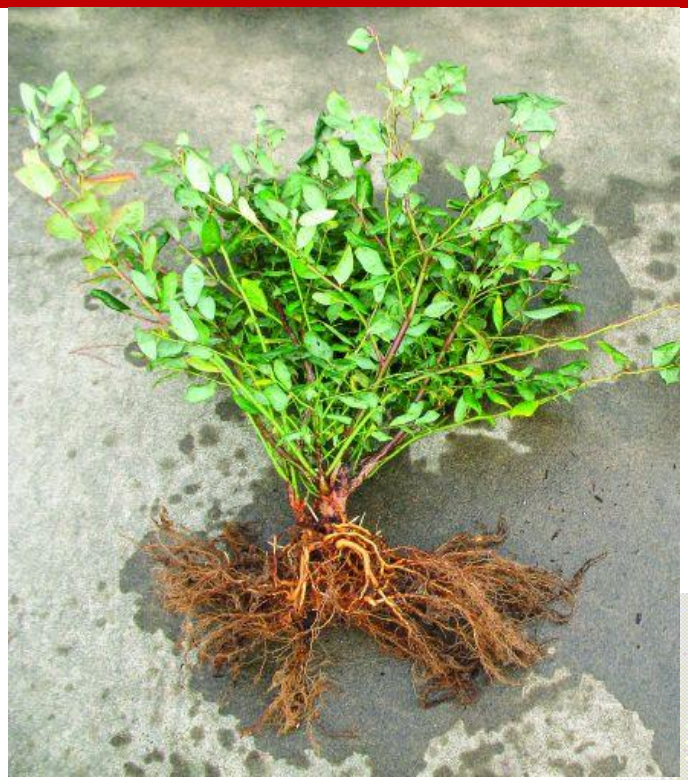
Non-Fruiting Wood

- Provide structure/support
- Carbohydrate storage – critical for spring growth
- Becomes less productive with age

Stimulating Fruiting Wood

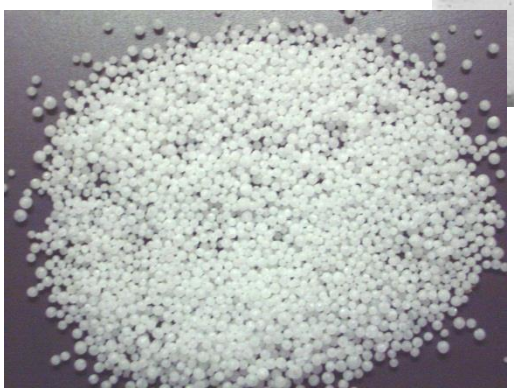
- Constant regeneration of growth
  - Pruning, sanding
- Must be supported by the renewal of root system

Root: Shoot



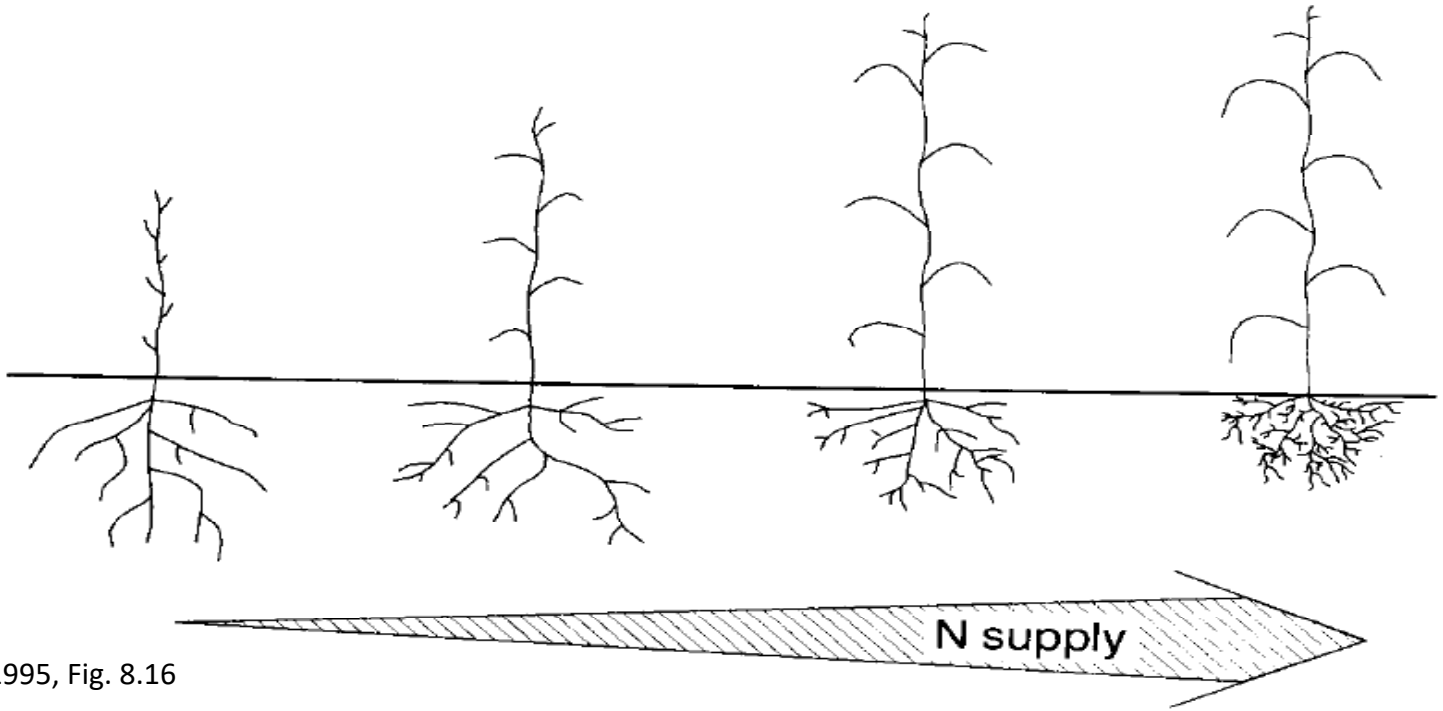
Canopy Management Techniques

- Nutrient Management
- Sanding
- Pruning
- Mowing



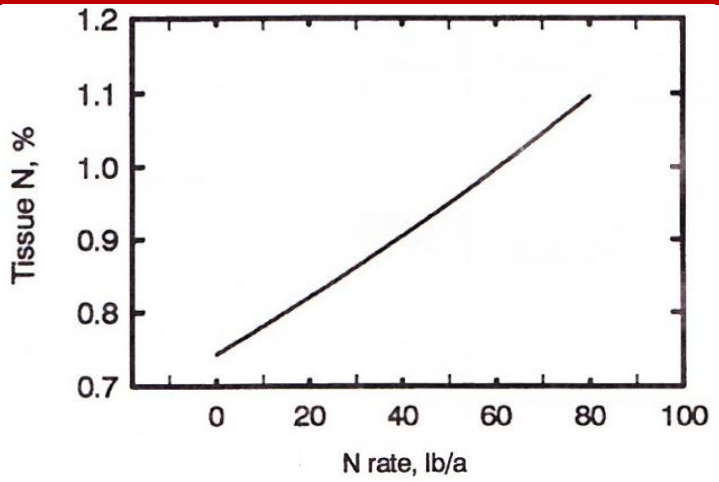
Nutrient Management

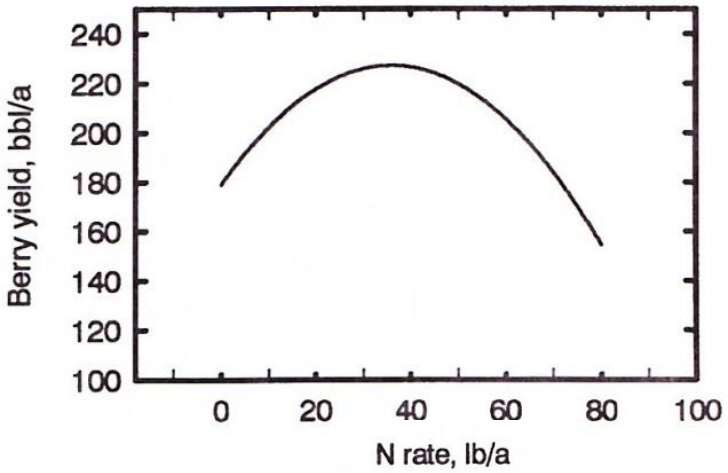
- N has a direct impact on vegetative growth
- High N application results in increased shoot growth and decreased root growth

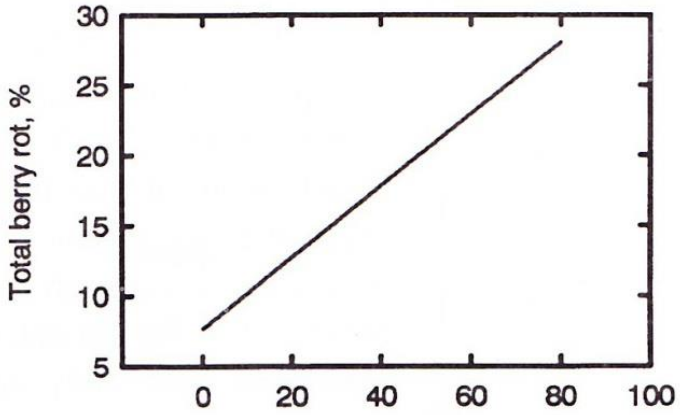


Marschner, 1995, Fig. 8.16

Nutrient Management: Nitrogen







*Massachusetts-grown 'Stevens'

- Why Does Excessive Vegetation Reduce Yield?
  - Shading
  - Disease
  - Allocation of resources

SANDING

Benefits:

- Covers leaf litter
  - Organic matter break down
  - Suppression of fungal inoculum
- Improved soil drainage and structure
- Buries runners
  - Simulate root growth
  - Stimulate upright growth
- Insect control
  - Dependent on uniform sand applications
- More rapid warming in spring
  - Moist freshly sanded beds can be 2-3^{o}F higher
- Important in new bed establishment

Challenges:

- Uneven settling of subsoil can occur with heavy sanding
- Yield suppression in year 1 and 2

1816- Henry Hall (Dennis, MA)

First to observe the benefits of sand blown in from nearby dunes

Pruning

- Objective
  - Open canopy
  - Remove runners
  - Stimulate upright growth
  - Even out canopy

UMASS PRUNING STUDY (06-07)

- Study conducted at UMASS Cranberry Research Station 2006 and 2007

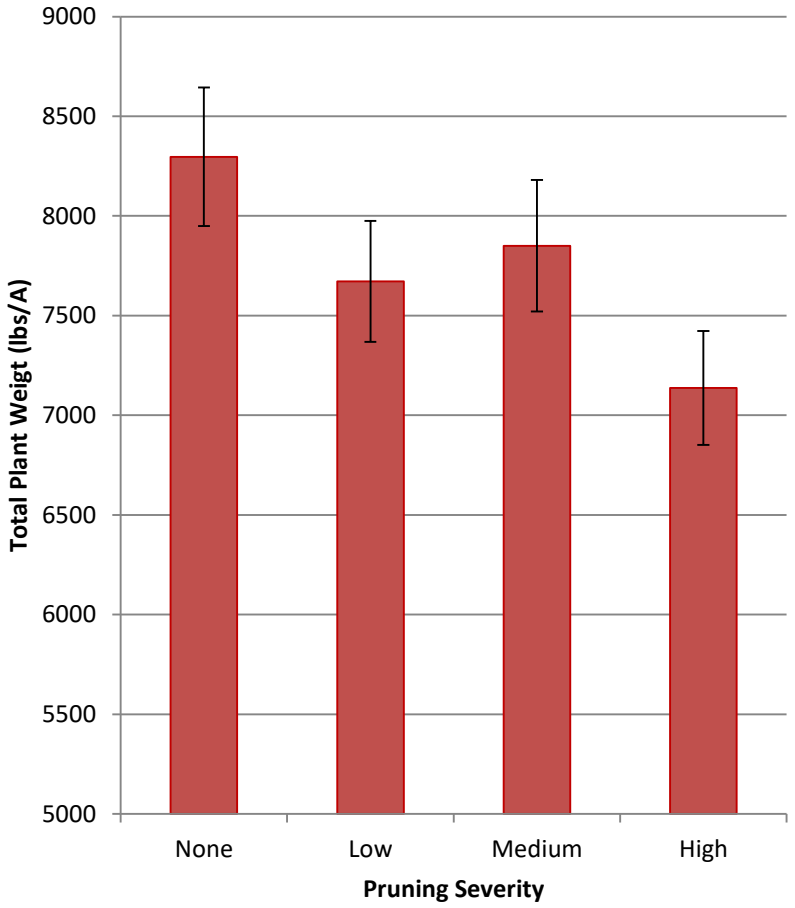
Treatment	Severity	
Pruning	Control	0 passes = 0 lbs/A
	Light	1 pass = 340 lbs/A
	Moderate	2 passes= 700 lbs/A
	Heavy	3 passes = 1080lbs/A
Sanding	Control	0
	Light	1.5 cm
	Moderate	3.O cm
	Heavy	4.5 cm

Effect Of Pruning On Plant Growth

Pruning reduced the total plant weight

BUT…

Did not reduce upright weight and number



Pruning And Sanding: Impacts On Yield

Severity of Treatment	**2006 Yield** (bbl/Acre)		**Pruning vs Sanding 2006**	**2007 Yield** (bbl/Acre)		**Pruning vs Sanding 2007**	**Net Pruning vs. Sanding**
	Pruning	Sanding		Pruning	Sanding		
Control	232	209	**+23**	166	202	-36	**-13**
Light	349	292	**+57**	215	215	0	**+57**
Moderate	216	137	**+79**	140	102	+38	**+117**
Heavy	177	109	**+68**	154	60	+104	**+172**

Role of Pruning In Canopy Management

- Can reduce canopy depth
  - May not be effective on very deep canopies
- Is not necessarily a replacement for sanding
  - Does not provide a new rooting medium
- Establish pruning rotation that is complementary to your sanding program

SUMMARY

- All perennial crops require management to maintain an optimal root:shoot and structural wood:fruiting wood
- The optimal canopy structure in BC has not been fully defined
- Understanding the carbohydrate dynamics in the crop will help define how we manage the fruit