SRSFC Sponsored Insect and Disease Identification and Management for Small Fruit

November 8-9, 2011

Table of Contents
2 ........ Agenda
3 ........ Basics of organics
44 ........ Organic Strawberry Production
140 ........ Organic Blueberry Production
181 ........ Organic Bramble Production
222 ........ Organic Muscadine Production
Organic Winegrape Production
266 ........ Organic wine grape production in the mid-Atlantic regions??
300 ........ Organic Winegrape Production in NC Our Experience
323 ........ Resources
SRSFC Sponsored Organic Small Fruit Training for County Extension Agents

November 8-9, 2011

In conjunction with the 2011 Strawberry Expo

Sheraton Imperial Hotel, Research Triangle Park, NC

Tuesday, November 8, 2011

Moderator-Heather Barnes, NCDA

7:30-8:30 a.m. Coffee and biscuits in exhibit area-breakfast on your own
8:30-9:00 a.m. Sign in and receive handouts
9:00-11:00 a.m. Basics of organics-Tony Kleese, Earthwise Company
11:00 -11:15 a.m Break in strawberry Expo exhibit area
11:15-12:15 p.m. Organic Strawberry Production-John Vollmer, Vollmer Farm, Bunn, NC
http://vollmerfarm.com/

12:15 p.m.-1:15 p.m. Sponsored Lunch in meeting room

Moderator-Allen Straw, VA Tech

1:15-2:15 p.m. Organic Blueberry Production-Gerard Krewer, Professor Emeritus, Univ of GA
Harriets Bluff Organic Farm, Woodbine, GA

2:15-3:15 p.m Organic Bramble Production-Gina Fernandez, Professor, Hort Sci, NC State

3:15-3:30 p.m. Sponsored Break in meeting room

3:30-4:30 p.m. Organic Muscadine Production _Bill Cline, Extension Associate,
Plant Path, and Terry Bland, Research Technician, Hort Sci, NC State

4:30-5:30 p.m. Organic Winegrape Production- Mizuho Nita, VA Tech and Clyde and Pat
Colwell, Carolina Heritage Vineyard and Winery, Elkin, NC
www.carolinaheritagevineyards.com

6:00 p.m. Dinner on your own

Wednesday, November 9, 2011

7:30 a.m. Depart Hotel by charter bus for Vollmer farm-tour of organic strawberry,blueberry
and blackberry plantings with extension specialists Gina Fernandez(blackberries,
raspberries), Bill Cline(blueberries, muscadine grapes), Terry Bland(blueberries,
muscadine grapes), Katie Jennings(weed management), Gerard Krewer
(blueberries, blackberries), Frank Louws(strawberries). Mizuho Nita(winegrapes),
Alan Straw(strawberries)

12:00 p.m. Sponsored Lunch

2:00 p.m. Arrive at Hotel and Depart for Home
Introduction to Organic Production and Certification

Tony Kleese
Organic Farm and Certification Consultant
www.earthwiselife.com
The Basis for National Standards

- 1990 - Organic Foods Production Act - part of the 1990 Farm Bill.
- 1996 - NOSB completes recommendations.
- 1997 - USDA publishes first proposed rule.
- March, 2000 – USDA’s 2nd proposed rule.
- December, 2000 – USDA’s Final Rule.
- October 21, 2002 – Implementation.
Organic Production

“A production system that is managed to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.”
Who must be certified?

Anyone who uses the word organic in selling and marketing organic food and fiber products

Exceptions:

- Organic farmers and handlers who sell under $5,000/year of organic products.
- Retailers
- Handlers who use the word “organic” only on the ingredient panel
- Handlers, such as warehouses, that do not re-package organic products
What is Certified Organic?

- Application of Consistent Production and Handling Standards.
- Development of a Mandatory Organic System Plan, including proactive strategies to prevent problems.
- Use of only Approved Substances.
- Mandatory Verification Through Certification and On-Site Inspection.
Organic farmers, livestock producers or processors do not use chemical fertilizers, herbicides, insecticides, or sewage sludge.
Organic farmers do not use genetically engineered products - seeds, planting stock, insecticides, and inoculants.
Must not use arsenate treated lumber for new installations or replacement purposes in contact with crops, soil, or livestock.
The producer must not use burning as a means of disposal for crop residues, except that burning may be used to suppress the spread of disease or to stimulate seed germination.
Residue Analysis

- Residue levels must not exceed 5% of the United States Environmental Protection Agency’s tolerance level for the specific substance.

- No tolerance levels yet established for GMO contamination.
Buffer and beneficial habitat
NOP Basic Crop Requirements

- Organic System Plan.
- Monitoring of management practices.
- Can have split operation but must have physical barriers to prevent commingling and contamination.
NOP Crop Land Requirements

- Land must have distinct, defined boundaries.
- Land must be free of prohibited materials for 3 years (36 months) prior to harvest.
- Must maintain or improve the physical, chemical, and biological condition of the soil and minimize soil erosion.
- Fertility management must not contaminate crops, soil, or water with plant nutrients, pathogenic organisms, heavy metals, or prohibited substances.
Must implement soil building crop rotations.
Mineralization and Immobilization

Organisms consume other organisms and excrete inorganic wastes.

Organic nutrients are stored in soil organisms and organic matter.

Inorganic nutrients are usable by plants, and are mobile in soil.

Organisms take up and retain nutrients as they grow.
Naturally mined minerals, - limestone, gypsum, black rock phosphate, etc. are allowed. All other fertility inputs must appear on the National List of Allowed and Prohibited Substances.
COMMON COVER CROPS

- **Cool Season**
  - rye, oats, wheat, field pea, hairy vetch, crimson clover

- **Warm Season**
  - buckwheat, sorghum-Sudangrass, Japanese millet
  - cowpea, soybean

- **Whole Season / Perennial**
  - clovers, alfalfa, mixed grass hay
Composted plant and animal materials are allowed. Uncomposted plant materials are allowed.

Raw manure must be applied at least 120 days prior to harvest of crops for human consumption which may have contact with the soil (or at least 90 days for crops which do not contact soil).
NOP Seed Requirements

- Must use organic seeds, if they are commercially available.
- May use untreated seeds if organic seeds are not commercially available.
- Must not use fungicide treated or genetically engineered (excluded method) seeds.
Must use organic seedlings for annual transplants.

Perennial planting stock must be under organic management for one year prior to harvest as “certified organic”.
Pest and Disease Management

Soil Health
Crop rotation
Sanitation
Plant variety selection
Mechanical/physical
Predators/parasites
Natural habitat development
Lures, traps and repellents
Non-synthetic biological, botanical or mineral inputs.
Figure 4.

Eliot Coleman's Vegetable Crop Rotation

Eight Year

- Sweet Corn
- Potatoes
- Cabbage Family
- Cover Crop / Green Manures Used
- English Peas
- Tomatoes
- Beans
- Squash
- Root Crops
Farmscaping

“Farmscaping” is the strategic cultivation and placement of flowering plants, hedgerows, etc. to attract beneficial predatory insects.
Once your farmscaping gets going, look for ladybugs, lacewings, and pirate bugs, plus parasitic wasps, syrphid flies, and other beneficials.
NOP Basic Crop Requirements

May only use non-synthetic biological, botanical, or mineral inputs or substances on the National List for pest, weed, or disease control when other practices are insufficient.
Look for these symbols

OMRI™
Listed
Organic Materials
Review Institute

Look for the OMRI and WSDA seals on allowed materials:

WSDA
Weed control

Crop rotation, field prep and mechanical cultivation, hand weeding, mulching with natural materials, flame weeding, grazing livestock, mowing
Can use plastic mulch, provided that it is removed from the field at the end of the growing or harvest season.
The Challenge

Maintaining residues while accomplishing tillage objectives
Records must fully disclose all activities and transactions of the certified operation in sufficient detail as to be readily understood and audited.
Steps in the Certification Process

- Pick a certifier
- Get the application
- Fill out the application
- Submit the application with applicable fees
- Certifier does first review and requests missing info
- Certifier assigns inspector
- Inspector conducts on farm inspection
- Inspector submits report to the certifier
- Certifier does second review
- Certificate issued
How much does it cost?

- Fee schedules vary by certifier
- Budget $500 to $1000 per year
- 75% (up to $750) cost share available through your State Dept of AG
- EQIP funds available for transition
Violations

Any certified operation that makes a false statement or knowingly sells or labels a product as organic that is not produced in accordance with the Organic Foods Production Act of 1990 shall be subject to up to $10,000 fine per violation.
USDA Seal

USDA ORGANIC
Organic Strawberry Production
Southeast Strawberry Expo
Southern Small Fruit Consortium

Durham, North Carolina
November 8, 2011

John Vollmer
“Farmer John”
Bunn, NC

www.vollmerfarm.com
Two Operations:
Spring/Summer-production oriented

• Operated by John & Betty
• 7 acres of Certified Organic Strawberries
• Organic Baby Greens
• 3 acre Organic Vegetable Garden
• CSA – Goal 250 members – 2012
• Organic Blueberries
• Organic Blackberries
• Farm Market / Ice Cream Shop – Russ
• Weekend Farmer’s Markets

www.vollmerfarm.com
Fall Harvest Season

School Tours
Weekend Family Fun

- Owned & operated by Russ
- Russ employed full time off farm
- Market & Ice Cream Shop
- Educational Tours
- Back Forty family play area
- Pumpkins & PYO
- Corporate/Company Picnics
Farm Market & Ice Cream Shop

www.vollmerfarm.com
The Back Forty

• $13 admission fee per person-includes all activities, does not include pumpkins or food!
• Open on fall weekends to the general public
• Open weekdays in fall for educational tours

www.vollmerfarm.com
CSA Packing Shed
Veggie Wash & Cool
Now, What You’re Here For!
Types of Strawberry Production Systems

• Matted Row Bare Ground – Biennial
  • Plant April/May 2011
  • Harvest 2012 and beyond

• Plastic Mulch Plus Drip Irrigation – Biennial
  • Plant April/May 2011
  • Harvest 2012 and beyond

• Plastic Mulch Plus Drip Irrigation – Annual
  • Plant September/October 2010
  • Harvest 2011
Cover Crops

**Winter:** Crimson Clover – 20 lbs.
Oats – 32 lbs.

**Summer:** Soybeans – 60 lbs.
Pearl Millet – 30 lbs.
Cover Crop Benefits

- Legume – Fix Nitrogen + Soil Life
- Grass + Soil Life
- Organic Matter
- Water Holding Capacity
- Soil Easy to Work
- Competition to Weeds
- CEC
- No Liming – Mineral Balance
- Disease + Insects
As of January 12, 2011
Summer Cover Crop

Pearl Millet @ 30 lbs.  
Soybeans @ 60 lbs.
Seed by May 15
Grow for 60 days
Flail Mow/Disc by Late July
Land Prep for Berries Starts August 1

Organic/Untreated
Organic Strawberry Fertility

• Timing – August 1-15
• Adjust pH 6.0-6.5
• Apply Compost 10-15 yd$^3$/acre
• Apply Nature Safe
  • 8-5-5 @ 800 lbs.
  • 13-0-0 @ 400 lbs.
• Apply Allganic Sulphate of Potash
  • 0-0-52 @ 200 lbs.
  • w/200 lbs. Gypsum-Extender
• N = 116    P = 40    K = 144
• Cost = $700.00/acre
• Cover Crops = $200.00/acre
Derived From

Hydrolyzed feather meal, meat meal and blood meal.

*This product contains 12.04% Slow Release Nitrogen from hydrolyzed feather meal and meat meal.

OMRI Listed

Directions for Use

This fertilizer is to be used to blend with other fertilizer ingredients. For best results, formulate 13-0-0 at 50% or greater of the total weight of the blend.

<table>
<thead>
<tr>
<th>Organic Farming:</th>
<th>50 lbs. N/A</th>
<th>100 lbs. N/A</th>
<th>150 lbs. N/A</th>
<th>200 lbs. N/A</th>
<th>538 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Specify Granular
Field Cultivator

Row Runner
Variety Selection

Chandler
- Best All Round – Above 36° Lat.
- Large Plant – 15k...2 rows per bed
- Good Flavor
- Soft Fruit – Odd Shapes

Camarosa
- Needs Warm Temperature
- Large Plant – 15k...2 rows per bed
- Good Flavor – Full Red
- Good Shelf Life

Sweet Charlie
- Early (+2 weeks)
- Small Plant – 23k...3 rows per bed
- Fruity Flavor – Low Acidity
- Soft Fruit – “Orangey” Color

Albion
- Early – Late
- Small Plant – 23k...3 rows per bed
- Good Flavor
- Firm Fruit
- Beautiful Shape and Color
13.5k = 1 tape
Plant Population = 23k

Two Drip Tapes
IMPORTANT POLICY REMINDER

STRAWBERRY PLANTING MATERIALS

Dear Organic Growers:

QCS would like to remind you of our policy pertaining to the use of strawberry planting stock on your organic farm. This policy is designed to ensure that your farm is in compliance with 205.204 of the National Organic Program Final Rule. Please contact our office if you have any questions regarding this policy, or any other issues regarding organic certification.

1. Strawberry Plugs Used for Annual Strawberry Production Must be Certified Organic

Strawberry plugs are runners that have been harvested from the mother plant and rooted in a potting media for further growth, storage, and transportation. All strawberry plugs used for production of an annual strawberry crop must be certified organic. There is no commercial availability exception for strawberry plugs used for annual strawberry production. These are considered “annual seedlings” under the NOP.
2. Strawberry Plugs Used for Biennial Strawberry Production, and Bare-root Planting Stock, Must be Certified Organic if Commercially Available

Bare-root strawberry planting stock, and strawberry plugs used for *biennial* strawberry production, must be certified organic unless an equivalent organic variety is not commercially available. If an equivalent organic variety is not commercially available, you may use nonorganic, untreated planting stock.

If you purchase nonorganic, untreated stock, you must provide QCS with documentation that you attempted to locate an equivalent variety of organic stock from at least three producers of organic strawberry planting stock. You must also obtain a statement from the producer of the planting stock that the stock has been *untreated since the time it was harvested from the mother plant.* The use of treated planting stock will result in the removal of strawberries from your Product Verification Form and will render your land ineligible for organic certification for three years.
Order Plants in Late June / July!

Plant Types & Planting

- Plug
- Bare Root/Fresh Dug
- Cut Off
Plug

Cut Off & Bare Root
7-10 Days $H_2O$
Yellow = Plug Punch
Green = Bare Root or Cut Off
Place the Tool Near the End

Twist the Root
Push Straight In – Crown at Ground Level
Within one hour, H$_2$O will be within 7-10 days.

Organic Strawberries
Pick your own!
Harvesting April-June
November-December Clean Up

Before

After
Weeds, Mites and Disease in the Bottom of the Row
- Not Exactly "Priceless!"...labor cost = $800.00/acre
Late December Row Cover Application

Benefits
• Keeps Plants in “Comfort Zone”
• Reduces Leaf Burn – Temps in Teens
• Camarosa Can be Grown North
• Helps with Deer
• March – Protection, Alberta Clipper
Purchase Cost
• 1 oz = $800/acre
• 1.2 oz = $1,200/acre
• 1.5 oz = $1,600/acre

Labor
• Put on Covers = $150/acre
• Take Off = $100/acre
Sod Staples
$40.00/k

Rock Bags
$1/each
Three Steps Apart
Early March Clean Up

• Dead Blooms
• Dead & Dying Leaves
• Weeds
• Cost = $400.00/acre
• Scouting for Insects & Disease
# Frost/Freeze Protection

## Critical Temperatures

The chart below indicates critical temperatures (degrees F) for cold damage of flower buds based on stage of development.

<table>
<thead>
<tr>
<th>GROWTH STAGE</th>
<th>CRITICAL TEMPERATURE (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bud emergence</td>
<td>10</td>
</tr>
<tr>
<td>Tight bud</td>
<td>22</td>
</tr>
<tr>
<td>“Popcorn”</td>
<td>26</td>
</tr>
<tr>
<td>Open blossom</td>
<td>30</td>
</tr>
<tr>
<td>Green fruit</td>
<td>28</td>
</tr>
</tbody>
</table>

*Sources: “Strawberry Critical Temperatures” – K. Perry and B.C. Poling, NCSU; and Richard Funt, OSU*

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### Floating Row Cover
- Useful to small acres
- Limited water Supply

### Sprinkler Irrigation
- Excellent results
- Uses lots of water
- Disease loves this!

*Google: Critical Temperature/Strawberry (for details about protection)*
Fruit Production Stage

• 3-Day Picking Schedule
• Weekly Scouting
• Tissue Tests – 2 weeks
• Weather Forecasts – 7-day/hourly
  • Skybit – Strawberry Canopy Forecast
  • Accuweather Premium – Free Trial
  • Local Stations
Common Strawberry Insects

- Spider Mites
- Aphids
- Lygus Bug
- Strawberry Clipper
- Thrips
- Sap Beetles

Identify Organic Solutions

Dr. Hannah Barrack – NCSU
Strawberries: Spider Mites

Twospotted spider mites (*Tetranychus urticae*) are the most common economically important pest of strawberries in the southeast.
Strawberries: Aphids

GPA: Cornicles long, light, if dark, only at tips

Melon aphid: Cornicles short and dark

Strawberry aphid, knobbed hairs

*Chaetosiphon fragaefolii*

*Aphis gossypii*  
*Myzus persicae*

Photos: UC IPM Program
Strawberries: Poor pollination, Lygus bug, or other damage?

Lygus bug: Uniform seed size, evident throughout the fruit

Poor pollination: Different sized seeds, no brown or hollow seeds

Dried calyx disorder: Unknown (likely abiotic cause) appears on calyx
Strawberries: Lygus Bug Biology

• What Lygus are not:

- Tarnished Plant Bug (*Lygus lineolaris*)
- Big Eyed Bug (*Geocoris* spp.)
- False Chinch Bug (*Nysius raphanus*)
Strawberries: Strawberry Clipper

*Anthonomus signatus*

Small, weevil with multiple generations
Feeds on strawberry, caneberry, and wild relatives
Clipper: Buds are clipped, damage occurs primarily in spring

Cutworm: Base of leaves, crown are cut. Preceded by leaf feeding. Occurs primarily in fall.

Mechanical damage? Leaves cut in middle/end of stem. Occurs in fall, winter, early spring.
Strawberries: Thrips

- Thrips feeding causes bronzing near the stem on fruit
- Thrips do not cause catfacing
- Threshold = 10/flower
- If bronzing is not observed, do not treat for thrips
Strawberries: Sap Beetle

- Sap beetles feed on over ripe fruit and are attracted to the alcohols produced by the microbes feeding on this fruit.
- Can be problematic in peach, plum, and apple production as well.
- At least 3 species of ripe fruit feeding beetles are pests of SE strawberries.
  - Strawberry sap beetle (*Stelidota geminata* (Say)), Picnic beetles (*Clishchrochilus quadrisignatus* or *C. fasciatus*)
These products cost about $40/acre to use per application. High Pressure/High Volume

Mites are in egg, nymph, and adult form... minimum of two applications. Aphids usually require one application.
Broad spectrum control of Lygus, Clipper, Thrips, Sap Beetle and BENEFICIALS!
Consider the use of Neem.
http://www.nysaes.cornell.edu/pp/resourceguide/
Fruit Major Diseases
Gray Mold Minor
Anthracnose Ripe fruit rot Major
Gnomonia fruit rot
Leather fruit rot
Tan brown spot
Miscellaneous fruit rots

Leaf Diseases
Angular leaf spot
Common leaf spot (Mycosphaerella)
Phomopsis leaf blight
Gnomonia leaf blotch
Powdery mildew
Leaf scorch
Phytoplasmas

Crown and Root Diseases
Anthracnose crown rot
Phytophthora crown rot
Black root rot
Red Stele
Southern stem blight
Armillaria root rot
Fusarium wilt
Botrytis crown rot
Nematodes (root knot, Pratylenchus, Sting)

Dr. Frank Louws & Dr. Mafuzur Rahman - NCSU
Gray mold on different parts of strawberry; a) Sporulation on dead petiole and leaf; b) fruit infection from colonized dead tissue; c) lesion appearance from internal infection that has occurred through the flower parts such as the stigma.
Infection Cycle of *B. cinerea*

- **New lvs**
- **Transplant lvs**
- **Nov / Dec lvs**
- **Critical time for management**
- **Source of inoculum**

**Graph Details:**
- **Axes:**
  - X-axis: Months from Oct to May
  - Y-axis: Percentage
- **Legend:**
  - Fruit
  - Flower
  - Leaves
  - Crown
  - Root
- **Key Events:**
  - Fruit set:
  - Flower development:
  - New lvs:
  - Transplant lvs:
  - Nov / Dec lvs:
  - Critical time for management:

**Timeline:**
- Oct
- Nov
- Dec
- Jan
- Feb
- Mar
- Apr
- May
Control for Botrytis (gray mold).

Cost = $25.00/acre per application... multiple applications
IPM-based Management for Gray Mold: (OMRI approved products)

- Manage optimum fertility
- Optimum plant spacing
- Remove dead and dying leaves (never conduct if anthracnose is present)
- Inspect when covers are removed and spray if necessary.
- Implement a fungicide program that reduces the risk of disease...14-day schedule (begin at first bloom).
- Rotate between Serenade and Actinovate to prevent selection of Botrytis populations that are resistant to these fungicides.
## The Anthracnose Pathogens

<table>
<thead>
<tr>
<th>Species</th>
<th>Associated Disease Phase</th>
<th>Economic Importance in NC</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Colletotrichum acutatum</em></td>
<td>Fruit rot</td>
<td>High</td>
</tr>
<tr>
<td><em>Colletotrichum gloeosporioides</em></td>
<td>Crown rot</td>
<td>Low to moderate</td>
</tr>
<tr>
<td><em>Colletotrichum fragariae</em></td>
<td>Crown rot</td>
<td>Not found since 1986</td>
</tr>
</tbody>
</table>
Disease cycle of *C. acutatum* on strawberry

- **Transplant**
- **Dissemination**
- **Rain and irrigation**
- **Acervulus with conidia**
- **Warm Temperature**
- **High RH**
- **Germination**
- **Survival**
- **Infection**
- **Sporulating lesions**
- **Plant debris**
Anthracnose

Ripe fruit rot/black spot: *Colletotrichum acutatum*

Symptoms appear as whitish, water soaked lesions (3mm) eventually become sunken and black

Crown rot: *C. gloeosporioides*

Symptoms: Above ground-Plant collapse/wilting and death; Crown-firm, reddish brown/marbled appearance
Biology: Anthracnose of Strawberry

• Infested plants are the main source of disease.
• NC observations suggest over-summering of the disease does not occur if all infected plants are destroyed after final harvest.
• Infested tips leads to widespread problems in plug houses
• Quiescent infections may be present and spring epidemics occur under favorable conditions
• *C. gloeosporioides* can originate from wild hosts
IPM-based Management for Anthracnose ripe fruit rot:

• Buy disease-free plants (Tissue cultured, certified or grown under similar stringent conditions)
• Immediately rogue out infected plants if small number
• Destroy or bury all infected plants/fruit
• Use PERpose Plus™ @ 1:100 ratio - 3 days in a row

• Work plants when dry. Rouge diseased plants. Remove diseased fruit. Windborne, splashing rains or irrigation cause widespread inoculation. Harvest infected areas last.
Phytophthora crown and root rot
Site Selection

• Good soil drainage is critical!
• Areas of standing water will increase the possibility of Phytophthora crown and root rot.
• Drip apply right after planting.
• 6 oz/acre – 30 min. – 2x (21 days)
• Cost: $4.00/oz. x 6 oz. = $24.00/acre
• Albion variety has some resistance.
• Preventative
ANGULAR LEAFSPOT
*Xanthomonas fragariae*

- has a narrow host range restricted to strawberry

- Distribution: now world-wide probably on infected plants
## Angular Leaf Spot Remedies
(OMRI approved products)

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate (lbs./acre)</th>
<th>Active Ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nordox 75-WG</td>
<td>3-5</td>
<td>Copper</td>
</tr>
<tr>
<td>Badge X2</td>
<td>.75-1.25</td>
<td>Copper</td>
</tr>
<tr>
<td>Kocide – No longer OMRI approved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERpose Plus</td>
<td>1:100 ratio</td>
<td>Hydrogen Peroxide</td>
</tr>
</tbody>
</table>
Weed Control

✓ Plastic Mulch – very effective

✓ Straw Mulch – middles/not free!

✓ Natural Cover – middles/mower

✓ Hand Weeding – pricey/necessary

✓ Weed Eater – ends of rows/tape

OMRI Approved Products - ?
Cost: $500/week \times 8 \text{ weeks} = $4,000.00
OMRI Approved Products - ??
You need to know more.
Notice the absence of fumigation tanks....we are organic!

Motivated by the loss of methyl bromide (fear) as a growing technique for growing strawberries.

Began the process in 1997, first certified in 2000 (3 year process)

Have added other organic crops each year as demand increased....working at this idea for 15 years.

Organic helps separate our farm from others and generates business for our pick-your-own business.

VOLLMER FARM
Pick your own fun!

www.vollmerfarm.com
In regard to organic,

I personally feel we are delivering a safe product particularly when kids go to the field and “snack” without washing the fruit.

Conventional strawberries are one of the “dirty dozen.”

I’ve had to learn that “yield” is not the total measure of success as a grower.

The safety and nutrition of the product you are delivering to your customer and your own personal satisfaction are new parameters for measuring success.

With organic, you have to be willing to accept the possibility of lower yields, which can be offset by strong demand and high value.

Farmer John
Who’s the NEXT farmer?
Farmer John Vollmer
farmerjohn@vollmerfarm.com
919-495-2392

You can do this!

Farmer John Vollmer
farmerjohn@vollmerfarm.com
919-495-2392

VOLLMER FARM
Pick your own fun!
Organic Blueberry Production
2011 SR-SFC Agent Training
Raleigh, NC

Dr. Gerard Krewer
Professor Emeritus- UGA (gkrewer@uga.edu)
Owner: Harrietts Bluff Organic Farm
Woodbine, Ga.
229-392-1388
Topics to be covered

- Site Selection and Establishment
- Cultivar Selection
- Fertilization Programs
- Weed Control Programs
- Insect and Disease Control
- Marketing
Disclaimer

- This information is provided for educational purposes.
- Actual experiences may vary.
- It is not warranted in anyway.
- Check with the current pesticide labels and organic regulations before use. These can change from year to year.
Preplant Considerations

Amendment effects and soil chemistry

Irrigation and water chemistry
Species Organic Matter/Soil Requirements

- Rabbiteyes: Grow well in mineral soils with moderate organic content (1.5-2% OM)
- Sands, loamy sands, sandy clay loams, clay loams (sandy is better than clay)
- Northern and Southern Highbush: In the South, highbush need high organic matter soil. Min. 3-4% organic matter. Three production systems have been successful (discussed later).
Organic Amendment Options

- Pine Bark
- Canadian Peat moss - Good but expensive
- White pine wood – Too much N tie up for organic, unless you have a lot of preplant time
Growing Media Effects on N Release or Tie Up

- Virgin soil without amendments- low N tie up unless lots of raw organic matter is added in land clearing. Usually a N source.
- Peat moss-?
- Pine bark-High C:N ratio 300:1 (ties up N)
- White wood-V. high C:N ratio of 1000:1 (severe tie up of N)
Pine Bark

- If you incorporate a lot pine bark and plant a short time after this, you will need a lot of additional nitrogen.
Rabbiteyes-soil organic amendments to help them get started

- If planted on low organic matter, mineral soils, organic matter is usually added to the planting hole (5-10 gallons). Mixed 50/50 with the soil.
- Strip treatment also works well. About two inches of pine bark rototilled into the soil.
Successful Soils for Highbush

- Three types of growing medias commonly used:
  - 1. Virgin spodic sand series **without** pine bark addition. A layer: high organic matter sand, B layer sand, Bh layer is a hard pan cemented with organic matter and heavy metals.
  - Min. of 3% natural organic matter needed, 5% is better.
2. Pine Bark Culture Solo Production

- Widely used in Florida
- Beds of pure pine bark
- Plants grow well, but high fertilizer and water requirements
- Not recommended for organic production
3. Mix of Pine Bark and Soil

- Works well with many well drained soil types
- Less demanding of fertilizer and water than solo pine bark
Basic Soil Chemistry Requirements

- pH 4 to 5.2
- Target is 4.5 to 4.8 – use sulfur to lower the pH
- Avoid sites with very high P over 300 pounds per acre
- Avoid high calcium soils unless you are willing to monitor closely and acidify as needed.
Organic Acidification Options

- Elemental Sulfur-Preplant (as much as needed) and Postplant (300 pounds per acre as needed).
- Natural Citric Acid
- Natural Vinegar?
Phosphorus Preplant Recommendations (soil or soil-bark mix)

- Phosphorus: If soil test indicates less than 20 pounds per acre apply 200 pounds of bone meal. Rototill in.
Basic Soil Prep For Organic Blueberries

- Bedding is very beneficial in areas with poor drainage
- Subsoiling is recommended
- Limited options for root rots in organic systems
Subsoiling

- Beneficial for drainage
- Beneficial on well drained sites with rabbiteyes for deep root penetration
Bed with Water Furrow
Prepping Plants for Setting

- Many plants are pot bound
Beat out the Root Ball

- Beat out the root ball if pot bound
Prep Top

- Cut to back to 2 or 3 strong canes, remove flower buds
Weed Control Systems in Organic Blueberry Production

- Course pine bark - Four inches lasts about 2-3 years
- White on black plastic - 1.5 mil lasts about 2-3 years - weed barrier effect
- Woven ground cover - lasts about 4 to 6 years depending on quality
- Wheat straw - Four inches (after settling) lasts one year - significant nutrient source
- Cultivation??
Management of Bed Edges

- Rolling cultivator or rototiller
- Organic burn now compounds
- Clover oil
- Citrus oil
- Vinegar
Management of Fence Lines

- Machete
- Propane touch
Fertilization Programs

- General N requirements
- Mature rabbiteyes: 60 pounds of N per year (30 spring - 30 postharvest)
- Southern highbush: 90-120 pounds per year
- Generally applied as protein
- Protein is converted to ammonium N
Phosphorus

Typically 30-60 pounds of P2O5 is needed per year for mature plants. Rate is based on soil and leaf analysis. Can be applied twice a year in soil or in smaller doses during the growing season.

- 8 pounds of P2O5 is needed to raise the P level of the soil by 1 pound
- Typically applied as bone meal for organic production.
Potassium

- Typically 60-100 pounds of K20 needed per year for mature plants
- Base rate on soil and leaf analysis.
- Apply in spring and some postharvest
- Natural mined potassium sulfate is the typical source in organic production
Magnesium Deficiency

- Deficiency common in many areas on lower leaves
- Magnesium sulfate can be used to correct the deficiency
Common Deficiencies

Iron

- Appears most often at pH above 5.3
- Diagnosis by soil sample and symptoms (leaf analysis not reliable)
- Often seen during droughts on shoot tips using high pH irrigation water or in wet spots.
- Best treated by correcting the pH
- Soil applications of iron sulfate can be used.
Copper

- Major problem on rabbiteyes on virgin soil
- Small mouse ear shoots in late summer, die back
- Deficiency greatly increases stem blight
- Treat with copper chelate (rate-read label) or copper sulfate 1/2 lbs. injected, 4 lbs. banded
- Use copper chelate if sulfur water is present "Bucket" test
Fertilizer Program I am Using

- Nature Safe 8-5-5 applied every 8 weeks under plastic
- Two applications in spring and two post harvest
- Applied two weeks before more N is needed to allow for break down from protein to ammonium N
- I am using one to three ounces per application depending on bush size
Fertilizer Program I am using

- Micros injected in drip as documented by deficiencies
- Copper chelate (Biomin-Wash. State organic label)
- Manganese sulfate (OMRI list)
- Borax for Boron (OMRI list)
Possible Insect and Disease Control Programs

- Dormant season:
- Fire ants- *spinosad insecticide, several brands, Conserve and Green Light, etc.*
- Scale insects- *Certain petroleum oils, check OMRI list*
Dormant Season

- Mummy berry- *bury mummies with at least ½ inch of soil or cover with mulch*
Late Dormancy (Bud stage 2 and 3)

- Gall midge-attacks swelling flower buds - *Spray with spinosad during warm weather if needed*
Green Tip or 1-5% Bloom

- Mummy Berry and Botrytis-Serenade plus or Regalia plus NuFilm 17 as sticker
- Apply weekly for a total of three applications
Late Bloom-Scout for thrips

- Thrips- *Spinosad insecticide-* Entrust, etc.
Near Harvest and Harvest

- **Spotted wing drosophila** - Monitor with vinegar or yeast traps, spray with spinosad or Pyganic if needed
- **Blueberry Maggot** - Monitor with traps, spray with spinosad or use spinosad bait (Naturalyte Fruit Fly Bait)
- **Weekly sprays will be needed until infestation stops**
Postharvest leaf spots

- Septoria leaf spot and rust - *Fish oils*, typically *Organic Gem or Omega Grow* at 2%
- Compost tea?
- *Serenade or Regalia*?
Postharvest Insect Control

- Blueberry leaf or flea beetle - *Spinosad* insecticide - *Entrust*, etc.
Organic Marketing Options

- You need a good price to make a profit
- U-Pick and Direct Sales at Farm
- Farmers Markets - My experience varies
- Health Food Stores
- CSAs or “Box” Programs
- Wholesale
Organic blackberry production

SRSFC Agent Training
November 8, 2011

Gina_Fernandez@ncsu.edu
A few points to consider...

• Your audience are county extension agents
• The goal of these trainings is to improve the agents ability to provide current and accurate advise to their grower and homeowner clientele.
• They are looking for take home information that can be applied directly.
• Stress approaches, techniques, etc that have worked well in your crops/situation and those that have not worked well.
• Use data to document your points but keep please data presentations at a minimum.
Site selection

• “tolerant” of heavier soils than raspberries
• pH 6.0-6.5
• High organic matter 3%
• Good air drainage
• Avoid planting into sites previously planted in fruit crops (crown gall)
• Remove wild *Rubus* from surrounding area (200-1000 ft)
• Don’t plant near infected *Rubus*
Pre-plant

• Soil preparation/crop rotation
  – No studies specifically for blackberry
  – Improve soil health cover crops, rotation
  – Would also to consider preparation that would deter nematodes (virus vectors)

• Raised beds
  – Raspberry research show that raised beds decrease level of phytophthora root rot (NY study)

• Row covers for weed control
  – White plastic best for high yields and weed control (TX study)
Cover crops?

- Preplant
  - Will depend on region and cropping history
  - Legume/grass mix
Raised beds

- Mulches help control weeds
- Raised beds on plastic
  - TX study
Mulching rows

- 4 plastic mulches tested
- White mulch improves yield over bare soil

Source: http://www.subplantsci.org/SPSJ/v59%202007/SPSJ%2059%2095-103%20Makus.pdf
No plastic

- This photo shows 2 plots with 8 ft strips (foreground left). Behind are 2 plots with one ft strips.
Weed free zones

Methods (conventional spray)
- Planted ‘Navaho’ plugs in April 2011
- Strip width: 0, 1, 2, 4, 6, and 8 ft.

Results
- Between row vegetation consisted of ambient species (crabgrass, Bermuda grass, Florida pusley, spotted spurge, yellow nutsedge, birdsfoot trefoil)
- Yield effects TBD

Source: Jennings and Meyers, NCSU Weed science team
Alley management

• Alley management
  – Winter
    • Rye or annual ryegrass winter
  – Summer
    • Permanent sod fescue, perennial ryegrass (not Bermuda)
  – Don’t allow weeds to grow
Plant selection

• Cultivars
  – Thornless types less susceptible to double blossom
  – Select based on known problems in growing area

• Virus indexed plants
  – 30+ known viruses
  – Blackberry yellow vein disease (complex of multiple viruses)

• Certified organic plants
  – None known (NY Times article)
Blackberry Disease Problems

- Phytophthora root rot
- Double blossom (Rosette)
- Orange rust
- Viruses
- Crown gall
- Cane blight
Phytophthora root rot
Orange rust
Double blossom
# Disease resistant

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Orange Rust</th>
<th>Double Blossom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apache</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Arapaho</td>
<td>yes</td>
<td>yes/susceptible</td>
</tr>
<tr>
<td>Natchez</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Navaho</td>
<td>no</td>
<td>high</td>
</tr>
<tr>
<td>Ouachita</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Sources: Univ. Ark (Clark) and UGA/USDA (Brannen/Buckley)
Viruses

- Clean virus tested plants
- Many viruses known and named, but don’t know which ones are key and in what combination
- Watch for vectors
  - Nematodes
  - Thrips
  - Others
Viruses

Multiple infections of TRSV, ToRSV and INSV in ‘Arapaho’ blackberry
Crown Gall

- Occurs in grape, peach and more..
- widest host range of any plant pathogen
- Persists 25+years
Irrigation and Drainage

• Drip irrigation is the only way to go with blackberries and raspberries
Cane blight
Soft tipping v. pruning
Disease: method to minimize

- Phytophthora root rot: raised beds
- Double blossom: resistant cultivar
- Orange rust: resistant cultivar
- Viruses: clean plants
- Crown gall: avoid planting in infected soils/tolerance?
- Cane blight: tipping not pruning
- Others may become more important in organic systems
Insects

• Red necked cane borer
• Raspberry crown borer
• Spotted wing drosophila
• Others may become more important in organic systems
University Arkansas

Don Johnson lab
# Bramble Pest Biology

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clipper</td>
<td>Bloom</td>
<td>Fruiting</td>
<td></td>
<td></td>
<td>New leaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RNCB</td>
<td>Adult</td>
<td>Egg</td>
<td>Larva</td>
<td></td>
<td></td>
<td>Galls appear</td>
<td></td>
</tr>
<tr>
<td>Stink bugs</td>
<td></td>
<td></td>
<td>Nymph</td>
<td>Adult</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCB</td>
<td>Larva in crown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pupa</td>
<td>Moth</td>
</tr>
<tr>
<td>GJB JB</td>
<td>Larva</td>
<td>Pupa</td>
<td>JB</td>
<td>GJB</td>
<td>---</td>
<td>--</td>
<td>---</td>
</tr>
</tbody>
</table>
Pests Reducing Blackberry Yield
Rednecked Cane Borer (RNCB)

*Agrilus ruficollis* (F.)

- Family: Buprestidae
- Adult feeds on primocane leaves & lays eggs only on primocanes (May-early June)
- Larva girdles cane = gall (July)
- Gall predisposes canes to winter injury

Rednecked cane borer

- Adults emerge = 29 April to 8 June

Rednecked Cane Borer (RNCB)

Scout weekly during the day in May:

- Walk planting looking for:
  - Adults on primocane leaves or
  - Small holes in primocane leaves

Cultural control if < 5% canes galled:

- March - remove galled fruiting canes

Chemical control if > 5% galled canes:

- OMRI approved but **untested** for RNCB:
Methods: Cultural Control of RNCB

- Hypothesis: avoid galls on primocanes emerging after RNCB egg laying during May to early June
- Date primocanes mowed to ground:
  - May 15
  - June 15
  - July 15
- Record number of galls at leaf drop (Dec.)

Photo: 12 June 2009
### RNCB Galling Differs By Cane Removal Date for Primocane-bearing Blackberries (2009)

<table>
<thead>
<tr>
<th>Cane removal date</th>
<th>No. RNCB galls/plot</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 15</td>
<td>3.1a</td>
<td>Fruit</td>
</tr>
<tr>
<td>June 15</td>
<td>1.4b</td>
<td>Fruit</td>
</tr>
<tr>
<td>July 15</td>
<td>0.6c</td>
<td>No fruit</td>
</tr>
</tbody>
</table>

*Prob. $F > P < 0.0001$*
## Preliminary Efficacy Against RNCB

<table>
<thead>
<tr>
<th>Biopesticide</th>
<th>Clarksville, AR&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Fayetteville, AR&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecotrol</td>
<td>0.8a</td>
<td>1.4a</td>
</tr>
<tr>
<td>Pyganic</td>
<td>1.0a</td>
<td>0.3a</td>
</tr>
<tr>
<td>Azera</td>
<td>0.4a</td>
<td>-</td>
</tr>
<tr>
<td>Check</td>
<td>1.2a</td>
<td>-</td>
</tr>
</tbody>
</table>

**Prob. F > P**

- 0.53
- 0.051

<sup>a</sup> Applied on 1 and 9 June 2009

<sup>b</sup> Applied on 28 May, 4 and 12 June 2009
Raspberry Crown Borer

_Pennisetia marginata_ (Harris)

- Family: Sesiidae (clearwing moth)
- Pupa ecloses to adult (Sept.)
- Adults mate and lay eggs on leaves (Oct.)
- Larva tunnels in canes (May-Aug.)
- Reduces crown vigor and kills canes
Raspberry Crown Borer Control

• Scouting:
  – Late July, cut dead or fruited canes off at soil line and check for larvae and/or tunneling in pith
  – September, look for females laying eggs from mid-morning to mid-afternoon
• Control:
  • OMRI approved but *untested* for RCB
Spotted Wing Drosophila

- Organic controls limited, some resistance detected
- Lots of data collected 2011
Fertility management

- Cover crops and compost can add some fertility
- Supplemental N usually needed
  - 25-50 lbs N year one
  - 50-75 lbs N subsequent years.
- March-May split application
  - 8-5-5 pellet product
USDA-NIFA OREI

• Organic Blackberry Production Systems for Improved Yield, Fruit Quality, and Food Safety in Fresh and Processed Markets
• Oregon State Univ. and NC State University
• NC
  – Budget, bioactive compounds, post harvest evaluation, training, food safety
• Eric Pond and John Vollmer-grower advisors
Budget

• Charles Safley, Olha Sydorovych
• Based on NC 10 conventional production budget, with changes based on Vollmer farm practices
Bioactive compounds

- Moo Jung Kim working in Penny Perkins-Veazie lab
Thanks!

- Phil Branen UGA
- Donn Johnson Uark
- Hannah Burrack, NCSU
- Marvin Pritts, Cornell
- Yannis Tzanetakis, U Ark
Organic Muscadine Grape Production

Terry Bland, Horticultural Science
Bill Cline, Plant Pathology
North Carolina State University
Horticultural Crops Research Station
Castle Hayne, NC
Topics to be covered:

- Site Selection
- Trellising
- Site preparation
- Weed barriers
- Irrigation

- Cultivars
- Culture
- Diseases
- Insects
- Weeds
Site selection is the most important decision you will make! Use a county soil map to determine whether your site is suitable for grapes:

- Soil classification
- Soil profile
- What crops grow well on your soil type?
- External drainage
- Internal drainage
- Most zones are irregular in shape
Site Selection -- Choose a soil with good internal drainage
Muscadines do not like “wet feet”!

Weak vines in a wet area

Crayfish holes at the End of a row – site Is too wet!
Trellising

- Use only approved materials such as red cedar, black locust, and metal

- NO treated posts
Weed Control

- Reduce weed populations as much as possible before planting.
- After planting utilize natural or synthetic mulches like landscape fabric, grain straw, and hardwood chips.
- Grow tubes are recommended.
Mulch around each vine to suppress weeds
Allelopathy

- Biochemical suppression of weeds
- Wheat straw most commonly used
Synthetic barrier fabric covered with bark mulch and irrigation drip line
Drip irrigation
Fertilization

- As usual begin with a soil test
- Use only approved sources of plant nutrients
- Keep in mind that natural fertilizers typically release nutrients over a long time period
- Some examples of natural fertilizers are poultry litter, compost, and dried manures
Compost-amended soil
Insects

- Although a number of insects feed on various parts of grape vines the grape root borer does the greatest long term damage.
- One possible way to reduce borers is the use of a mechanical barrier to prevent the adult females from depositing eggs.
Adult Female Grape Root Borer
Japanese beetles cause obvious damage but vines survive and productivity is not usually diminished
Japanese beetles eating late-blooming flowers
Resources

- www.ams.usda.gov/nop
- www.extension.org/pages18321/can-i-use-input-on-my-organic-farm
Organic Grapes in the Southeastern US?

- Most organic grapes are grown in arid regions
- Organic production of bunch grapes in the eastern US is very difficult (diseases, weeds)
- Muscadines in backyard plantings are usually not sprayed

Muscadines are a good candidate for commercial organic production:
- No Downy Mildew, Bunch Grape Anthracnose or Botrytis gray mold
- Resistant to Phomopsis
- Physically tough, thick-skinned
- Sulfur can be used to control the biggest disease threat, Powdery Mildew
What Causes Fruit to Rot?

- Mostly fungi
- Spores are microscopic
- Spread by wind, splashing rain, or insects
- Most spores require moisture to germinate and infect
Fungal pathogens overwinter in old, infected plant parts, releasing spores that infect new emerging shoots in the spring.
Powdery Mildew

- **Fungus** (*Uncinula necator*)
- Appears as faint white “powder” on young fruit
- Causes brown russetting on surface
- Affected fruit cannot ripen normally; may crack
Fruit Rots

- **Macrophoma rot**
  - *Botryosphaeria spp.*
- **Ripe rot**
  - *Colletotrichum spp.*
- **Bitter Rot**
  - *Greeneria uvicola*
- **Sooty mold**
  - *Peltaster fructicola*
Leaf Diseases

- Bitter Rot
  *Greeneria uvicola*

- Black rot
  *Guignardia bidwellii*

- Pierce’s Disease
  *Xylella fastidiosa*

- Angular leaf spot
  *Mycosphaerella angulata*
Disease Resistance in Muscadine Grapes

Noble
Cultivars vary greatly in susceptibility to rots. In general, the dark-fruited types are more resistant
CULTIVAR RESISTANCE TO DISEASE -- Unsprayed ‘Carlos’ (left) retains leaves fairly well, while unsprayed ‘Granny Val’ (right) may not retain enough leaves for fruit to ripen normally.
Suggestions for Organic Disease Control:

- Plant resistant cultivars (Carlos, Summit, Tara, Triumph, Nesbitt, Noble, Supreme)
- Use detailed pruning to remove overwintered infections (old fruit and fruit pedicels)
- Apply sulfur or Serenade for powdery mildew
- Serenade to suppress rots
- Identify pests and keep records – only control the pests that you actually have
- Expect more disease!
Flowering/Set

Dry Calyptera (cap) fails to come off, preventing pollination and fruit set on some flowers

Self-fertile

Female
Wet stem scars are a serious defect on some cultivars, making them unsuitable for fresh market sales.
Some cultivars like Black Beauty and Sugargate will split during rainy weather, attracting bees.
CARLOS (NCSU, 1970)

- Self-fertile
- Highly productive
- Dry stem scar
- Best cultivar for wine
- +90% of NC acreage
- Tart skin
- Not highly rated for fresh market (does not chill well, small size)
Noble (NCSU, 1974)

- Very productive
- Self-fertile
- Stable pigments
- Small size
- Wet stem scar
- #1 muscadine used for wine in Florida
- Not for fresh sales!
SUMMIT – “Pink-bronze”, very productive and vigorous, edible skin, few rots
TRIUMPH – early-ripening, dry scar, productive, with edible skin, few rots
SUPREME -- Very productive, largest black-fruited cultivar. Some vines died in years 2-4, probably due to overcropping. Thinning or removal of fruit is recommended in early years of production.
NESBITT – Medium large, perfect-flowered, good vigor, productive, dry stem scar
MARKETABLE yields at Castle Hayne, NC 2005 (wet year, vineyard not irrigated, no fungicides used).

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Berry (g)</th>
<th>Tons/Acre</th>
<th>Cultivar</th>
<th>Berry (g)</th>
<th>Tons/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carlos</td>
<td>5.2</td>
<td>5.8</td>
<td>Noble</td>
<td>3.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Darlene</td>
<td>14.0</td>
<td>1.8</td>
<td>Pam</td>
<td>16.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Doreen</td>
<td>4.6</td>
<td>--(^a)</td>
<td>Scarlett</td>
<td>12.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Fry</td>
<td>11.0</td>
<td>5.4</td>
<td>So. Home</td>
<td>6.6</td>
<td>--(^a)</td>
</tr>
<tr>
<td>Gr. Val</td>
<td>14.0</td>
<td>5.5</td>
<td>Sw. Jenny</td>
<td>15.0</td>
<td>1.9(^b)</td>
</tr>
<tr>
<td>Higgins</td>
<td>9.5</td>
<td>2.5</td>
<td>Sugargate</td>
<td>14.0</td>
<td>2.4(^c)</td>
</tr>
<tr>
<td>Ison</td>
<td>8.0</td>
<td>2.8</td>
<td>Summit</td>
<td>8.5</td>
<td>5.8(^d)</td>
</tr>
<tr>
<td>Jumbo</td>
<td>9.3</td>
<td>--(^a)</td>
<td>Supreme</td>
<td>16.4</td>
<td>3.6(^c)</td>
</tr>
<tr>
<td>Nesbitt</td>
<td>--</td>
<td>--(^a)</td>
<td>Triumph</td>
<td>8.2</td>
<td>3.7</td>
</tr>
</tbody>
</table>

\(^a\) Yield not shown for immature vines  
\(^b\) Sweet Jenny had only 43% marketable due to rots  
\(^c\) Sugargate had 24% splits, Supreme 7%  
\(^d\) Summit with 10% loss due to macrophoma rot
Best performers at Castle Hayne (unfortunately the experiment did not include Tara, Early Fry)

- **Triumph** (Bronze, early, perfect-flowered)
- **Summit** (Bronze, mid, female-flowered)
- **Nesbitt** (Black, late, perfect-flowered)
- **Supreme** (Black, mid-late, female)

Scarlett, Pam, Ison recommended for further trial.
Cluster harvest might be used for Fry, Granny Val, Pam (lg brz) and Ison (med blk)
Home-made catcher frames (left) or those designed for blueberries (right) can be used to speed harvest and reduce ground loss.
Where to find plants

- Old Courthouse Nursery (NC)  
  910-293-9374

- Ison’s Nursery (GA)  
  1-800-733-0324

- Bottoms Nursery (GA)  
  770-884-5661

- Tinga Nursery (NC)  
  910-762-1975

WEB RESOURCES:  
http://www.smallfruits.org
Resources

- Southern Region Small Fruit Consortium  
  www.smallfruits.org
- Fruit Disease Information Notes  
  http://www.ces.ncsu.edu/depts/pp/notes/Fruit/fdin012/fdin012.htm
- Organic Grape Production  
- Resource Guide for Organic Insect and Disease Control  
  http://www.nysaes.cornell.edu/pp/resourceguide/
- EPA Biopesticide database  
  http://www.epa.gov/oppbppd1/biopesticides/index.htm
‘Southern Home’ muscadine x vinifera hybrid
Organic wine grape production in the mid-Atlantic regions?

Mizuho Nita, Ph. D.
(sounds like me-zoo-ho, or Navajo)
Research/Extension Grape Pathologist
Virginia Tech, Alson H. Smith, Jr.
Agricultural Research and Extension Center
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Winchester, VA 22601
Phone: 540-869-2560 ext. 33
Email: nita24@vt.edu

Organic Agriculture Workshop
8 November, 2011
Fungal diseases are very common in the mid-Atlantic vineyards

- Due to high humidity (rain and relative humidity) during the growing season
- Variety selection
  - French varieties such as ‘Chardonnay’ can be grown due to relatively milder winters

It is not a matter of “if”, but “when” you see them!

A commercial vineyard in Loudoun county, VA
Can you grow wine grape in the mid-Atlantic region without chemical management?
It is not possible to grow susceptible variety without fungicide
There are many grape diseases, but there are the major fungal diseases in our area that need to be managed.

- Downy Mildew
- Powdery Mildew
- Black Rot
- Phomopsis cane and leaf spot
- Botrytis gray mold

Black rot
It is very important for you to recognize these diseases!

Downy Mildew

Powdery Mildew

The infection conditions and chemicals to be used are different!
Downy Mildew

- It can infect leaves and berries, berry infection can cause serious damage
- Heavy leaf infection can cause a defoliation

Pictures taken from Organic grape production guide: OSU, Ellis and Nita 2004
Downy Mildew
Powdery Mildew

- It can infect leaves and berries, berry infection can cause serious damage
- Infection of berries during early season can increase the risk of other diseases

It can be found on the both upper and lower surface, but more commonly found on the upper surface.

Pictures taken from Organic grape production guide: OSU, Ellis and Nita 2004
Powdery Mildew
Phomopsis Cane and Leaf Spot

- It can infect leaves, canes, rachis, and berries (up to 30% loss of yield has been reported), it can cause premature drop of berries
- Even though it does not cause major damage, it can cause a slow decline of vines
Phomopsis cane and leaf spot
Black Rot

- It can infect leaves and berries, berry infection can cause serious damage
- Infected berries will produce spores next year
Black Rot
Botrytis

- It can cause damage to berries, and can be very significant
How these disease occur?

- Pathogens need to have a certain conditions to infect and cause disease

Host (grape)

Environment (esp. Rain & Temp)

Pathogen
The management of disease = aiming to break the disease triangle

- Use of Genetic Resistance
  - Variety Selection
- Cultural Control
  - Site selection
  - Sanitation
    - Pruning methods
  - Vine training methods
- Chemical Control
  - Use of fungicide
- Biological Control
  - Some agents are available, but results are not consistent
Why is Integrated Pest Management (IPM) Important?

- You can **not** protect your vines without integrating various management strategies.
  - Most of wine grapes are not meant to be grown in our area
  - Overuse or misuse of chemical will cause issues that are bigger than you can handle
    - Chemical resistant isolates that cannot be managed by a fungicide(s)
Why is Integrated Pest Management (IPM) Important?

- To save your money and time
  - Proper viticulture practices will reduce the risk of disease, increase yield, and prolong life of your vines

- To save the environment, your money and time
  - Proper disease management practices will:
    - Reduce the risk of chemical misuse (injury to you and your vine)
    - Reduce the risk of development of resistant isolates
    - Save your (and chemical companies’) money.
So what are components for *Organic* grape production IPM?

- Variety Selection
  - This will be the KEY for your success
- Site Selection
  - Air movement and degree days
- Canopy Management
  - + Training system
    - Once again, air movement!
- Sanitation
  - Remove infected or dead tissues out from the vineyard
- Fungicide application
  - Our choices are limited...
Black rot management is the key for our growing area

- Sulfur materials provide control against powdery mildew
  - Potassium bicarbonate materials (Kaligreen, Milstop)
  - Regalia SC *(Reynoutria sachalinensis)*
  - Serenade *(Bacillus subtilis)*
  - Oils (SuffOil-X, Trilogy, etc)

- Copper materials provide control against downy mildew, Botrytis, and Phomopsis
  - 0.05% lime sulfur against Phomopsis works

- Botrytis prefers some variety more so than others. Many of reds are moderately susceptible to Bot.
Variety Selection

- Since we do not have any materials against black rot at this point, variety selection will be the backbone of your IPM.
- Slightly susceptible varieties for black rot:
  - Cascade, Cayuga White, Chancellor, Chelois, Corot noir, DeChaunac, Elvira, GR7, Ives, Marquette, Noiret, Traminette, Vidal blanc, and Vignoles.
Cultural Practices

- Site selection
  - Air circulation is the key!

- Sanitation
  - Many pathogens survive on or in wood tissues during the winter
  - Removal of infected tissues (woods and berries)
    - Both during growing season and winter

- Canopy management
  - Cane pruning vs. Cordon pruning
  - Shoot positioning and leaf removal
Chemical Management

- Materials that may have efficacy against black rot
  - Copper (various formulations)
    - Inconsistent results

- Materials that are discussed (i.e., no formal testing was done)
  - Oxidate
    - Unlikely provide protective activity
    - It may reduce the disease spread...
  - Regalia
    - ???
Environmental monitoring

- Each disease has a specific condition for infection and disease development.
- Monitoring weather will help grower examine the risk of disease development.

<table>
<thead>
<tr>
<th>Temperature in °F</th>
<th>Temperature in °C</th>
<th>Minimum Leaf Wetness Duration (hr) for Light Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>55</td>
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<td>70</td>
<td>21</td>
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<td>75</td>
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<td>80</td>
<td>27</td>
<td>6</td>
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<td>85</td>
<td>29</td>
<td>9</td>
</tr>
<tr>
<td>90</td>
<td>32</td>
<td>12</td>
</tr>
</tbody>
</table>
Scouting of diseases and insects

- Since the chemical management options are not as effective as conventional approaches, you need to scout frequently to observe disease development
  - Weekly, on foot, 2-3 locations per vineyard
  - Some have “sentinel” vines that do not receive any fungicide
- There are not many options for “curative” or “kick-back” treatments
A little bit about insect management

- There are several materials against Grape Berry Moth
  - Biobit HP (Bacillus thuninglensis)
  - Entrust (spinosad)
  - Aza-Direct (azadirachtin)

- We do not have sufficient data for Japanese beetle and leafhoppers

- Oils (JMS Stylet Oil) are effective against spider mites

- Once again, scouting is important
How about other diseases? Ripe Rot, Sour Rot, etc?

- These rate season rots are more difficult to predict its outbreak because multiple pathogens can be involved.
  - Rainy conditions as we observed this year in VA were ideal for these diseases
- There are not many studies done for these diseases, even with conventional approach
- Once again, canopy management and site selection are key
Resources on Grape Disease Management

My blog

- Updated almost daily during the season
- Please refer to my handout for URLs
Organic Small Fruit Disease Management Guidelines

Integrated Management of Grape Diseases

Prepared by
Mike A. Ellis,
Professor
and
Mizuho Nita,
Graduate Research Associate

Department of Plant Pathology
at the Ohio State University/OARDC

This PDF file is provided as a part of “OSU Fruit Disease Resources” website (http://www.cاردc.ohio-state.edu/fruitpathology/).
Viticulture Books

Wine Grape
PRODUCTION GUIDE
for Eastern North America

THE GRAPE GROWER
A Guide to Organic Viticulture
Lon Rombough
What is your priority?

- Increase your yield
  - Quality
  - Quantity

- Disease management need to make sense to you in terms of
  - Economy
  - Ecology

- Please spend time during off season to be better prepare for next season!!
Thank you for your attention!

Please keep coming to vineyard meetings and workshops in the future.

Any Questions?
Organic Winegrape Production in NC
Our Experience

Site Selection
Varietal Selection
Organic Certification Process

Pat and Clyde Colwell
www.carolinaheritagevineyards.com
(336) 366-3301
Site Selection

• Key challenges to organic viticulture in NC
  – Humidity + warm weather => mildew/fungus
  – Insects
  – Inconsistent weather year-to-year

• Sites to best address these challenges
  – >1000 ft altitude
  – Sloping land
  – Good airflow
  – Open area with natural buffers on sides of property
  – Ample water supply
  – Good clay/loam soil
  – No recent history of grape insect/disease issues
Carolina Heritage Vineyard
Site Selection

1000 ft alt

Sloping fields

Natural Buffers

Water Supply

Air Flow

Sloping fields

1000 ft alt

Natural Buffers

Sloping fields

3

Carolina Heritage Vineyard & Winery
Organic Winegrape Production
November 8, 2011
Sloping fields
Varietal Selection

• Best varieties for organic vineyards in NC:
  - Grapes which are best suited for micro-climate of location
    • # Growing-degree-days (GDD)
    • Varieties with early budbreak ⇔ Location with late spring frosts?
    • Varieties which ripen early ⇔ June Bug Infestations?
    • Varieties which ripen late ⇔ Location with early autumn frosts?
  - Native grapes
    • Natural defenses against native pests and diseases
    • Muscadines
      - Not all varieties are cold-hardy (ie. < 9 degrees F)
      - Not all varieties make good wine, etc
    • Native hybrids (eg. Norton)
      - Sometimes a bit challenging to get started
  - European/American Hybrids which are more disease/pest tolerant
    • Cornell Research Station
    • University of Minnesota (Cold-hardy grapes)

• Our recommendation to vineyards: Choose the grapes you like (within these parameters)! You’ll enjoy giving them the attention they will demand to do well and you’ll truly enjoy the fruits of your labor!
Carolina Heritage Vineyard
Varietal Placement
Keep your location’s micro-climate in mind when selecting varietals.

Late “Winter” - March 2, 2010

Vine loss following “Easter Freeze”
Organic Pest Management

• Build the soil and vine strength !!!!!!!
  – Test soil regularly and treat with needed nutrients
    • Organic Fertilizers are available (albeit are often a bit more expensive)
  – Plant cover crops which return nutrients to soil (eg clover)
  – Plant vines with worm castings & mychorozial fungi

• Monitor for pests constantly!

• Use preventative measures
  – Compost Teas – disease control
  – Chickens, guinea fowl – insect control

• Be proactive when as soon as specific pests discovered:
  – Mildews –
    • Serenade, Oxidate, Sonata, JMS Stylet Oil, Sulfur, canopy thinning
  – Insects –
    • Surround, Insecticidal soap, Dipel
  – Opossum –
    • Live traps
  – Birds
    • Bird distress calls, Bird netting
  – Deer
    • Predator calls, dogs, Electric fencing
<table>
<thead>
<tr>
<th>Brand Name</th>
<th>General Material</th>
<th>Purpose</th>
<th>Currently Used (C)</th>
<th>Potentially Used (P)</th>
<th>Label Datasheet Attached</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmony</td>
<td>Fertilizer (5-4-3)</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>NatureSafe-Pelleted</td>
<td>Fertilizer (13-0-0) – correct P deficiencies as indicated by soil test</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>JMS Stylet Oil</td>
<td>Fungicide – stop mildews which were harbored in the vines over winter</td>
<td></td>
<td>C</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>Matratec</td>
<td>Herbicide – plan to use where mechanical removal of weeds is not working effectively</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>Trilogy</td>
<td>Fungicide – stop mildews</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>Sonata</td>
<td>Fungicide – stop mildews</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>Heteromask</td>
<td>Insecticide - Beneficial Nematodes (Hb)</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>Lime</td>
<td>Correct pH as need indicated by soil test - (Fields A,B,C,D and H)</td>
<td></td>
<td>P</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Rock Phosphate</td>
<td>Correct P as need indicated by soil test – all fields</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
<tr>
<td>Sulfate of Potash</td>
<td>Correct K as need indicated by soil test (Field H only)</td>
<td></td>
<td>P</td>
<td></td>
<td>No – submitted last year</td>
</tr>
</tbody>
</table>
5-4-3
AG. ORGANIC
WITH 9% CALCIUM

APPLY ONLY AS DIRECTED

USE HARMONY PRODUCTS AND PROGRAMS FOR ANNUAL:
- NUTRIENTS
- APPLICATIONS
- ADDITIONS OF ORGANIC MATTER
- MAINTENANCE OF C:N RATIOS

MANUFACTURED/GUARANTEED BY ENVIRONMENTAL PRODUCTS, LLC
4415 PLEASANT RIDGE RD SUITE 308, ROANOKE, VA 24014 (804) 347-3443

GUARANTEED ANALYSIS

| TOTAL NITROGEN (N) | 5.0% |
| 100% WATER SOLUBLE NITROGEN |
| AVAILABLE PHOSPHATE (P2O5) | 4.0% |
| SOLUBLE POTASSIUM (K2O) | 3.0% |
| CALCIUM (Ca) | 9.0% |

PLANT NUTRIENTS DERIVED FROM
Processed Poultry Manure
*4.0% slowly available nitrogen from processed poultry manure

TURF
5-4-3 can be applied to any type of grass at any time of year. It is always good to water in fertilizer materials. Cool Season Crops: Apply in spring and twice during the fall. Warm Season Crops: Apply every two months during growing season. Prior to Seeding or Sodding: Apply to area to be seeded or sodded.

COVERAGE

TURF:
FOR 1 LB. OF NITROGEN, APPLY AT A FULL RATE OF 20 LBS. PER 1,000 SQ. FT. OR 500 SQ. FT. AT A HALF RATE.

LANDSCAPE APPLICATION:

SHRUBS: TOPICALLY APPLY OF LIGHTLY SCRATCH INTO THE SOIL SURFACE AT 5 LBS. PER 1,000 SQ. FT.

FLOWERS: APPLY 4 LBS. PER 100 SQ. FT. LATER IN THE GROWING SEASON, A SECOND APPLICATION CAN BE MADE.

TREES: APPLY 1-3 "S" OF 5-4-3 FOR EACH INCH OF TRUNK DIAMETER.

OMRI LISTED

TECHNICAL PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>N</th>
<th>P</th>
<th>K</th>
<th>Ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-4-3 9%</td>
<td>6.0</td>
<td>16</td>
<td>70%</td>
</tr>
</tbody>
</table>

NET WEIGHT 50 Lb. (22.7 Kg)

* Listed by the Organic Materials Review Institute (OMRI) for use in organic production.

Carolina Heritage Vineyard & Winery
Organic Winegrape Production
November 8, 2011
Carolina Heritage Vineyard

June Bugs devouring Rubiana cluster
July 28, 2010

Rubiana Clusters – July 27, 2010

Carolina Heritage Vineyard
Organic Winegrape Production
November 8, 2011
<table>
<thead>
<tr>
<th>Crop Field</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011 (Italics = plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noble (A)</td>
<td>Feb 17 - began pruning</td>
<td>Feb: + Lime</td>
<td>Mar 2: + Lime (1T/Ac)</td>
<td>Apr 6 - finished pruning</td>
<td>Dec 20 2010 - finished pruning</td>
</tr>
<tr>
<td>1.5 Acres</td>
<td>Mar 15 - finished pruning</td>
<td>Mar 2 - began pruning</td>
<td>Mar 2 - began pruning</td>
<td>Note: Despite deep pruning, mites noted on vines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jun + Harmony</td>
<td>Apr 1+ NatureSafe 13-0-0 (8oz/plt)</td>
<td>Mar 16+ NatureSafe 13-0-0 (8oz/plt)</td>
<td>Apr 7 JMS Stylet Oil (2%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul - mulched vines</td>
<td>Apr 18 - finished pruning</td>
<td>Apr 5 - finished pruning</td>
<td>Apr 19 JMS Stylet Oil (2%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul + worm castings</td>
<td>Apr 18 - Budbreak</td>
<td>Apr 30 - noted dying cordon from frost damage</td>
<td>Apr 21 - Heavy rain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul 22 - Japanese Beetles active</td>
<td>May 8 + Harmony 5-4-3 (300lbs/A)</td>
<td>Jun 6 - set out pheromone sticky tapes &amp; traps</td>
<td>May 6 + Harmony 5-4-3 (2cups/plant) - first 2 rows</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul 23 Surround(25#/60gal)</td>
<td>June 14 + Harmony 5-4-3 (200lbs/A)</td>
<td>May 6 + Harmony 5-4-3 (2cups/plant) - first 2 rows</td>
<td>May 6 + Harmony 5-4-3 (2cups/plant) - first 2 rows</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul 23 Champion(4#/60gal)</td>
<td>Aug 5 Serenade (1 oz/g), Molasses (1 oz/g), Fish Emulsion (1 oz/g)</td>
<td>Jun 7 Lime sulfur spray (1 oz/gal)</td>
<td>May 16 - Heavy rain</td>
<td></td>
</tr>
<tr>
<td>Sept</td>
<td>Beneficial Nematodes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul 2 Oxidate (1.28 oz/gal)</td>
<td></td>
<td></td>
<td>May 17 JMS Stylet Oil (1%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 2 JMS Stylet Oil (2%)</td>
<td></td>
<td></td>
<td>May 28 THAT flowable sulfur</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 30 Found Grape Root Borer in pheromone trap</td>
<td></td>
<td></td>
<td>June 1-5 - rain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 16 Beneficial Nematodes (Heteromask)</td>
<td></td>
<td></td>
<td>June 7 Trilogy mixed with JMS Stylet Oil (1%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>June 10: + Lime (1/2T/Ac)</td>
<td></td>
<td></td>
<td>June 10: + Lime (1/2T/Ac)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>June 13-19 - rain</td>
<td></td>
<td></td>
<td>June 13-19 - rain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>June 25 Oxidate (64oz/50gal) + THAT</td>
<td></td>
<td></td>
<td>June 25 Oxidate (64oz/50gal) + THAT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>July 10 - set pheromone traps out for grape root borer</td>
<td></td>
<td></td>
<td>July 10 - set pheromone traps out for grape root borer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>July 18 - rain</td>
<td></td>
<td></td>
<td>July 18 - rain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>July 19 Oxidate (22oz/53gal) + Trilogy (22oz/53gal)</td>
<td></td>
<td></td>
<td>July 19 Oxidate (22oz/53gal) + Trilogy (22oz/53gal)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 1 - Grape root borers found in traps</td>
<td></td>
<td></td>
<td>Aug 1 - Grape root borers found in traps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug - Kept out root borer pheromone traps</td>
<td></td>
<td></td>
<td>Aug - Kept out root borer pheromone traps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug - rain and high temps nearly all month</td>
<td></td>
<td></td>
<td>Aug - rain and high temps nearly all month</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 25 - Harvested</td>
<td></td>
<td></td>
<td>Sept 25 - Harvested</td>
<td></td>
</tr>
</tbody>
</table>
Organic Growers’ Resources

- Surry Community College Viticulture & Enology Program
  Central Carolina Community College Sustainable Agriculture Program
- Carolina Farm Stewardship Association (CFSA) - www.carolinafarmstewards.org
- Organic Growers’ School – UNC Asheville (March 5-6, 2011) www.organicgrowersschool.org
- Richard Boylan – NC Extension Agent familiar with organic practices
- Certifying Agencies – familiar with NC growing conditions and vineyard certification:
  - Clemson University's Department of Plant Industry. [864-646-2140.] - certify USDA National Organic Program (NOP) organic operations in the three major categories of certification: crops, livestock and processing.
  - International Certification Services, Inc [701-486-3578] - offers several programs to help you with your organic and sustainable certification.
    - USDA National Organic Program (NOP) – required to market organic products in US
    - Farm Verified Organic: Encompassing the USDA NOP, the FVO program increases market access internationally.
    - Canadian Organic Regime: accredited by the Canadian Food Inspection Agency (CFIA) to certify organic products, under the Organic Products Regulations, 2009
    - Food Alliance – handles inspections for Food Alliance, a sustainable certification program.
    - JAS, EC 834/2007 (previously EEC 2092/91)
    - Bio Suisse.

Carolina Heritage Vineyard & Winery
Organic Winegrape Production
November 8, 2011
Organic Certification Process

• Education -Take advantage of all resources
  • CFSA Conferences, Organic Growers’ School, ASU and UNC-Asheville seminars
  • Order the OMRI Guide and study it!
  • Periodic Organic Certification Workshops

• Plan for Certification – 3-year process
  – Keep records in detail of all vineyard actions (why, what, when, how much?)
  – Use organic seeds & plant-stock and/or have record of search for this material
  – Do not use prohibited substances (3 years record of no use required.)
  – Ensure have buffers (at least 20 feet) between neighboring fields and your “organic” fields
  – Keep equipment used for “organic” fields separate or have detailed cleaning process between uses
  – Be pro-active on improving the environment, soil, natural predator habitats, etc
  – Keep copies of labels for all substances used

• Selecting a Certifying Agency – 1 year prior to 1st inspection
  – Easiest if you have that agency’s forms and use them for a year prior to 1st Inspection
  – Fees are similar across agencies
  – Look for agency with:
    • Familiarity with NC growing conditions
    • Experience with vineyard certifications
    • A local certifier (as you will pay travel costs)
  – Talk to others in industry regarding their experiences with different agencies
  – Engage the agency of your choice ahead of time on use of any new substances

• Inspection – 6-9 month process
  – Submit completed forms as early in the year as possible
    • Generally 2 reviews of your forms will occur prior to your on-site inspection
    • Leave sufficient time to schedule inspection when you’re not 100% pre-occupied with vineyard tasks
  – Plan to spend entire day with Inspector on day of your inspection.
    • Will want to walk entire vineyard, check equipment and storage areas for input substances, etc
    • Will want to go through your form input with you in detail
  – Be responsive if agency and/or inspector has additional requests
  – Final review following inspection can take an additional 1-2 months, depending on outstanding items
Application sections and attachments for 2011 Organic re-Certification
Carolina Heritage Vineyard

1. Module 1R – Renewal Form – original signed and will be mailed with Module 3 – Production Agreement
2. Module 5 – Field & Livestock Identification
3. Attachment – Map of Field Layout
4. Module 6 – Environmental Impact, Soil Conservation & Biodiversity
5. Module 7 – Seeds, Seedlings and Planting Stock
6. Module 8 – Soil Building/Fertility Management Plan
7. Attachment: Spreadsheet showing all Field Inputs 2005 - 2010
8. Module 9 – Split & Parallel Production
9. Module 11 – Weed, Pest and Disease Management – Field
10. Module 00 – 2010 Off Farm Input List
11. Field Record of all Proposed Inputs for 2010
12. Attachments: Labels/OMRI certificates for proposed Farm Inputs
13. Module 12 – Water – Farm/Ranch
14. Module 13 – Harvest/Post Harvest, Crop storage & Sales
15. Attachment: Example of Wine Production Spreadsheet
Module 6: Environmental Impact, Soil Conservation, and Biodiversity
NOP 205.200, 205.201, 205.203

• Describe the general topography of your farm.
• Please describe any areas on your farm that has evidence some erosion. What is the cause? What are you doing to prevent it?
• What equipment do you use for tillage?
• Describe your tillage practices. How do you minimize the negative effects of tillage, namely soil compaction and disruption of the soil’s structure? How do your tillage practices maintain surface residues?
• Describe all fallowing practices on your farm. Is bare fallow used, and if so, how and for how long? With what frequency do you employ these practices? Are they documented in your records?

All programs other than the NOP (i.e. FVO, EEC, Bio Suisse, etc) please complete the following questions.
• Describe how you encourage and monitor bio-diversity on your farm or ranch. Biodiversity refers not only to the different species you cultivate, but also to the fostering of environment (s) in which wild species (such as insects, birds, mammals, etc.) can thrive.

• List wildlife and dominant native plants present on the farm.
Carolina Heritage Vineyard
Erosion Areas
Backup:
Application sections and attachments for 2011 Organic re-Certification Carolina Heritage Winery

16. Module 13A – Inventory Table
17. Module 18 – Processed/Handled Products Overview
18. Module 19M – Carlos Wine Details
19. Module 19M - Noble Wine Details
20. Module 19M – Honey Mead Details
21. Module 19M – Blueberry Wine Details
22. Module 20 – Processing Facilities and Product Flow
23. Attachment: Facility Layout
25. Module 21 – Water – Processing/Handling
26. Module 22 – Receiving, Storage and Shipping
27. Module 23 – Audit System – Handler/Processor
28. Module 24 – Quality Control
29. Module 25 – Sanitation and Clean Out Procedures
30. Module 26 – Structural Pest Control
Example: Organic Certification Fees

I. Organic Crop Production Fees:
• Initial Application Fee (Non-refundable) $500
• Annual Renewal Fee $400
• *Inspection Fee: (based on acreage)
  • first 20 acres (minimum 10 acres) $10 / acre
  • above 20 acres $5 / acre

II. Organic Livestock, Poultry, and/or Handler/Processor Fees:
• Initial Application Fee (Non-refundable) $500
• Annual Renewal Fee $400
• Inspection Fee: (based on gross sales)
  • <$15,000 / year $100
  • $15,001 - $40,000 / year $200
  • >$40,000 / year $300

III. Miscellaneous Fees:
• Postage and handling of unsigned or incomplete applications....Actual cost
• Copies of official documents...................Greater of $5 or $0.25/page
• Out of state travel.........................Mileage and expenses at Clemson University rate

IV. Late Fees for Renewals:
• Recertification applications and renewal fees are due at the DPI office no later than 60 days prior to the anniversary date of the applicant’s initial certification. Any recertification applications and renewal fees that are submitted after this time period will be charged a $50.00 late fee.
Organic Farm Certificate

North Carolina Crop Improvement Association, Inc has determined that

CAROLINA HERITAGE VINEYARDS
Clyde & Pat Colwell
170 Heritage Vines Way
Elkin, NC 28621
Certification # 795108

complies with the Organic Certification Standards of the United States Department of Agriculture National Organic Program, producing

Organic Blueberries and Grapes

Certificate # OF 728019

July 21, 2008
Inspection Date

August 13, 2008
Date First Certified

Director, NCCIA

USDA ORGANIC

November 8, 2011
Any Questions?

Thank You!

Carolina Heritage Vineyard & Winery
Organic Winegrape Production
November 8, 2011
RESOURCES


http://eorganic.info