Establishing Blueberries in Southern Georgia

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Note

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Outline of Today's Course

- 1. Types of blueberries grown in Georgia
- 2. Rabbiteye blueberry requirements
- 3. Southern highbush blueberry requirements
- 4. Soil drainage
- 5. Freeze protection considerations

Today’s Course

- 7. Land clearing
- 8. Cultivars
- 9. Fertilization

Types of Blueberries

- Southern highbush ripen in April and May
- They require high organic matter soil (3-4%)
- Very susceptible to root rot and Xylella
- Short lived in South Georgia (probably 10-15 years)
- Bloom in Feb. and early March
- Overhead irrigation for freeze protection is recommended
- Currently hand picked

Rabbiteye Blueberries

- Native to S.Georgia
- Ripen from late May to late July
- Grow well in soil with moderate amounts of organic matter (2%, maybe less).
- Can often be harvested for the fresh market with a mechanical harvester
- Bloom in early to late March
- Often drip irrigated
- Expected life is 30-50 years

Site Selection for Rabbiteyes

Will grow on many types of acid, well drained soils

Perform best on moist but moderately well drained or drainable, virgin sands and loamy sands with good organic content (2% or more)

Rabbiteye Production Systems

- Rabbiteyes also perform well on low pH sandy clay loams and loams.
- However growth rate is slower than on sandy soil.
- More difficult field operations.
- Respond well to mulching

Some good rabbiteye soils in the Ga. Coastal Plain

- Leefield loamy sand
- Albany sand
- Mascotte sand
- Sapelo sand

Rabbiteye soil chemistry and top soil requirements

- Virgin soil is generally much better than old crop land.
- Ideally……..

Soil pH should be 5.3 or less

Soil calcium should be 900 pounds or less

Soil phosphorus should be less than 300 pounds per acre

Top soil should be at least 6 inches deep

What about old fields for rabbiteyes?

- Generally not recommended, but can be used, **but requires much more monitoring and a good irrigation, water acidification, and fertilization program.**
- Normally pine bark is used to improve organic matter content (if needed)
- Typically about 3 inches or 2 semi-loads (200 cubic yards) per acre.

Rabbiteye Economic Considerations- Mechanical Harvesting

- Min. of 20 acres for a small harvester??- $25,000 new
- Min. of 40 acres of an over the row havester??- $110,000 new
- One harvester will pick about 75 acres
- Good used equipment is about ½ price

Southern Highbush Blueberries

- Grow best in pine bark beds or on a high organic matter soil with a spodic horizon
- Top soil is a min. of 6 inches deep
- A2- Sand layer for drainage. Four inches min.
- Bh2-Hard pan at least 10 inches below the soil surface

Highbush Soils

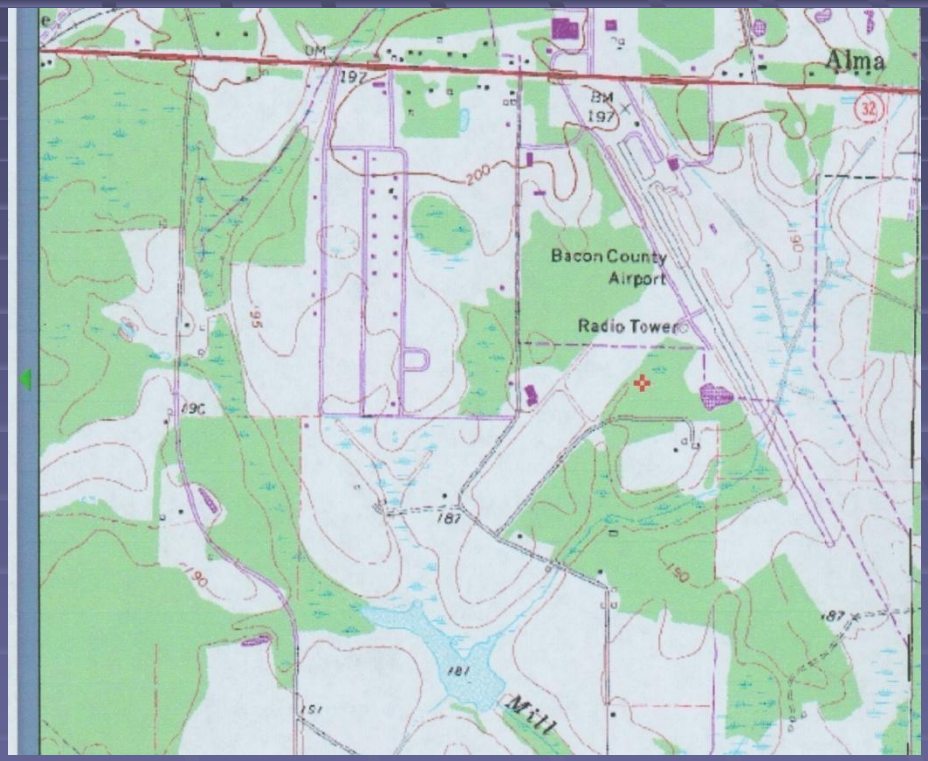
- Sapelo
- Mascotte
- Olustee
- Significant amounts are found in Clinch and Akinson Counties.
- Of limited distribution in Coffee County.

Can good drainage be provided?

- Soil should be moist, but well drained
- Depth to water during normal wet period should be at least 15 inches below soil surface
- Ditches are important
- Bedding common in blueberry culture
- On wet sites, “square beds” about 3.5 to 4 feet wide or normally used.

Avoiding Frost Pockets

- Some areas have a general problem with more frost
- There can be large mircoclimate differences during radiation freezes
- Top to bottom of hill can be 4 degrees F or more
- Problem: much of the blueberry land is at low elevations
- Overhead irrigation for freeze protection is very successful (radiation freezes)
- Another option: Plant late blooming varieties



Site Considerations-Water

- Availability of irrigation water or water for freeze protection.
- Typical yield of wells in Coffee Co. and surrounding areas.
- Shallow wells
- 4 inch (5 hp) 40 gallons per minute?

Irrigation Costs (Vary widely)

- Drip cost with well: $600 per acre
- Pivot cost with well: $700 per acre
- Solid set pumping from pond: $2200 per acre
- Can be used for freeze protection (must be able to run around the clock during a freeze)

Three Aquifers

- Surficial- 30 feet deep- acid water??, dependability varies, may be OK for a few acres
- Miocene Aquifer- Sand / Marl- about 100-200 feet deep, water quality varies greatly, yield about ½ Floridan aquifer
- Floridan- Limestone, about 200-600 feet deep, dependable, high pH

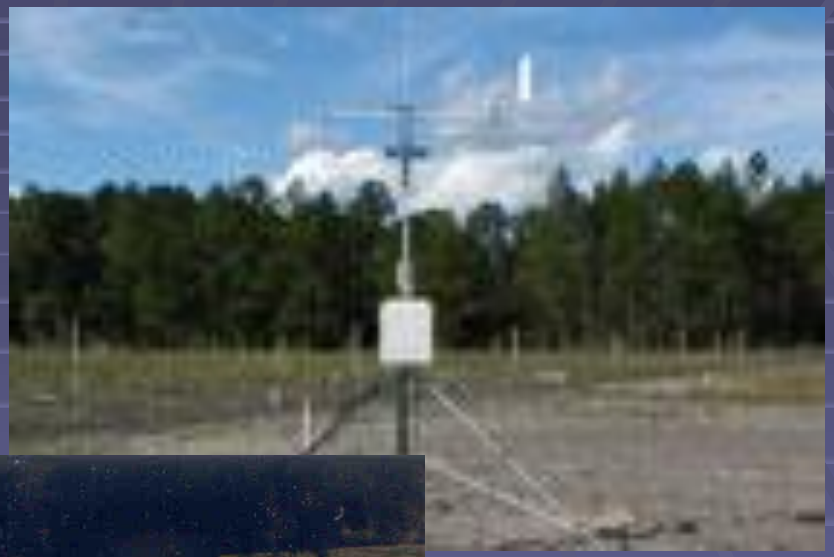
Ponds

- Normally used for overhead irrigation for freeze protection of large acreages. This requires 90 gallons per minute for .2 inches per acre per hour.
- Less than 1.1 acres can be build without surface mining permit.
- Large ponds can be build in wet land areas if needed for overhead irrigation. $10-12,000 per acre.
- Water budget is required (see Bob Boland-County agent in Brantley Co.)

Water

- 6 inch well- 300 gallons min.??
- 8 inch well- 600 gallons per minute??
- 12 inch well- 1100 gallons per minute??
- Pond- 27,000 gallons per acre inch
- Drip irrigation: Plan for a max of 3000 gallons per acre per day
- Overhead- 1.5 inches of water per week at peak times
- Pine bark beds might need more-2 inches per week at times

Frost Protection-Very Important Passive and/or Active



Strategies for Freeze Protection

- Install overhead irrigation for freeze protection
- Plant late blooming or frost hardy cultivars:
- Alapaha, Brightwell, Powderblue, Ochlockonee
- Use gibberellic acid after partial freeze damage

NC April 19, 2001 Freeze
Same row
Does overhead irrigation for freeze protect pay off?
Usually in one night
(photos courtesy of Bill Cline, NCSU)

Overhead irrigation for freeze protection

- Most widely used active freeze protection method on blueberries
- Very successful if you pay attention to the laws of physics
- Requires a min. of 67 gallons per min. per acre (15/100 inch)
- Typically .2 inches of more per hours is used (90 gallons per min.)

Land clearing (photos from Joe Cornelius)

- General procedure
- 1. Cut merchantable timber.
- 2. Dig out stumps with a track hoe
- 3. Push large limbs,stumps to edge of field or burn and hall off ashes
- 4. Drum chop remaining debris (two times)
- 5. Chop with woods harrow (four times

Bulldozer with blade and root rake
Drum chopper

Ground Prepping Machines Grinder

Land Clearing

- 6. Pick up remaining large debris by machine or hand
- 7. Level land slightly with a land plane (if needed)-be careful
- 8. Shoot elevations to determine direction and angle of beds (free service from your local soil conservation service- FSA)
- 9. Subsoil, bed with a pine tree bedder (Rome bedder, Savannah plow) if the site is wet, bed with a harrow if the site only needs a small bed

Slight Slope is Important

- On sides with 1 or 2 % slope we are generally bed down the hill
- Use herring bone on steeper slopes

Initial Bedding

- Pine Tree Bedder
- Rome Bedder
- Savannah Plow

Disc Hillers

- If field is very smooth, disc hillers can be used

Subsoiling

- Beneficial for drainage
- Beneficial on well drained sites with rabbiteyes for deep root penetration

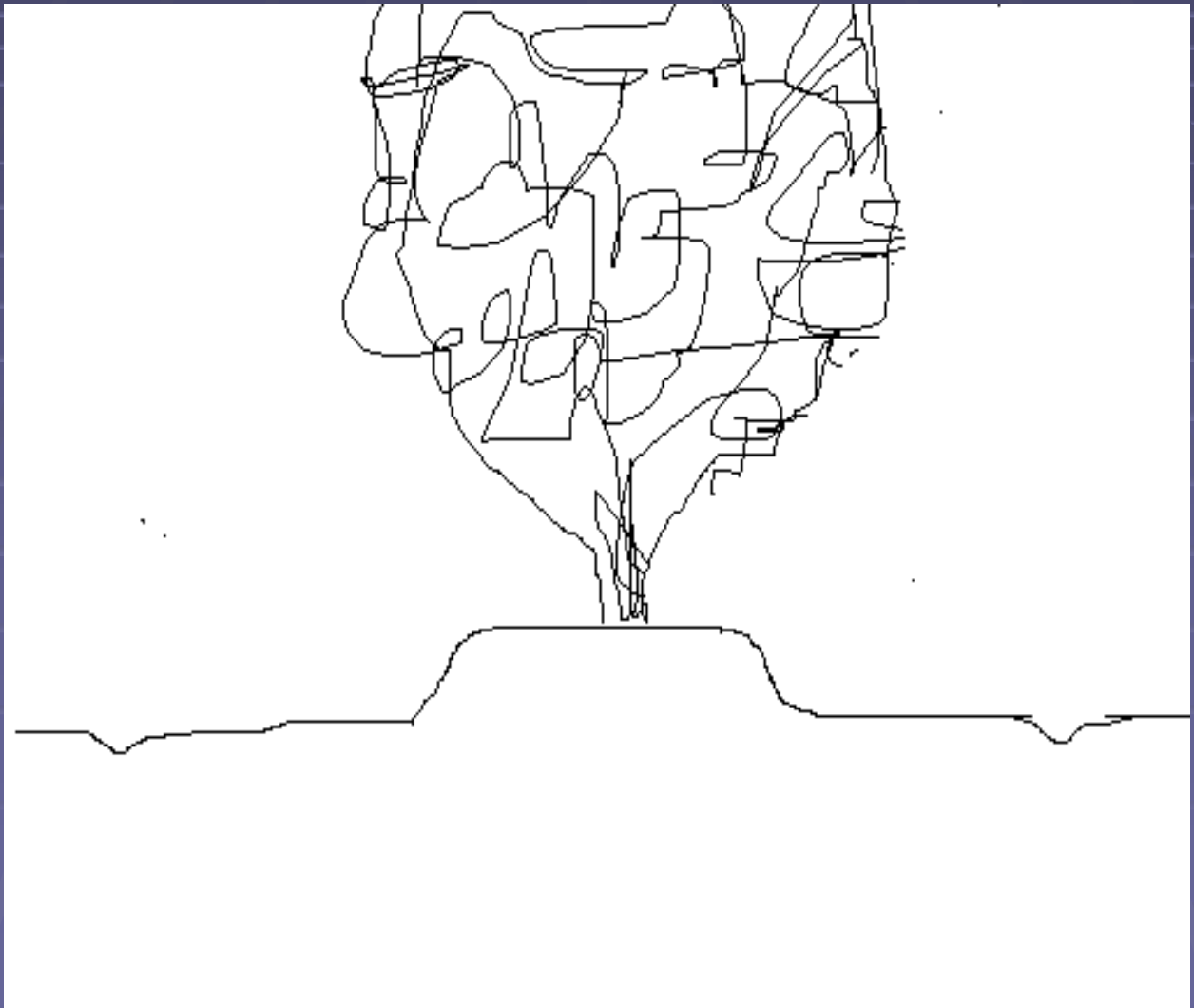
Land Preparation

- 10. Bed should be 3.5 to 4 feet wide on top. Break out the aisle with the front gangs of a harrow or fire break plow.
- 11. If the site is wet, prepare a water furrow in the center of the aisle.
- 12. Prepare ditches to carry water from the edges of the field. Ditches are normally a bucket wide and a bucket deep (4 by 4 feet-minor field drainage)

Bed Just after Planting

Plowing out aisles

Bed with Water Furrow



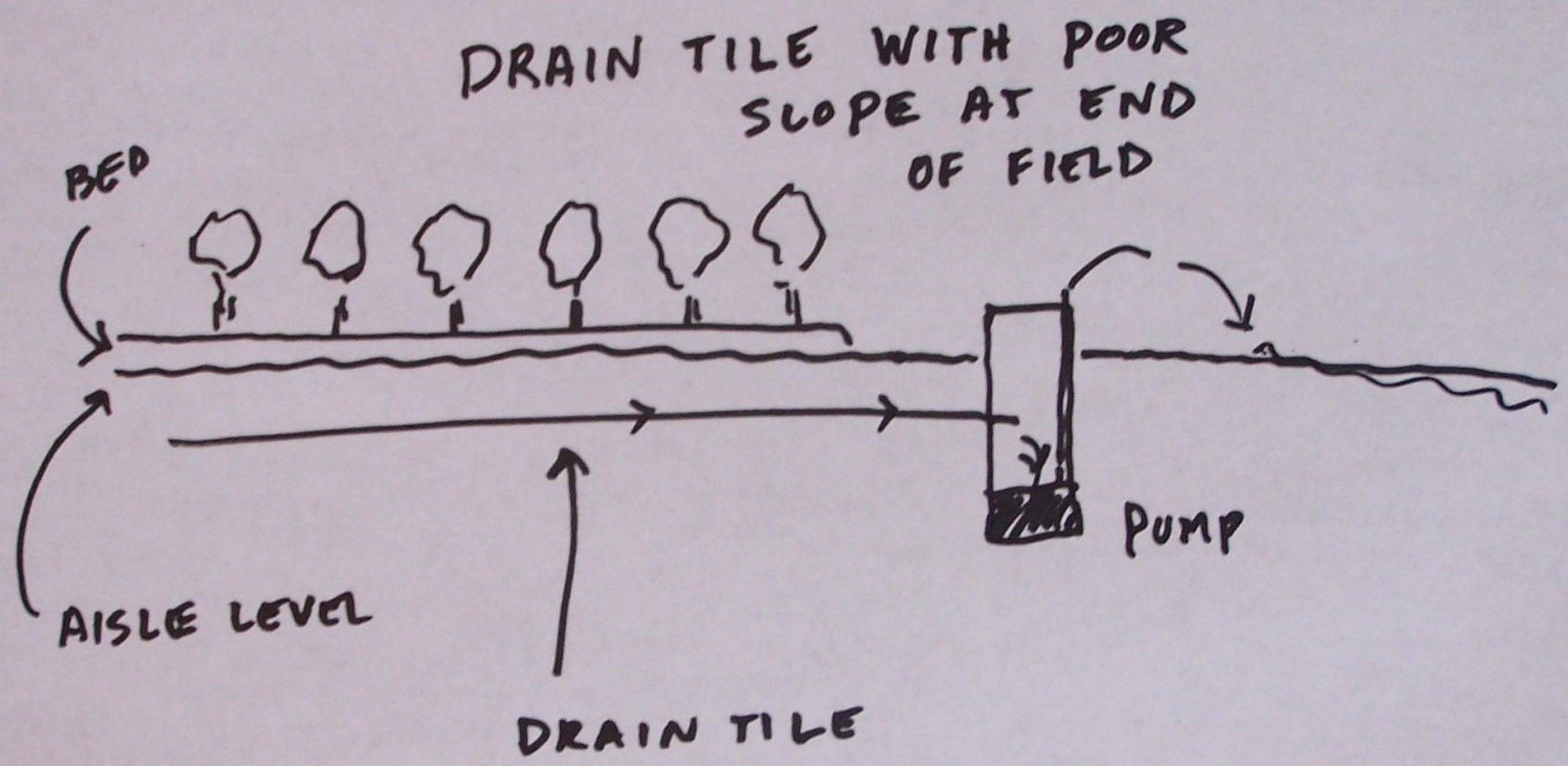
Busting out aisle and making water furrow

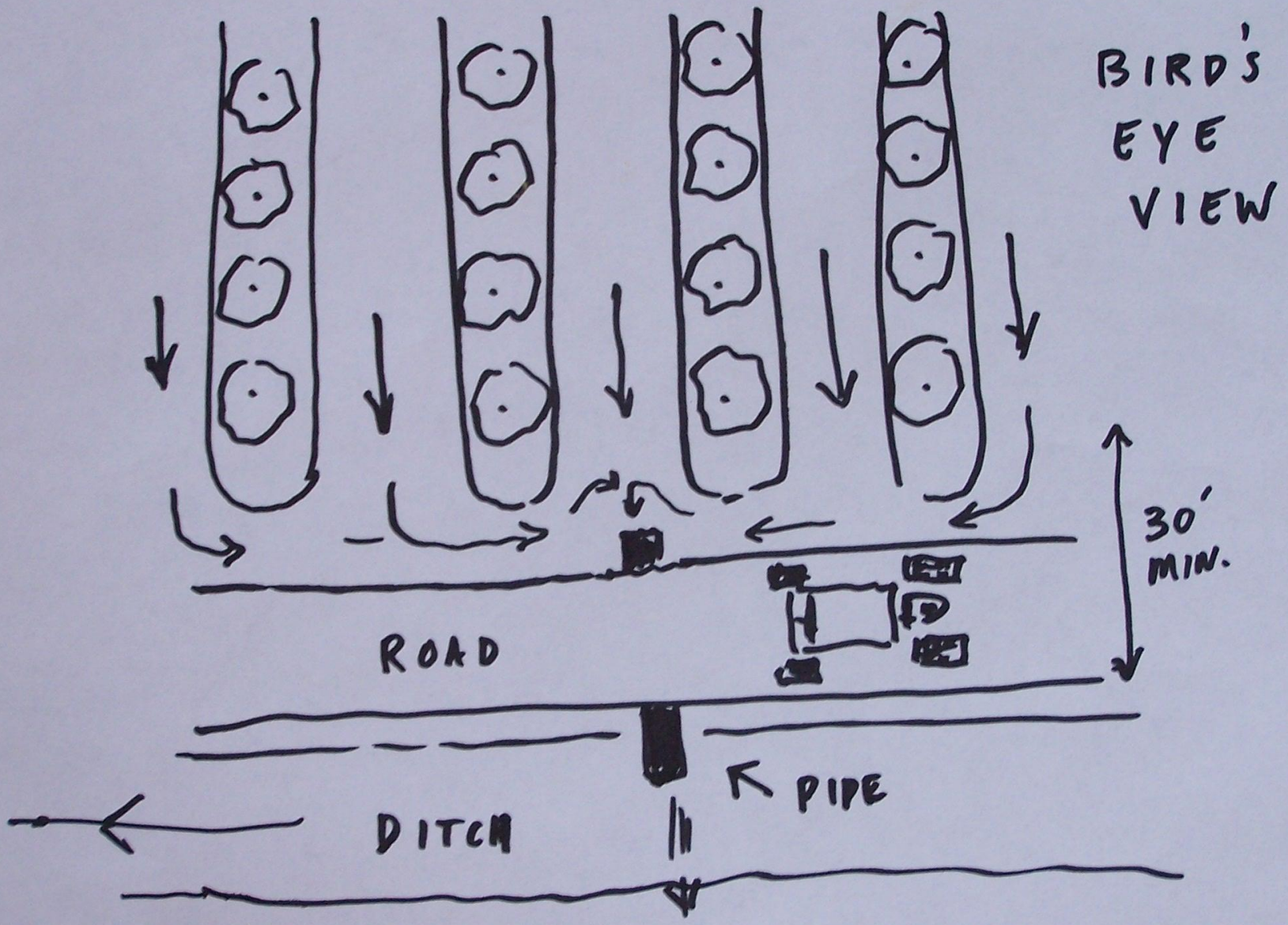
- Front gangs of harrow
- Inverted disk hillers
- V plow

A proper bed for a wet site

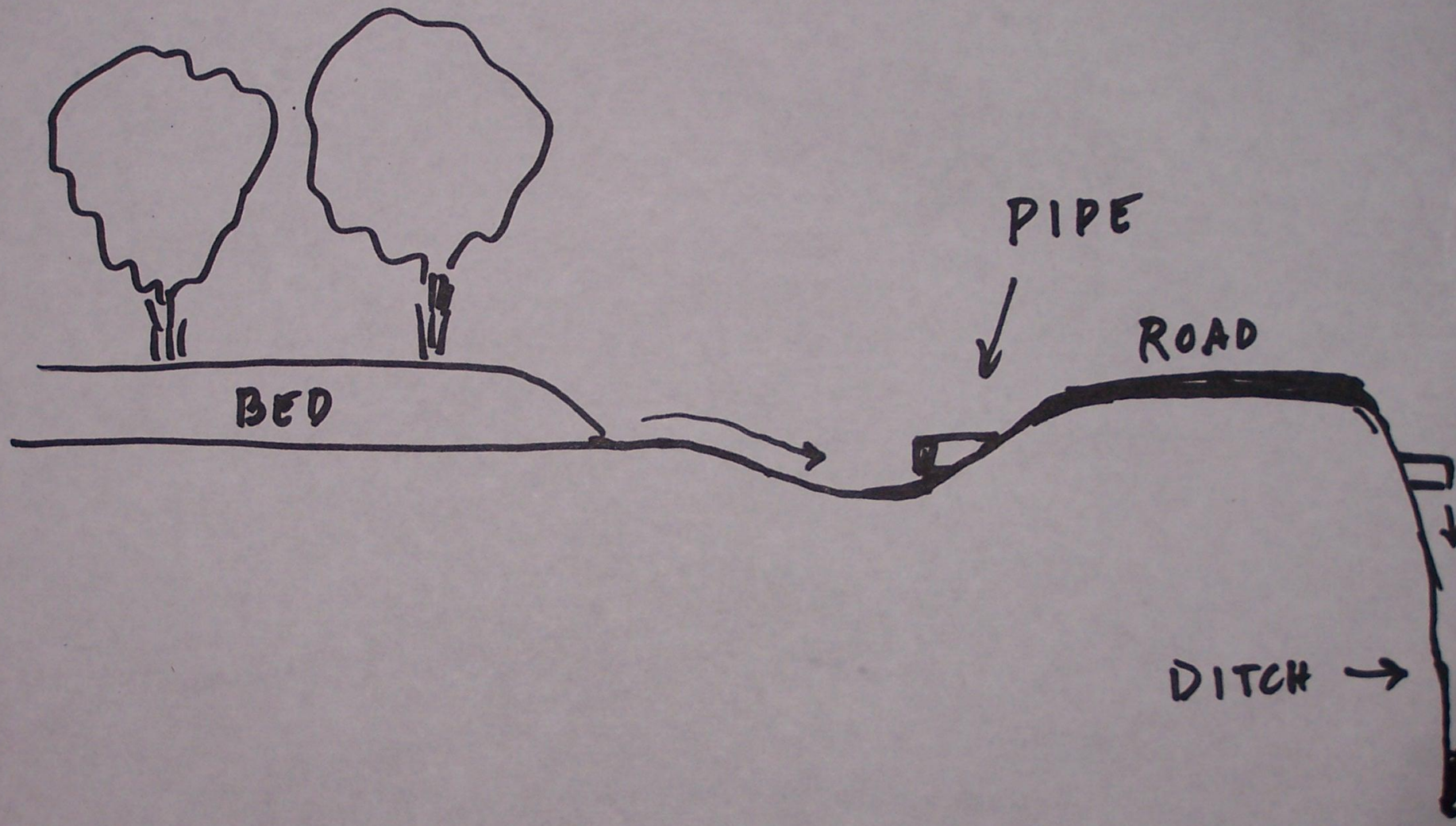
Site Preparation

- 13. Drainage at lower end of field should be designed to minimize eroision.
- Several options: 1. Pipes every fifth row 2. Grassed water ways
- 14. Drain tile, another option. Generally lines are about 40 feet apart. May require a sump in some situations.
- 15. Ditches on wet ends of field (if needed)


DRAIN TILE WITH POOR SLOPE AT END OF FIELD
BED
PUMP
AISLE LEVEL
DRAIN TILE


BIRD'S EYE VIEW
30' MIN.
ROAD
PIPE
DITCH

WET END OF FIELD



Addition of Organic Matter for Rabbiteyes

- Generally recommended for rabbiteyes on sites with less than 2% organic matter.
- On fairly good soil, 1 ½% organic matter, etc. addition can be to the planting hole or to the bed.
- Strip treatment on low organic matter sites. Typically pine bark 2-3 inches deep by 3 feet wide. Rototill, cross cut harrow, or Dutch spade in as deeply as practical (6-8 inches).

Addition of Organic Matter for Southern Highbush

- On soils with 2% of organic matter or less incorporate 5-6 inches of pine bark plus mulch pine bark nuggets
- On soils with 2-3% organic matter add 3 inches of pine bark plus mulch
- Over 3% (black soil) only mulch needed-best results have been with spodic soil

Wood / soil mixes

Wood /soil mix

High Density Southern Highbush

Planting arrangements

- Southern highbush
- High density (2 or 3 by 5 feet with beds 30 to 34 feet wide-6 to 10 feet tractor aisle)
- Two row (2 or 3 feet by 5 feet with 2 feet on edges-15 feet between bed centers)
- Single row
- 2 to 3 feet in drill
- 9-11 feet between rows
- Single row systems are increasing in popularity

High Density-Good for Small Farms or where water is limited

High Density

- “Rungs of ladder” arrangement most popular
- Use a road grader to crown bed before pine bark is applied
- Boards or railroad ties used in areas of questionable drainage

Double Row

Single Row

Blueberry Plasticulture

Custom bedders for blueberries have been developed in Europe

Plastic mulch

- Can be used if drip tape is placed under plastic
- Use an injection system to delivery fertilizer after year one
- White-on-black or black plastic can be used. (Spray black plastic with 1 to 10 latex paint

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

Hand Planting

- Dig hole, but put mound of soil in center of hole

Planting Depth

- Set about level with soil surface
- Cover over with about ½ inch of soil

Methods of Planting

- Hardwood cuttings: Tobacco transplanter
- One gallon size plants: Plant by hand or use a modified pine tree planter

Mechanical Transplanting

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Injection Systems

- Typical large field without electrical service

Systems For Irrigation and Fertigation

What about mulching?

- Generally not required for rabbiteyes, but highly beneficial in situations with small plants and heavy weed pressure or poor irrigation.
- Course pine bark is very good, pine straw is good, other mulches (yard waste, wheat straw, etc.) can be used for the physical effect.
- Mulching machines have made mulching more practical.

What Cultivars to Plant??

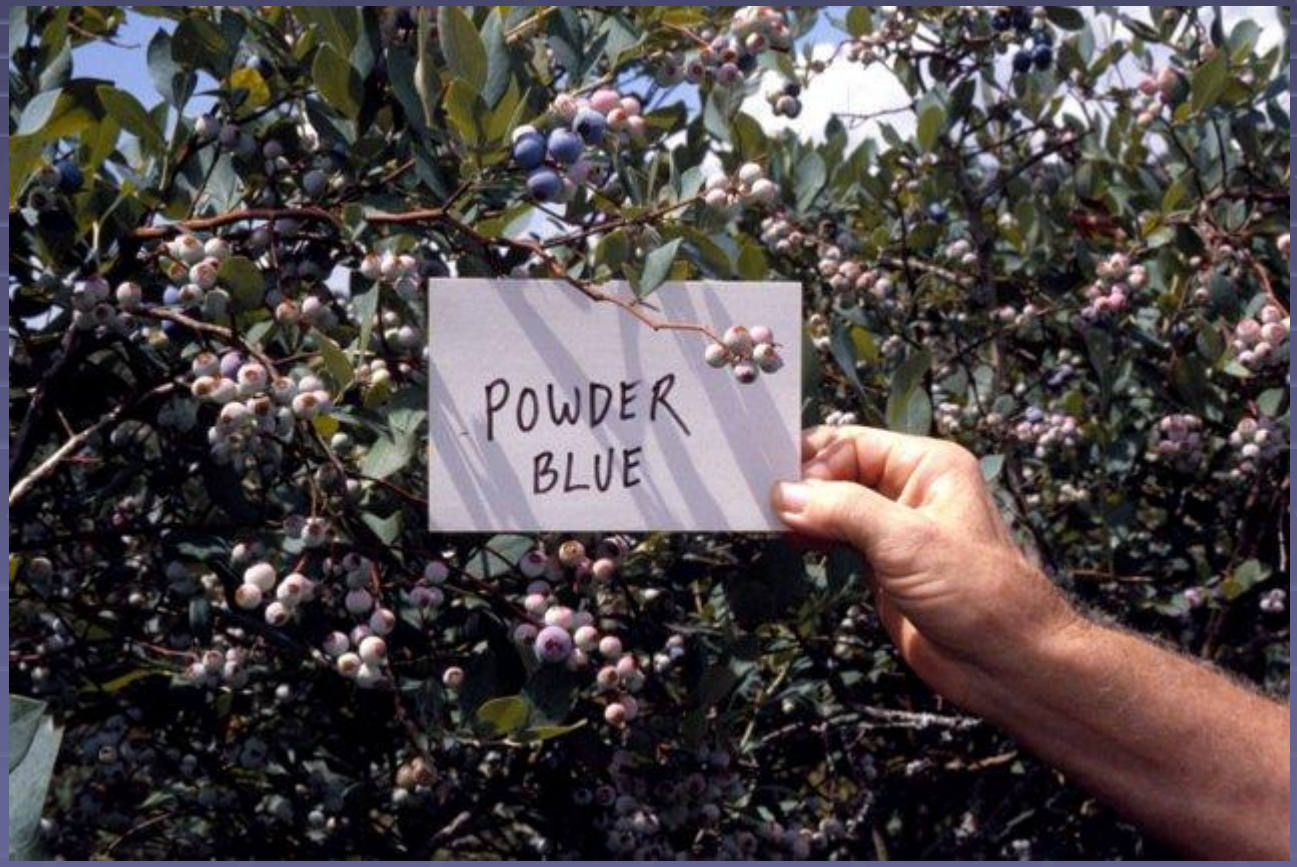
- Big three (plus pollinators)
- Premier (Savory,Alapaha, Austin?,Vernon)-Premier has been performing poorly in recent years
- Brightwell (Austin, Columbus, Vernon)
- Powderblue (Ochlockonee)

Vernon

Premier

Brightwell

Powderblue

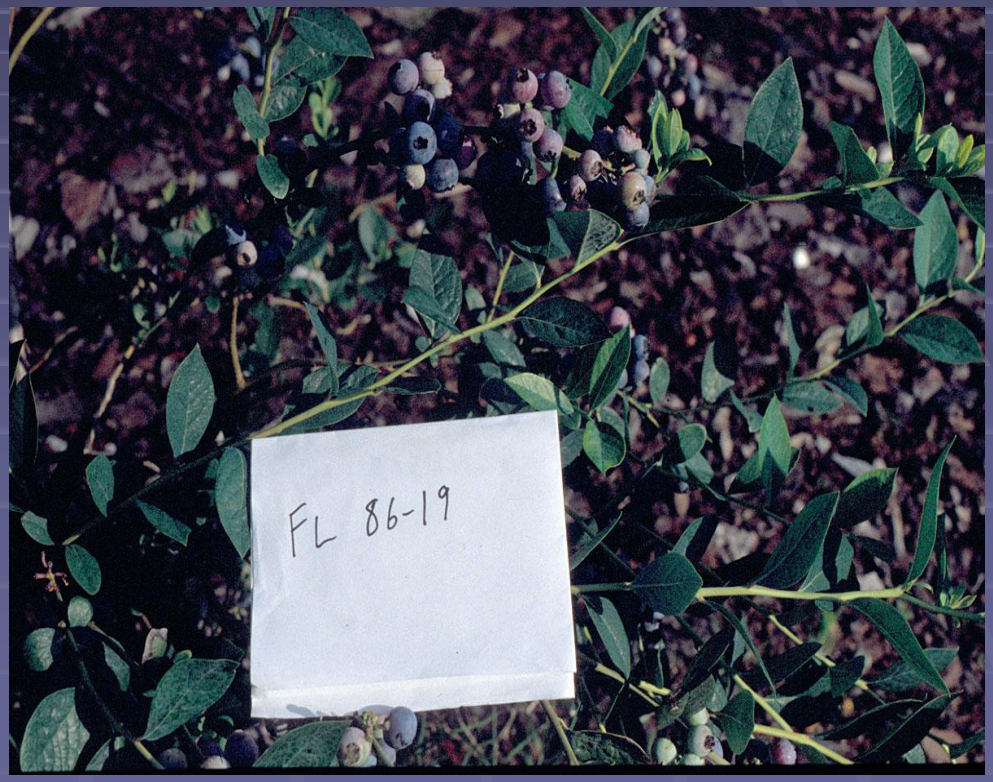


How will you get them picked?

- What volume can you handle??
- Southern highbush: 3-5 hand pickers needed per acre!
- Rabbiteyes: 1 machine for each 75 acres
- Really two lists- 1. What you would like to plant.
- 2. What you can get in quantity.

Florida 86-19 (V1, No.1, JV1)

- Currently the earliest ripening cultivar available in quantity
- Note!: On the way out
- Quality is fair when the weather is cool, goes soft and must be abandoned in hot weather
- Check with your marketer!!!!
- Pollinator for Emerald



Rebel (pat. UGA)

- New cultivar
- Blooms with Star
- Ripens with FL86-19
- Flavor is bland to slightly sweet
- Plant with Star, O’neal or Windsor

Star (pat. UFL)

- Most important SHB cultivar
- Healthy, upright bush
- Susceptible to septoria leaf spot and Xylella
- Shy flower bud bearer on fall wood
- Chilling requirement is about 400 hours
- Pollinate with O'neal, Windsor??

Photo from Fall Creek Nursery catalog

O'Neal

- Older southern highbush grown as a pollinator for Star
- Not patented
- Good quality, medium-large fruit
- Protracted bloom and ripening

Windsor (pat. UFL)

- Possible pollinator for Star
- Ripens in late April through early May
- Fruit is large and bushes are productive
- Has a problem with skin tearing-best picked in AM
- May soften quickly during hot weather.
- Check with your marketer!!!!

Emerald (pat. UFL)

- Early blooming (200 hours)
- Heavy flower bud producer, good leafer
- Ripens starting in late April
- Very large fruit, tight clusters, fairly good flavor
- Very productive
- Pollinate with FL 86-19

Photo from Fall Creek Nursery catalog

Late Ripening Southern Highbush

- Can be grown without overhead irrigation for frost protection- still need high organic matter soil
- Bladen-600 chill hours, small to medium fruit, very firm, machine harvestable
- Magnolia-500 chill hours, medium to large fruit
- Legacy-550 chill hours, medium to large fruit, widely adapted

Legacy- photo from Nick Vorsa

For trial in S. Georgia

- Springhigh- 150 hour chilling, 9 days before Star, berry is large with medium firmness
- Jewel- 250 hour chilling, berry is large, slight tart, late April startup
- Abundance- 300 hour chilling, berry is large, bush productive, berry may tear, starts about 3 days after Star
- Sweetcrisp- hours chilling, very firm, new

For Trial

- Farthing
- Sinctilla

For trial in South Georgia

- Palmetto, 400-450 hours of winter chilling, may grown on “rabbiteye” soil?, starts in late April, fruit size is small to medium, possible pollinator for Star? Not impressive.
- Camellia, 450-500 hours of winter chilling, starts in late April, large, high quality fruit, might be a sleeper

Methods of Planting

- Hardwood cuttings: Tobacco transplanter
- One gallon size plants: Plant by hand or use a modified pine tree planter

Weed Control

- Weeds are a major problem in blueberry culture
- Control with a mixture of preemergent and postemergent herbicides
- Also mulches can be used

Program for Newly Set Plants

- Typically a very low rate of oryzalin and simazine is used in year one (1 pound a.i. of each- broadcast rate)
- A low rate of Solicam can be use later in the summer.
- Rely is used a spot spray. (1% solution)
- Shielded sprayers are highly recommended.

Program for Newly Set Plants

- Rely can be applied in a shielded sprayer
- Glyphosate can be use a spot spray (normally 1% is used).
- Be use to use low pressure (20 pounds-flat fan nozzle)

Fertilization

- Small amount of fertilizer applied frequently (every 4-6 weeks if at least 4 inches of rain in received) or moderate amounts of slow / controlled release fertilizer have produced good results.
- Small plants are easily killed by fertilizer.

Questions?