Blackberries

Blackberries - Overview

- Tolerate hot Texas summers well
- Produce well for growers who follow Earth-Kind orchard principles
- Mature plants can produce 5,000 to 10,000 pounds per acre per year
- High labor requirement for harvesting limits most to small-acreage ventures

Blackberries – Growth Habits

- Cultivated blackberry is an improved form of wild blackberries, or dewberry
- Biennial plants – flowering plants that take 2 years to complete their biological life cycle
- Primocanes – grow during current season
- Floricanes – 1-year-old, flower-bearing canes that die after the berry crop matures

Blackberries – Growth Habits

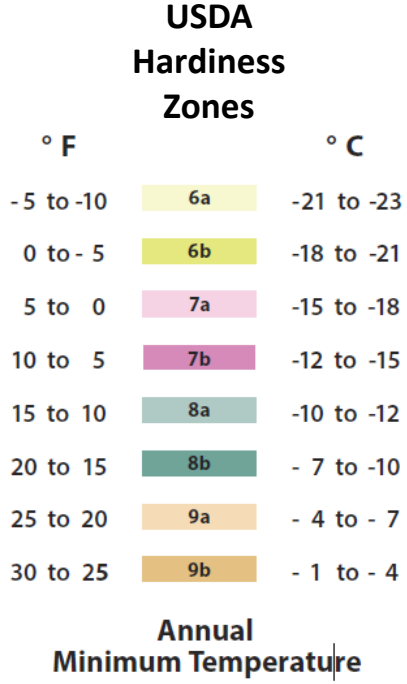
- Floricane- bearing
  - Flower and set fruit only on floricanes
- Primocane-bearing
  - Flower and set fruit on primocanes late in the growing season
  - Bear on floricanes also the following spring
  - Varieties so far ae not well adapted to hot Texas summers

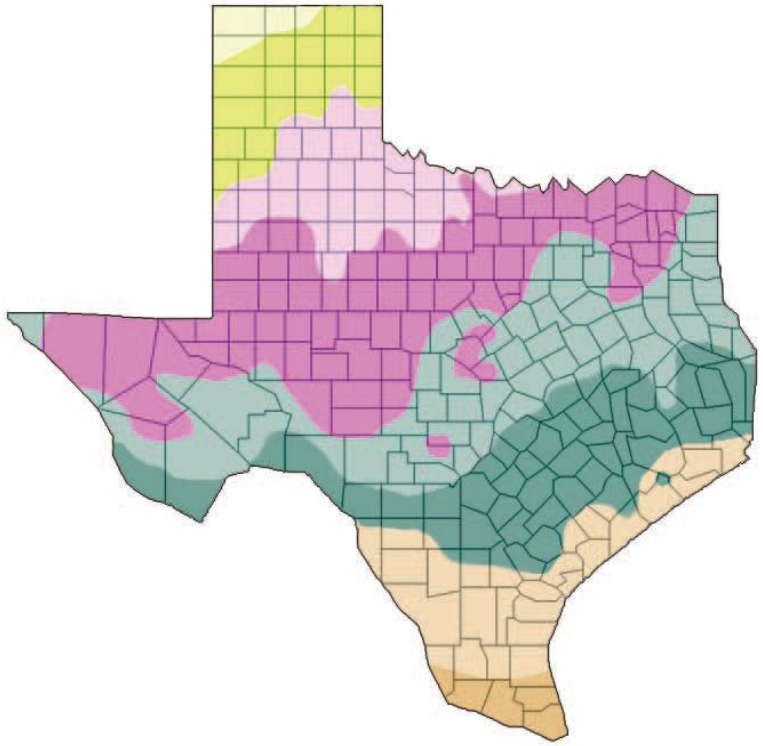
Blackberries – Growth Habits

- With proper care, Texas varieties may remain productive 20 years or longer
- University of Arkansas varieties (those with American Indian tribe names) generally produce 5 to 10 years
- Good yields on healthy, mature plants range from 5 to 10 pounds per plant

Blackberries - Climate

- Can be grown anywhere in USDA Hardiness Zones 7, 8, and 9
- Need relatively few chilling hours
- Fruit well where temperatures are below 45 degrees F for 300 or more hours per year





Blackberries - Soil

- Well drained soils at least 1 foot deep with a pH range of 4.5 to 7.5
- On soil with pH greater than 8.0, plants experience iron chlorosis (iron deficiency)

Blackberries - Varieties

- Thorny varieties
  - Most productive
  - Bear larger fruit than thornless
  - All varieties developed in Texas have thorns
- Thornless varieties
  - Easy to harvest, train and prune
  - Apache and Natchez have large fruit that compare with thorn varieties
- Primocane-bearing varieties
  - Have been introduced into Texas only recently
  - Potential for long-term performance not understood

Blackberries - Propagation

- Plots can be established by rooted cuttings, bareroot plants, or small tissue-culture plants
- Dormant bareroot and rooted cuttings
  - Planted in mid to late winter
  - Plant 2 to 3 feet apart in rows 8 to 12 feet apart
- Tissue-culture plants grown in laboratories
  - Disease free
  - Best planted in spring or fall

Blackberries – Irrigation and Fertilizing

- Must be watered regularly
- Drip irrigation is most efficient
- Begin irrigating in March or April during bloom and early fruit periods
- Continue watering through harvest period
- Reduce watering by September to slow new growth and allow canes to harden
- Most important nutrient – nitrogen
- Apply in spring as the buds break dormancy and in summer after the fruit harvest is complete

Blackberries – Training & Trellising

- Most Texas varieties are semi-erect or erect
- Trellises help prevent fruit decay caused by ground contact
- Regularly tip-prune to prevent canes from getting too long and to encourage many short floricanes to form
- All floricanes die after fruiting – move dead canes as early in the growing season as possible

Blackberries – Weed Control

- Control weeds to:
  - Increase fruit yields
  - Reduce disease pressure
  - Make it easier to find and harvest low hanging fruit
- Organic mulches and weed-barrier fabric can help keep weeds down
- Selective chemical herbicides can be use in established plantings

Blackberries - Diseases

Disease	Symptoms	Prevention	Treatment/notes
Anthracnose	Oval spots on new primocanes; small, purplish spots on new shoots and leaves in spring; shothole effect on leaves; canes may die back; fruit is usually small, dry, and scabby	Plant in sites with good air circulation; control weeds; prune and remove all dead canes each year	A fungal disease; use copper sprays in the delayed dormant period or early spring as buds begin to open; strobilurins are effective if applied between budbreak and flower petal fall
Crown gall	Irregular, swollen galls at the plant crown (stem/root junction) and on any roots and canes	Buy cuttings or plants from reliable sources; avoid areas known to be infected; prune and remove all dead canes each year	A bacterial disease; remove infected plants
Double blossom, rosette, witches broom	Short, broom-like clusters of foliage arising from infected canes; large, misshapen blooms with wrinkled and distorted petals; leaves may grow in the flowers	Plant highly resistant thornless varieties; 'Brazos', 'Womack', and 'Kiowa' have some tolerance; many other thorny varieties are highly susceptible; prune and remove all dead canes yearly	The most serious fungal disease in East and southeast Texas; remove and destroy infected canes; destroy wild berries in the area; may need to mow the plants to the ground; during bloom, fungicides are effective
Orange rust	Masses of orange spots on leaves in spring; moves through the plant, and all canes produced afterward will be nonproductive	Plant disease-free nursery stock; prune and remove all dead canes each year	A fungal disease; a serious problem for susceptible varieties, especially thornless; Quickly remove infected plants exhibiting symptoms
White drupelet	Light beige to white drupelets that may or may not be softer than normal-colored drupelets	—	A serious problem for 'Apache'

Blackberries - Pests

- Insect and mite pests
  - Leaf-footed plant bugs
  - Red-neck cane borers
  - Spider mites
  - Stink bugs
  - Strawberry weevils
  - Thrips
  - White grubs
- Nematodes may infest roots, reduce vigor

Blackberries - Harvest

- Generally ripen May-June
- Do not continue to ripen after harvest
- Color changes from red to glossy black to dull black at maturity
- Refrigerate after harvest to increase shelf life
- Not machine harvested – pick by hand
- Economic analysis of commercial blackberry farms have found that labor for harvest and other operations comprises about 70% of total annual variable expenses

Blueberries

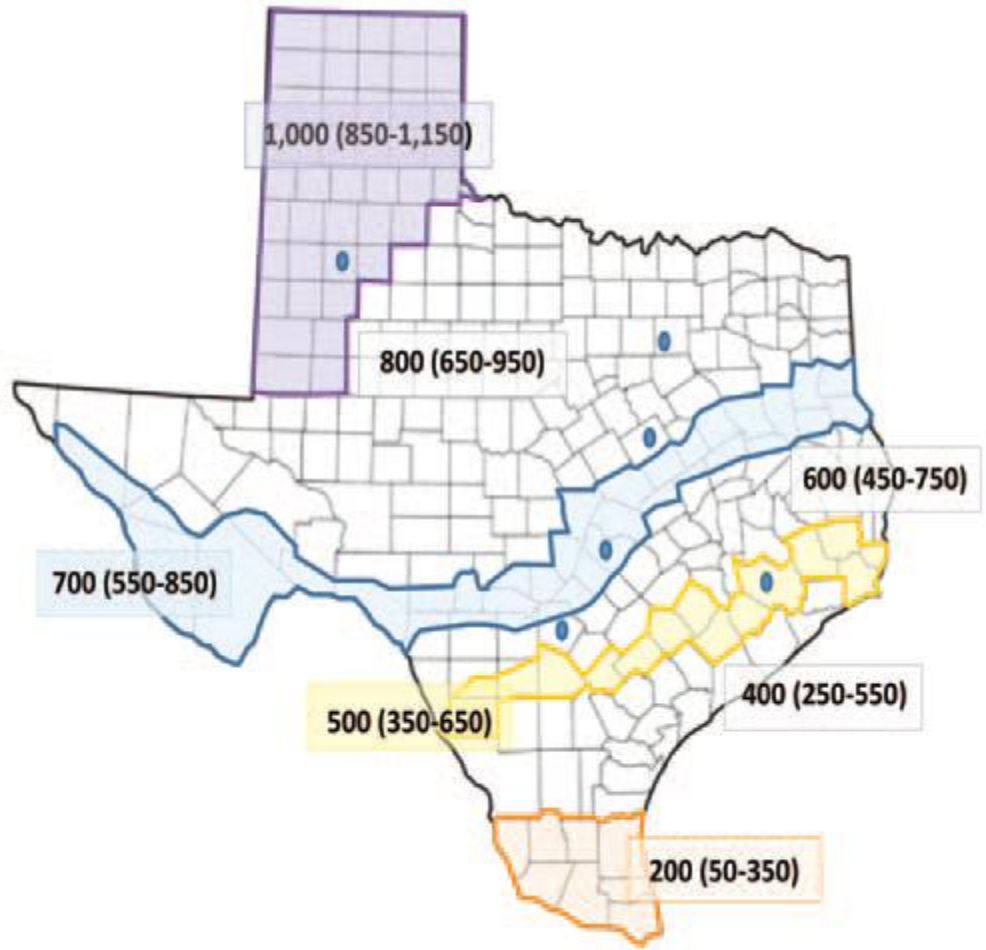
Blueberries Overview

- Grow best in acid soils
- Best blueberry for Texas – rabbiteye blueberry
- Commercial production in east Texas
- Single rabbiteye plant can produce 15 pounds of berries per year
- Fruit has high concentration of antioxidents
- Have few serious pests, need little fertilization

Blueberries - Varieties

- Rabbiteyes bloom in spring
- Varieties that need fewest chilling hours typically bloom and set fruit early – most likely to be injured by late spring frosts
- With proper management, commercial plantings in Texas can yield from 5,000 to 9,000 pounds per acre per year
- Most varieties need a pollenizer variety planted nearby

Chill hours for Texas



Blueberries – Soil & Climate

- Rabbiteyes are calcifuges – do not tolerate alkaline soil or water
- Prefer soil pH from 4.0 to 5.5
- Have soil tested to determine soil pH
- May produce satisfactory yields if planted in containers or raised beds with peat moss or pine bark
- Well drained soil; sandy soil ideal

Blueberries – Spacing & Planting

- Most plants reach mature size in 7 to 8 years
- 15 feet tall, 10 feet wide
- Many trunks that develop to form the crown
- Kill off weeds before planting
- Incorporate organic matter into soil – pine bark or peat moss
- Space plants 6 feet apart in rows that are at least 12 feet apart

Blueberries – Fertilizing & Mulching

- Depend upon mychorrhizae fungi for nourishment
- Rabbiteye blueberries are sensitive to excessive fertilizer
- Organic, slow-release fertilizers applied at low rates 2-3 times a year are preferable
- Most commonly used nitrogen source – ammonium sulfate (21-0-0)

Blueberries – Fertilizing & Mulching

- Soil can become too acidic over time with ammonium sulfate – can use Urea
- Do not fertilize with nitrogen until plants have established
- Increase amount of nitrogen as plants get older

Blueberries – Fertilizing & Mulching

- Mulch is vital during first 2 years
  - Acidify the soil
  - Control weeds
  - Conserve soil moisture
  - Moderate soil temperature
- Use:
  - Peat moss, pine straw, pine bark, leaves, grass clippings

Blueberries - Irrigation

- Water must have little to no calcium bicarbonate
- Also extremely sensitive to sodium
- Once in full growth, give 1-year-old plants about ½ gallon of water per day
- Double the rate during the second year, adding a gallon per plant each year to a maximum of 5 gallons of water per day

Blueberries - Pruning

- Thin out lower limbs to keep fruit from touching the soil
- Tin out any overly vigorous upright shoots several feet from the ground to keep the center of the bush open and keep the bearing area within reach
- As tree forms thick, gray branches, begin thinning about 20% of branches at ground level every year – encourages new growth

Blueberries - Harvest

- May be harvested by hand or machine
- Harvest season is usually May through July
- Berries do not ripen further after harvest
- For maximum flavor and minimal bitterness, allow to ripen on bush

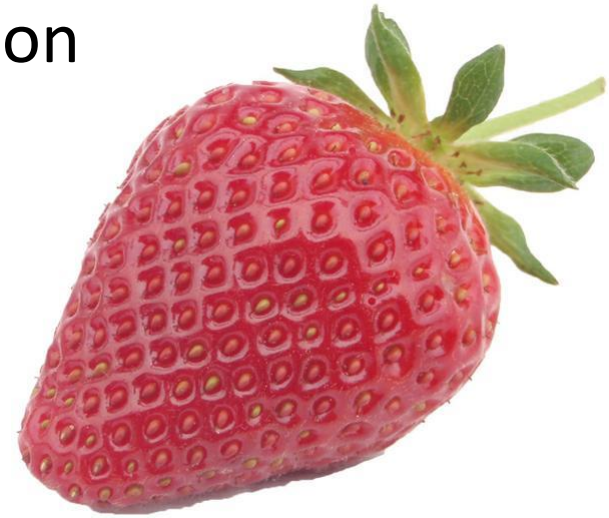
Blueberries – Insects, Diseases & Birds

- Main insect pest is blueberry maggot
- Fungal diseases include
  - Mummy berry
  - Botrytis blight
  - Anthracnose
- Birds can be a major problem

Strawberries

Strawberries

- Can be difficult to grow, often leaving home gardeners frustrated
- Prefer a sunny location with good quality, well-drained soil
- Prefer a pH of 6.5-7.0
- Too high pH can cause iron deficiency
- Fertilize with at least 1 pound/1,000 square feet of balanced fertilizer (13-13-13) at transplanting and periodically during season



Strawberries

- Yield and quality increases significantly when protected from wind
- Perform best when given uniform irrigation – use drip irrigation
- Use of black plastic mulch will reduce soil moisture evaporation and help raise soil temperatures during cooler weather

Strawberries - Transplants

- When planting transplants, make sure the soil stays moist so the roots do not dry out
- Plant transplants 12 inches apart in rows that are 12 inches apart
- Transplant in the fall, generally between mid-September and late October
- When transplanted in spring, air temperature quickly becomes too hot for strawberries, limiting growth and development

Strawberries - Transplants

- Plants will grow by sending out new roots as well as runners (or stolons)
- Runners are stems that have growing points the strawberry plant will use to reproduce, generally forming a new plantlet which will root on exposed soil
- Remove runners during early growth of the plant to allow nutrients to be used for overall growth
- If runners are not removed, they will try and spread out too early thereby reducing yields
- Allow runners to grow after harvest

Strawberry

- Fall-transplanted strawberries should be protected using low tunnels covered with clear polyethylene plastic
- Protects from cold temperatures and wind

Strawberry

- Self-pollinating
- Honey bees are important to increase fruit quality and yields
- Wind can aid in the self-pollination process
- Misshapen berries can be a result of cold temperature during the off-season or absence of wind and bees

Strawberry - Varieties

- Varieties generally fall into one of two fruit bearing categories
  - June bearers – develop flowers in early spring from buds that were developed the previous fall
    - Varieties – Chandler, Strawberry Festival, Radiance, Allstar, Surecrop, Cardinal
  - Ever-bearing – produce fruit under long-day conditions, usually do not produce a lot of runners
    - Albion, Seascape, San Andreas, Ogallala, Ozark Beauty, Tribute, Tristar

Strawberry - Harvest

- Peak harvest is March through May
- Might need to pick strawberries two to three times per week
- Harvested berries should be fully ripe, they do not ripen once picked
- Refrigerate unwashed berries immediately, or wash and freeze for storage

Strawberry - Pests

- Major pests include:
  - Birds, mice, spider mites, slugs, snails, white grubs
- Root and fruit diseases:
  - Botrytis gray mold, nematodes, black crown rot, Verticillium wilt,