Apples

Apples Overview

- Most successful commercial Texas production has occurred in the Davis Mountains and the High Plains region near Lubbock
- These areas have fewer fungal and bacterial diseases and higher winter chilling
- Chilling hours is traditionally the number of hours of temperatures below 45 degrees F from November to March

Apples - Climate

- The major factor limiting the selection of apple varieties is the chilling requirement
- Most commercial apple varieties grown in the northern United States have chilling requirements of 1,000 to 2,200 hours
- The highest chill hour zone in Texas averages only 800 to 1,000 hours each year

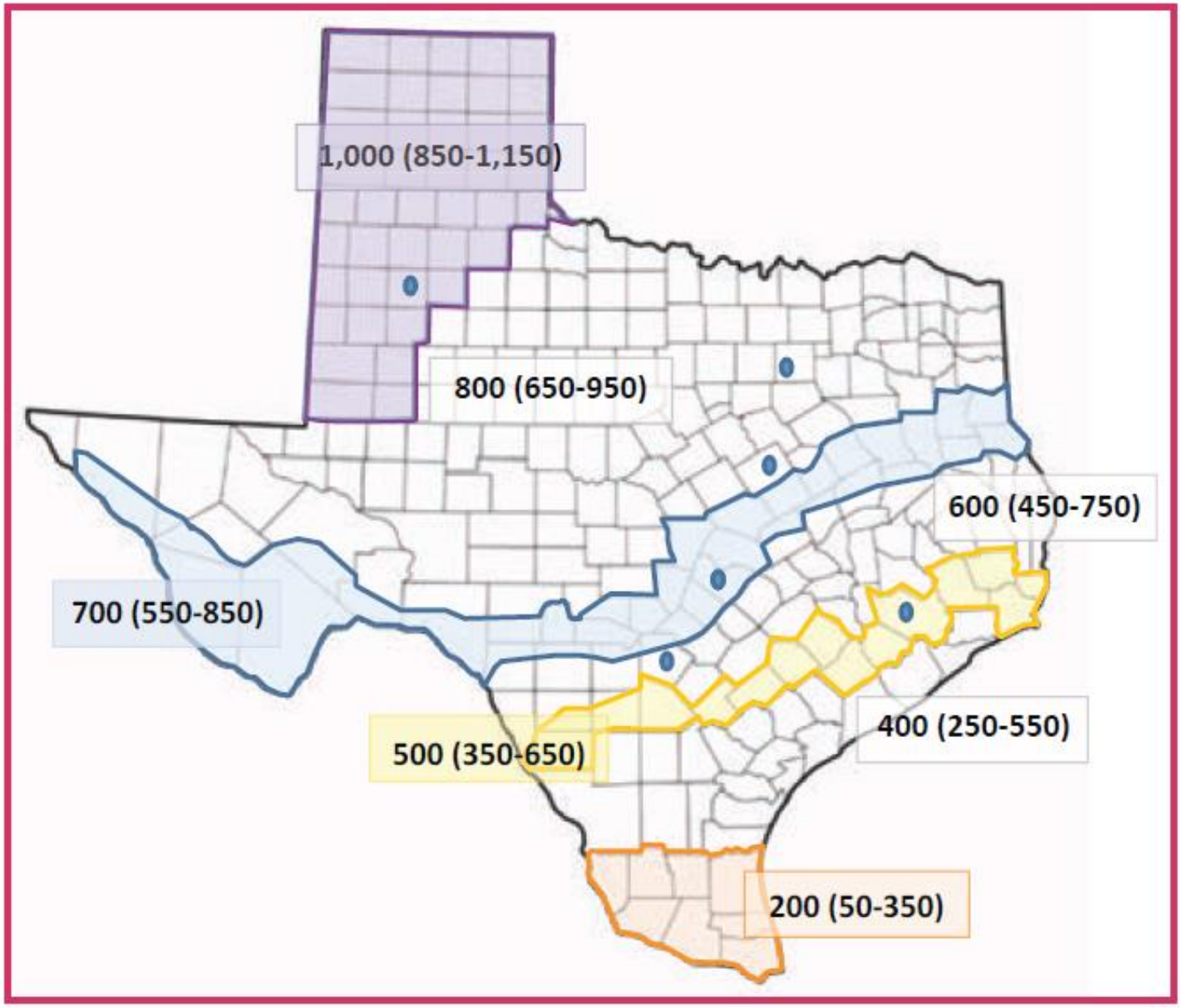

Figure 2. Chill hour zones in Texas

Apples - Climate

- Varieties should have a chilling requirement within 150 hours of the average winter chilling
- If the chilling requirements are too low, bloom can occur too early in the year, and later spring freezes and frosts can reduce or destroy the crop
- If the chill requirements are too high, many buds will not form flowers and the bloom crop will be reduced and develop over a prolonged period.

Apples - Soil

- Prefer well-drained soils with a pH of 6.5 to 7.0
- Production is unsuccessful in areas that are warmer and have alkaline soils (above 7.0) because of cotton root rot
- Because apples are strongly cross pollinated, you will need to plant more than one variety with overlapping bloom dates (similar chill requirements) for good fruit production

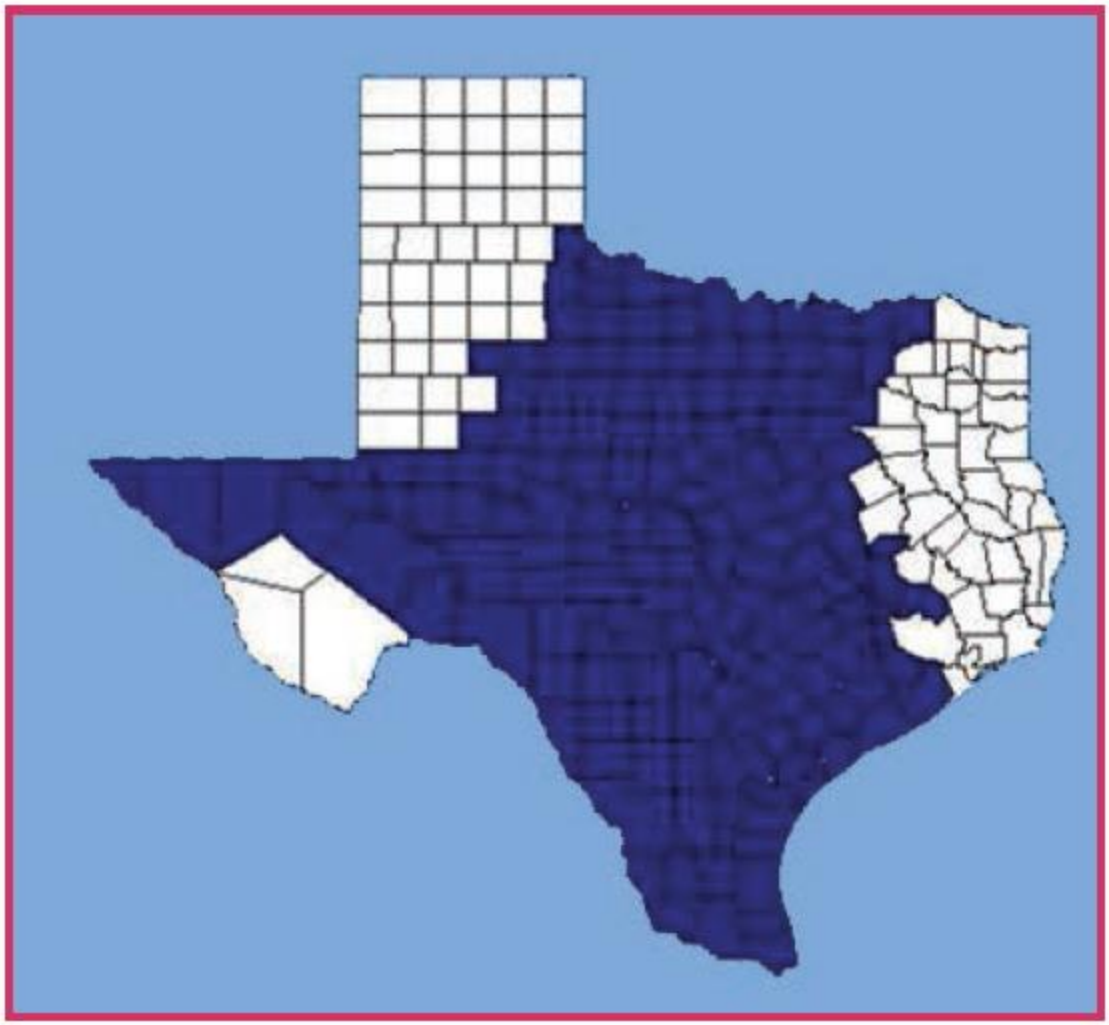

Figure 3. Texas counties where cotton root rot probably occurs (Source: S. D. Lyda)

Apples - Varieties

- For areas with more than 400 winter chill hours

Mutsu

Gala

Pink Lady

Fuji

Mollie's Delicious

Imperial Gala

Apples - Varieties

- For areas with less than 400 winter chill hours

Anna

Dorsett Golden

Apples - Rootstock

- Rootstocks first used to overcome the wooly apple aphid, a soil-borne insect that kills the roots of susceptible trees
- Some of these rootstocks had the advantage of reducing the size of the bearing tree
  - Come into production at a younger age
  - Can better produce high-quality fruit
  - Use space more efficiently
  - Bear fruit that can be harvested easily

Apples - Rootstock

- M7 and MM111
  - Somewhat dwarfing
  - Do not need a support system
  - More efficient and bear at a younger age
  - Common in both commercial and home planting
- EM 26 and M9
  - Shallow roots
  - Must have a trellis-type support structure

Apples – Pruning and Training

- Naturally erect growth habit and traditionally are trained in a central leader system
- Christmas tree shaped – dominant central trunk and an array of scaffold limbs (primary branches) every 4 to 5 feet
- Goal of training
  - Minimize shade and intercept sunlight to manage vigor
  - Minimize disease pressure
  - Produce high quality fruit

Apples – Pruning and Training

- Trellis support is needed for severely dwarfing rootstock like M9 because of shallow, brittle, poorly anchored root systems
- Rootstocks such as MM111, EM7, and MM106 are best grown freestanding

Apples - Irrigation

- The water needs of apple trees vary depending upon tree age, soil type, and rootstock

Table 3: Recommended number of gallons of water to apply per tree per week*

Year	Month					
	April	May	June	July	August	September
1	7	7	14	21	21	14
2	14	14	21	28	28	21

*The amounts will vary according to temperature, soil type, and natural rainfall.

Apples - Irrigation

- Trees need more water as they age
- Supply water to the area of the root system that is actively drawing water and nutrients and to keep the crown of the tree relatively dry

Apples - Fertilization

- Soil test before planting
- Apply nitrogen every year
  - Promote early canopy development
  - Maintain leaf health throughout the fall
- Calcium deficiency is common
  - Most calcium taken up by the tree does to the developing leaf tissue
  - Deficiency in fruit can cause problems

Apples - Fertilization

- Bitter Pit
  - Areas of brown, dry tissue in fruit flesh
  - Peel discolors and browns, pit forms on surface
  - Most of the affected areas are usually towards the calyx (bloom end) of the fruit

Apples - Fertilization

- Lenticel Blotch Pit
  - Small, dark, dying areas surround the fruit lenticels (pores) and then develop slight pits
  - May occur just before harvest, usually appears during storage

Apples – Weed Control

- The most limiting factor to orchard establishment is the failure to control weeds
- Cultivating (plowing or disking) weeds can damage the roots of an apple tree
- Use contact herbicides approved for weed control around apples
- Mulch about 6 inches thick

Apples - Diseases

- Collar Rot
  - Soil-borne disease
  - Caused by *Phytophora cactorum*
  - Rotting around base of the tree
  - Can be reduced by proper site and rootstock selection
  - Manage with fungicide as needed

Apples - Diseases

- Fire Blight
  - Caused by bacterial pathogen *Erwinia amylovora*
  - Causes twig and limb dieback
  - Can kill the tree
  - More common in more humid areas of the state
  - To manage, grow resistant varieties, prune infected limbs, reduce nitrogen fertilization to slow vegetative growth

Apples - Diseases

- Cotton Root Rot
  - No diagnostic test to determine if present at site
  - No know resistant rootstocks
  - No fungicides have proven effective
  - Fungus can move easily from tree to tree
  - Plant in slightly acidic soils to help control

Apples - Insects

- Insects of concern include:
  - Apple maggot
  - Coddling moth
  - Scale insects
  - Tarnished plant bugs
  - Flat-headed apple tree borer
  - Several stink bug species
- Use caution when applying insecticides, especially during bloom, to protect important pollinators

Apples - Harvest

- Apple maturity is judged by fruit color, firmness, and soluble solid content
- For local sales, growers keep fruit on trees as long as possible for highest quality
- For distant markets, fruit picked less ripe in order to withstand travel to market
- Apple will continue to ripen (ethylene)
- To maintain optimal quality, refrigerate and humidify the apples after harvest