

Environmental Challenges of the Southeastern USA

TemperatureHumidity



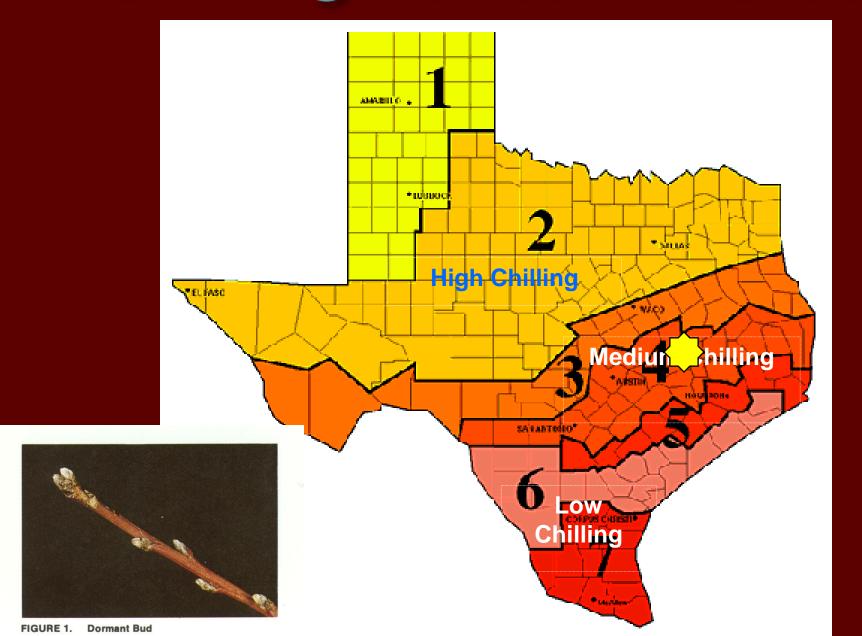
Temperature Stress

Effect depends on the plant growth stage

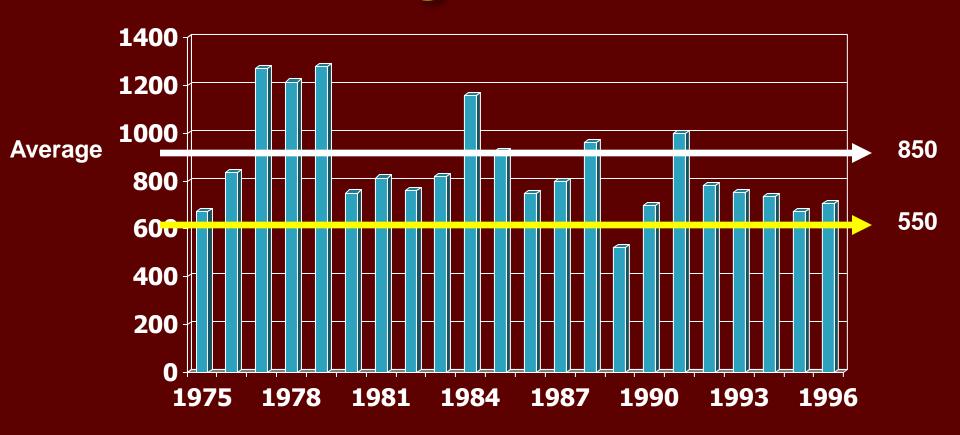
- Dormancy
- Flowering

- Fruit bud development
 - Fruit development

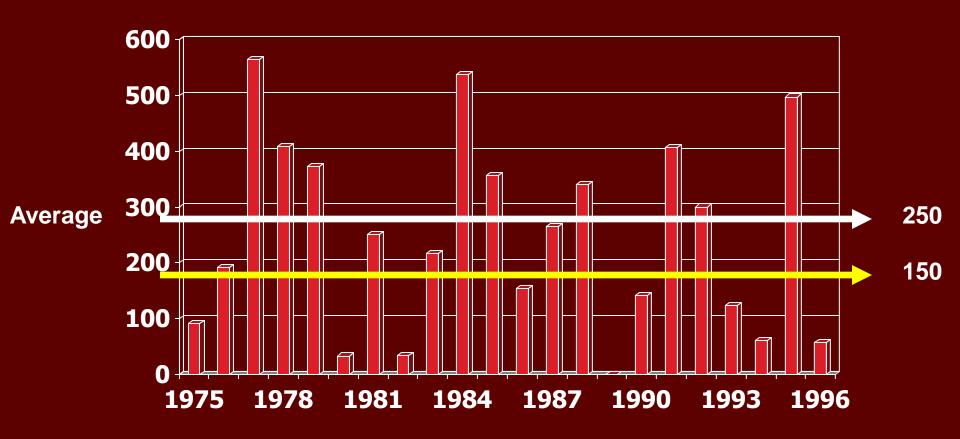
Chilling Zones in Texas



Accumulated Chilling hours in College Station



Accumulated Chilling in McAllen



WHAT HAPPENS IF A PEACH DOES NOT

RECEIVE ENOUGH CHILLING?



Delayed Foliation



Prolonged Flowering

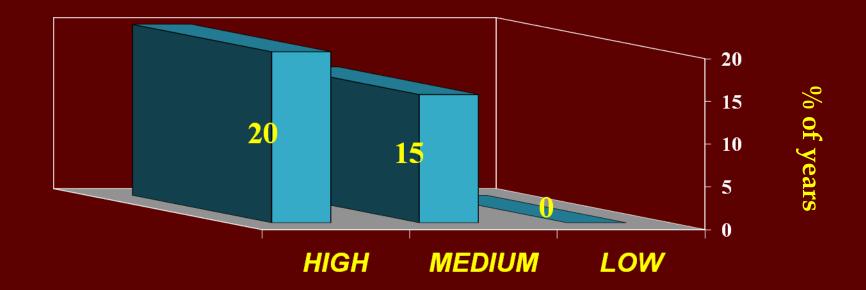


Freezes during Bloom



Photo courtesy of Dr. George Ray McEachern

Frost Damage Probabilites in Low, Medium, and High chill Zones



Chilling Zones

Frost Damage during Flowering



Protection with Wind Machine

Mix Warm and Cold Air



Flowering

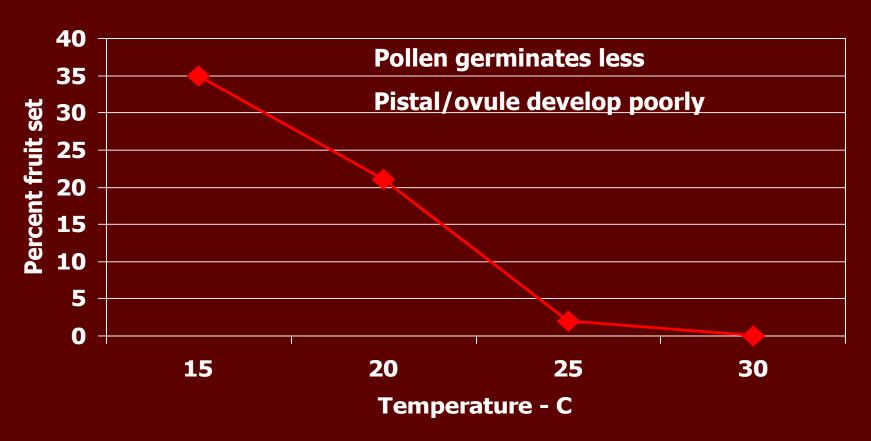


Sensitive to high temperatures

Fruit set and temperature during bloom

Kozai et al., 2004. J. Hort. Sci. Biotechnol. 79:533-537

Variety = "Hakuho"



Tolerance to Heat During Bloom



Warm Spring





TXW1A40

Cool Spring



TropicPrince

Effect of Chilling/Warm Spring on Fruit Shape







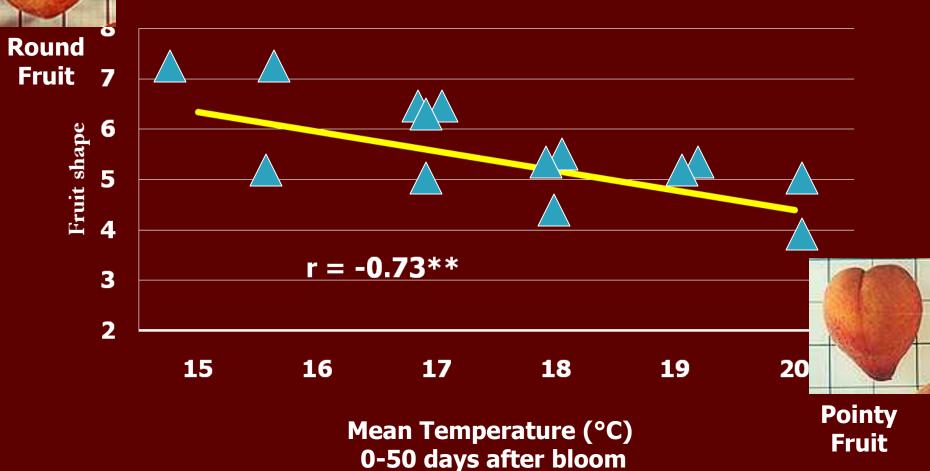
950 hours

650 hours

500 hours



Fruit Shape and Spring Temperature Texstar: 1984-1998



Chilling Effect on Peach Fruit Shape



950 hours



Susceptible Variety

650 hours





500 hours

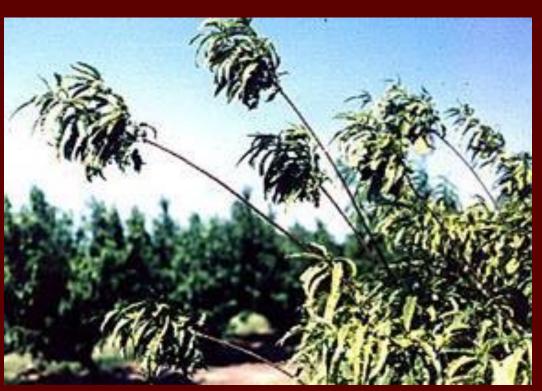


Department of Horticultural Sciences
Texas A&M University

Effects of High Temperatures

During summer





Twins

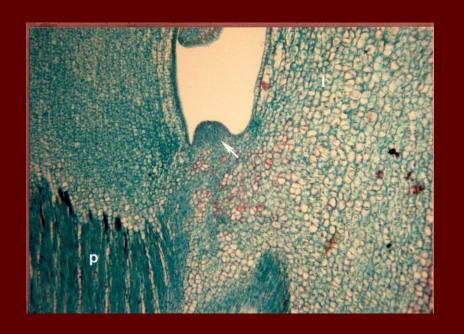
Blind nodes

Blind nodes

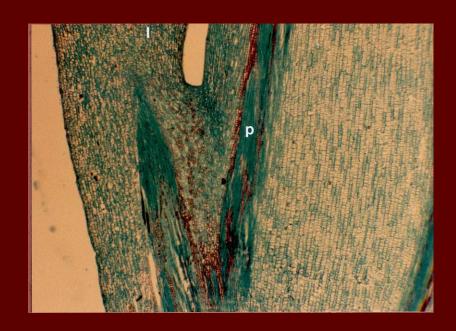


Longitundinal sections of peach bud

Normal bud

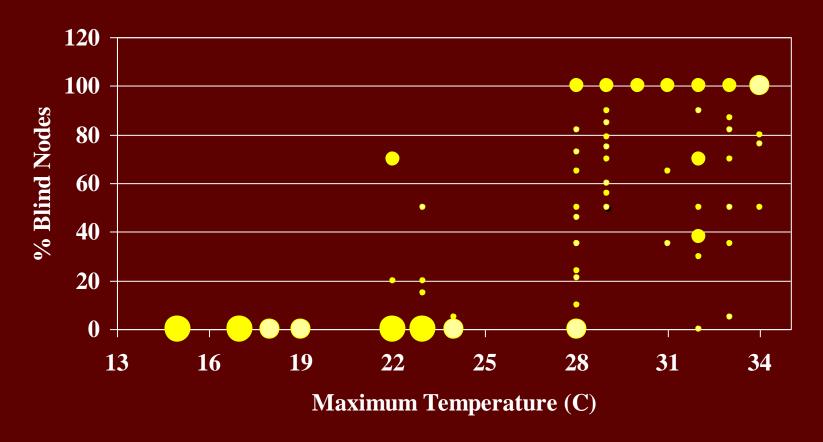


Bud of blind node



Pictures taken by Unaroj Boonprakob

% Blind nodes and maximum temperature

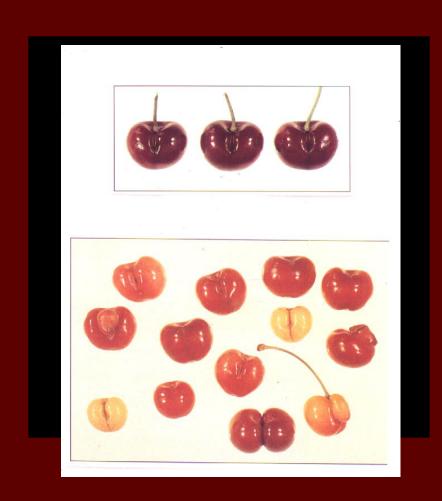


Research done by Dr. Unaroj Boonprakob

Twin or double fruit High Temperature and Water Stress



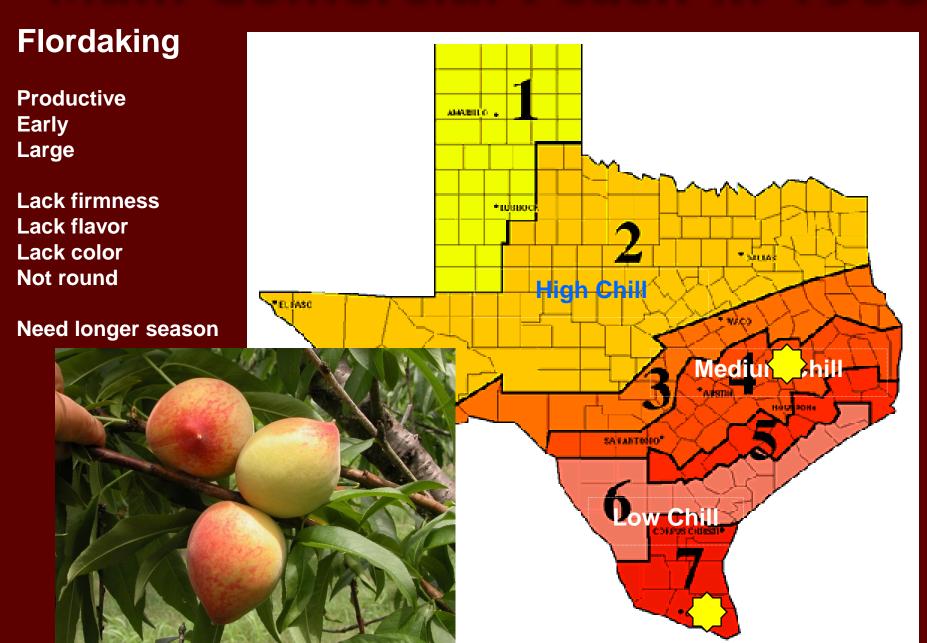




Breeding Objectives Adaptation

- Tolerance to high temperatures
 - Mild (ie warm) winters (less chill requirement)
 - Bloom time
 - Fruit bud development
 - Fruit development

Main Comercial Peach in 1983



Objectives

- Adaptation: Mild Winter Conditions
 - Low and medium chill regions
 - Resistance to bacterial leaf spot
- Ripening series: early to mid season
- Varieties: Fresh Market
 - Peaches
 - Flesh color: yellow

Process of Peach Breeding from Seed to Variety Release 8 to 10 years



Plant Breeding is a Long Term Project





Especially for Tree Crops





Peach Varieties for Low Chill Zone

Variety	Chill	Ripe
TropicPrince	150	Mid April
EarliGrande	250	Mid April
Thai Tiger 1193-1	150	Late April
TexFirst	200	Late April
Thai Tiger 1C4	150	Early May
Tropic Beauty	150	Early May
Thai Tiger 1490-1	150	Early to mid May
Thai Tiger 1491-1	150	Mid to late May



Peaches for the Medium Chill Zone

Variety	Chill	Ripe	
TexFirst	200	Late April	Frost protection
Flordaking	450	Early May	Standard
TexKing	450	Mid May	
Texstar	550	Late May	
TexRoyal	550	Early to mid June	
TexPrince	500	Early to mid June	



Shift in Objective in late 1980s

Expand products available

- Yellow peaches
- White peaches
- Yellow nectarines
- White nectarines
- Donut peaches







More types of peaches

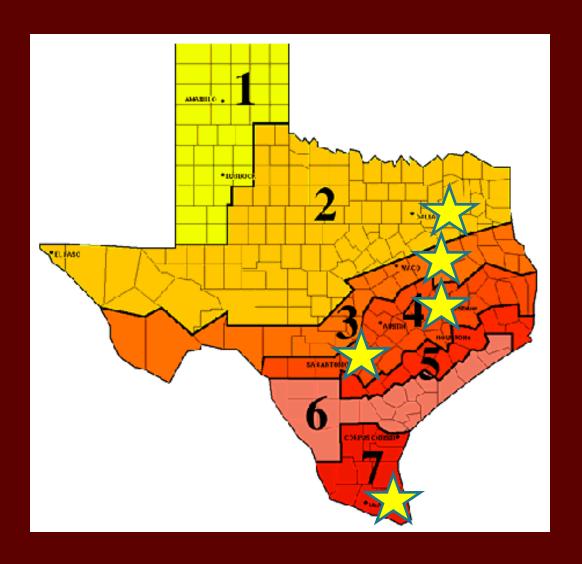






Primary Objectives

- Adaptation: Mild Winter Conditions
 - Low and medium chill regions
 - Resistance to bacterial leaf spot
- Ripening series: early to late season
- Varieties: Fresh Market
 - Peaches, nectarines, flat peaches
 - Flesh color: yellow, white, red
 - Flesh quality: soluble solids > 12%
 - Markets: Local, distant



State wide testing of selections

Royal Zest Peach Series

Variety	Bloom	Ripe
Royal Zest One	600	May 26
Regal	700	May 26
Royal Zest Two	500	June 04
June Gold	650	June 04
Royal Zest Three	550	June 17
Royal Zest Four	600	June 22
Sentinel	750	June 22
Golden Zest	600	June 29
Harvester	750	July 07





Royal Zest One

Fairfield, Texas







Royal Zest Two Fairfield, Texas



Sentinel

GaLa

Royal Zest Two

Royal Zest Two

Fairfield, Texas





Royal Zest Three

Fairfield, Texas



Sentinel

GaLa

Royal Zest Three

Royal Zest Peaches California

Harvester Rich Lady RoyalZest3

Sentinel

RoyalZest2

RoyalZest4

Golden Zest

Fairfield, Texas



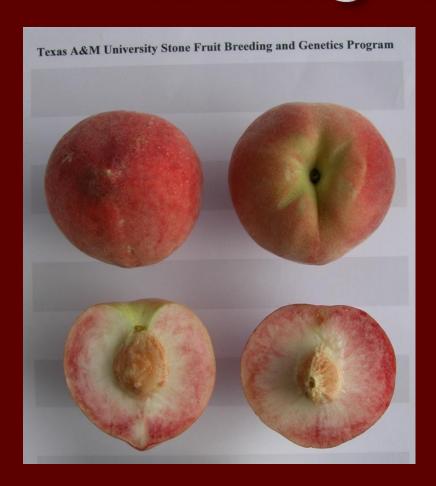
White Delight Peach Series White Low Acid Peaches

Variety	Bloom	Ripe
WhiteDelOne	550	June 04
WhiteDelTwo	550	June 22
Galaxy	550	June 25
Scarlet Pearl	750	June 26
WhiteDelThree	700	July 07
WhiteDelFour	700	July 14





White Delight Peach Series



Late May Chill: 550

Flavor: Subacid



White Delight One

White Delight Two Mid June Chill: 550 Flavor: Subacid





White Delight Two Fairfield versus Floresville, Texas



Fairfield



Floresville

White Delight Peaches

Late June - Early July

Chill: 700

Flavor: Subacid







White Delight Four

White Zest peach

Early June

Chill: 550

Flavor: Sweet Acid





Smooth Texan Nectarine Series

Variety	Bloom	Ripe
SmTexanOne	550	May 22
SmTexanTwo	550	May 28
SmTexanThree	650	June 04
June Gold	650	June 04



Smooth Texan One

Mid May

Chill: 550

Flavor: Sweet Acid





Smooth Texan Two

Late May

Chill: 550

Flavor: Sweet Acid



Smooth Texan Three Early June Chill: 650

Flavor: Sweet Subacid



Smooth Texan Three



Smooth Delight nectarines

Early to mid May

Chill: 400

Flavor: Subacid





Smooth Zest nectarines



Early May

Chill 350





Flavor Acid Sweet



Smooth Zest Two

Smooth Zest One

Galaxy Peach

Fairfield, Texas



Flat Delight peaches



Late May to Early June

Chill 500

Flavor Sweet Subacid







New Releases

Royal Zest

- 500-650, Yellow peaches
- Better shape, color, firmness

White Delight

- 550-700, Low acid whites
- Excellent sweet flavor

Flat Delight

- 500-550, Flat peaches
- Subacid flavor

White Zest

- 500, White peach
- More to come

Smooth Texan

- 550-650, Yellow nectarines
- Late May to early June
- Excellent color, flavor

Smooth Delight

- 400, Nectarines
- Early to mid May
- Subacid

Smooth Zest

- 350, Nectarines
- Early May

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