Influence of Tomato Shoot Pruning on Bacterial Spot Infestation

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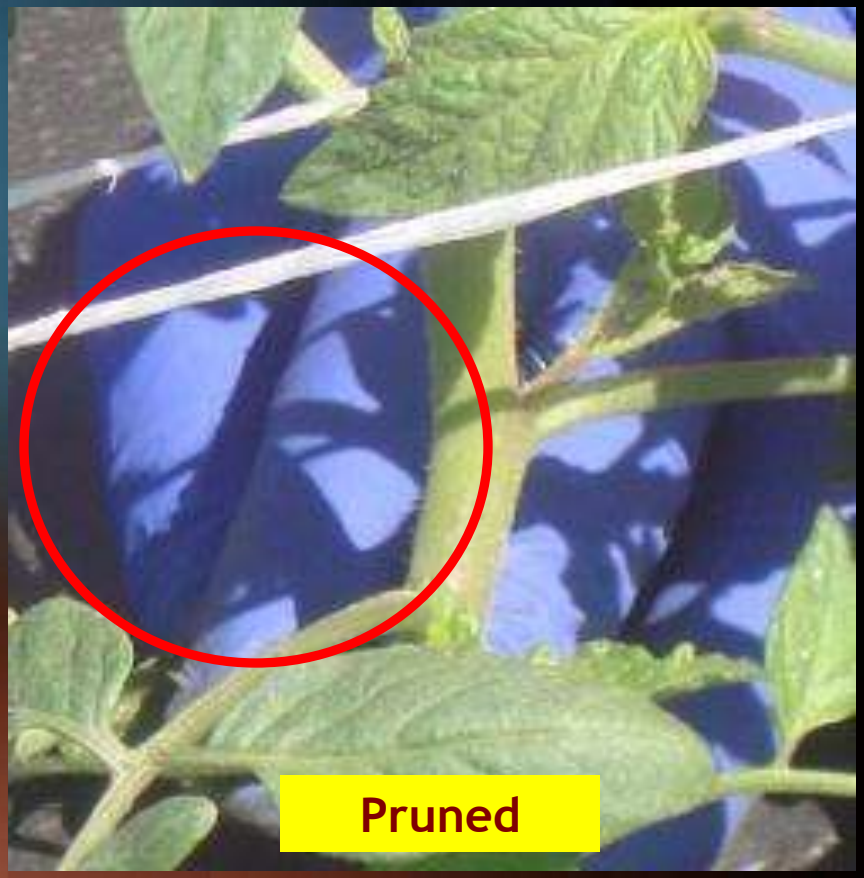
Pruning

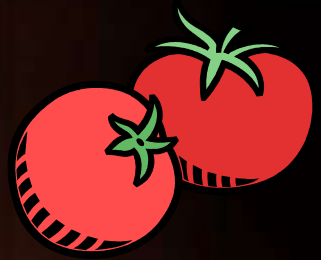
- Remove extra suckers (side branches).
- Between 2 and 3 WAT (<10 inches tall).



Pruning

- About 50% of tomato growers use pruning.

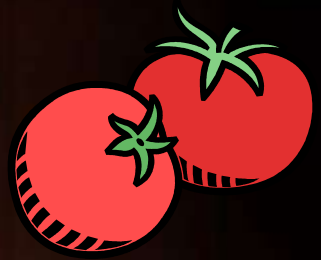
- Literature is conflictive on the biological and economic feasibility of this practice.
  - UC-Davis: Increases vigor and tomato yield.
  - OSU: Reduces overall yield.
  - UF: No difference in some cultivars.



Pruning

- **It is linked to the crop growth habit.**
  - Cultivar specific practice.

- **Estimated cost of pruning:**
  - 6.00 h/acre at $8.00/h.
  - $4800 for 100 acres of tomato.



Bacterial Spot

- *Xanthomonas perforans* (races 3 & 4)

= *X. campestris*. pv. *vesicatoria*.

- Starting on lower leaves.
- Enhanced by:
  - Rain.
  - High temperatures.
  - Crop residues.

Objectives

Effect of pruning on:

- Tomato yield of different cultivars.
- Bacterial spot severity.

2009 & 2010 Studies

- "Small-plot" research:
  - GCREC, IFAS, Univ. of Florida, Balm, Fla.

- Grower field validations:
  - Pacific Tomato Growers, Parrish, Fla.
  - West Coast Tomato, Duette, Fla.

Materials and Methods

- **Two trials at GCREC, IFAS, Univ. Of Florida:**
  - Spring and Fall 2009.

- **Cultivars:**
  - ‘Tygress’ and ‘Security-28’.
  - TYLCV-resistant cultivars.

Materials and Methods

- **Pruning (3 WAT):**
  - No pruning.
  - Light: remove 2 to 3 suckers.
  - Heavy: removing suckers and stems up to 6 inches high.
- **Split-split plot design with 5 replications.**
  - Cultivars in main plots.
  - Bacterial spot inoculation in subplots.
  - Inoculation at 5 WAT (1 x 10^8 cfu/mL).

- Raised beds are 28 in wide and 8 in tall.
- Staking and tying 3 times.

- Fumigated beds covered with mulch.
- Fertigation.

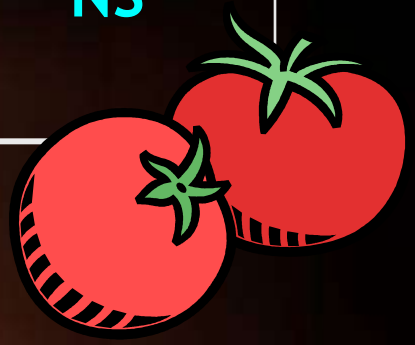
Materials and Methods

- Plant height at 6 WAT.
- BS severity (1-5) at 9 WAT.
- Marketable yield:
  - 2 harvests per season (10 and 12 WAT)
  - Fruit weight.

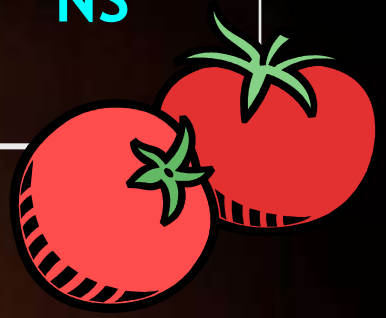
Results

- No significant treatment x season.
- Data from both seasons combined.

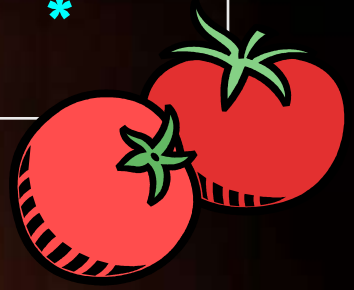
Plant height 6 WAT (cm)		*P<0.05*
Cultivars		
Security 28	57.8	NS
Tygress	57.5	
Bacterial spot		
Inoculated	56.1	NS
Non-inoculated	59.3	
Pruning		
None	57.1	NS
Light	57.1	
Heavy	58.8	



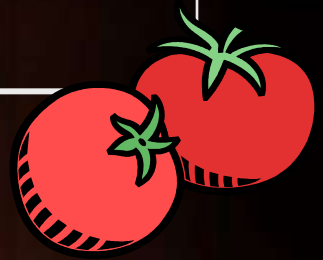
Bacterial spot 9 WAT (1-5 rating)		*P<0.05*
Cultivars		
Security 28	2.3	NS
Tygress	2.5	
Bacterial spot		
Inoculated	2.8 a	*
Non-inoculated	2.1 b	
Pruning		
None	2.4	NS
Light	2.3	
Heavy	2.7	



Early fruit weight 10 WAT (ton/acre)		*P<0.05*
Cultivars x pruning		
S28, non-pruned	7.4 a	*
S28, light	7.1 a	
S28, heavy	6.3 a	
Tygress, heavy	4.4 b	
Tygress, light	3.7 b	
Tygress, non-pruned	3.4 b	
Bacterial spot		
Inoculated	2.9 b	*
Non-inoculated	4.2 a	



Total fruit weight 10 & 12 WAT (ton/acre)		*P<0.05*
Cultivars		
Security 28	18.3 a	*
Tygress	15.0 b	
Bacterial spot		
Inoculated	15.2 b	*
Non-inoculated	18.1 a	
Pruning		
None	62.7 a	*
Light	59.8 ab	
Heavy	56.2 b	



Summary

- **Plant height:** No effect of pruning.
- **Early yield:**
  - Pruning had no effect on fruit weight.
  - BS inoculation reduced yields.
- **Total yield:**
  - Differential response of cultivars to BS inoculation.
  - No pruning = light pruning.
  - Heavy pruning reduced yields.

Summary

- Early pruning may not be an effective way to reduce BS infestation in these cultivars.
- Results were validated in grower's fields.

Large Grower's Plots

- 2 commercial tomato fields in Manatee Co., Fla.
- Spring 2010.
- 5 trials, 2 pruning programs.
- Plant densities: 3350-3600 plants/acre.
- Plot size: 400 to 600-ft long (1 or 2 beds).

Large Grower's Plots

Location	Cultivar	Planting date
Duette 1	'XP-200'	Jan. 20, 2010
Duette 2	'XP-200'	Jan. 25, 2010
Duette 3	'XP-200'	Feb. 4, 2010
Parrish 1	'XP-200'	Feb. 9, 2010
Parrish 2	'Tygress'	Feb. 9, 2010

Materials and Methods

Variables measured:

- Plant height
- Leaf greenness (SPAD values)
- Petiole NO_3-N
- Early yields
- Total yields

Pruned

Non-pruned

← Pruned

Non-pruned →

Plant Height

Pruning program	'XP-200'				'Tygress'
	Jan. 20	Jan.25	Feb.4	Feb.9	Feb.9
	----------inches----------				
Non-pruned	21.4	17.7	15.6	20.0	19.6
Pruned	21.7	17.3	15.8	20.5	20.1
P<0.05	NS	NS	NS	NS	NS

Leaf greenness and petiole NO_3-N:
No differences among pruning programs.

Early Yields

Pruning program	'XP-200'		
	Jan. 20	Jan.25	Feb.4
	----------ton/acre----------		
Non-pruned	14.8	13.5	13.6
Pruned	15.2	12.8	13.1
P<0.05	NS	NS	NS

Total Yields

Pruning program	'XP-200'		
	Jan. 20	Jan.25	Feb.4
	----------ton/acre----------		
Non-pruned	24.1	NA	21.3
Pruned	24.5	NA	21.1
Significance (P<0.05)	NS	NA	NS

Summary

There were no differences between pruning treatments on:

- Plant height.
- Leaf greenness.
- Petiole NO_3-N content.
- Yields.

Summary

- "Light" shoot pruning:
  - Did not reduce bacterial spot severity on 'Security-28' and 'Tygress'.

- No pruning may save growers up to $50/acre.

- In contrast, "heavy" pruning reduced total marketable yield as compared with "light" or non-pruning.

Thanks!!

Acknowledgements

Pacific Tomato Growers

West Coast Tomato

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