Use of MaxCel

Philip Schwallier
Amy Irish-Brown
Clarksville Research Center

Thanks to:
Michigan Apple Research Committee
Michigan State Horticulture Society
Valent BioSciences, Valent USA
AmVac
BASF

MICHIGAN STATE UNIVERSITY EXTENSION

MICHIGAN STATE UNIVERSITY AgBioResearch

6-BA

- Mild to moderate, gentle, thinning.
- Dose dependent.
- Improves fruit size.
- Best use throughout window?
- Standard rate = 100 ppm (64 oz/100)
- Labeled up to 200 ppm
- Do not use with NAA???
- Aggressive with Sevin.

MaxCel and NAA Gala Thinning

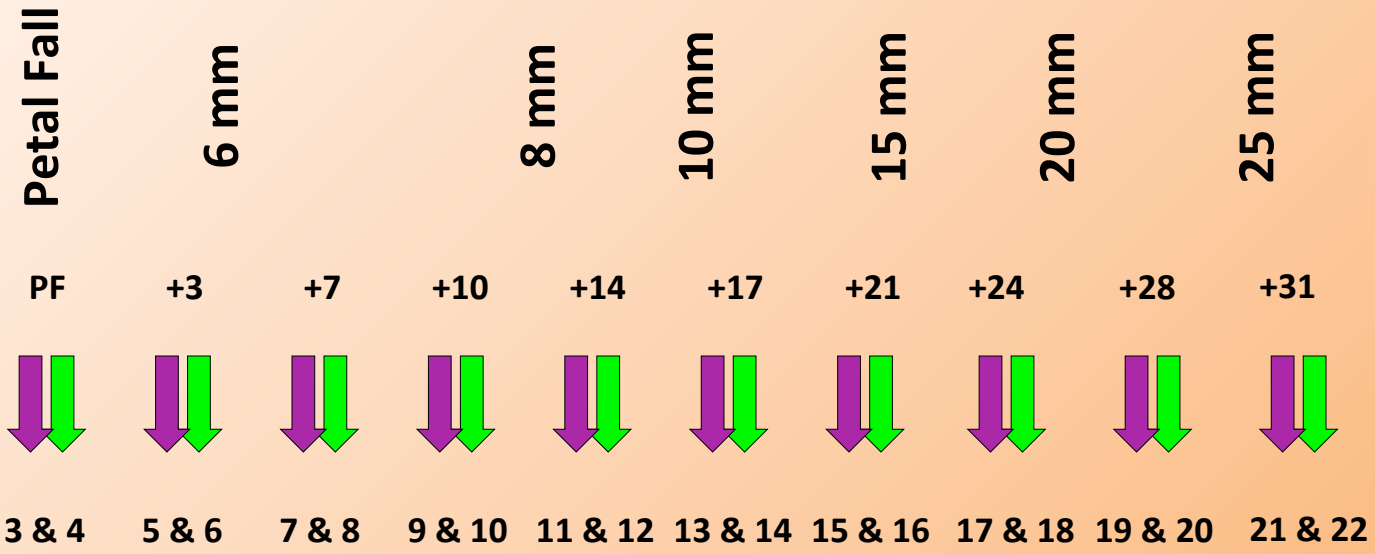
Treatments of Sevin plus NAA or Sevin + MaxCel were applied periodically from Petal Fall to ~ 30 DAFB for 8 years (2004 to 2011) to mature Gala trees at CHES.
Important indices, Cropload, Ave Fruit Weight and Return Bloom were measured.

Conclusions:

- S+M thinning is identical to S+N on Gala.
- MaxCel AFW is greater than NAA.
- MaxCel @ 150 ppm = NAA @ 13 ppm.
- Return Bloom, Fruit/Cluster are equal.

Gala Thinning Trial CHES 2010		
Number	Treatment	Rate
1 UTC	Untreated Check	
2 HT	Hand Thinned	
Even, S+N	Sevin+NAA	1 qt+15 ppm
Odd, S+M	Sevin+MaxCel	1qt+150 ppm

7 Years MaxCel Thinning Summary



Sevin + NAA

Sevin + MaxCel

2004 MaxCel = 100 ppm
2008 MaxCel = 100 ppm

Sevin = 1qt XLR/100
MaxCel = 150 ppm
NAA = 15 ppm

2004 to 2010 Gala MaxCel NAA Trials

Table 1. Percent Cropload 2004-2010 with Optimums Paired Treatments.

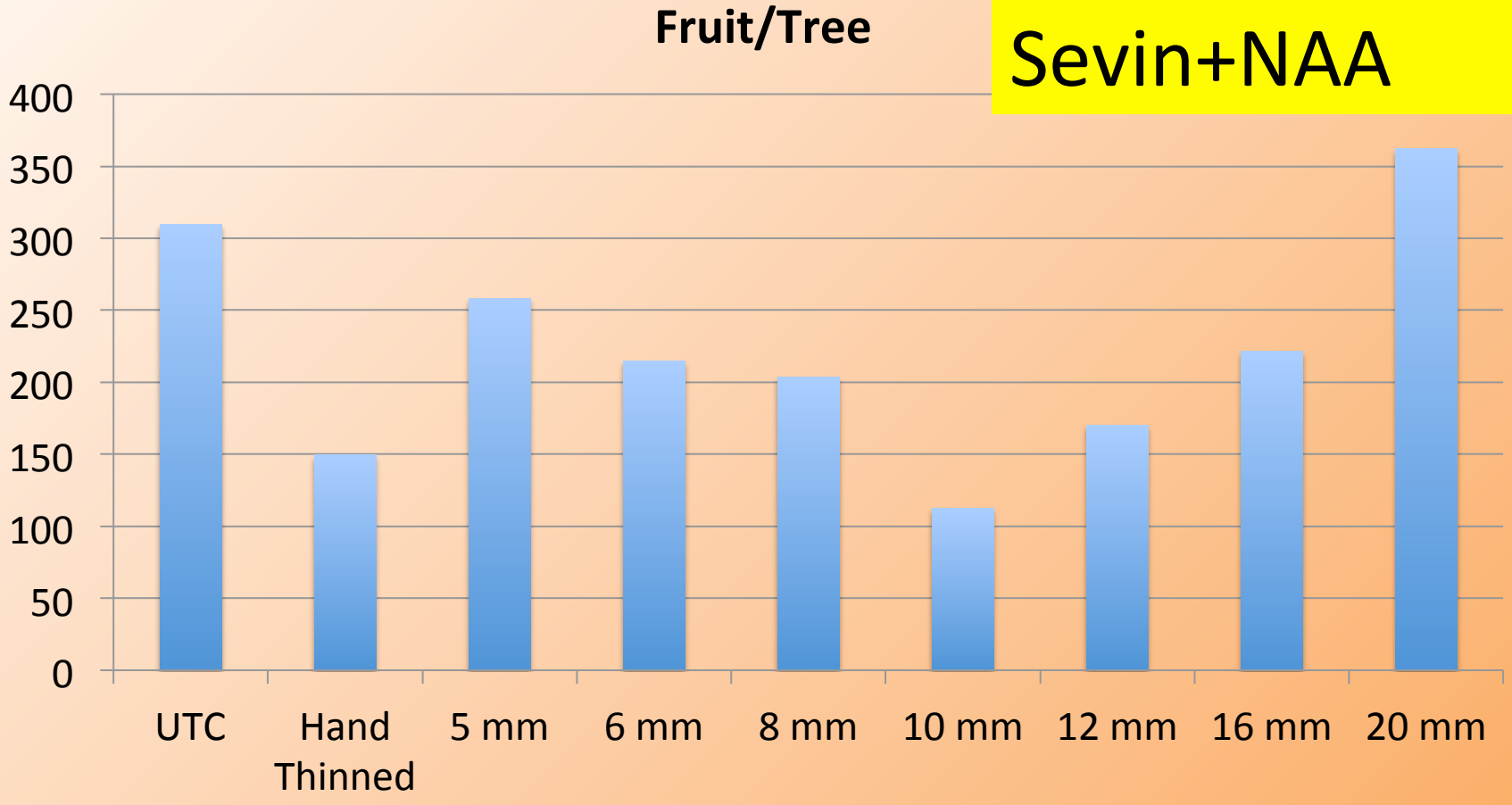
Target Timing	Tmt.	Percent Fruit/Tree of UTC						
		2004	2005	2006	2007	2008	2009	2010
	UTC	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	HT	46.7	57.0	48.3	59.2	56.9	40.6	68.7
PF	S+M	56.7	67.8	111.3	85.3	72.1	80.6	85.4
PF	S+N	40.3		71.8	75.7	66.8	71.4	69.2
PF+3	S+M	51.9	56.5	83.5	64.5	71.6	69.0	85.3
PF+3	S+N		54.2	87.4	83.8	69.1	64.4	70.2
PF+7	S+M	70.2	54.4	69.4	69.9	57.2	58.8	83.9
PF+7	S+N	59.6		65.8	63.3	36.2	42.6	66.3
PF+10	S+M	53.7	26.0	61.6	43.2	51.0	63.8	60.0
PF+10	S+N		29.6	36.3	45.9	46.4	53.2	60.3
PF+14	S+M	83.4	51.3	56.5	49.3	45.1	66.0	61.2
PF+14	S+N			55.0	49.2	28.2	55.4	60.5
PF+17	S+M	105.7	72.8	71.6		42.9	68.8	57.7
PF+17	S+N	63.9		67.0		52.7	52.2	51.0
PF+21	S+M	81.1		117.0		81.6	78.7	67.6
PF+21	S+N			85.4		71.7	72.1	75.0
PF+24	S+M	116.8				73.6		78.0
PF+24	S+N					76.1		86.8
PF+28	S+M	114.7				80.8		
PF+28	S+N					91.5		
PF+31	S+M	99.7				100.0		

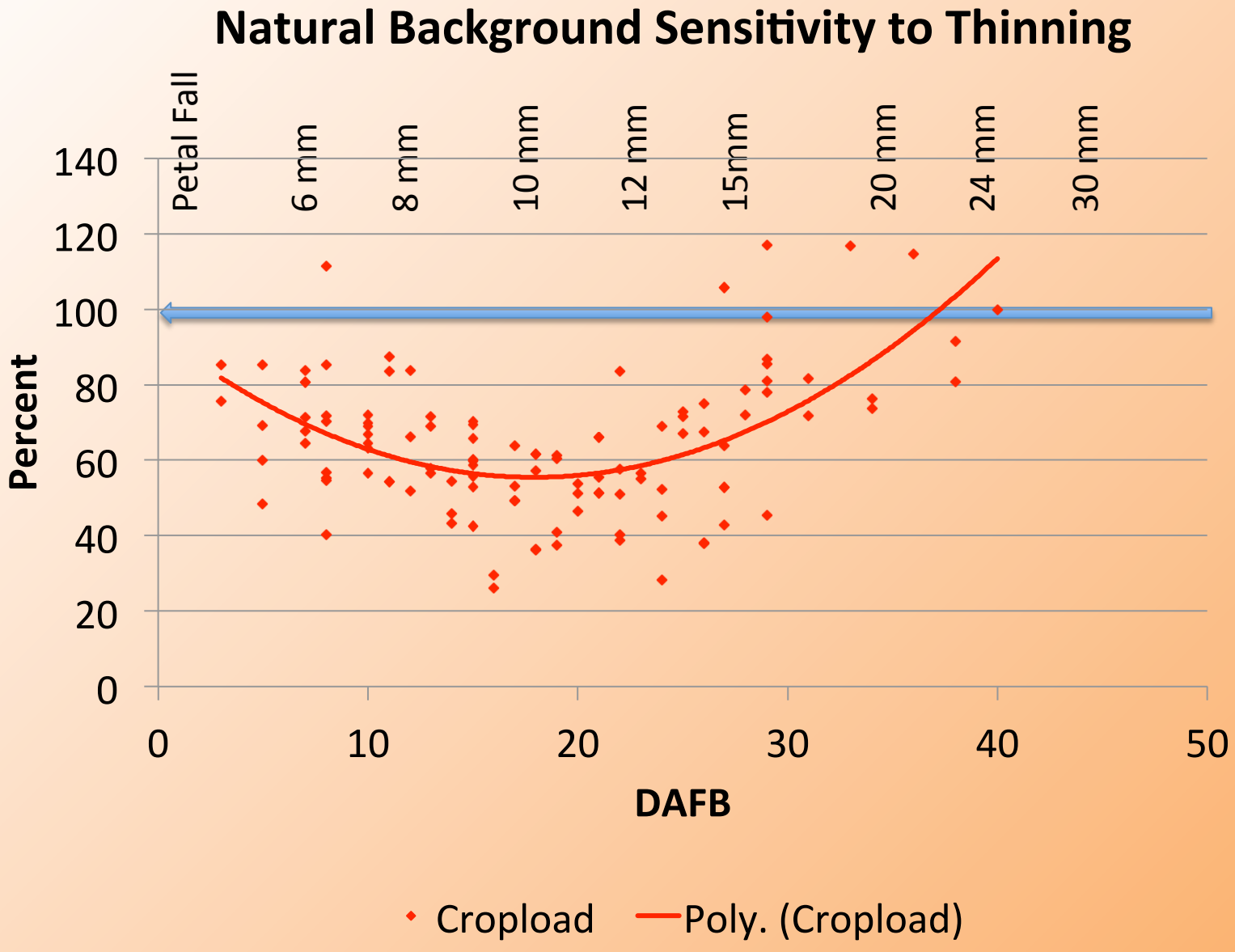
Optimum Paired Treatments (based on effectiveness) Yellow

General Post-Bloom Thinning

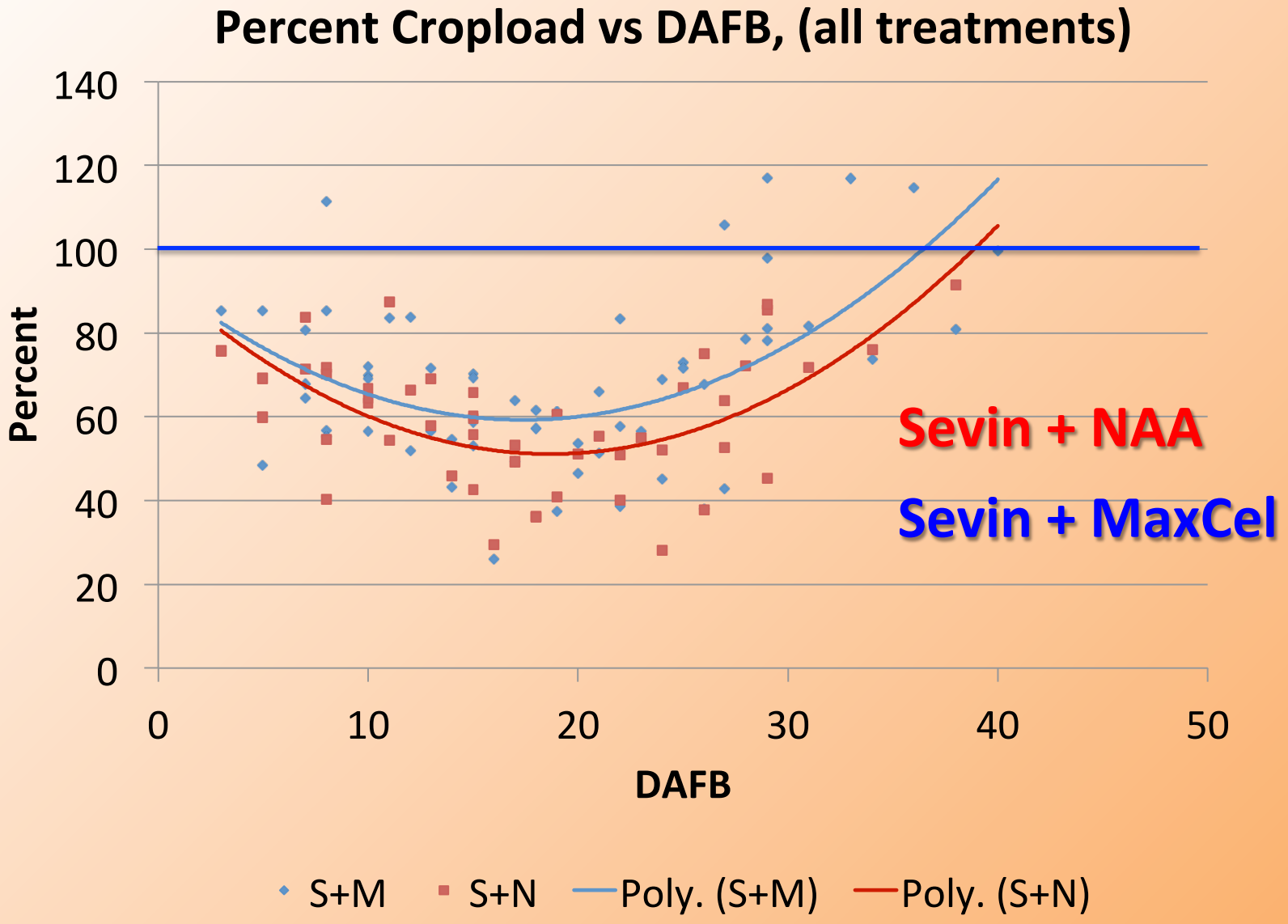
2006 Gala

Sevin+MaxCel
Sevin+NAA





CROPLOAD = % FRUIT/TREE OF UTC



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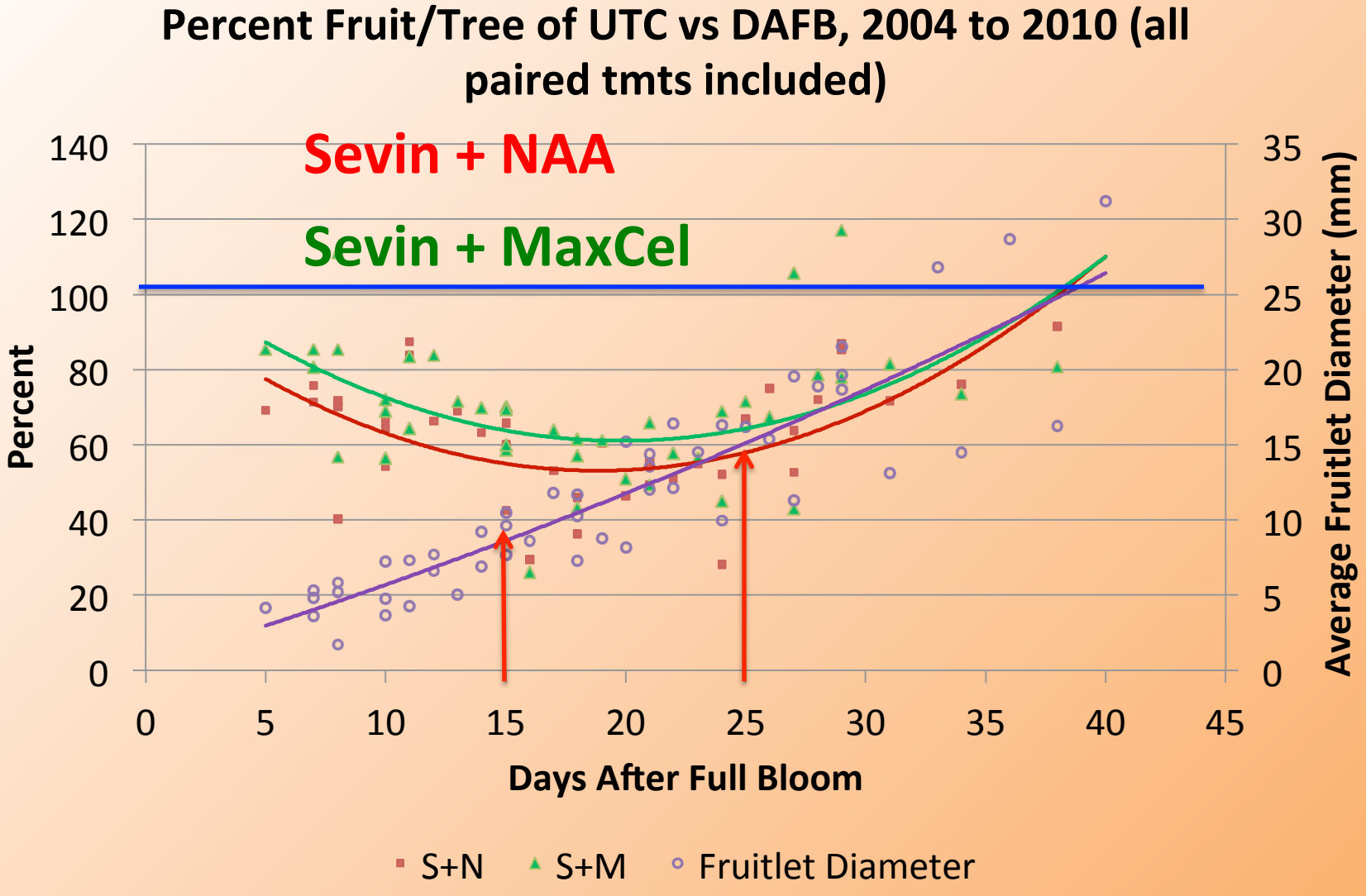
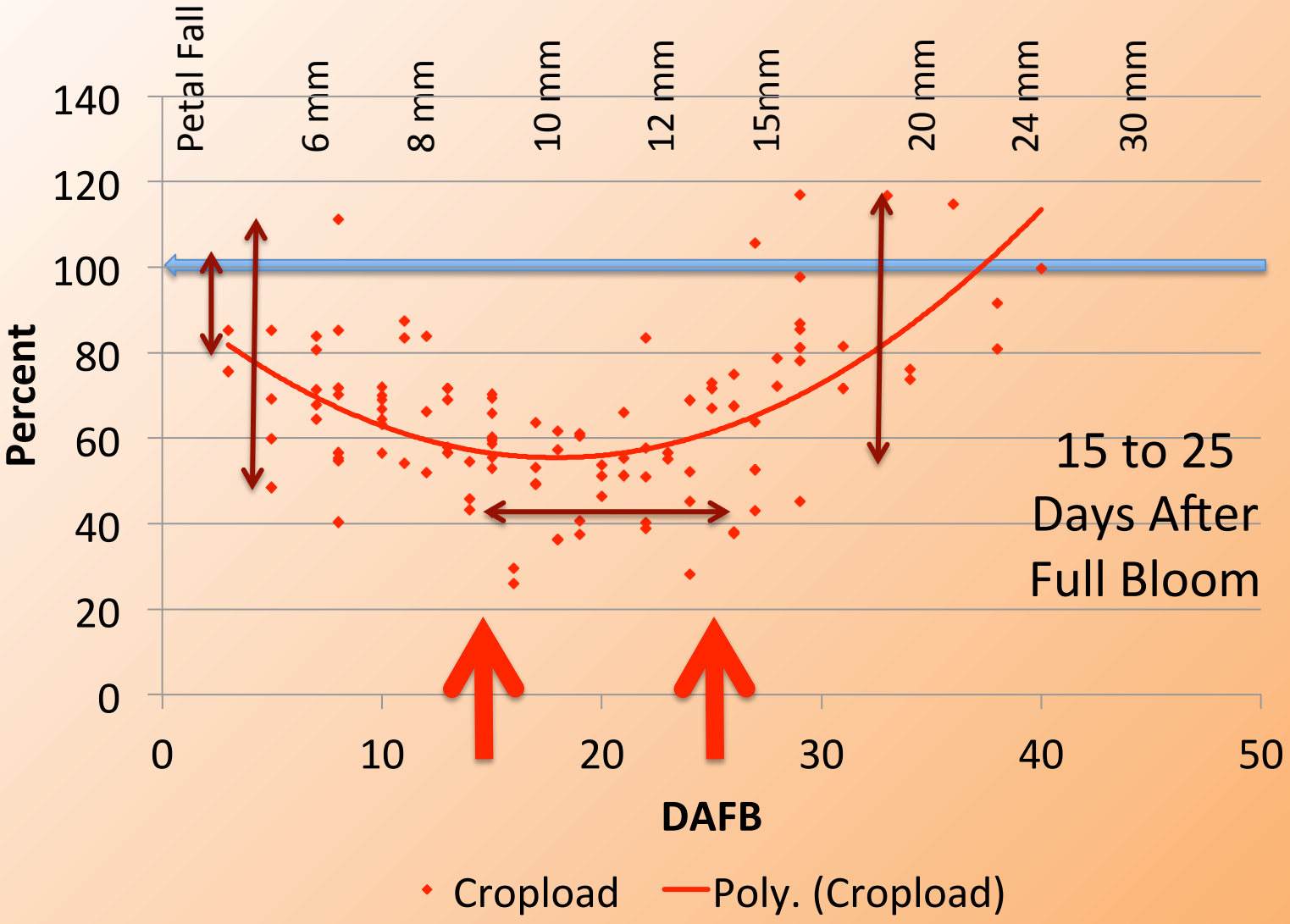
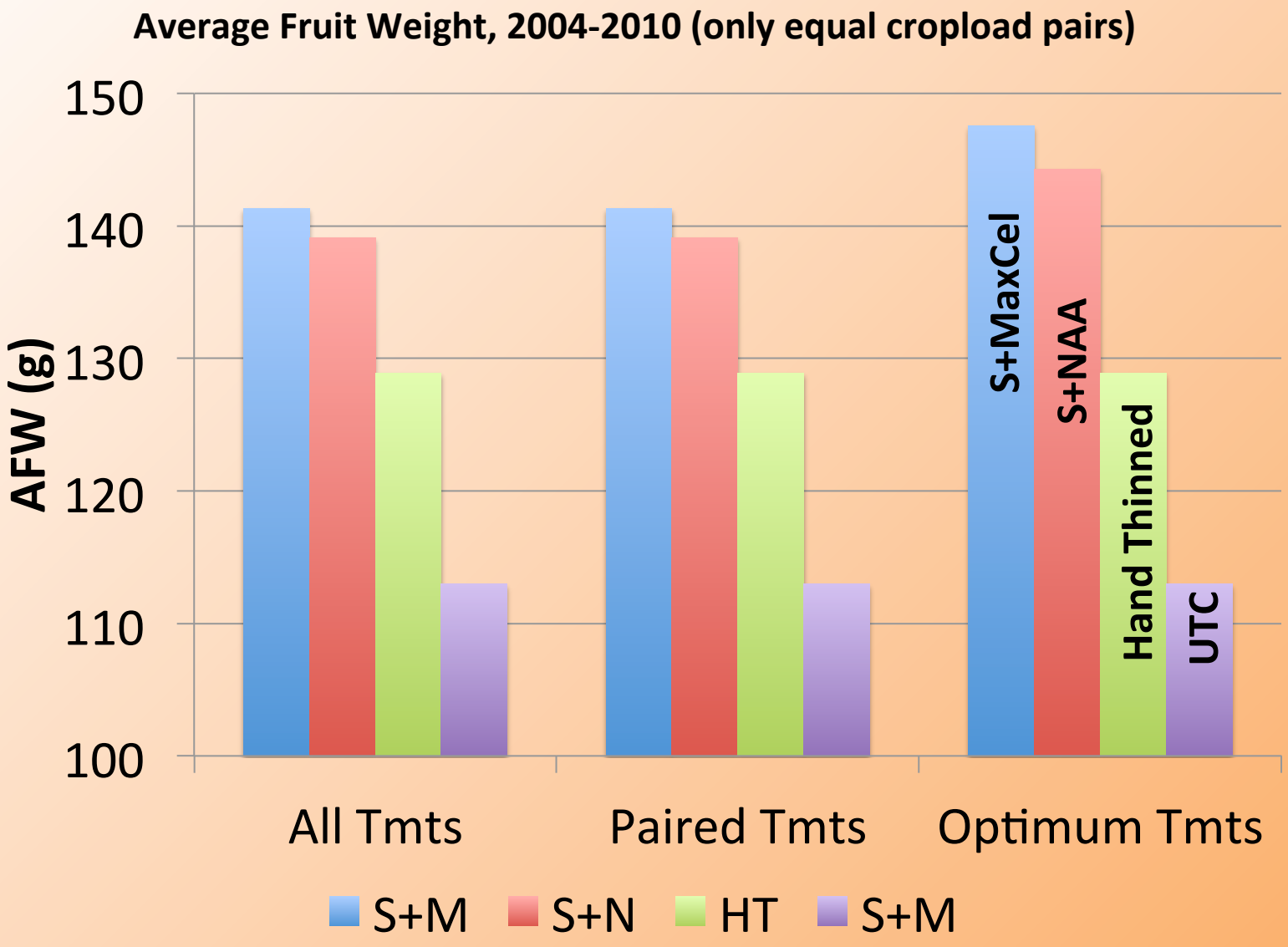


CROPLOAD = % FRUIT/TREE OF UTC

Natural Background Sensitivity to Thinning



CROPLOAD = % FRUIT/TREE OF UTC


Average Fruit Weight, 2004-2010 (only equal cropload pairs)
AFW (g)
150
140
130
120
110
100
S+MaxCel
S+NAA
Hand Thinned
UTC
All Tmts
Paired Tmts
Optimum Tmts
S+M
S+N
HT
S+M

MaxCel and NAA Gala Thinning

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Important indices, Cropload, Ave Fruit Weight and Return Bloom were measured.

Conclusions:

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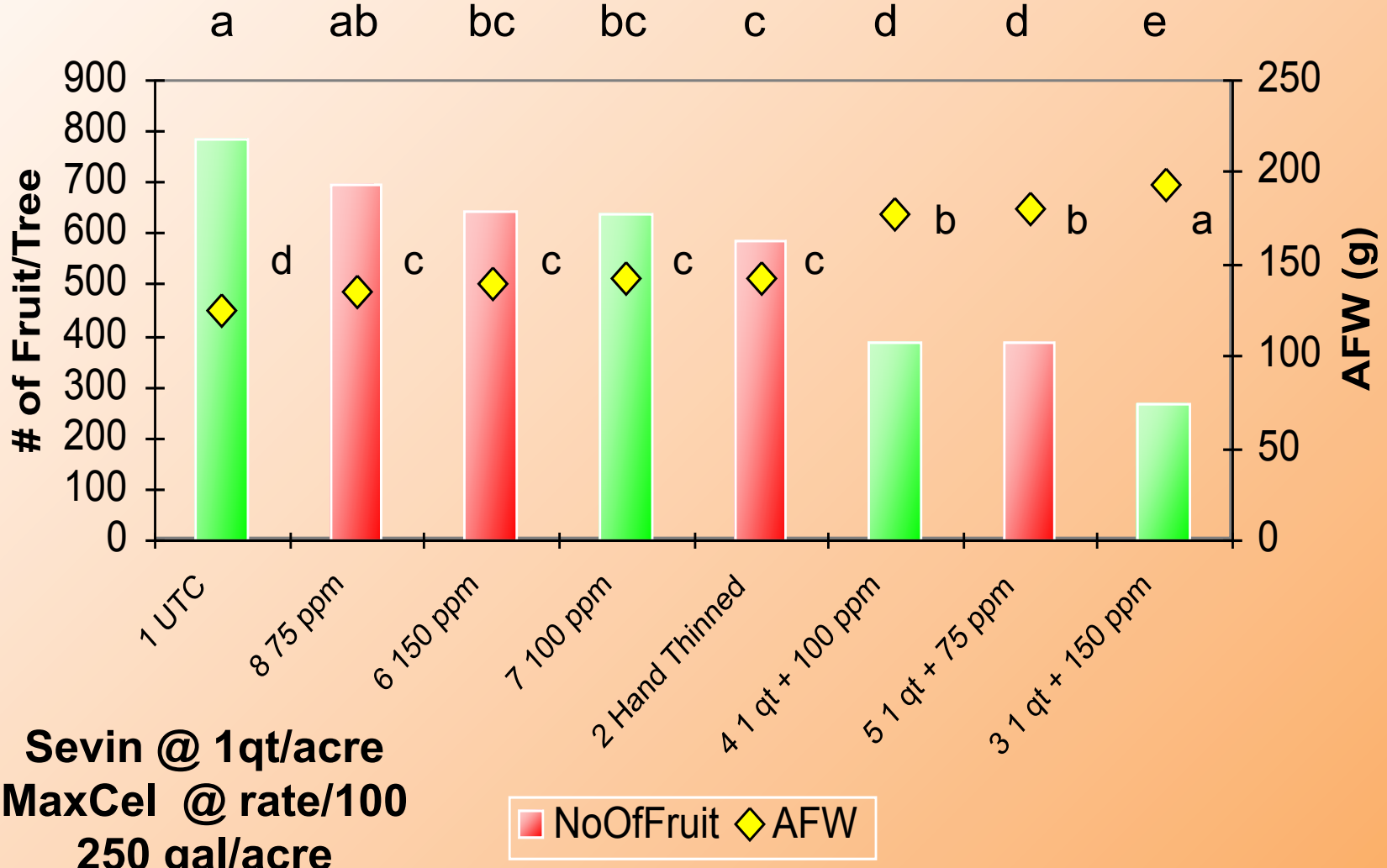
- MaxCel AFW is greater than NAA.
- MaxCel @ 150 ppm = NAA @ 13 ppm.
- Return Bloom, Fruit/Cluster are equal.

MaxCel Airblast Reds Thinning



Sevin @ 1qt/acre
MaxCel @ rate/100
250 gal/acre

Plant Growth Regulator

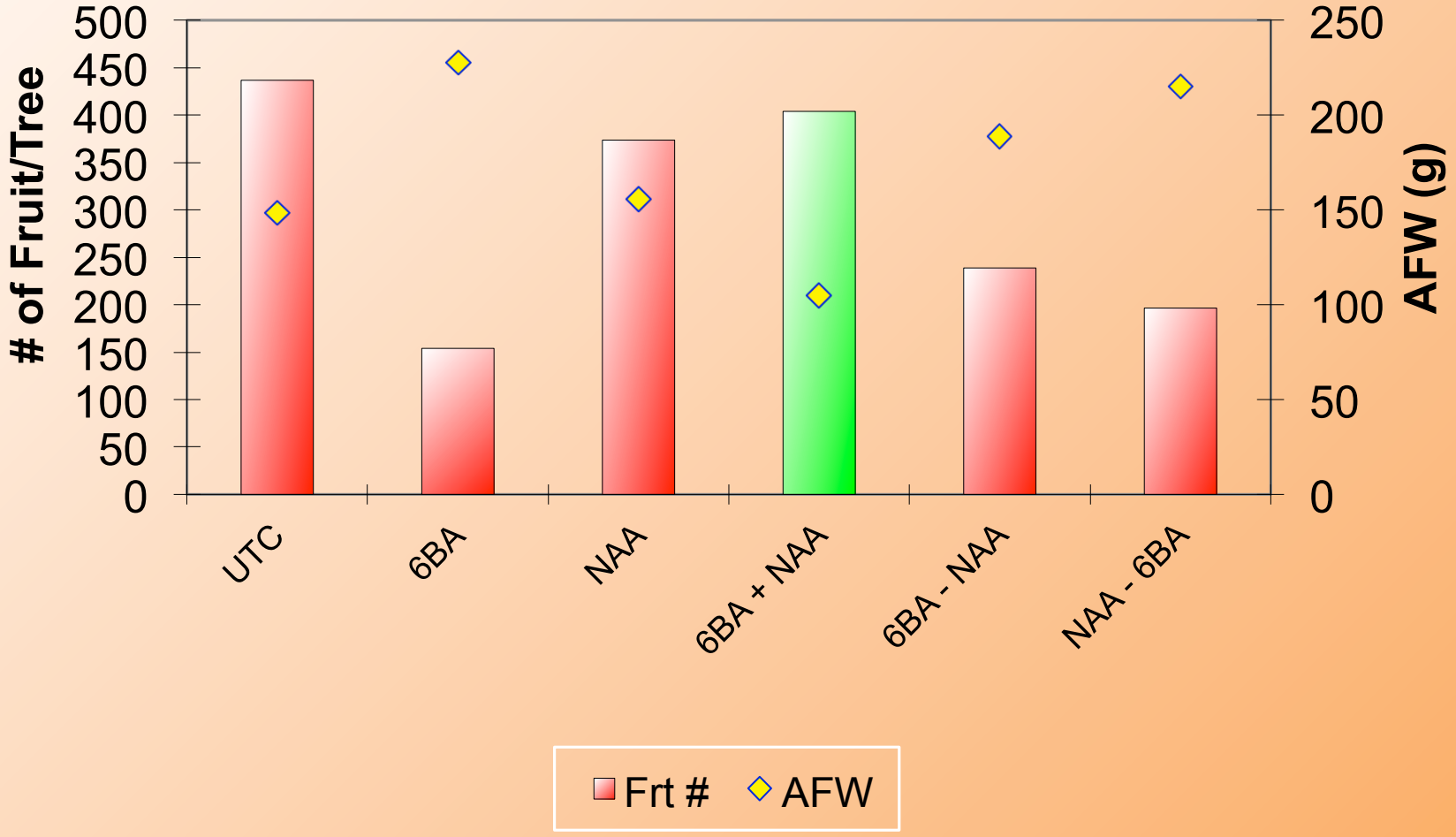
MaxCel™

Solution

MaxCel Program: Use Recommendations

Thinning Difficulty ↓	Desired Thinning Strength		
	Aggressive Thinning	Moderate Thinning	Slight Thinning
Hard to thin	150 ppm + Sevin	100 ppm + Sevin	100 ppm
Moderate to thin	100 ppm +Sevin	75 ppm +Sevin	75 ppm
Easy to thin	75 ppm + Sevin	75 ppm	50 ppm

Fuji 6BA NAA Thinning

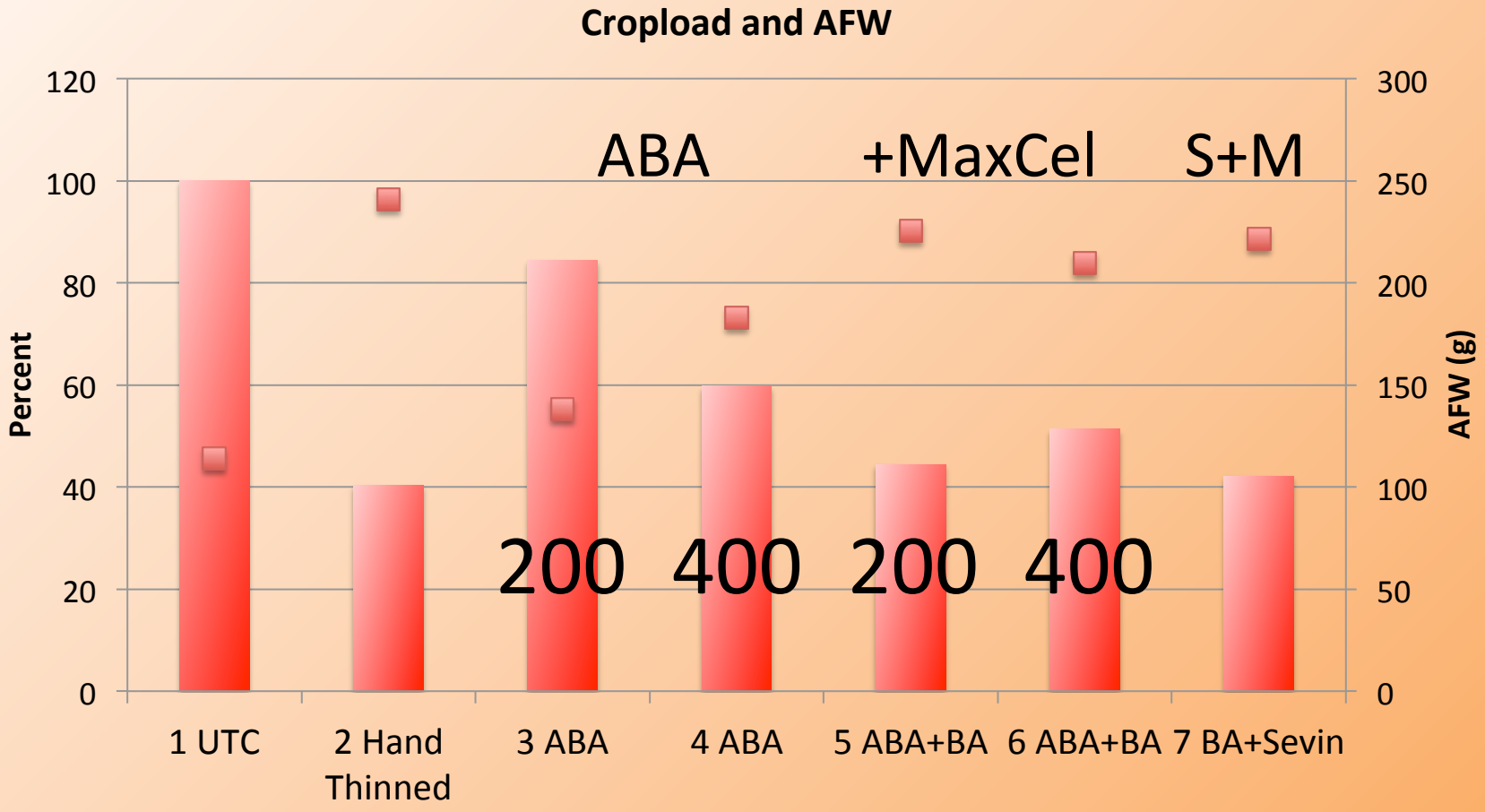



6-BA and NAA

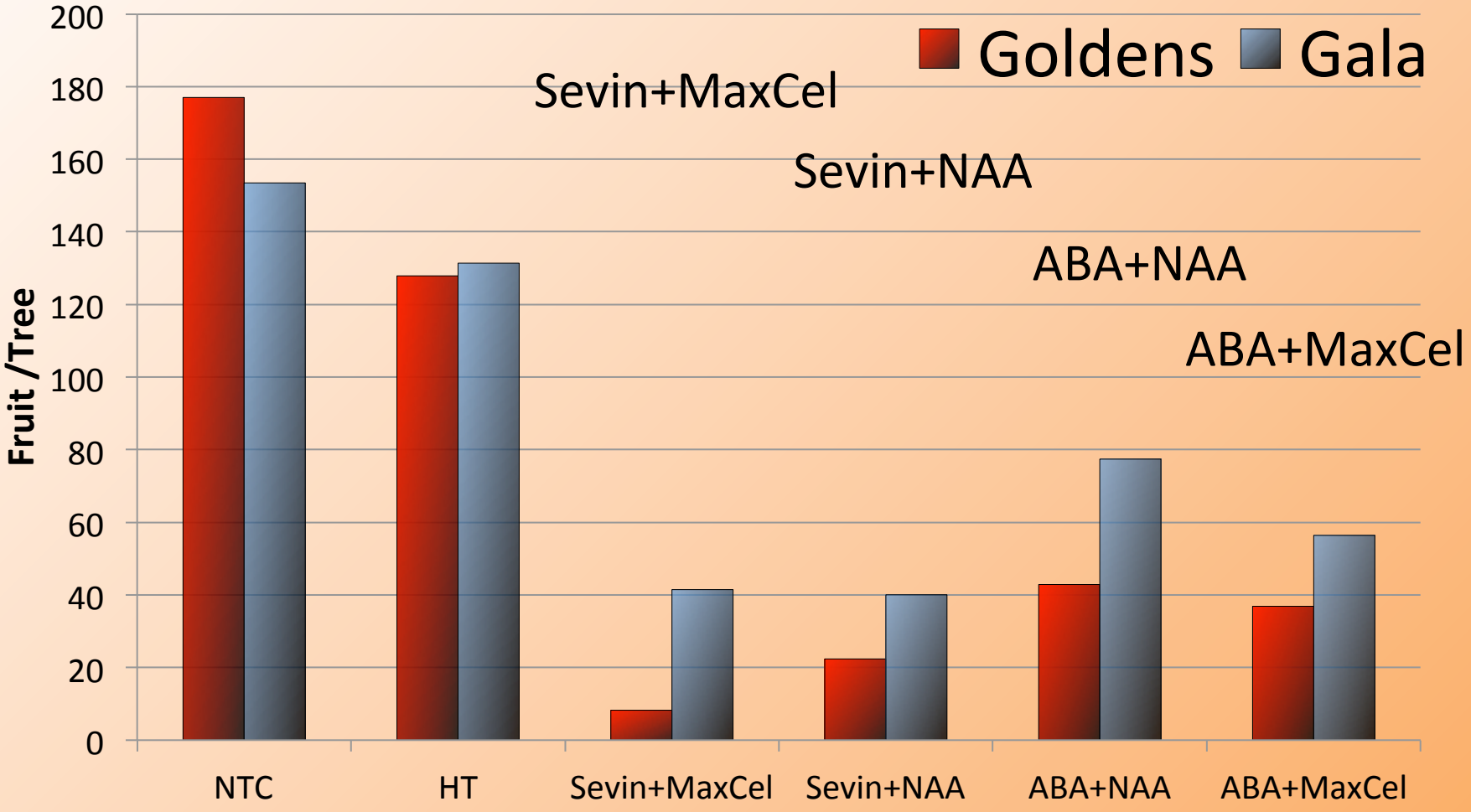
New Experimental Thinners

- ACC
- ABA
- Metamitron

Honeycrisp ABA 10 mm Trial 2011

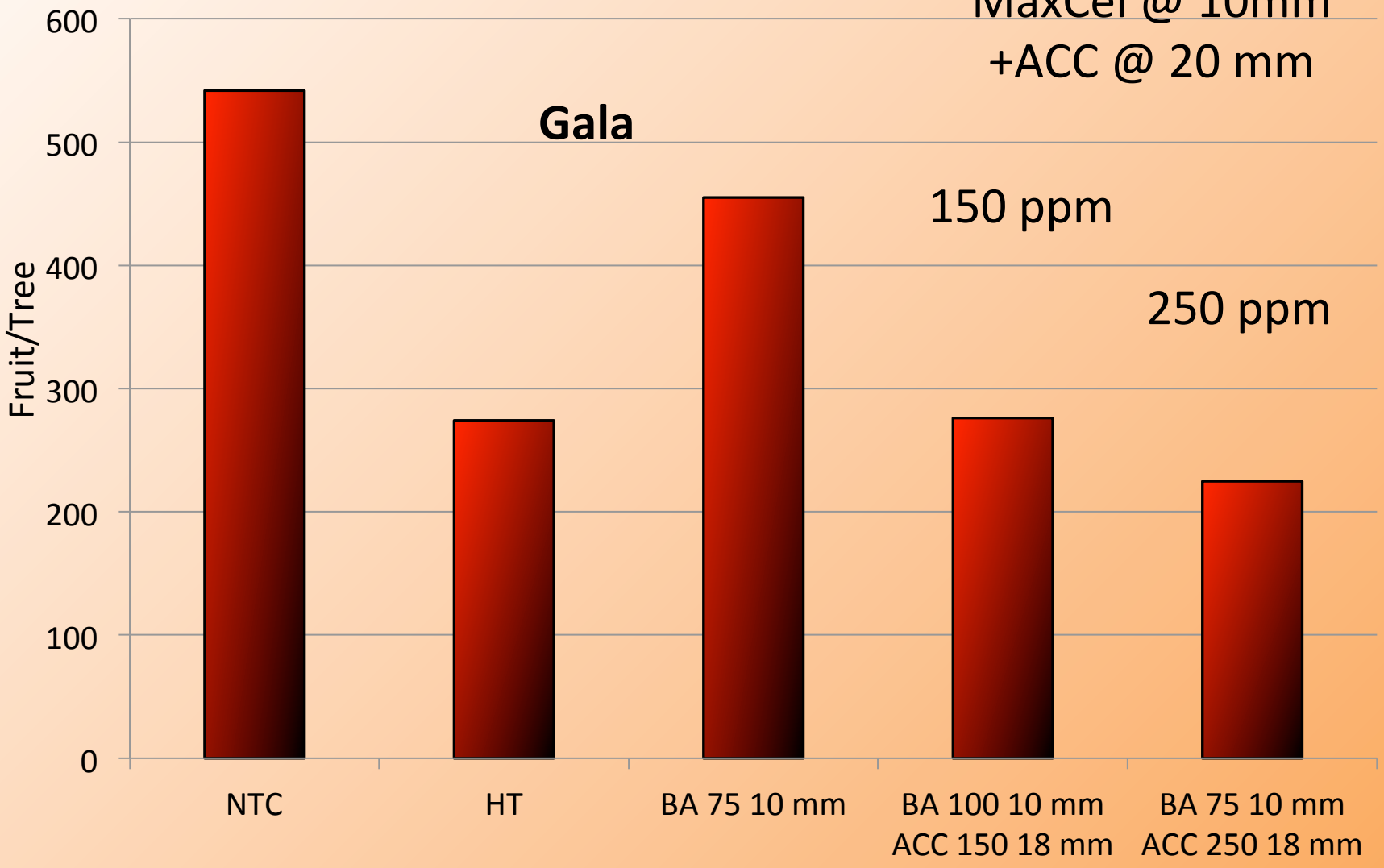


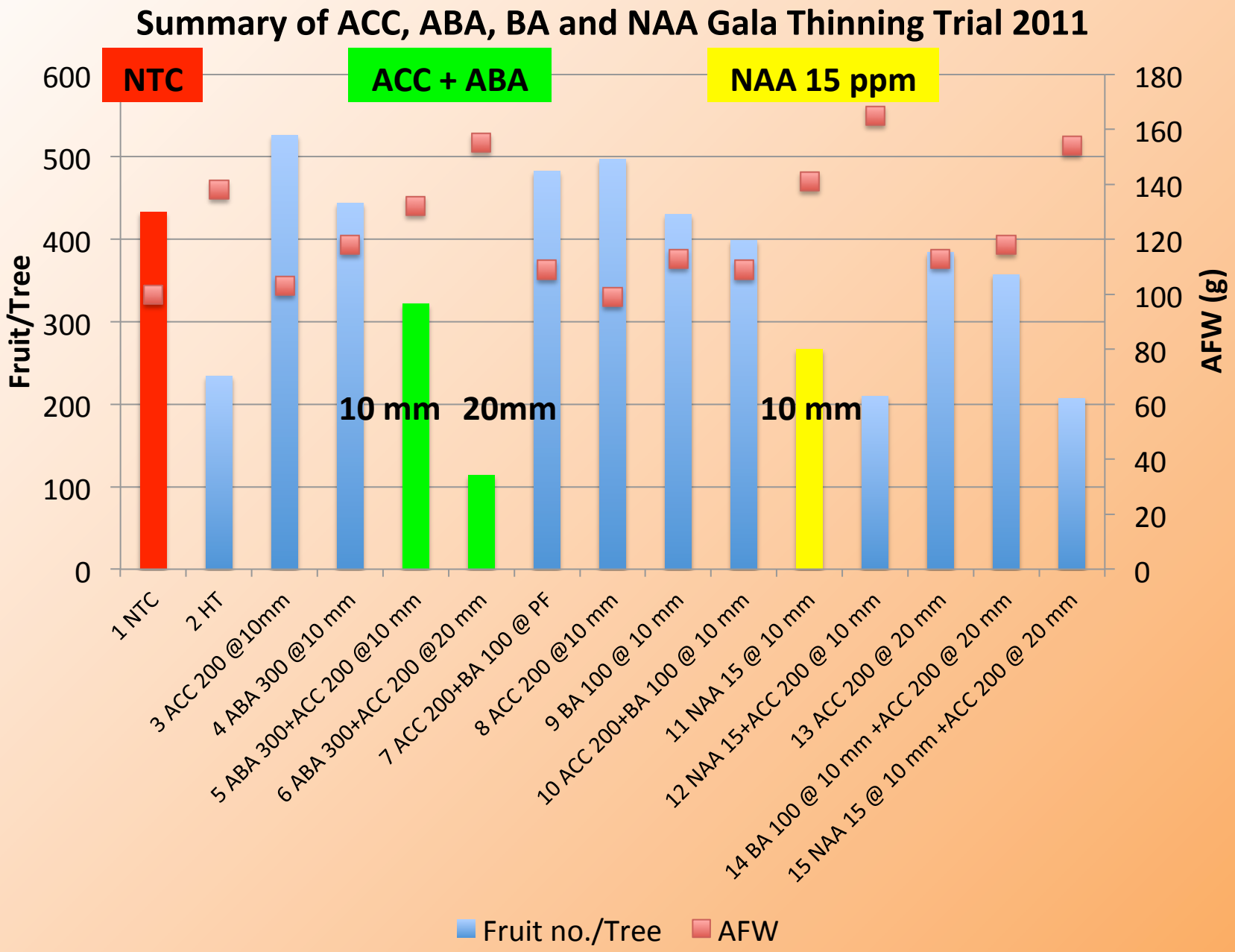
ABA Thinning Trial 2010 @ 10 mm.



Sevin = 1qt/100
MaxCel=100 ppm
NAA=10 ppm
ABA=250 ppm

ACC Thinning Trial 2010 @10 mm and 18 mm




Summary of ACC, ABA, BA and NAA Gala Thinning Trial 2011
NTC
ACC + ABA
NAA 15 ppm
10 mm
20mm
10 mm
Fruit/Tree
AFW (g)
600
500
400
300
200
100
0
180
160
140
120
100
80
60
40
20
0
1 NTC
2 HT
3 ACC 200 @10mm
4 ABA 300 @10 mm
5 ABA 300+ACC 200 @10 mm
6 ABA 300+ACC 200 @20 mm
7 ACC 200+BA 100 @ PF
8 ACC 200 @10 mm
9 BA 100 @ 10 mm
10 ACC 200+BA 100 @ 10 mm
11 NAA 15 @ 10 mm
12 NAA 15+ACC 200 @ 10 mm
13 ACC 200 @ 20 mm
14 BA 100 @ 10 mm +ACC 200 @ 20 mm
15 NAA 15 @ 10 mm +ACC 200 @ 20 mm
Fruit no./Tree
AFW

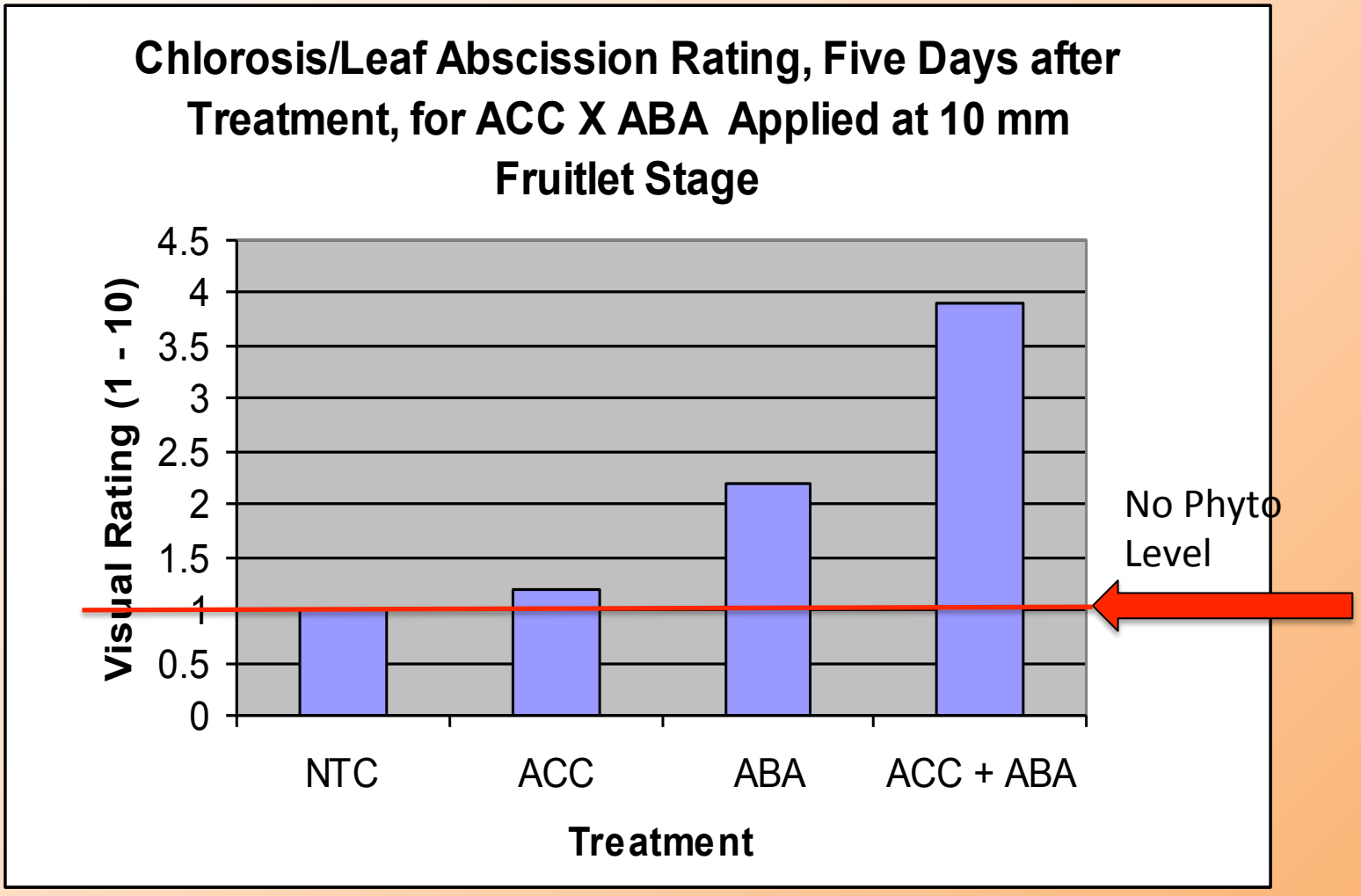


Figure 3. Chlorosis/leaf abscission rating for ACC X ABA on Gala five days after application at the 10 mm fruitlet stage. ACC- 200 ppm, ABA- 300 ppm, and ACC + ABA (200+300 ppm). Rating of 1 represents no phytotoxicity. Data– mean of 10 replications.

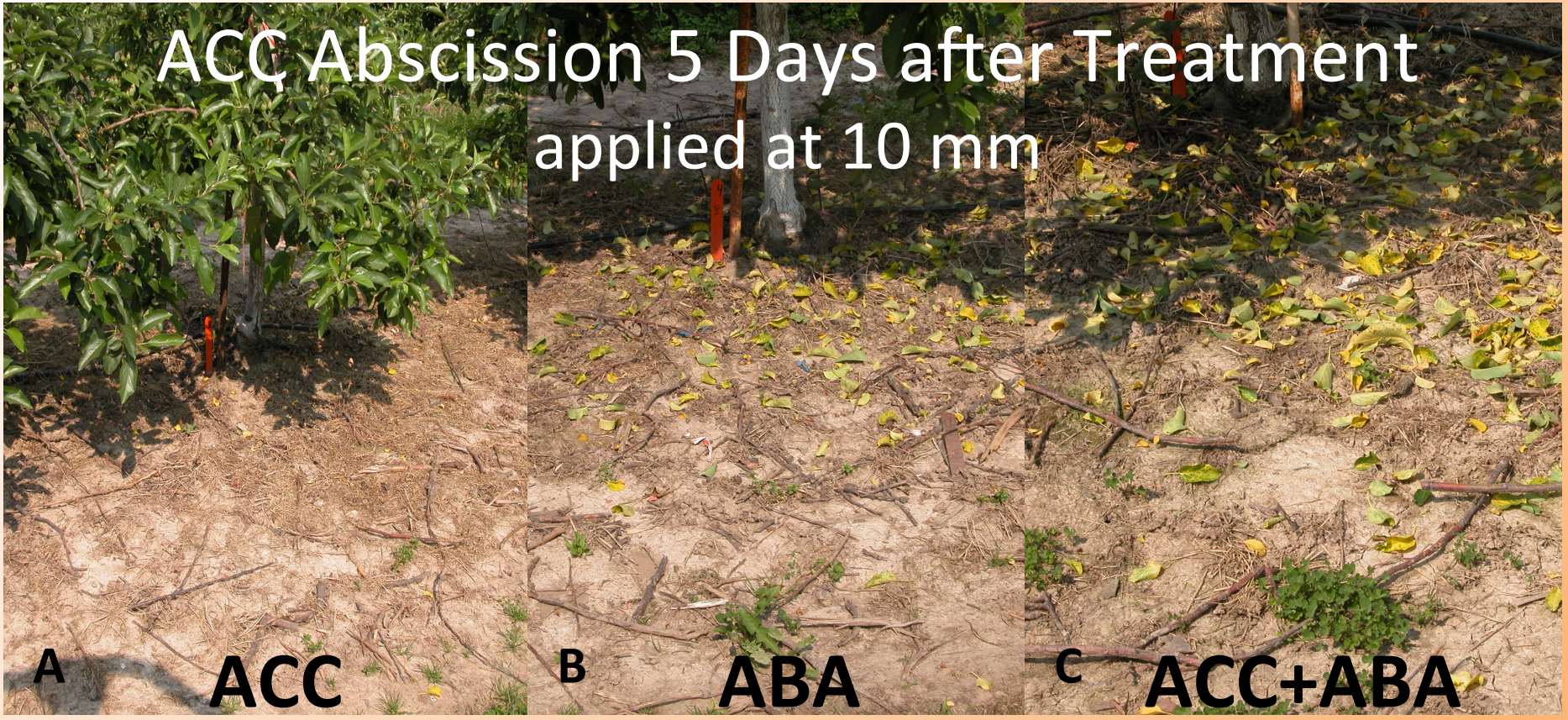


Figure 4. Leaf abscission, five days following application of (A) ACC (200 ppm), (B) ABA (300 ppm) and (C) ACC (200 ppm) plus ABA (300 ppm), in Gala apple trees treated at the 10 – 12 mm king fruit developmental stage.

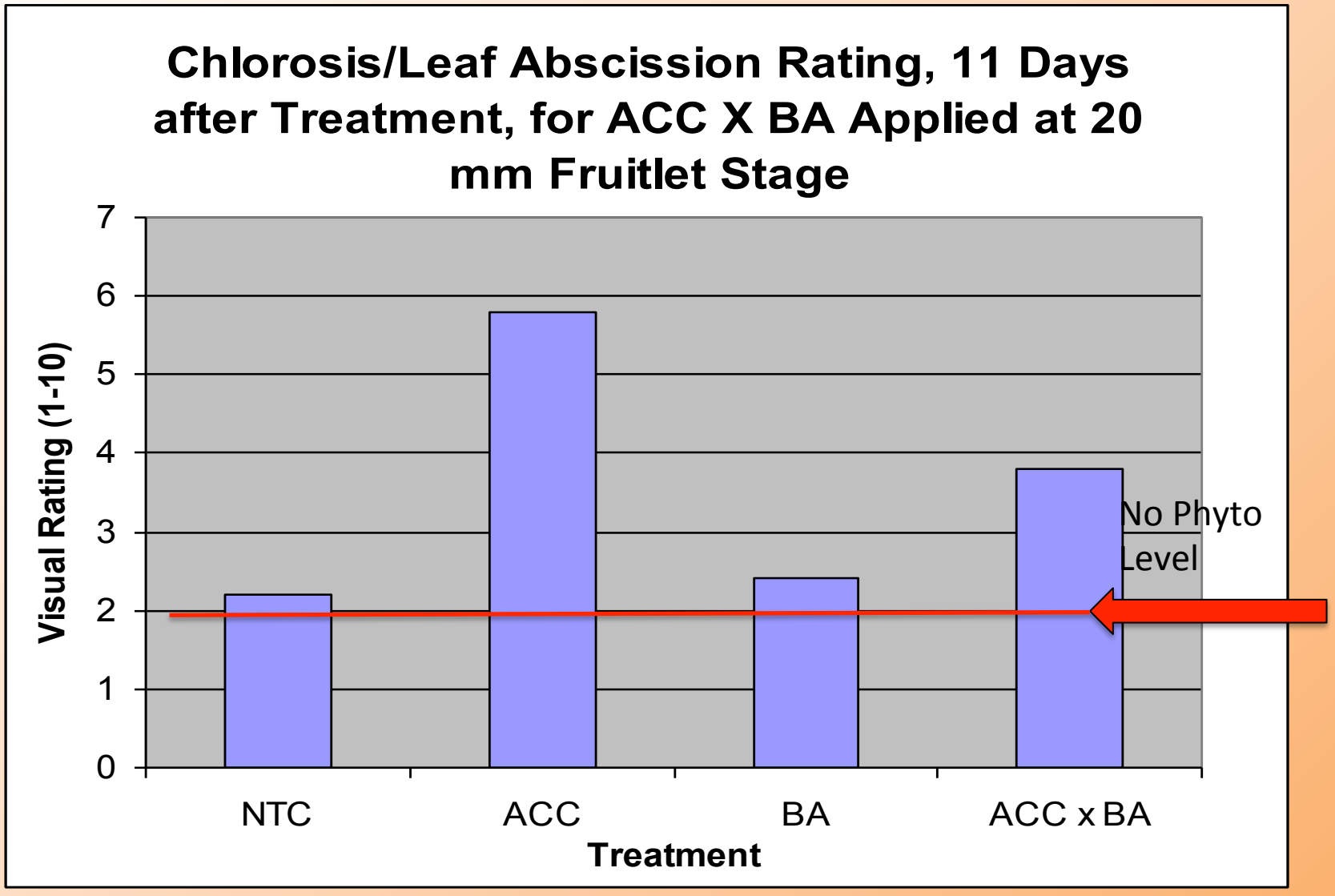


Figure 6. Chlorosis/leaf abscission rating for ACC X BA on Gala 11 days after application at the 20 mm fruitlet stage. ACC- 200 ppm, BA- 100 ppm, and ACC + ABA (200+100 ppm). Rating of 2 represents no phytotoxicity. Data–mean of 10 replications. Leaf drop in all NT trees ~2.

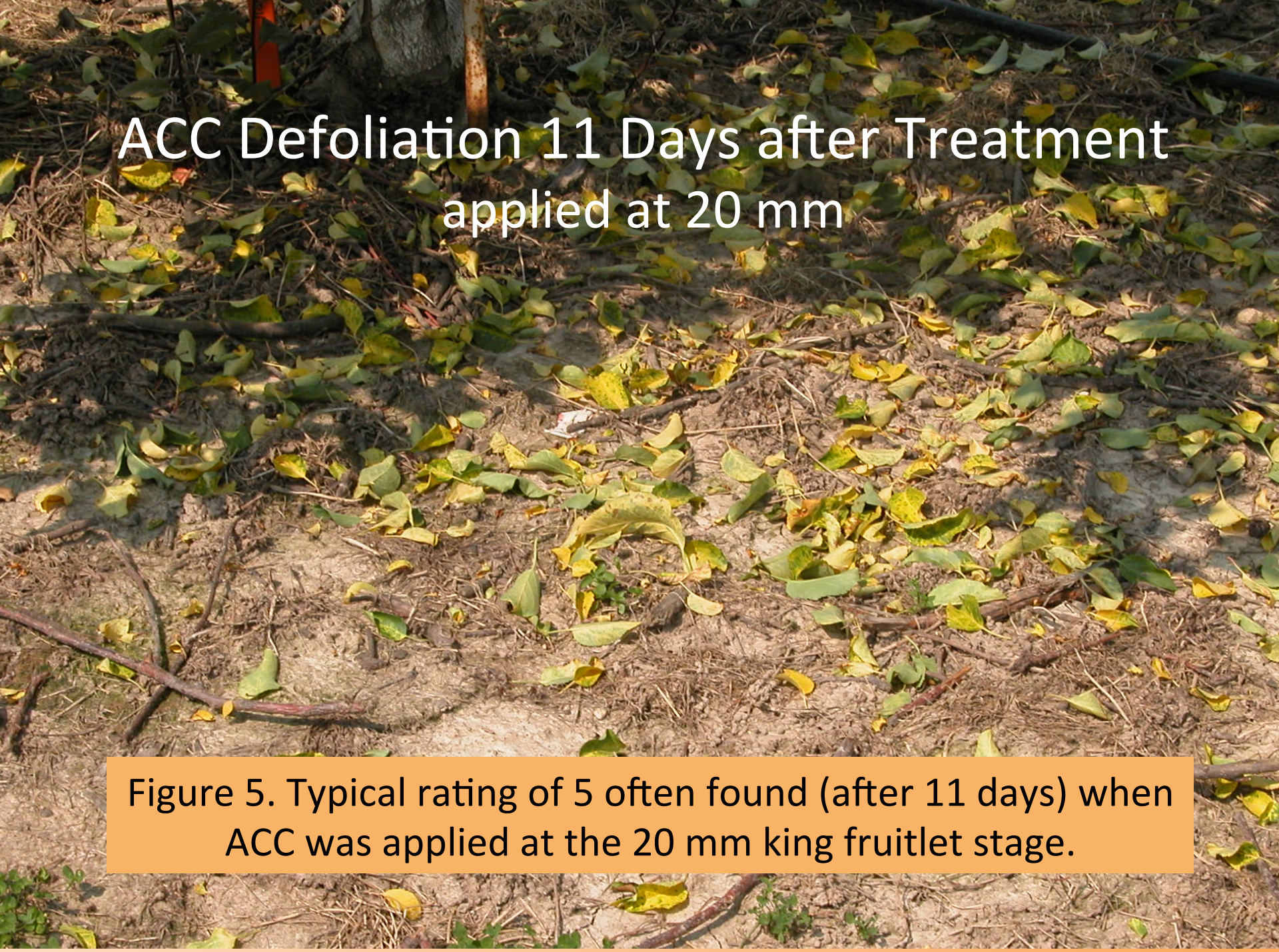


Figure 5. Typical rating of 5 often found (after 11 days) when ACC was applied at the 20 mm king fruitlet stage.

Varieties

Easy	Intermediate	Difficult
Gingergold	McIntosh	Gala
Empire	Paulared	
Cortland	Honeycrisp	Fuji
Idared	Spur Delicious	Rome
Mutsu	Spartan	Golden Delic.
Jonagold		
Non-spur Rome	Stayman	Cameo
Jonathan		

6-BA

- Mild to moderate, gentle, thinning.
- Aggressive with Sevin.
- Timing (8 to 15 mm stage).
- Standard use rate.
  - 100 ppm (64 oz/100)
- Varieties (small fruited types, NAA sensitive).
  - Gala, Empire, Reds, Fuji

6-BA

- Difficult to Thin Varieties.
  - Sevin 1 qt + 150 ppm MaxCel
  - Add 1 qt Oil for 10% increase in thinning.
- Intermediate to Thin Varieties.
  - Sevin 1 qt + 100 ppm MaxCel
- Easy to Thin Varieties.
  - 150 ppm MaxCel

    OR
  - Sevin 1 qt + 50 ppm MaxCel in on years.

Use of MaxCel

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Honeycrisp

- Aggressive Thinning
  - Sevin 1 qt + 100 ppm MaxCel
  - Or Sevin 1 qt + 7 ppm NAA
- Moderate Thinning
  - Sevin 1 qt + 50 ppm MaxCel
  - Sevin 1 qt + 5 ppm NAA
- Mild Thinning
  - Sevin 1 qt
  - 100 ppm MaxCel
  - 15 ppm NAA

NAA Rates

Easy to Thin	10 ppm
Intermediate	15 ppm
Difficult	20 ppm
Very Difficult	20 + Oil

or spray multiple times (PF and 10 mm)

or Sevin + 15 + Oil

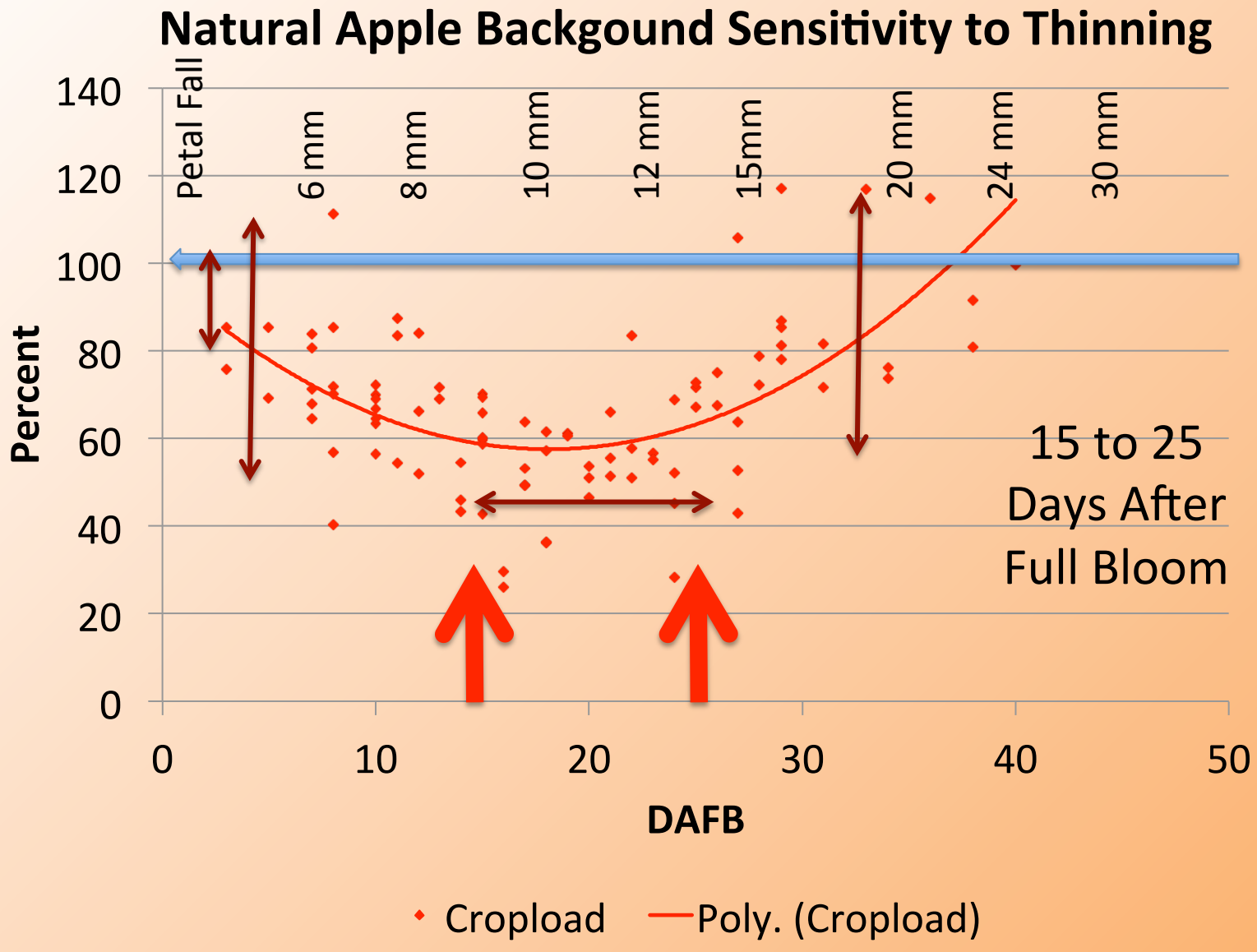
If adding Sevin to NAA, reduce NAA 50%

Maxcel Rates

Easy to Thin	100 to 150 ppm
Intermediate	100 ppm +Sevin 1 qt/100
Difficult	150 ppm +Sevin 1 qt/100

6-BA

- Mild to moderate, gentle, thinning
- Dose dependent.
- Improves fruit size.
- Best use throughout window?
- Standard rate = 100 ppm (64 oz/100)
- Labeled up to 200 ppm
- Do not use with NAA???
- Aggressive with Sevin.



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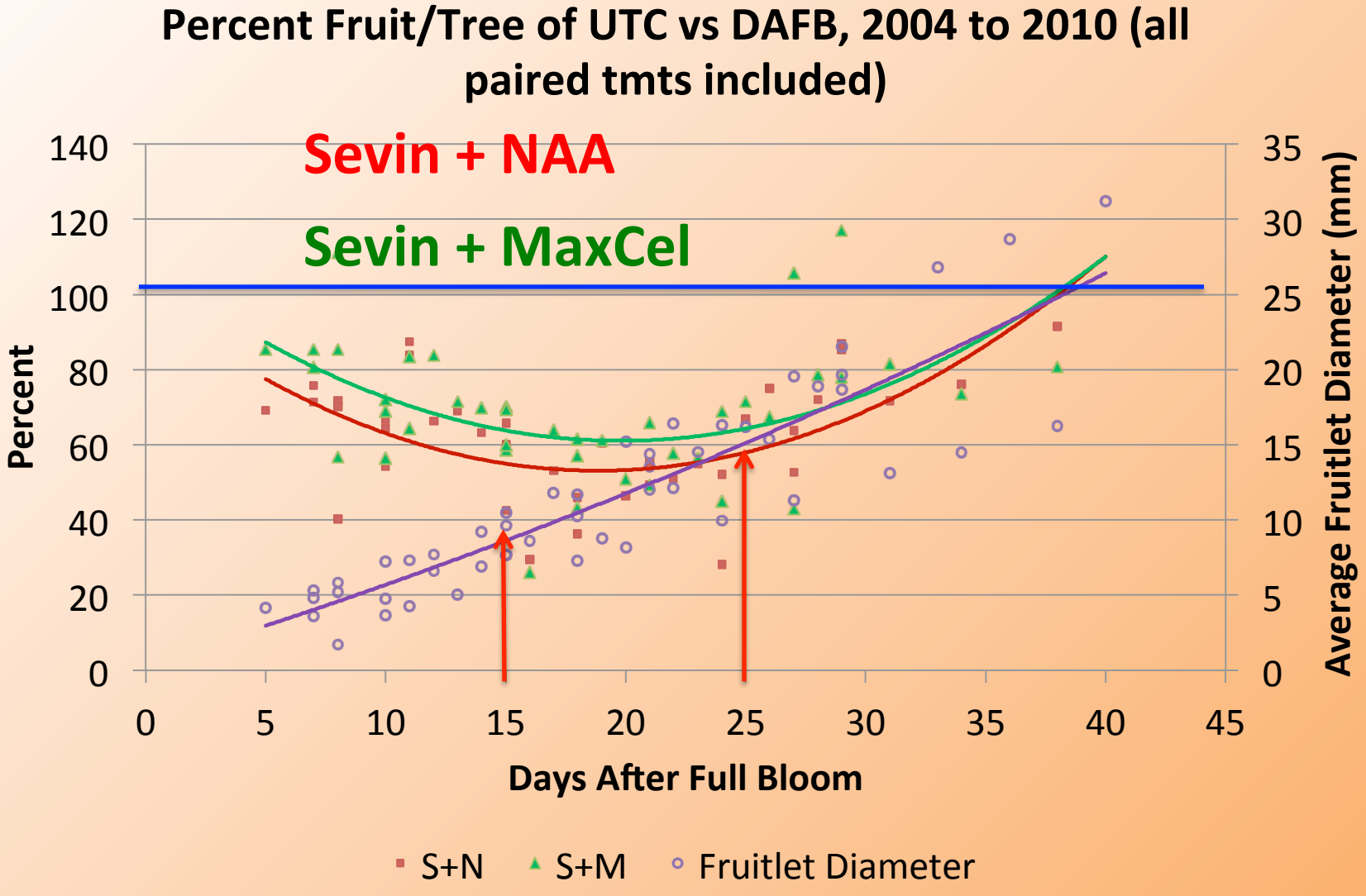

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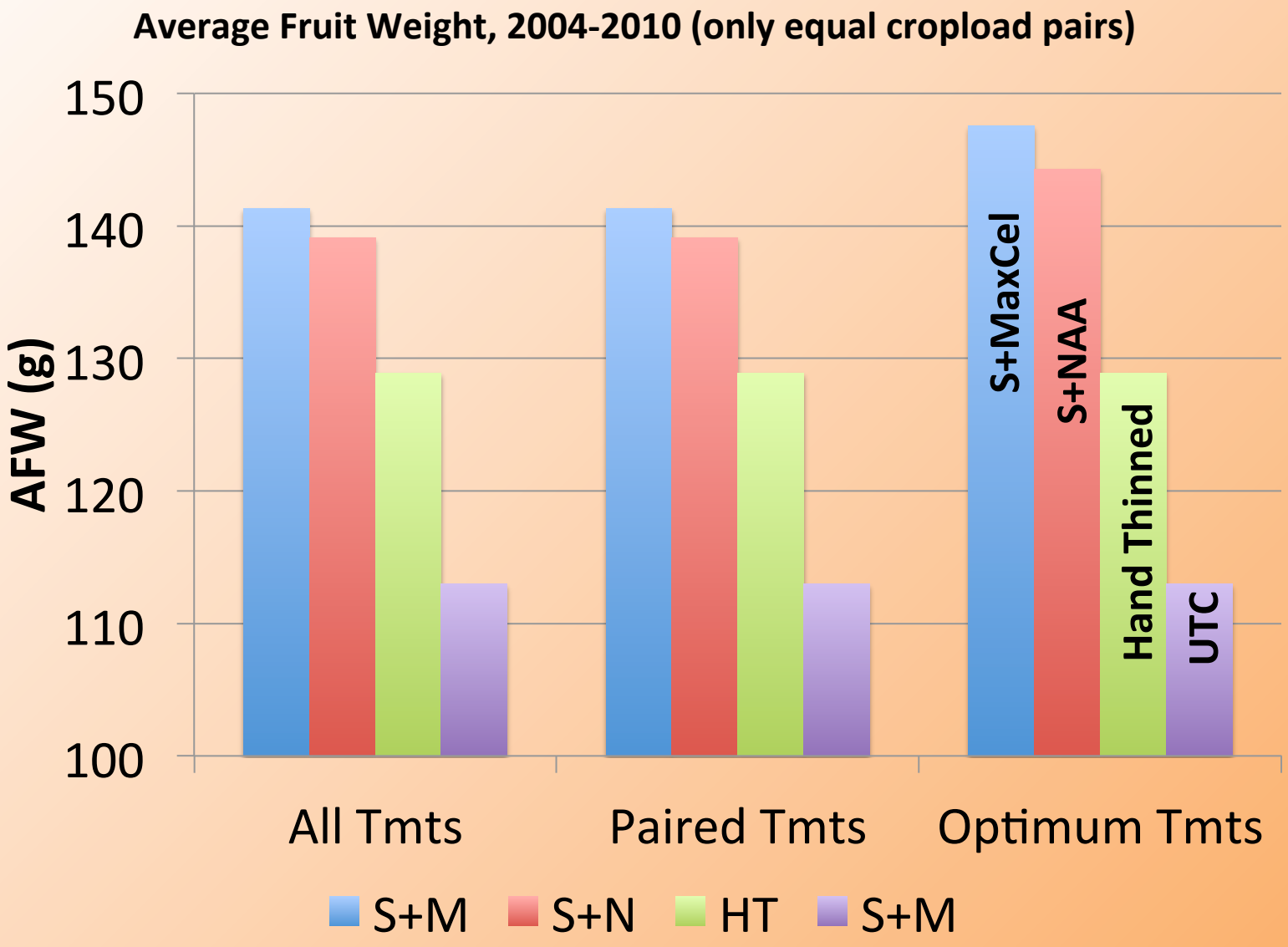
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All Tmts
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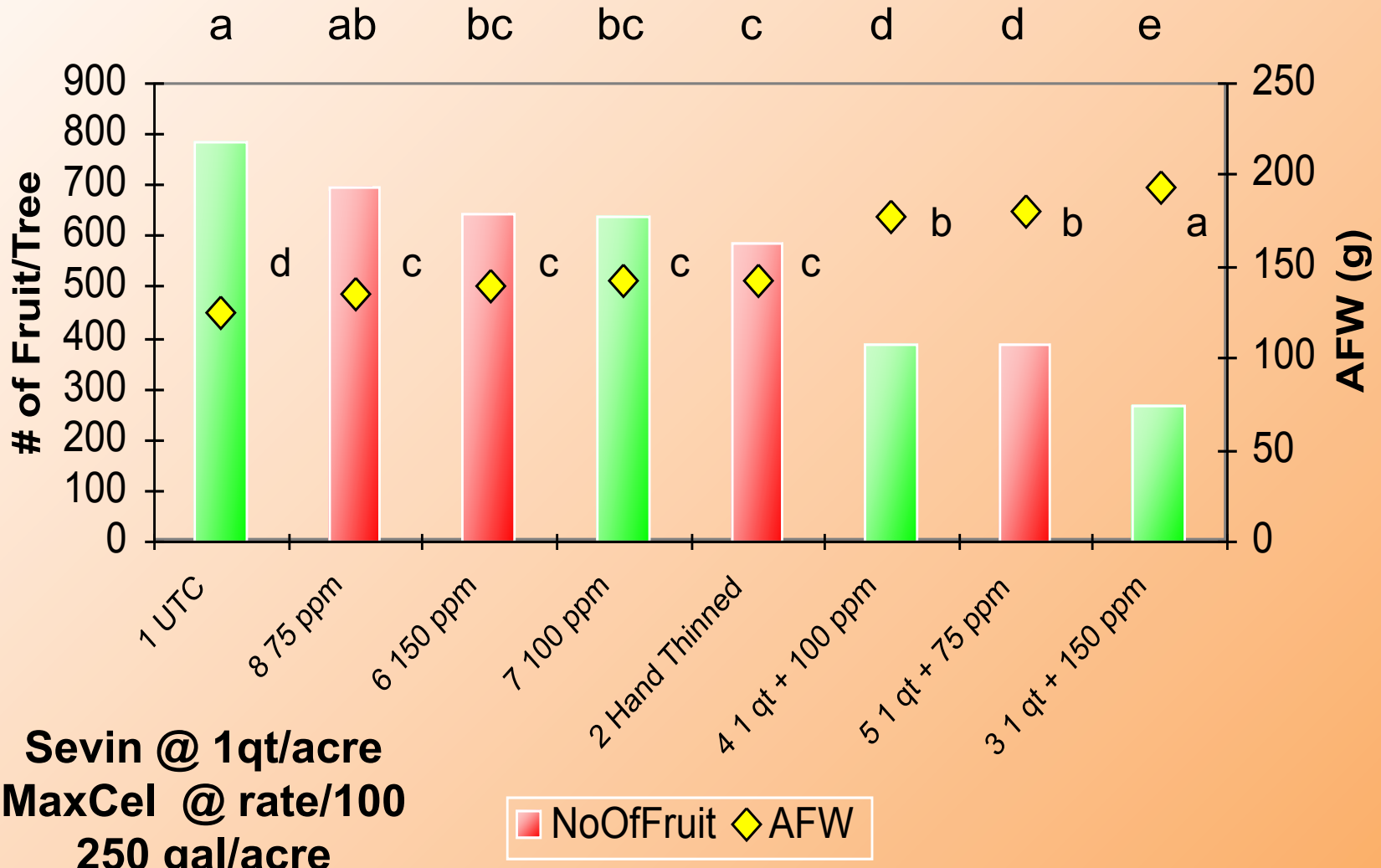
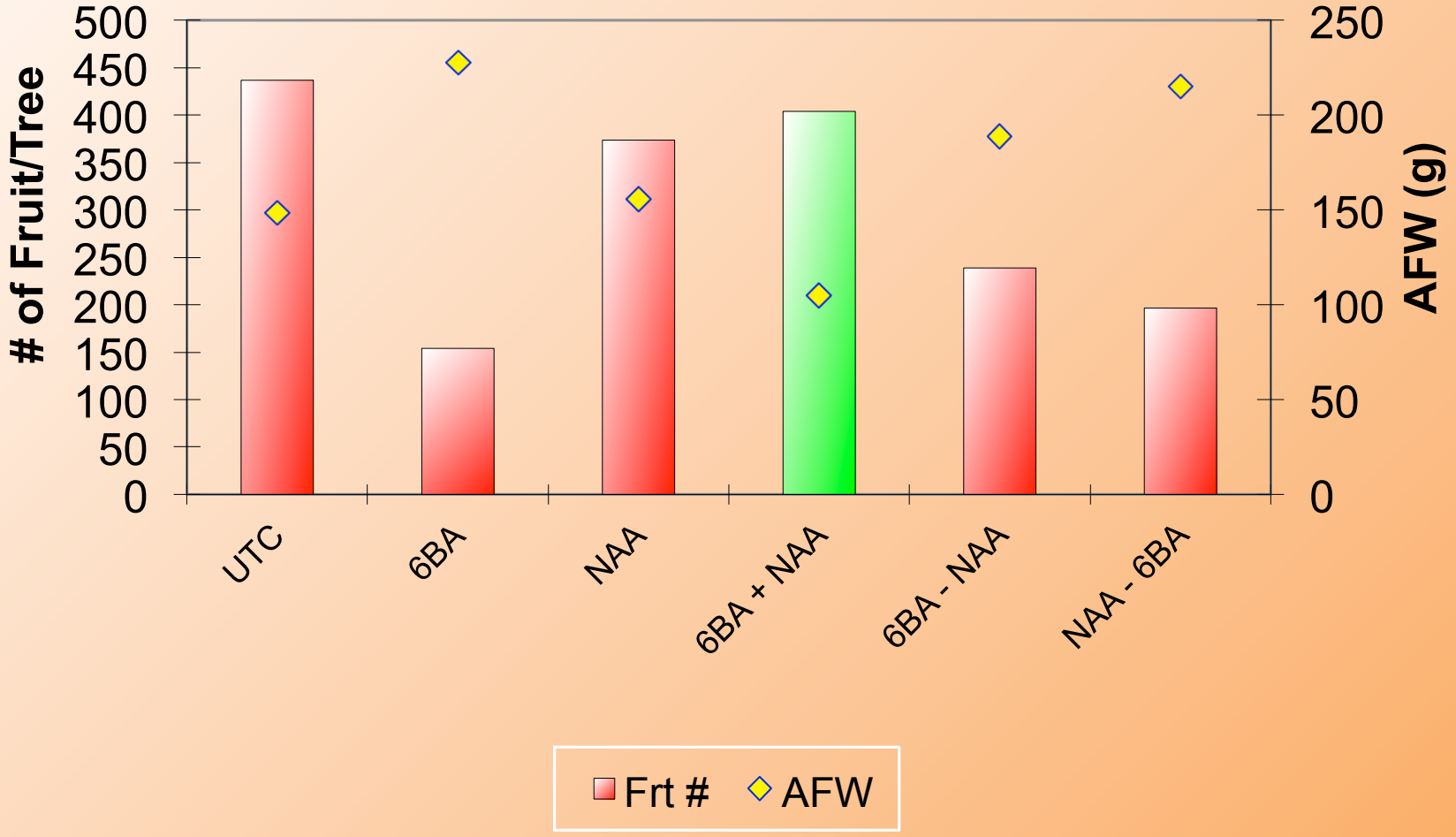
S+M
S+N
HT
S+M

MaxCel Airblast Reds Thinning



Sevin @ 1qt/acre
MaxCel @ rate/100
250 gal/acre

Fuji 6BA NAA Thinning



Thinner Ratings Guide