

Preparing for Thinning in 2015- What to Expect and New Strategies

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A Poor Memory is Sometimes an Attribute

- If we remember too vividly what happened the previous year it may hinder using good judgment this coming season.
- The most useful thing to remember is a reduced crop last year will result in a near snowball bloom this coming spring.
- The weather conditions last year may or may not occur again.
- Based this years decisions on the facts NOW.

Keep Up on Weather Events

- Freezes and cold in the fall
- Very warm and very cold events during the winter
- In the spring note when very cold temperatures occurred, prior warm weather and the flower stage at the time of the cold.
- Large fluctuations in temperature.

Be a Good Observer

- As flowers start to open observe spurs very carefully.
- Trust your instincts.
- There are signs other than black flowers or brown conductive tissue that signal problems.

Some Injury is Obvious

- Brown flower parts
- Black flower centers
- Leaf damage
- Lack of growth in opening blossom clusters

Some Injury is Not Obvious

- Difference in pedicle length of flowers even though flowers open
- Slight off colored spur leaves (lighter green).
- Slightly savoyed spur leaves
- Off colored but not necessarily brown flower parts

A Clean Bill of Health

- It is only after you can be sure that you are working with healthy and viable flowers can you seriously plan a thinning strategy.
- Doubt leads to waffling which can then can lead to indecision and ultimately to under application of thinners.

Time of Thinner Application

- Bloom
- Petal fall to 4 mm
- 7-14 mm
- 15-18 mm
- 20+ mm

Important Message

- One of the messages the I want to leave with you today is that the bloom and/or petal fall applications of thinners may be your most important thinning spray, especially with a snowball bloom.
- It is not as dangerous as you may think.

BLOOM

- This is a viable time to apply a thinner but many have not even tried it.
- Rarely is there excessive thinning when thinners are applied at this time
- Seriously consider bloom to be a viable and relatively safe time to apply a thinner
- The probability of inadequate thinning is much greater than the probability of over thinning.
- Early thinning is important for enhanced return bloom and peace of mind.

Petal Fall

- First generally accepted opportunity to thin
- Promotes differential fruit size in clusters
- Less aggressive thinning will be required later.
- Important (critical) component in the multiple thinner approach
- Over thinning is very unlikely.
- Petal fall sprays have been largely embraced by growers in New England (primarily carbaryl).

Bloom and Petal Fall

- In years where you have a snowball bloom and no damaged flowers YOU MUST apply a thinner during at least one of these times.
- It is a real gamble if you wait to apply a thinner once and only at the traditional time of application, 7-14 mm.

Bloom Thinners

- NAA 12 ppm
- Amid-Thin
- ATS caustic
- Oil + lime sulfur
- No carbaryl

Petal Fall Thinners

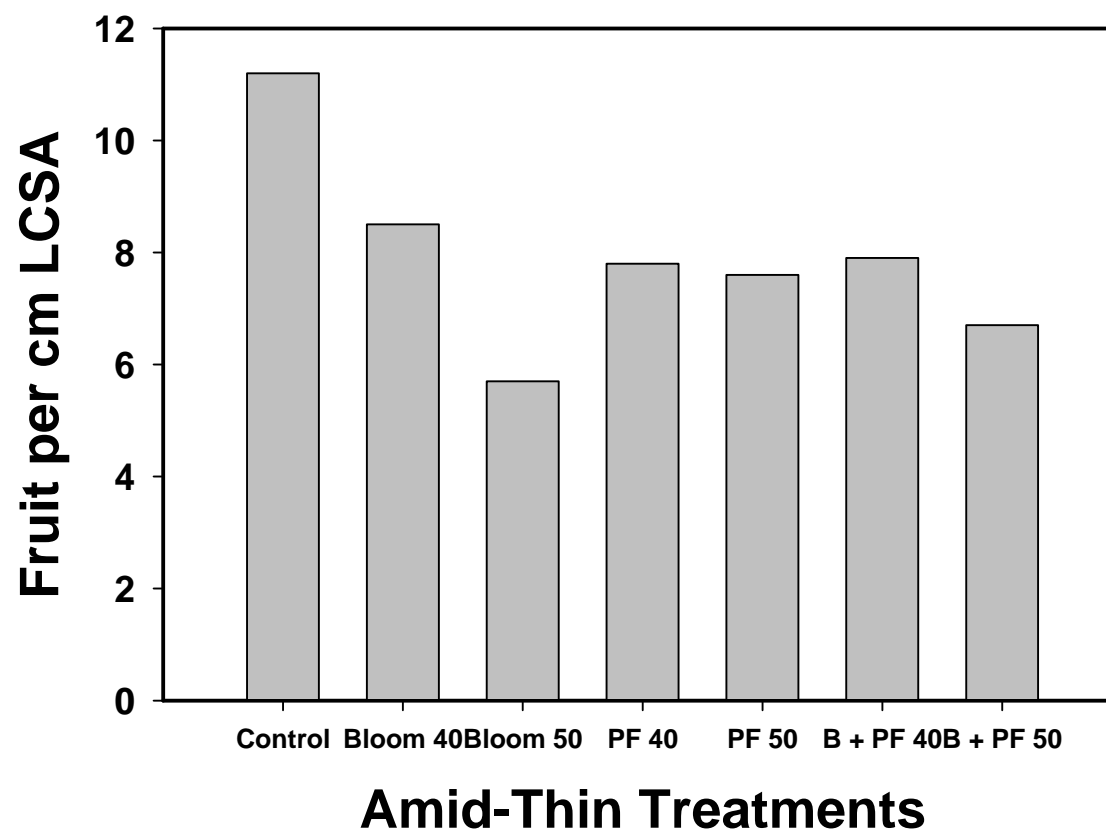
- Carbaryl
 - Generally the thinner of choice, safe, mild
 - Effort being made to thin without carbaryl
- NAA
 - Required for more aggressive thinning
- Benzyladenine
 - Not very effective at this time
- Amid-Thin
 - An underused thinner with potential

Effect of Amid-Thin (NAD) applications at bloom and petal fall on final set on mature Macoun/M9. apple trees.

Treatment	Rate	Timing
Control	----	-----
Amid-Thin	40 ppm (6.4 oz)	Bloom (B)
Amid-Thin	50 ppm (8.0 oz)	Bloom (B)
Amid-Thin	40 ppm (6.4 oz)	Petal Fall (PF)
Amid-Thin	50 ppm (8.0 oz)	Petal Fall (PF)
Amid-Thin	40 ppm (6.4 oz)	B + PF
Amid-Thin	50 ppm (8.0 oz)	B + PF

Effect of Amid-Thin (NAD) applications at bloom and petal fall on fruit set of Macoun/M.9 apples

Treatment (ppm)	Fruit/cm LCSA	Percent set
Control	11.2 a	99 a
NAD 40 B	8.5 ab	79 ab
NAD 50 B	5.7 b	55 b
NAD 40 PF	7.8 b	75 ab
NAD 50 PF	7.6 b	66 b
NAD 40 B + PF	7.9 b	69 ab
NAD 50 B + PF	6.7 b	63 b



Thinning Summary- Amid-Thin

- Thinning occurred at both bloom and petal fall
- Thinning was the same if applied at bloom, petal fall or at both times
- Fruit size was increased but not by a large amount.
- Since carbaryl was not used, a follow up spray of BA could be used at 7-14 mm to increase fruit size to get a small amount of additional thinning.

Amid-Thin Potential

- This is an underused thinner.
- It has the potential to do the majority of thinning even before the traditional thinning season begins.
- Rarely do petal fall sprays overthin
- This may eliminate the need for using carbaryl in programs trying to avoid using this thinner.

Why Isn't Amid-Thin Used?

- It is as old as NAA (1940s) but not as strong a thinner so initially it was not the thinner of first choice.
- It can cause pygmy fruit on some varieties especially when applied at the 12-14 mm stage.
- Very little research has been done using Amid-Thin.
- Read the label. It was written in the 1950s.

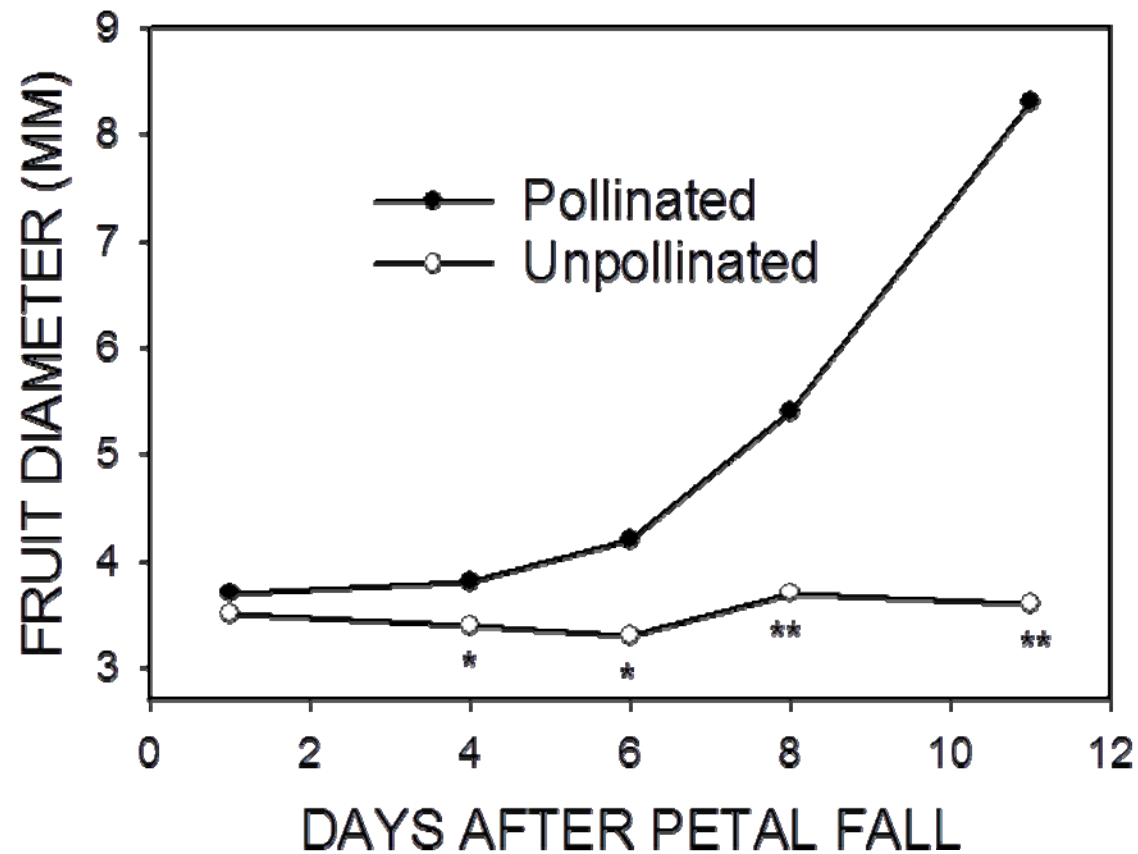
Why Isn't Amid-Thin Used?

- The manufacturer has not promoted the use of Amid-Thin or supported research to encourage its use.
- Petal fall sprays did not come into general use until the 1990s and this is the niche timing where there is a good fit for Amid-Thin.
- Very few (if any) professionals and extension personnel encourage its use as a thinner.

7 to 14 mm Stage

- This is the growth stage where traditionally most thinning is done.
- Fruit are most vulnerable at this time because they are growing very fast.
- The demand by the fruit for carbohydrates (CHO) may exceed the ability of the spur to supply as that is required thus triggering abscission of the weakest and slowest growing fruit.

Rapid Fruit Growth 6-12 mm



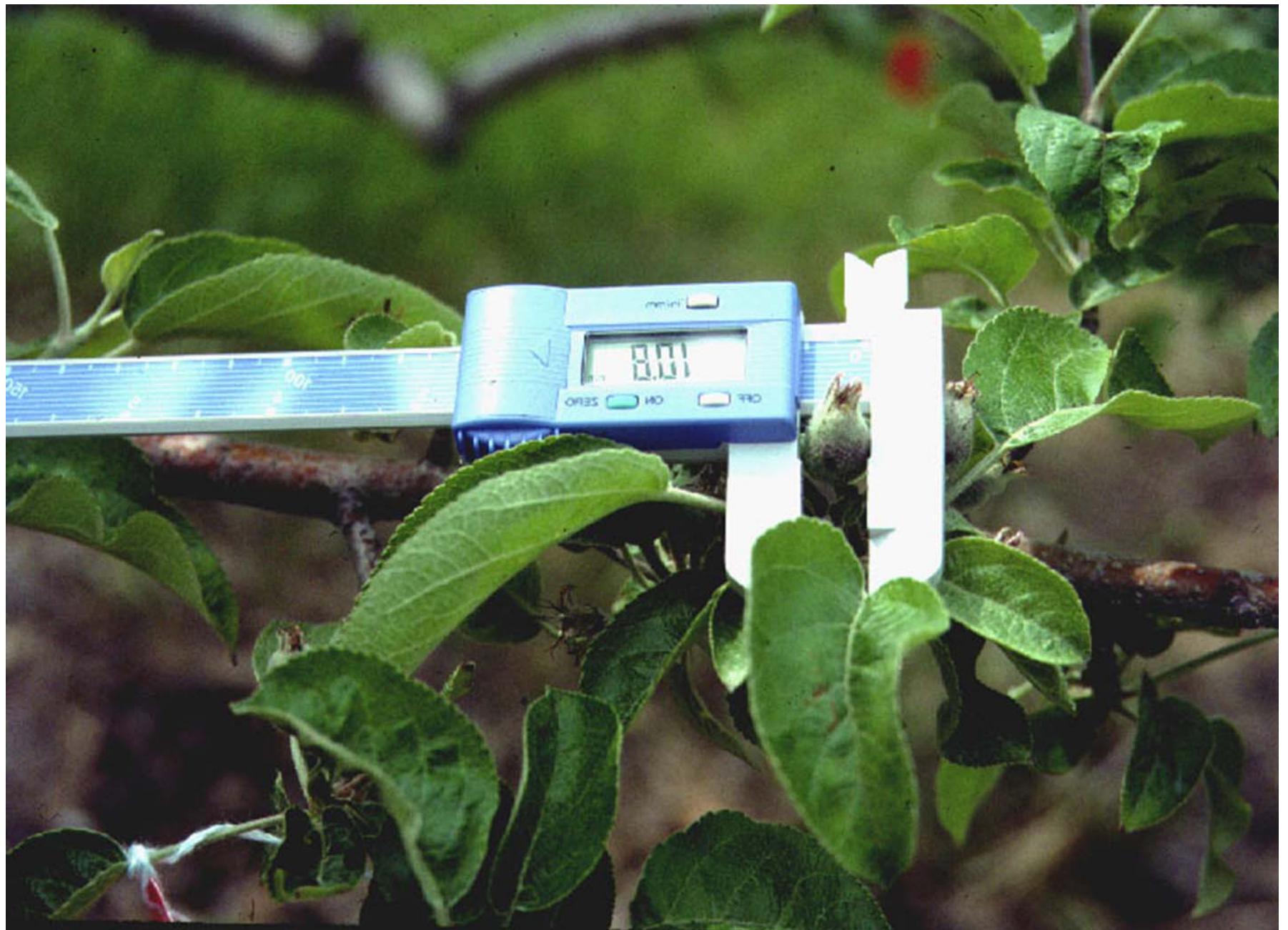
CHO available to the fruit =
Photosynthesis – Respiration
(Light) (Temperature)

Carbon Balance

- The success or the lack of success you have at the 7 to 14 mm stage is heavily influenced by the weather AFTER the thinner application.
- The carbon balance model was developed to estimate and predict the CHO level in apple trees and provide guidance in determining when to spray and what to spray with.
- I view this information to be used as a guide for YOU to make thinning decisions not the computer.

Fruit Growth Model

- A fruit growth model was developed to predict the success of a thinner application with in 7 days of application.
- While this model has been shown to be very accurate, it may consume more time than many small growers with small blocks wish to invest.
- I offer an alternative.



Observe How Your Fruit Develop

- IPM and other ways are used to identify, count and follow the development of insects and diseases in the orchard.
- Much time is spent in the orchard looking for these and monitoring for these.
- However, little or no time is spent examining the growth of fruit at the same level of intensity.
- Fruit will tell you what they are going to do.

Suggestion

- It would be just as useful to know what is happening to the fruit in your orchard as it is to know what is happening to the insects and diseases there.
- This does not have to be time-consuming and you would be most surprised to observe the developments of fruit during the thinning season.
- It will sharpen your “Instinct”.

Suggestion

- When fruit reach the 6 mm stage tag perhaps 15 to 20 fruit spurs in total. Identify these and then measure them every day or every other day.
- It will take 45 minutes to set up and about 15 minutes per day to measure the fruit. Record all data.
- What will you see?
- If this is too many, do less, but do it.



Thinners for 7-14 mm

- NAA
- Carbaryl
- MaxCel
- Amid-Thin
- MaxCel + carbaryl
- NAA + carbaryl
- MaxCel + NAA

Application at 7-14 mm

- Look for a favorable period to apply the thinner.
- The carbon balance model may help you decide this.
- Look for at least 3 days with favorable weather predicted after application.
- **Do not miss this opportunity. Thinning efficacy goes rapidly down hill from here.**

Interpretation of the Carbon Balance Model

Carbon status	Result or response
-20 to +20	Thinning may be difficult
-20 to -40	Good thinning expected
-40 to -80	Excessive thinning likely
+20 to +40	Thinning possible but more aggressive thinning may be needed
+40 to +80	Very difficult to thin. It may be best to wait

15 to 18 mm

- Much more difficult time to thin
- Effective thinning may be questionable
- Effectiveness is quite weather dependent
- Previous weather may influence the potential for effective thinning at this time.
 - Warm weather which stressed the fruit-Thinning more difficult
 - Cool weather with little stress-Thinning more likely.

15 to 18 mm

- BA
- NAA ?????
 - May have problems with fruit size at this timing depending on the fruit size, concentration and temperature
- BA + carbaryl
- NAA + carbaryl ???
- Ethephon (Too early) + carbaryl

20+ mm

- Emergency situation, a “Bail Out” treatment
- Some luck and a little gambling is required here.
- Ethephon is the only viable choice here
- Sometimes it works and at other times it does not.
- The alternative is small fruit, hand thinning and reduced return bloom.

Effect of Ethephon on thinning of McIntosh apples at 23.5 mm.

Ethephon	Initial fruit set (no./cm LCSA	Final fruit set (no./cm LCSA)
0	14.1	9.5
200, 1	14.1	6.7
300, 1	13.8	5.3
400, 1	14.6	3.3
500, 1	14.6	2.6

Autio et. al., 2005

Conclusions

- Prior to bloom assess the health and history of cold temperatures to determine if there is injury.
- Start thinning early
- Do your most aggressive thinning at the beginning of the season
- Spend time in the orchard, following fruit growth

Goal- Avoid This

