RUTGERS COOPERATIVE EXTENSION AT THE NEW JERSEY AGRICULTURAL EXPERIMENT STATION

PLANT & PEST ADVISORY

FRUIT EDITION $1.50 APRIL 30, 1996

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Peach IPM Starts From the Ground UP

Peter W. Shearer, Ph.D., Tree Fruit Entomology

Recent Fruit editions of the Plant & Pest Advisory contained information about weed control in orchard crops. These articles, written by Dr. Brad Majek, outlined control strategies for eliminating weeds in the orchard. The intent of today's article is to stress the importance of weed and ground cover control in a larger context of **Integrated Pest Management (IPM)** and **Integrated Fruit Production (IFP)**.

Orchard ground cover management is an important component of IPM and IFP. A properly maintained ground cover prevents soil erosion and compaction, increases soil permeability to rainfall and irrigation while minimizing ground water pollution, regulates soil temperature, and promotes build-up of certain natural enemies. However, mismanaged orchard ground covers can promote frost problems, reduce yields because of nutrient and water competition, and harbor crop pests.

Ground cover management is important in peach orchards because some ground covers (especially weeds) are alternate hosts of peach pests. For example, peach orchards with **broadleaf winter annual weeds** usually have increased amounts of feeding damage caused by **catfacing insects** (primarily **tarnished plant bug** and **stink bugs**). Likewise, many weeds increase infestations of **green peach aphid**. Orchard ground cover can also serve as reservoirs for **twospotted spider mites, tufted apple bud moth, western flower thrips**, and **false chinch bug**. These pests can then disperse to the crop following mowing, cultivation, or decline of the weeds. In addition, numerous weeds such as **dandelion, clover, lambsquarters**, and **plantain** are hosts of the **Tomato ringspot virus**, the **nematode-vectored virus** that causes **prunus stem pitting**.

Several studies have demonstrated that removal of alternate weed host plants can reduce pest incidence and damage to peaches. Greatest reduction in fruit damage was achieved when all ground cover was removed with either herbicides or cultivation when compared with peaches grown in solid or reduced stands of ground cover. The problem remains, however, that bare ground is not conducive to sustainability because of soil compaction and erosion. Decreasing the amount of orchard ground cover, especially ground cover that is mostly naturalized vegetation (weeds), by combining under-tree herbicide applications with mowing of drive-rows also reduces arthropod damage

SEE GROUND COVER ON PAGE 2

GROUND COVER FROM PAGE 1

and problems associated with bare soil. Likewise, converting orchard floors to non-host plant ground covers decreases pest damage by minimizing or eliminating alternate host plants and subsequent pest populations. This latter practice is recommended if ground cover is desired in the peach orchard. One important consideration when planting ground covers in peach orchards is to have the herbicide strip extend out beyond the drip-line of the tree to avoid competition between the crop and the ground cover.

I realize that there are plenty of peach growers in New Jersey that practice clean cultivation. There is a long history of this practice which in turn has led to some really good crops. Clean cultivation is one way to minimize both insect pests and **brown rot** incidence. However, studies are being planned to demonstrate that large, clean crops can also be had in orchards with well managed ground covers. You will hear and read more about this in the future. In the meantime, you can start to reduce insect and pest problems by eliminating weeds in your orchard. ❑

Calendar of Events

May 8, Wednesday, 6:30 pm
South Jersey Twilight Fruit Meeting
Rutgers Res. & Dev. Center, Upper Deerfield Twp.
Contact Jerry Frecon, RCE of Gloucester County, (609) 863-0110

May 15, Wednesday, 5:30 - 8:30 pm
Second North Jersey Tree Fruit Twilight Meeting
Windy Brow Orchard
Route 519, South of Newton
Contact Bill Tietjen, RCE of Warren County, (908)-475-6505

May 30, Thursday, 3:00 - 8:00 pm
Twilight Fruit Meeting and Strawberry Breeding Showcase
Rutgers Fruit Research & Development Center, Cream Ridge
Contact Joe Fiola, Rutgers Fruit Res. & Dev. Center, (609) 758-7311

Twilight Fruit Meeting at Rutgers Research & Development Center Upper Deerfield Township

May 8, 1996
6:30 P.M.

This meeting will include a wagon tour of new plantings at the station. NJ Pesticide Recertification Units will be offered. Agenda:

6:30 pm - Welcome - *Dr. Steve Johnston, Director & Extension Specialist in Plant Pathology*

6:45 to 8:00 pm Observations and data on Insect & Disease Activity by *David Schmitt, IPM-Fruit Program Associate.*

Update on Tree Fruit Research Activities by *Dr. Peter Shearer, Specialist in Entomology.*

Update on Tree Planting System, Weed & Sod Management by *Dr. Brad Majek, Specialist in Weed Science.*

Integrated Pest Management Practices to Control Insects and Diseases of Tree Fruit by *Dean Polk, Statewide IPM Agent Tree Fruit.*

Update on Plasticulture Strawberry Production at the Station by *Dr. Steve Garrison, Specialist in Vegetable Crops.*

Update on Research Activities in Tree Fruit Pathology by *Dr. Norman Lalancette, Specialist in Plant Pathology.*

Tree Fruit Management Observations and Suggestions by *Dr. Robert Belding, Specialist in Pomology.*

Final comments as time permits by *Jerome L. Frecon, Agricultural Agent.* This facility is partially accessible to the physically impaired, disabled and handicapped. Please call Jerry Frecon at 609-863-0110 for further assistance. ❑

Weed Control

Bradley A. Majek, Ph.D., Weed Science

Apple. Warm weather will encourage the germination of **summer annual grasses** and **broadleaf weeds**. Inspect each orchard before herbicide application and switch from 2,4-D to Roundup or Gramoxone Extra plus nonionic surfactant if **summer annual grasses** have emerged. Consult the Commercial Production Recommendations for rates and additional information.

Peach. Warm weather will encourage the germination of **summer annual grasses** and **broadleaf weeds**. Inspect each orchard before herbicide application and switch from 2,4-D to Roundup or Gramoxone Extra plus nonionic surfactant if **summer annual grasses** have emerged. Consult the Commercial Production Recommendations for rates and additional information. ❑

Nematode Sampling and Testing

Jerome L. Frecon, Gloucester County Agricultural Agent

The Rutgers Plant Diagnostic Laboratory has a nematode testing facility from which we make recommendations. I have seen some blocks of injured trees from orchard that need to be tested for nematodes.

While the soil is moist, these need to be sampled. Late summer or fall testing is better because there may be more nematode activity. Samples however, should only be taken when the soil is moist.

Remove at least three soil cores per plant, 12 to 15 inches deep, from the fibrous root zone under the canopy of declining trees. Soil samples should be collected from blocks containing plants of a similar species, variety, cultivar, and age. Follow a systematic sampling pattern in the block, and submit a 1 qt. subsample.

Place a 1 qt. subsample of soil in a plastic bag and seal tightly to prevent drying. Securely attach the following information to the sample in its own plastic bag:

1) Plant and variety name from which the sample was taken
2) Sample identification specifying the field number, location, or some other owner designation. This is very important if more than one sample is submitted to the laboratory.
3) Name address, telephone number, county of grower, and the person to whom the response should be sent.
4) Information regarding cultural conditions, pesticide use, site conditions, crop history, and plant symptoms should also be included with the samples.

Since sunlight or freezing will kill nematodes, samples must be protected from temperature extremes. For best results, maintain collected samples between 40 and 70^{0}F.

For best results, samples should be promptly delivered to the Rutgers Plant Diagnostic Laboratory and Nematode Detection Service at either of the following addresses:

For U.S. Mail only, mail to:
PO Box 550, Milltown, NJ 08850-0550
For other delivery services:
Building 6020, Dudley Road
Cook College
New Brunswick, NJ 08903

The cost per sample is $20.00, payable to Rutgers, The State University. Send check or money order with the sample. ❑

Fruit IPM
for the Week Ending May 3, 1996

Dean Polk, Agricultural Agent

◆ Apple

✔ **Rosy apple aphids (RAA):** Adult RAA are present in several locations. Highest levels are 0.4 colonies per tree, below a treatment level. Most aphid controls already have been applied. Include an aphid material at petal fall if a pre bloom aphicide was not applied.

✔ **Spotted tentiform leafminer (STLM):** Egg laying by adult females is increasing as the adult flight increases. Adult counts in Warren and Sussex Counties reached over 3,000 males per trap per week. The highest egg level to date is 1.5 eggs per leaf in Richwood, Gloucester Co. This is just under provisional thresholds established in NY. The best petal fall applications for STLM include Provado @ 6 oz/A or Agrimek @ 10 oz/A. Provado controls leafminers, aphids, and leafhoppers, while Agrimek is labeled for leafminers and mites.

✔ **Tufted apple budmoth (TABM):** It is still not too late to use Asana as a ground application if needed. This information is repeated from the last newsletter. Asana XL is labeled for control of overwintering larvae in several mid-Atlantic states, including NJ. Applications may be made at rates of 8 to 14.5 oz/A in a minimum of 30 gal of water/A. Application rate is determined by stage of the larvae. In general, use the lower rate at pink and the higher rate at petal fall. One caution is these applications may adversely affect emergence of the mite predator, *Stethorus punctum* which overwinters in the same locations as TABM. Since *S. punctum* is 90 to 100% emerged by petal fall, the later timing close to petal fall may let many predators escape the application. The ground cover application should only be used where TABM is a known problem**. This application is also labeled on peach.**

✔ **White apple leafhopper (WALH):** Leafhopper nymphs started to hatch, and will continue the next 2 to 3 weeks. Recent research in Virginia shows up to 4 leafhoppers per leaf did not adversely affect fruit size, yield, or quality. **Based on this, we are using a 3 nymph per leaf action threshold. Treatment for WALH is not advised unless the total count exceeds 3 nymphs per leaf.** Since this occasional, we are recommending WALH be treated based on thresholds and not on a preventative basis as in previous years. The usual treatment has been Carzol or Thiodan applied at petal fall, along with the standard organophosphate (Guthion or Imidan) for leafrollers, green fruitworm, and plum curculio. If using Agrimek with an OP at petal fall for STLM and mites, **do not add** something for WALH. If using Provado, it already controls WALH. If you were

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planning to use an OP plus Carzol or Thiodan, then consider dropping the Carzol or Thiodan, and using the OP alone.

✔ **European red mites (ERM):** ERM motile forms were first found on 4/24. Mite hatch should be about complete by petal fall. If mites are present and Apollo or Savey were not used, you may wish to consider 2 early applications (petal fall and first cover) of Vendex @ 2 to 3 lb/A. Kelthane is still registered and should remain so throughout this season. Kelthane may also be used early, but since its use is limited, and it is the only material we still have for mid season, Kelthane use should probably be delayed.

✔ **Apple scab:** Additional scab infection periods were/are being recorded on 4/23 and predicted for 4/30. Spore release should be quite heavy at this time of year.

✔ **Powdery mildew:** Where this disease is a concern, particularly in high quality fresh market fruit, effective fungicides should continue to be included.

✔ **Fire blight:** A fire blight infection period took place on Friday 4/26, showing up on pear. A predicted infection should take place on Tue 4/30. Fire blight is a bacterial disease caused by the bacterium *Erwinia amylovora*. Symptoms are quickly visible after infection takes place. The most common symptom is where new shoots are scorched and bent over in a crook type appearance. Infection may start at various parts of the plant, and is so named by the plant part where infection originates. Infections may be termed blossom blight, shoot or twig blight, leaf blight, fruit blight, limb and trunk blight, and collar or root blight. By far the most sensitive time for infection is the blossom stage. Newly infected blossoms are water soaked, then turn brown to black. Infection works its way down the flower stem, into the fruit spur, and often further.

Fire blight infection is greatly dependent on weather conditions. Temperature, relative humidity and wetting need to be in a favorable balance for the growth and reproduction of the bacteria. The bacteria multiply most rapidly between 75° to 84°F, but can also multiply in a range from 39° to 90°F. Ideal conditions during bloom are when temperatures exceed 77°F under moist or rainy conditions. Severe wind conditions during wetting periods, thunderstorms and/or hail storms can aggravate infection conditions. Infection may also occur if no precipitation occurs. Infection has also been noted with conditions of heavy fog or dew.

There are several models available for predicting fire blight infections. The MARYBLYT model which we are currently using outlines a number of minimum conditions for blossom blight to occur. The bacteria must be present with the following conditions: 1) blossoms must be fully opened, 2) at least 198 accumulated degree days (base 65°F) from first open bloom. (Canker blight activity may begin with at least 130 degree days base 55°F after greentip.) 3) a wetting period of at least .01 inch of rain, heavy dew or fog sufficient to wet foliage, or a wetting period the previous day of at least .1 inch of rain, 4) an average daily temperature of at least 60°F.

Ideal disease control occurs when bactericides are applied **from one day before to one day after the infection takes place**. Streptomycin (Agri-Strep or Agrimycin) is still the most effective material to use at bloom. It is locally systemic and must be applied to open blossoms. Applications should be made at 4 to 8 oz/100 gal dilute or 1 to 1.5 lb/A concentrate, depending on tree size. Apply within 24 hr of an infection and again 5 days later. Do not use under 50 gal/A, the more volume, the better. Efficacy may be increased with the addition of a spreader such as Regulaid. Applications made in the evening under slow drying conditions improve material uptake and thus improve disease control.

Infection periods are predicted for Tuesday afternoon and evening 4/30. We have favorable fire blight conditions in NJ and other mid-Atlantic areas. I picked up this message today from Dr. Paul Steiner in MD:

"Fire blight in MD and surrounding territory this

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Insect Degree Day Accumulations as of April 30, 1996
Site & County
with Biofix Date plus Degree Days since Biofix

Insect	Bridgeton Cumb.	Hammonton Camden	Hardingville Gloucester	Richwood Gloucester	Princeton Mercer	Oldwick Hunt.	Morristown Morris
OFM_{45}	4/20 - 178	4/5 - hit on 4/27	4/19 - 193	4/17 - 198	4/19 - 182	4/22 - 126	4/24 - 77
$TABM_{45}$							
CM_{50}							

All reported accumulations based on Skybit, Inc. data, except Hammonton. OFM base = 45, max = 90; TABM base = 45, max = 91; CM base = 50, max = 88. Spray targets based on: OFM - 200°D after biofix and again 200°D later (first generation only). TABM - (A.M. sprays) 490, 625, 763, 898 - 1st generation and 2228, 2415, 2605, 2795°D after biofix - 2nd generation. CM - 250°D after biofix and again 2-3 weeks later.

year appears similar to 1995 - one of the most severe outbreaks in recent history. While green tip arrived nearly 0-14 days later than usual, the sudden change to warm weather and rush into flowering increased our risks for blossom infections considerably. Cumulative degree hour totals >65F are increasing at a high rate with some sites registering 600+ hr. 4-5 days into the bloom period. This translates into an EIP, epiphytic infection potential, of about 300 in the MARYBLYT model system, a level shown to be an indicator for severe blossom blight.

An additional factor related to the prolonged warm weather period is the rapid progress of predictions for canker blight. Given the current stage of development, it is likely that canker margin symptoms (water soaking around overwintering canker margins) will be coincident with full bloom on many varieties and typical canker blight symptoms with dead shoots may appear before the end of bloom. The last time this occurred in MD was in 1985. The earlier than usual appearance of canker blight symptoms means there will be many additional sources of inoculum available for blossom colonization.

This is certainly a year to be on top of local weather\bud development conditions so **streptomycin sprays are applied before anticipated blossom infection** events. Sketchy data we have all points to excellent control where the antibiotic is applied before infection and about 90% control when there is a 24 hr delay. Note, however, that 90% control under conditions that support 1000s of infections means a whole lot of strikes can still develop. Because of the continuing warm weather, the early development of blossom and canker blight symptoms and the probably early maturation of leafhopper vectors, we can expect the shoot blight phase of fire blight epidemics to also be much earlier this year."

◆ Peach

✔ **Oriental fruit moth (OFM):** Moths are being caught at high levels in many areas of the state. One site reached 300 moths per trap. Egg laying is taking place and the first treatments should be going on. Treatments for the Hammonton area should have been applied on 4/27. Treatments for most other southern counties will be due around Wed to Thurs 5/1 to 5/2. Hunterdon County areas will be due around May 7. While more northern areas will be due sometime during the second week of May. Treatments should be timed for 200°D after biofix and again 200°D later. Please see the degree day (°D) chart below for a summary of degree day counts for OFM.

✔ **Catfacing insects:** Catfacing insects are the primary insect targets in the petal fall spray. The OP's, Guthion and/or Imidan, are suggested for control. Penncap is not recommended this early, since it is extremely toxic to bees.

✔ **Green peach aphid (GPA):** Low levels of GPA are found on newly emerging leaf tissue in several southern orchards. Treatments are suggested if GPA are present on nectarines at one or more colonies per tree. Peaches can withstand 5 to 6 colonies per tree. Use 1.5 to 2 pt Lannate LV when treating. High volume applications work better than concentrate sprays for aphid control. When using Lannate, reduce the organophosphate to half of a full rate.

✔ **Flower thrips and Western flower thrips (FT, WFT):** Thrips are still found in the flowers and on developing fruit. Thrips treatment is mandatory for nectarines. See last newsletter for control.

✔ **Bacterial spot:** Applications for bacterial spot control should start at petal fall. Use either Mycoshield @ 1 to 1.5 lb/A depending on tree size or Tenncop 5E @ 4oz/100 gal dilute.

✔ **Peach scab:** Peach scab infections occur mostly from 1st through 3rd covers. If inoculum from overwintering lesions is present, or if you had scab last season, plan on extra controls this season. 'Extra controls' may include 1 or 2 applications of Bravo at petal fall and shuck split, and/or addition of Benlate to a Benlate/Captan mixture during periods when infection is likely to occur. Captan is also effective for scab control, while sulfur is effective for maintenance programs. The reason Bravo goes on early is its residual action remaining on lesions and developing fruit when infection periods take place. Bravo is not labeled past shuck split. Observe caution using Benlate this year. We found resistance to Benlate on 1 Gloucester County nectarine block in 1994. We also tested overwintering lesions from a block in Middlesex County, which showed scab resistance to Benlate at every rate tested. In these cases, I suggest 2 applications of Bravo at the full rate (Bravo 720 @ 3pt/A) followed by several applications of Captan @ 5 - 6 lb/A.

◆ Insect Trap Captures

Week Ending	4/5	4/12	4/19	4/26
Tree Fruit - Southern Counties				
RBLR	1.1	1.9	16.3	47.9
STLM	20.4	48.1	1236	1282
TABM-A	—	—	0.0	0.0
CM	—	—	0.0	0.0
AM	—	—	—	—
OFM	0.1	.03	0.5	20.7
TABM-P	—	—	0.0	0.0
LPTB	—	—	—	0.0
PTB	—	—	—	—
Tree Fruit - Northern Counties				
RBLR	—	22.0	41.5	63.6
STLM	—	7.0	355	506
TABM-A	—	—	0.0	0.06

CM	—	—	—	0.0
AM	—	—	—	—
OFM	—	0.0	2.5	1.3
TABM-P	—	—	0.0	0.02
LPTB	—	—	0.0	0.0
PTB	—	—	—	—
Blueberry - Atlantic County				
RBLR	—	14.4	51	106
OBLR	—	—	—	—
CBFW	—	—	—	—
SNLH	—	—	—	—
BBM	—	—	—	—
Blueberry - Burlington County				
RBLR	—	3.8	8.8	51
OBLR	—	—	—	—
CBFW	—	—	—	—
SNLH	—	—	—	—
BBM	—	—	—	—
Blueberry - Abandoned Fields (both counties)				
RBLR	—	1.0	7.0	23.7
OBLR	—	—	—	—
CBFW	—	—	—	—
SNLH	—	—	—	—
BBM	—	—	—	— ❑

Apple Thinning

Robert Belding, Ph.D., Pomology and Winfred P. Cowgill, Jr., Hunterdon County Agricultural Agent

Fruit thinning is truly one aspect of fruit growing where experience, the weather and luck are equally important. As reported in the 1996 Apple Plant Growth Regulator School in Pennsylvania, it is important to retain detailed records of your own experiences to refine your thinning program including: Cultivar, fruit size, amount (rate) of thinner applied per acre, amount of adjuvant applied per 100 gallons, number of gallons applied per acre, nozzling used, weather conditions before, during and after the application, and finally the results obtained.

Excessive moisture, cloudy weather during and directly after application affects activity of thinner. Reduced sunlight either weakens trees and allows greater thinning activity, or reduced sunlight reduces photo-degradation of chemical thinners allowing longer than normal activity.

Chemical thinners should be applied as dilute sprays, wetting all leaf and fruit surfaces to drip. Overuse of carbaryl is detrimental to IPM mite control programs and should be avoided when possible. However on some difficult to thin apple cultivars it has been one of our most effective thinners on hard to thin cultivars especially in combination with other materials.

Thinning Apples at Full Bloom and Petal Fall

Extensive research has been done on thinning apples at full bloom and petal fall. The following are excerpts from an article written by Terrence Robinson and Ed Stover, Cornell, published in the New York State Fruit Extension News Publication. These results are based on research in New York State.

•Thinning apples at full bloom or petal fall is based on the well known principle that the earlier thinning is accomplished, the greater the improvement in fruit size from the remaining fruits. This is due to the fact that earlier thinning reduces the competition among fruits for resources. With small-fruited varieties like 'Empire' or 'Gala', where achieving large fruit size is critical, early thinning may provide significant benefits over thinning at the tradition timing. In a hand thinning study we did with 'Empire', thinning at bloom gave larger fruit size than thinning 10 or 20 days later.

•Several of the common post-bloom thinners we use also have some thinning action at full bloom and petal fall. These include Naphthaleneacetic acid (NAA), Carbaryl (Sevin) and Benzyladenine (Accel). Growers may want to consider using our existing thinners at full bloom or petal fall. Reducing cropload by chemical thinning at or near full bloom should make it easier to obtain optimum fruit size.

•Of the materials above only NAA is best suited for bloom thinning, Sevin is caustic to bees and must be not be used at bloom. In most cases, Accel is just too weak of a thinner to be used at bloom since it must be combined with carbaryl *for optimum effectiveness and carbaryl cannot be used during bloom due to bee toxicity.* NAA has a *relatively mild effect* at full bloom and we have had good success with rates as high as 7-10 ppm.

•Frost damage to flowers may affect response to bloom thinners. We have not had much experience with NAA applied either preceding or following a frost at bloom. However, we would expect excessive thinning in those conditions and consequently do not recommend bloom thinning if frost is forecasted.

Thinning at petal fall: The main advantages of waiting until petal fall to thin instead of full bloom are that growers can better judge success of pollination, spring frosts are less likely, and it is possible to use carbaryl. Although we have recommended for years to thin early varieties and 'Macoun' at petal fall, in the last 4 years there has been a surging interest in petal fall thinning. This is due to the loss of Elgetol in the West and the need to thin earlier for better fruit size with new varieties like 'Gala'. There are 3 approaches for thinning at petal fall:

l) Carbaryl (Sevin XLR+) at I pt/100 gal. is an effective thinner at petal fall and has given positive results in both Washington and New York. The XLR+ liquid formulation is the preferred formulation at this time since carbaryl granules are too small for bees to pick up and take back to the hive. Thus, this formulation is safer to use at petal fall when there may still be feral bees in the orchard. However, the chemical itself will kill any bees sprayed. It should not be used if colonies of bees are still in the orchard or when bees are actively working in the orchard.

See Thinning next page.

Thinning from page 6

2) The combination of Carbaryl at 1 pt/100 gal. + NAA at 5-10 ppm can be used when more thinning is needed than with just Carbaryl alone. This combination has been very dependable and predictable in giving moderate thinning and reasonable fruit size enhancement. The combination of NAA and Sevin at petal fall will not sufficiently thin in all situations but minimizes the negative effects of NAA on fruit growth rate (as does the bloom timing) and allows a second application of thinners at the 10-12 mm fruit size stage if needed.

3) The combination of Carbaryl at I pt/100 gal. + Accel at 40-75 ppm has shown particular promise in improving fruit size of 'Empire' and other small-fruited varieties like 'Jonamac' and 'Gala'. For best results, Accel should always be applied with Carbaryl. For easy-to-thin varieties, this combination gives moderate thinning and maximum fruit size response. This may be particularly suited to 'McIntosh' using Accel at the lower rate of 40 ppm. For harder-to-thin varieties, this combination will give incomplete thinning and will need to be followed up with a second application 10-14 days later. It appears, however, that Accel is a relatively weak thinner at petal fall just as it is at bloom. Given the relatively high cost of Accel, it is probably wiser to use this chemical (in combination with Carbaryl) at the 8-10 mm fruit size stage when it will give greater thinning and fruit size enhancement. Nevertheless, if relatively little thinning is needed, the petal fall timing with Carbaryl will give modest thinning and maximum fruit size enhancement.

Thinning at full bloom or petal fall is a new concept to most New York growers but it can help maximize fruit size without undue risk. Although the risk of frost near the time of application of the thinners is higher at these early timings, they allow growers to have two opportunities to accomplish thinning. This spreads the risk and makes it possible to be a little more cautious at each timing.

In North Jersey many of our growers have been following a program of utilizing multiple applications of NAA beginning at bloom and repeating every 5-7 days as needed. It takes advantage of the bloom thinning advantages as outlined above in the New York article.

This program is based on a program developed by Mike Thomas, an Agricultural Agent from Michigan State University. It is very safe and gives some thinning effect on most cultivars without fear of over-thinning. If you have never chemically thinned apples this is a good program to go with. The beauty of NAA is that it has no memory. Once applied it is quickly absorbed and utilized. A second application is not cumulative. For a complete outline of this program contact Win Cowgill.

Weather

Currently we are experiencing a week of cloudy cool rainy weather in North Jersey. Extensive research and observation by Ross Byers and Rich Marini for Virginia indicate that the lack of sunlight and low temperatures following bloom may have an adverse impact on pollination, subsequent fruit set and most importantly, the effectiveness of chemical thinners.

NAA on Red Delicious

Caution should be used in applying NAA on red delicious, especially spur types. Mummies or pygmy fruit have resulted. NAA should not be used in combination with Accel or Promalin on red delicious for the same reason. Work from Michigan State indicates the combination can promote pygmy fruit formation. ❑

Planting Depth for Dwarf Apples

Ron Perry, Ph.D., Tree Fruit Extension Specialist, Department of Horticulture, Michigan State University

We remind those planting apple trees to pay close attention to the importance of planting depth forapples on dwarfing clonal rootstocks. Too often, I visited grower orchards to find trees on dwarfing rootstocks scion rooted. At the time of planting, the orchardist may have thought that the trees were planted correctly, only to find out 5-7 years later the unions are too deep. As a consequence, adventitious roots arising from the scion become dominant and the trees take on the normal vigorous level approximating seedling. At that point, nothing can be done to correct the problem. Digging down to expose the unions and cutting roots causes a depression in the soil which fills, causing *Phytophthora* crown rot or later in the year, ice formation and subsequent injury to the crown. Secondly, the depression refills with eroded soil later in the year anyway, requiring follow-up attention.

My recommendation has been to plant apples on clonal rootstocks so the union is a minimum of 4 inches above soil line when using a mechanical planter and a minimum of 6 inches above the soil when planting by shovel or augured holes. Because of the problem with infestation by "dogwood borer" on exposed rootstock shanks in North America, unions at planting time should not exceed 10 to 12 inches above the soil line. If they are too high, growers are advised to cover a large part of the exposed shank with a burm or mound of soil. This remedy works well to correct a shallow planted tree, and may need follow-up attention annually or biannually.

A shallow planted tree can be easily corrected later in tree life, compared to the task of trying to correct an insurmountable problem of a deep planted tree. Using a mechanical planter, growers should follow-up and check each newly planted tree to insure proper planting depth. While the soil is still loose, pull trees up that are too deep and push those down that are too shallow. When setting planting depth for mechanical planters, stay on the shallow side. If you err, do it on the side of shallow planting. The last thing you need 5 years down the road is to have trees planted 5 feet apart in a high density planting that should have a spacing of 15 by 20 feet! ❑

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