RUTGERS COOPERATIVE EXTENSION AT THE NEW JERSEY AGRICULTURAL EXPERIMENT STATION

PLANT & PEST ADVISORY

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INSIDE

Understanding Water Hardness for Spray Effectiveness

Jeremy Compton, North Jersey Tree Fruit Technician and Win Cowgill, Area Fruit Agent

Hard water is a very common problem that affects more than 85% of the national water supply. The presence of dissolved carbonates, sulfates, chlorides of calcium, magnesium and iron in the water supply cause it. Calcium hardness is the amount of dissolved calcium (plus other minerals such as magnesium) in the water.

Hard water can affect the performance of certain Plant Growth Regulators, specifically Apogee. Hard water not only affects the performance of PGR's, but it can also have an effect on the performance of many pesticides, including herbicides and nutrient sprays. Understanding this, the question remains as to what constitutes hard water? Water hardness is related to the amount of dissolved calcium carbonate in the water supply and is the cause of soap scum and clogged pipes. But, the influence of other factors and concentration of dissolved minerals in the water supply needed to create hard water are rarely questioned.

Though hard water may be detrimental to pesticide activity, it does not affect human health. Water hardness is measured in parts per million (ppm) or grains per gallon (GPG). A GPG is equivalent to 17.1 ppm. Water is considered hard when it measures 250 ppm or 14.6 GPG. Also, its alkalinity (total amount of alkaline materials in the water) must be over 150 ppm in order to be considered hard. Soft water contains less than 50 ppm (3 GPG) of calcium carbonate and an alkalinity of less than 30 ppm.

Make sure to consult the label for additional information on rates, precautions and mixing instructions. Growers should consider having their water tested for hardness (calcium carbonate) and iron prior to the spraying season to determine the need for a conditioning agent. Fortunately, there are several commercially available water conditioning agents that are inexpensive to use if you have hard water. These include ammonium sulfate (AMS), Quest and Choice. There are others and some products have already been premixed with surfactants. Check with your chemical supplier for availability and price.

SEE WATER HARDNESS ON PAGE 4

Fruit Weed Control

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

Small Fruits

Grapes: Apply residual herbicides to established vineyards before growth begins. Use Surflan, or Devrinol, or Solicam for annual grass control. Solicam also suppresses perennial grasses and yellow nutsedge when sprayed at the maximum-labeled rate for the soil texture. Tank-mix with Karmex or Princep to control most annual broadleaf weeds. Add Gramoxone and nonionic surfactant to kill emerged seedling weeds. Spot treat with Roundup to control established weeds. Consult the *Commercial Production Recommendations* for rates and additional information.

Tree Fruit

Recommended postemergence (knockdown) herbicide options include 2,4-D, Gramoxone Extra, and glyphosate products including Roundup Ultra, Touchdown, and Glyphomax. Expect to see additional glyphosate products with various trade names. Rely is also labeled, but not recommended for use in tree fruit. The characteristics of each herbicide are different, and should be used in different situations.

Weedar 64 and other labeled formulations of 2,4-D effectively control annual and certain perennial broadleaf weeds, such as dandelion. Applications should be sprayed before the target weeds begin to bloom. Effectiveness decreases after flowering has begun. No control of annual or perennial grasses can be expected, therefore, the use of 2,4-D as a knockdown herbicide should be limited to fall and early spring before summer annual grasses emerge. Peach and apple shoots sprayed with 2,4-D will be killed, but the rest of the tree will not be affected. Do *not* use 2,4-D on newly planted trees.

Gramoxone effectively controls seedling annual broadleaf and grass weeds, but may only provide temporary control of established annual and perennial weeds by "burning off" the foliage. Applications should be sprayed before the target annual weeds become well established. No long- term control of perennial broadleaf weeds or grasses can be expected. Peach and apple shoots sprayed with Gramoxone Extra will be killed, but the rest of the tree will not be affected. Do *not* use Gramoxone Extra on newly planted trees.

Roundup Ultra (and other labeled glyphosate formulations) effectively controls many annual and perennial broadleaf weeds. The reason is that after absorption through the leaves, Roundup is moved (translocated) throughout the plant, including down into the roots. Applications should be sprayed when the target weeds are actively growing and have a large healthy canopy of foliage to absorb the herbicide. Effectiveness decreases when treatment is made during periods of stress for the target weed. Control perennial broadleaf weeds and grasses are more difficult, require a higher rate, and must be applied at the right time of year for control to be obtained. Applications at the wrong time of the year will result in control of the shoots, but poor translocation into the roots and regrowth. The correct time of year for Roundup application depends on the target species. Generally, perennial grasses must be tillered and have at least six or more leaves before treatment. Perennial broadleaf weeds are most susceptible when they are in full bloom to the green fruit stage of growth. This occurs at different times of the year for different weeds. Peach and apple limbs sprayed with Roundup will be killed. The rest of the tree may be affected the same year by Roundup translocated out of the sprayed limb into the tree, or the next year by Roundup translocated from the sprayed limb into the roots where it is stored until the following spring. Do *not* use Roundup on newly planted orchards until they are four to five years old and all the bark that may be hit by spray is old, mature, and brown. Heavily shaded apple suckers sprayed in the spring do not affect the rest of the tree, but suckers that receive several hours of direct sun treated in the late summer may translocate Roundup to the roots.

Rely is labeled for use in apples, effectively controls annual broadleaf and grass weeds, and may provide temporary control of perennials, and regrowth of may be suppressed, but *Rely is not recommended for use in New Jersey.* Research conducted at Rutgers with experimental formulations that contained glufosinate, the active ingredient in Rely, caused significant trunk injury to apples and peaches. Other herbicides that are currently recommended did not cause injury in the same experiments. Additional research is currently in progress using the formulation of glufosinate marketed under the trade name "Rely". ❑

Trickle Irrigation Tips for Strawberries

David Handley, University of Maine, Vegetable and Berry News, No 3, March 5, 2001

In recent years many strawberry growers in the northeast have begun using trickle irrigation in strawberry beds. While trickle is considered an essential component of growing strawberries in a raised bed plastic mulch system, it is also becoming more popular for matted row system production. In the past, the conventional wisdom has been that since overhead (sprinkler) irrigation is necessary for frost control in strawberries, there's no need to install a trickle system as well. However, several factors have now led growers away from this view, and trickle irrigation is more often seen in the fields. Some of the reasons for making the investment in trickle include the relatively low cost of a system compared to other types of irrigation, less labor moving pipes around, less water needed to meet the plants needs, and the ability to fertilize through the system.

During the growing season, strawberries can use 15,000 gallons of water per acre per week for optimum growth. During the fruit development period, this amount can triple. If nature doesn't provide this amount of water, the plants are likely to have slower growth and lower yields. Supplying this much water to strawberry fields with overhead irrigation presents the problems of having to move pipe from field to field, having a dependable source of high volumes of good water, and a big enough pump to move it. The overhead system also wets the entire plant surface which, while good for frost control, can encourage the development of diseases, and requires lots of water to get sufficient moisture down into the soil to the roots.

Trickle irrigation systems require relatively low volumes of water. For example, a source providing as little as 10 gallons per minute can irrigate ˚ acre of strawberries per day. A 50-gallon per minute source can irrigate up to three acres per day. This means that smaller sources of water, such as wells, can be used to irrigate, and a much smaller pump can be used than is required for overhead irrigation. Because less water is used with trickle, growers can also consider using municipal supplies, if other sources are not available.

The water is brought to a field from a pump through plastic pipe ranging in diameter from one inch to six inches (1˚ to 2˚ is common). Larger diameter pipe requires higher pressure (larger pump, more water) to push liquid through. Elevation will also affect water pressure. For every 2.4 feet of elevation the water has to climb, one pound per square inch (psi) of pressure is lost. This pipe is usually buried and outlets are set up around the field according to the planting scheme. A lateral pipe is attached to the outlet and runs along the surface, perpendicular to the strawberry rows. This pipe is usually flexible (e.g., "lay-flat") so that it can be run over by equipment and customers. Trickle tape is attached to the lateral pipe so that a line is running down the center of each row of strawberries. This line can be buried about 2˚ inches below the soil surface prior to planting, or laid on the surface. While burying the lines can add to the cost of installation, it reduces problems with the lines being damaged by animals, people and machinery. Most trickle tape is designed to adjust the water pressure for even distribution along the

See Trickle Irrigation on page 5

Small Fruit Pesticide Changes

Kathy Demchak, Pennsylvania State University Cooperative Extension

Reprinted from Fruit Times Vol. 20, No. 3, March 2001

There are a number of changes in labels for small fruits pesticides from last year. Some of the more notable changes for the upcoming season are:

1) The label for Dacthal was recently approved by EPA, so Dacthal should be available for use on strawberries in Pennsylvania this upcoming season.

2) Diazinon, which had been labeled for use on strawberries, no longer is.

3) Nova 40W (myclobutanil, Rohm and Haas) has a supplemental label for use on cranberries, strawberries, gooseberries, and currants for a number of diseases. Probably of most interest is the use as an orange rust protectant for black raspberries and blackberries. Rates and timings for these uses vary with the crop and disease, so consult the label for specifics. In all of the above uses, applications may be made up to the day of harvest.

4) Confirm 2F and Confirm T/O (tebufenozide, Rohm and Haas) are labeled for use on blueberries and cranberries against some species of leaf rollers and gypsy moth, and other pests that vary with the crop. See the label for rates and timings, as these vary with the pest targeted. The pre-harvest interval is 14 days.

5) Savey 50WP (hexythiazox, Gowan) is labeled for two-spotted spider mite control on strawberries. It is effective against the eggs and immature mites, but not adults. This means that it should be applied when mite populations are still low. The rate is 6 oz/acre, and only one application can be made per year. The pre-harvest interval is 3 days.

Submitted by Jerome L. Frecon, Agricultural Agent. ❑

Pruning Grapes

Bruce Bordelon, Purdue University, Facts for Fancy Fruit 2001-01, March 14, 2001

March is the most common month for pruning grapes. The threat of extremely cold weather has passed and we can evaluate any winter injury to vines that may have occurred. By April buds will begin to swell and it is important that pruning is completed prior to bud swell to avoid damage to the tender buds. Winter injury in grapes this year should be minimal. However, there is likely to be more damage on cold-tender varieties.

You should assess bud damage prior to pruning so that adjustments in the balanced pruning formula can be made based on the amount of bud loss. Typically, if less than 25% of the buds are damaged you can prune normally. If 25-40% of the buds are damaged then you'll want to adjust the number of buds retained accordingly. For example, if 40% of the buds are damaged then 60% are live. If you need 40 buds per vine for the proper crop load then you'll have to leave 68 buds to end up with 40 primary shoots. To determine how to adjust the bud number multiply the inverse of the % live buds (1/.60) times the desired number of buds (1/.60=1.7 x 40=68 buds). If more than 40% of the buds are damaged then you'll probably want to do minimal pruning now and wait until after budbreak to determine where live buds occur in order to have an adequate number for balancing the vines.

Spring freeze damage can also be a significant economic problem for grape growers. A technique called long pruning or double pruning helps avoid spring frost and freeze damage, especially on varieties that tend to bud out early. The procedure utilizes the apical dominance of buds on the cane. The first buds to begin growing are those on the tip of the cane, while buds closer to the base begin growth later. This type of pruning is only applicable to spur or no-tie training systems.

To perform long pruning, select canes to be used for fruiting spurs during the normal pruning practice, but leave those canes long, with 10-15 more buds than desired. Spurs are normally pruned to 5 or 6 nodes for fruiting, but if they are not cut back, then the extra buds will help delay the development of the desired basal 5-6 buds, which helps avoid frost injury. After the date of the last probable spring freeze has passed, the canes are shortened to the desired length to properly adjust the bud number for the vine. Growth of the basal buds can be delayed by as much as two weeks if weather conditions are favorable. While this procedure requires an extra trip through the vineyard, it can mean the difference between a full crop and little or no crop.

Submitted by Jerome L. Frecon, Agricultural Agent. ❑

Pruning Currants

Bruce Bordelon, Purdue University, Facts for Fancy Fruit 2001-01, March 14, 2001

Similar to highbush blueberries, there are 3 main goals when pruning currants:

1) to give the plant the shape of an open bush;

2) to achieve and maintain equal proportions of three-, two-, and one-year-old stems; and

3) to distribute the fruiting wood and the year's shoots equally around the bush.

These goals can be achieved by following these practices:

- at planting cut back all canes to 1 - 2 buds
- 1st year: remove all but 6 - 8 of most vigorous shoots
- 2nd year: keep 4 - 6 1-yr shoots and 4-5 2-yr shoots; 8-11 shoots total
- 3rd year: keep 3 - 4 of each 1, 2, and 3-yr shoots
- Mature bushes: remove all 4-yr shoots and keep only enough 1-yr shoots to replace what old ones were removed
- Always remove weak and broken shoots, shoots lying on the ground, and try to keep middle of bush open for air circulation.
- Don't overprune.

Submitted by Jerome L. Frecon, Agricultural Agent. ❑

WATER HARDNESS FROM PAGE 1

Apogee and Water Hardness

If your water is high in calcium carbonate, the water may need to be conditioned. Add one pound of ammonium sulfate (AMS) for every pound of Apogee. Use high-quality, spray grade AMS to avoid plugging nozzles. Research at the Rutgers Snyder Farm in 2000 indicated the water conditioning products Quest and Choice could also be used effectively to modify the water hardness and improve the efficacy of Apogee. In our trial at the Snyder Farm the addition of water conditioners AMS, Choice and Quest significantly enhanced the effectiveness of Apogee™ in reducing total shoot growth. The efficacy of Apogee™ can be greatly enhanced with the addition of water conditioning agents in high calcium hardness conditions.

If you suspect that you have hard water, it can easily be tested. There are cheap and simple methods available to growers. North Jersey growers can have their water tested for hardness and pH at the Rutgers Snyder Farm. ❑

TRICKLE IRRIGATION FROM PAGE 3

length of the row, and can even compensate for changes in elevation through the field, provided they are not extreme.

The amount of water pressure available will determine how much of a field can be irrigated at one time. If lots of pressure is available, whole fields may be irrigated at once. If the pressure is weaker, then the field must be divided up accordingly and one section is watered at a time. But this can be accomplished with the simple switching of a few valves, rather than disassembling and moving lots of pipes. The water used in a trickle system must be clean; otherwise the system will easily clog. Clean sources of water, such as a well or a municipal supply will require very little filtering, and the system would be relatively inexpensive. Other sources such as ponds may require more elaborate filtering systems, which can become a major part of total outlay. Fertilizer injectors can be placed near the pump and used to run liquid forms of nutrients through the system. Fertilizing in this way can provide more accurate distribution of nutrients in a more readily available form.

Growers who have adopted trickle irrigation in strawberries have generally been pleased with the amount of labor it has saved them. It has also made them more likely to water the plants when they need it, resulting in improved growth and yields. Trickle irrigation technology has become less expensive and easier to use over the years, and now may be the time to consider a system for your strawberry fields.

Submitted by Jerome L. Frecon, Agricultural Agent. ❑

Calendar of Events

April 19, 2001, 5:30-8:30 pm - North Jersey Twilight Fruit Meeting, Rutgers Research and Extension Farm, 130 Locust Grove Road, Pittstown, NJ. Contact: Win Cowgill at Rutgers Cooperative Extension of Hunterdon County at 908-788-1339 or cowgill@aesop.rutgers.edu.

April 24, 2001, Tuesday, 7:15 p.m. - Evening Fruit Meeting, Office of Government Services, 1200 N. Delsea Dr. Clayton, NJ. Contact: Jerry Frecon at Rutgers Cooperative Extension of Gloucester Co. at 856-307-6450.

May 15, 2001, 6:15 PM - Twilight Fruit Meeting, Wm. Schober Sons Farm, Rt. 553 Buck Rd. Monroeville, NJ. Contact: Jerry Frecon at Rutgers Cooperative Extension of Gloucester County at 856-307-6450.

June 5, 2001, 6:15 PM - Twilight Grape And Enology Meeting, Heritage Tree Fruit LLC. Rt. 609 Richwood-Elmer Rd., Richwood, NJ. Contact: Jerry Frecon at Rutgers Cooperative Extension of Gloucester Co. at 856-307-6450.

June 26, 2001, 6:15 PM - Twilight Fruit Research Meeting, Rutgers Agricultural Research and Extension Center, Northville Rd., Upper Deerfield Township, Bridgeton, NJ. Contact: Jerry Frecon at Rutgers Cooperative Extension of Gloucester Co. (Registration required) This meeting will be part of the State Horticultural Association of Pennsylvania Fruit Tour of southern NJ.

Evening Fruit Meeting

Wednesday April 24, 2001
7:30 p.m.
Gloucester County Office of Government Services
1200 North Delsea Drive
Clayton, NJ

Sponsored by Rutgers Cooperative Extension of Gloucester County

7:30 p.m. Update on Pest Populations in Tree Fruit by Dave Schmitt, Fruit IPM Program Associate, Rutgers Cooperative Extension

7:45 p.m. Growth Regulation including Thinning of Tree Fruit by Dr. Robert Belding, Specialist in Pomology, Rutgers Cooperative Extension

8:00 p.m. Insect Control and New Insecticide Labels by Dr. Peter Shearer, Specialist in Fruit Entomology, Rutgers Cooperative Extension

8:15 p.m. Disease Control Update and New Fungicide Labels by Dr. Norman Lalancette, Specialist in Tree Fruit Pathology, Rutgers Cooperative Extension

8:30 p.m. Integrated Pest Management by Dean Polk, Statewide Fruit IPM Agent Rutgers Cooperative Extension

8:45 p.m. Program Announcements and Nematode Management by Jerome L. Frecon, Agricultural Agent, Rutgers Cooperative Extension

9:00 p.m. New Pesticide Regulations and Worker Protection Training by Dr. George Hamilton, Specialist in Pest Management, Rutgers Cooperative Extension

9:20 p.m. Adjourn Meeting

NJDEP PESTICIDE APPLICATOR UNITS: 1A – 3 Units, 3A – 3 Units, Core – 1, PP2 – 3 Units

For further information contact Jerry Frecon at Rutgers Cooperative Extension of Gloucester County at 856-307-6450.

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