scaffolds Weekly Update on Pest and Crop Development

FRUIT JOURNAL

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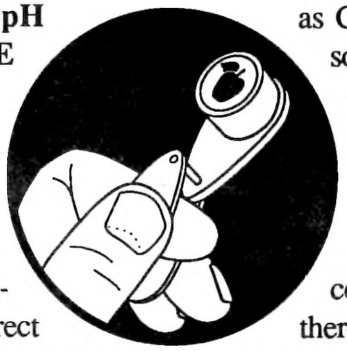
GENERAL INFO

pH AND PESTICIDE ACTIVITY

EFFECT OF pH ON PESTICIDE ACTIVITY



❖❖There may be times when you don't get the expected results from a pesticide application, even though you used the correct concentration of the recommended material and applied it in the same way that has given acceptable control at other times. Although you may suspect a bad batch of chemical or buildup of pesticide resistance, the poor results may in fact be due to alkalinity - that is, a solution with a pH higher than 7.0. A close inspection of the pesticide label will often reveal advice against mixing the chemical with alkaline materials such as lime or lime sulfur. The reason is that many pesticides, particularly insecticides, undergo a chemical reaction under alkaline conditions that destroys their effectiveness. This reaction is called alkaline hydrolysis, and can occur when the pesticide is mixed with alkaline water or other materials that cause a rise in the pH.

Hydrolysis is the splitting of a compound by water in the presence of ions. Water that is alkaline has a larger concentration of hydroxide ions (OH^-) than water that is neutral; therefore, alkaline hydrolysis increases as the pH increases. Insecticides are generally more susceptible to alkaline hydrolysis than are fungicides and herbicides, and of these, organophosphates and carbamates are more susceptible than pyrethroids. A survey of fruit-growing areas in N.Y. showed that water from as many as half of the sites in western N.Y. had pH values above 8.0. Water at this pH could cause problems for compounds that will break down in only slightly alkaline water, such as ethephon (Ethrel). Compounds that break down at a moderate rate at this pH, such as Carzol and Imidan, should be applied soon after mixing to minimize this process in the spray tank. A smaller number of sites (less than a quarter of them) had pH levels greater than 8.5. Above this level, the rate of hydrolysis is rapid enough to cause breakdown of compounds such as Carzol and Imidan if there is any delay in spraying the tank once it is mixed. In a few sites having a pH above 9.0, compounds such as Guthion and malathion, which would not break down in most situations, may have problems. It is also important to note that in any one site, ground water pH can vary substantially (by nearly 2 pH units) during the season.

In order to prevent alkaline hydrolysis, you should:

1 - Determine the pH of your spray solution; because of seasonal variability, this should be done more than once during the growing season. Measuring your spray water pH before mixing can be misleading, because the chemicals you use can raise or lower the pH of the overall spray solution. It makes more sense to take the time to run some bottle tests of your most-used spray materials after they have been mixed with your spray water. The most accurate method is by using an electronic pH meter; however, these are expensive and not very practical. Another, less accurate method uses dyes that change color in response to pH. These are available in the form of paper strips, or in solution for use in soil pH test kits. In general, the indicator is mixed with or dipped into the water, and the resulting color is compared against a standard color chart.

2 - To minimize loss of chemical effectiveness

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from hydrolytic breakdown in the tank, it is a good practice to apply right after it is mixed (as much as is allowed by the weather and other factors). If a delay occurs, a buffering agent may be added to the tank if the pH is high and the chemical you are using is susceptible to alkaline hydrolysis; these agents work by lowering the pH and resisting pH change outside of a certain range. A pH in the range of 4-6 is recommended for most pesticide sprays.

Buffering agents are available from many distributors; some examples are: Buffer-X (Kalo Lab), Nutrient Buffer Sprays (Ortho), Spray-Aide (Miller), Sorba-Sprays (Leffingwell), Mix Aid (Agway), and Unite (Hopkins). Some sources for pH testing materials are (pH Indicator Paper): Ward's Natural Science Est., PO Box 1712, Rochester, NY 14603; VWR, PO Box 1050 Rochester, NY 14603; Fisher Scientific, PO Box 8740, Rochester, NY 14642; (Soil pH Test Kits): Agronomy Soil Test Lab, 804 Bradfield Hall, Cornell Univ., Ithaca, NY 14853.

Growers often add technical flake calcium chloride to the tank when spraying cultivars such as McIntosh, which is susceptible to storage disorders related to inadequate levels of fruit calcium. However, research done in Massachusetts indicates that, although calcium chloride does not itself affect pH, a contaminant present as a result of the manufacturing process does increase the pH of the solution; this could in turn encourage alkaline hydrolysis. There are a few pesticide materials that should not be acidified under any circumstances, owing to their phytotoxic nature at low pH. Sprays containing fixed copper fungicides (including Bordeaux mixture, copper oxide, basic copper sulfate, copper hydroxide, etc.) and lime or lime sulfur should not be acidified. But if the product label tells you to avoid alkaline materials, chances are that the spray mixture will benefit by adjusting the pH to 6.0 or lower.

For further information on water pH and pesticide effectiveness, refer to N.Y. Food & Life Sci. Bull. No. 118, "Preventing decomposition of agricultural chemicals by alkaline hydrolysis in the spray tank", by A. J. Seaman and H. Riedl, from which much of this information was adapted.❖❖

INSECTS

EUROPEAN RED MITE AND SAN JOSE SCALE

EUROPEAN RED MITE AND SAN JOSE SCALE CONTROL IN APPLES USING OIL

❖❖ It won't be long before you need to make a decision on early season mite and scale control in apples, and once again we want to emphasize the wisdom of choosing an oil application over alternative methods, in order to conserve the efficacy of the miticides we still have. One way is by using something other than Kelthane, Omite, or Carzol during the early season if at all possible. Our preferred approach continues to be a delayed-dormant spray of petroleum oil from green tip through tight cluster. Technically, of course, we have been advising that it is possible to get good control using 2 gal/100 at the green tip through half-inch green stage, or 1 gal/100 at tight cluster; this advice assumes ideal weather and excellent coverage. In the real world, however, oil applications haven't always lived up to our expectations, not only because of weather and coverage problems,

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but also because proper timing is difficult. That is, we have seen mites start to hatch when the trees are at solid tight cluster, and the spray loses much of its effectiveness once the eggs have legs. To be practical, you'll probably be better off if you do the following:

1) In order to be sure that mites are still in the egg stage, start on your blocks as early as the weather and ground conditions permit, even if it means using a higher rate.

2) Tend toward the high end of the dosage range, especially if there's no danger of freezing temperatures 48 hr before or after the application. A distinction that might be worth making is to use 1.5 gal/100 if the buds linger somewhere between half-inch green and full tight cluster during your chosen spray period.

3) As an alternative, Morestan at pink has given very good results in recent years; it makes sense to take advantage of this material's limited (prebloom) period of application in blocks where you can't oil.

The success of an oil application depends on a number of factors. First, the absence of foliage at this time leaves the eggs more exposed to the spray material, so there is no better time for achieving a high mortality rate. However, good coverage of the trees is essential to take advantage of this potential efficiency; this in turn requires adequate spray volume delivered at an appropriate speed. Experience and research show that a 1X concentration (300 gal/A) is clearly preferable; however, if all other conditions are perfect (weather, speed, calibration), then 3X, or 100 gal/A, is the highest concentration that MIGHT be expected to give acceptable control at any given time. Some growers have concentrated more than this to save time and the hauling of extra water, with no problems; you might get away with it, but it doesn't really pay to take the risk. The influence of tractor speed on European red mite control has been a debated subject as well. Research has shown that a 'normal' tractor speed of 2.5 mph results in adequate mite population reductions until early summer, but reducing the speed to an unrealistically slow 0.7 mph does not improve control efficacy. Increasing it to 5.7 mph, however, results in unacceptable population resurgence before the early summer treatment would normally be applied.

For **San Jose scale**, a 2% oil treatment at half-inch green will control the nymphs, and is the preferred treatment if no other problem insects need to be controlled. Combining the oil with an insecticide is usually not more effective in this case than using the oil alone. If you choose not to use oil against the scale nymphs, or have rosy apple aphid or other early season insects to be controlled, an insecticide would be more appropriate. For both of these pests, Lorsban 4EC or Supracide 2EC have proven very effective during the green tip to tight cluster stage. Check the opening buds for infestations of rosy apple aphid; treatment would be advisable upon finding one colony per100 clusters. ❖❖

PEAR PSYLLA

❖❖ Just an update on Agri-Mek: I received word this past week that our Section 18 request for use of Agri-Mek on pears has been passed along to the EPA by the DEC. This puts New York on an equal footing with the other pear-producing states that are tendering a request for this material. With any luck, EPA will make their decision in time for growers and distributors to get organized for this season. We'll keep you posted.❖❖

PHENOLOGIES (Geneva)

Apple, Pear, Cherry, Peach, Plum: **all dormant**

PHEROMONE TRAP CATCHES
Number/Trap/Day, Geneva NY

	3/20	3/23	3/30
Green Fruitworm	0	0	0

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1-3/23):	29	7

Coming Events:	**Ranges:**	
Green Fruitworm 1st adult catch	41-143	9-69
Pear Psylla adults active	2-121	0-42
Pear Psylla 1st oviposition	27-147	10-72
Redbanded Leafroller 1st adult catch	32-480	17-251
Apples at Green Tip	39-147	19-61

Note: For current information in your area of the state, check PEST STATUS under FRUIT on CENET.

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