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THE OHIO STATE UNIVERSITY Newsletter Extension

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Calendar

April 7: North Central Ohio Fruit Crops Breakfast, Vanson's Restaurant, Intersection of St. Rte. 99 and U.S. Rte. 20, Monroeville. Breakfast at 8:00 AM; discussion at 8:45, featuring Dr. Celeste Welty, Extension Entomologist, OSU.

Egg Hunt

Source: Art Agnello, Scaffolds Fruit Journal, Cornell University, Geneva, New York

The European red mite (ERM), *Panonychus ulmi* (Koch), is the most important mite species attacking deciduous fruit orchards of North America, being the only species in NY that can maintain itself at high populations in commercial orchards, and is one of the few mites in the state that overwinters as a fertilized egg. The egg is dark red, has a ridged surface, and is a slightly flattened or onion shape in form including a short "stalk" arising from the egg's center. The winter eggs are frequently deposited in groups on roughened areas of the bark, especially around the bases of buds and fruit spurs, and may be so numerous as to give, to the unaided eye, a reddish cast to infested areas.

Winter egg deposition occurs over a relatively long period during the summer. This form passes the winter in a state of diapause, or arrested development, which carries the population through the cold winter period that is unfavorable for growth. When the weather returns to conditions in which the mite can resume active life, diapausing eggs are stimulated to hatch. Some winter eggs may be laid in July, but most are deposited from mid- to late August. Environmental factors inducing winter egg production include: diminishing food supply (or food quality), lowered temperature, and decreasing photoperiod (daylength). Of these, photoperiod and temperature are the most important factors. Food availability becomes a factor if it is depleted or restricted, as can happen when populations reach high levels early in the season, and the quality of the foliage on which they occur suffers because of excessive feeding. This drop in food quality can condition the females to produce winter eggs somewhat before the temperature and daylength alone would cause the mites to enter diapause. Such situations have been observed to take place as early as mid-July. If injury to foliage is not severe early in the season, populations often build

up significantly in late August and early September. Many of these late-appearing females deposit their eggs in the calyx and stem ends of apple fruits, in addition to the wood surface.

The survival of the winter ERM egg has been addressed by a few researchers in the past, and some facts are known fairly well, but others have yet to be formally documented. First of all, the outer shell of winter egg is structurally similar to that of ERM eggs laid in the summer, except that the summer egg is vulnerable to desiccation up to six hours after deposition, but the winter egg is able to survive desiccating conditions as soon as it is deposited. Both types of egg are laid on the substrate, and then a layer of cement (for attachment) and a layer of wax (for waterproofing) is secreted over it; however, the winter egg is held in the mite until a developmental stage at which it is already waterproofed, before being laid and receiving these additional coverings.

The eggs must go through a period of chilling in order to resume their development and proceed to hatch; it is estimated that hatching occurs 3-4 weeks after the breaking of diapause. Studies have found that the fully developed mite embryo (= larval stage) is stimulated to break the eggshell by light; in one trial, 86% of the eggs being studied hatched during daylight. Researchers have found that winter eggs in diapause never hatch if temperatures remain between 64-77 degrees F, but diapause can be broken by chilling the eggs (at 34-48 degrees F) for 100 to 200 days. Less time is required at lower chilling temperatures.

Every year, the winter weather pattern in NY produces questions about the effect on ERM eggs, in terms of their ability to either tolerate exceptionally cold temperatures, or to take advantage of unusually mild weather. The fact is that there is always some winter mortality of ERM eggs, that it can be quite variable (ranging from perhaps 15% to nearly 60% in severe cases), and that it is dependent on many different factors, such as orchard micro-habitat and air drainage, amount of snow cover, and genetic characteristics of local populations, in addition to simple raw temperature readings. One study conducted in NY after the extremely cold winter of 1956-57 showed that ERM hatch was cut drastically (to 1-20% of normal) in western NY after a 3-5-day period in the -23 to -28 degree F range, but that hatch reduction was not uniformly this severe in the Lake Champlain growing region following the same temperature pattern. These results suggest that the eggs in that district may have been conditioned to withstand lower winter temperatures than in warmer parts of the state. The long-term average winter minimum in Peru, NY is approximately -22 F, whereas in the Geneva area it ranges from -10 to -15 F.

Bearing this in mind, it still should be noted that an evaluation of winter ERM egg numbers is used for management purposes in some apple growing regions. One representative procedure was developed by Dick Rogers in Nova Scotia during the early 1990's, and is still used routinely with success by growers in that area. The technique involves examining 10 spurs from each of 3-10 trees per block to determine egg abundance. The "spur" sample unit is defined to be the equivalent of about 3 cm (slightly > 1 inch) of wood around a spur or bud from at least 2-year old wood that is < 2 cm (0.8 inch) in diameter. Spurs are examined on the trees to avoid time-consuming collection and laboratory analysis. A scoring of the abundance of eggs on this unit of spur wood is based on a scale from 0-4, as follows:

Score	Number of Eggs
0	0
1	1-10
2	11-50
3	51-100

4	>100

The scores for all the spurs in a sample are tallied, and an average score is calculated by dividing the total tally by the number of spurs examined. Three levels of intervention are envisioned as being possible outcomes of the sampling process. Therefore, three arbitrary thresholds were established that could be related to the scoring system used. These are shown below:

Threshold	Recommendation	Example ERM Egg Population
0	No treatment	0% of spurs w/eggs
0.1	Superior oil "concentrate" (not available in U.S.) at 0.5% at tight cluster	10% of spurs w/ 1-10 eggs
1.0	Superior oil (i.e., 6E) at 1-2% at tight cluster	100% of spurs w/ 1-10 eggs
2.0	Early season ovicide (e.g. Apollo)	100% of spurs w/ 11-50 eggs

This method appears to be reliable in Nova Scotia, provided the persons sampling have some training and experience, and mite counts in June suggest that egg scores may even be a fairly good predictor of post-bloom mite numbers. However, it should be mentioned that this type of sampling method has not been verified under NY conditions, and that differences in mite populations, weather patterns, and mite control products (history and labelling restrictions) could very well necessitate considerable modifications of the above guidelines. Nevertheless, egg scores might be useful as a relative index of potential mite numbers in any block, although the overriding influence of spring weather conditions should never be dismissed as an ultimate factor in the development of early summer ERM populations.

In general, it can be an advisable practice to survey the spur wood in blocks with a history of moderate to severe mite problems, particularly after seasons when mites were not so abundant, because under such conditions high populations can build up and lay high numbers of eggs in September (after the grower has stopped thinking about them). A severely cold winter can reduce the viability of the eggs that are present in the spring, but favorable developmental weather early in the season can easily compensate for a small founding egg population, whereas a cold, wet and extended April and May can serve as effectively to retard mite development as would a good early season spray program.

Fire Blight

Source: Bruce Bordelon, Facts for Fancy Fruit, March 24, 1999, Dept. of Horticulture, Purdue University

If fire blight has not been a problem in your orchard over the past few years there is no need to apply a copper-based dormant spray. Dormant copper sprays are most beneficial in those years following severe fire blight. However, if you do feel copper sprays are needed, we suggest you apply copper to the entire

orchard block, including non-susceptible cultivars. The reason for treating non-susceptible cultivars is that even normally fire blight resistant' trees like Red Delicious can be colonized by the bacteria and serve as a source of infection during bloom. If copper sulfate (4 pounds per 100 gallons) is used, be sure to apply it when trees are dormant. If applied late it may burn leaf tissue. Also, do not apply copper sulfate with oil; apply copper sulfate and dormant oil as separate sprays, spaced at least 10 days apart. If copper sulfate is applied under poor drying conditions or later than silver tip, plant injury can result. An alternative to copper sulfate are the fixed coppers such as Kocide and C-O-C-S; most fixed coppers do not have the compatibility problems of copper sulfate and can be tank-mixed with early season oil sprays. Remember, however, that even fixed coppers, if applied after half-inch green, can cause fruit russetting in years when there is not enough rain to remove the copper residues before tight cluster. Collar rot of apple: Think back to late last summer. Did trees in your orchard show premature leaf reddening, sparse, yellow foliage, and many small, highly colored fruit? Such symptoms, if accompanied by a canker (localized discolored tissue) at or just below ground level, are evidence of possible collar rot, caused by the soil-borne fungus, Phytophthora. If collar rot is suspected, we advise the use of Ridomil 2E or Aliette. We especially recommend these fungicides in those problem, wet areas having poor drainage and heavy, clay-type soil. Be sure to treat surrounding healthy-appearing trees, not just trees already showing severe symptoms of collar rot. Both these fungicides are best used to prevent collar rot.... not cure it. Note: Ridomil Gold EC and Ridomil Gold WSP are new formulations of Ridomil that will eventually replace the Ridomil 2E formulation.

Powdery Mildew of Apple

Source: Bruce Bordelon, Facts for Fancy Fruit, March 24, 1999, Dept. of Horticulture, Purdue University

The Pathologist's Almanac states: after a very cold winter there will be very little powdery mildew on apple; however, after a very mild winter powdery mildew may be severe. If this prediction holds true, we could be in for a bad mildew year. It might be wise to use a fungicide that will also control mildew in your early scab sprays. Nova and Rubigan are excellent for scab, powdery mildew, and rust control.

Peach Leaf Curl

Source: Bruce Bordelon, Facts for Fancy Fruit, March 24, 1999, Dept. of Horticulture, Purdue University

Peach trees need all the help they can get; that includes a spray for control of peach leaf curl. If you have not yet sprayed for leaf curl, get on your tractor and spray the first chance you get. If peach trees are at, or past bud swell, you're too late.

Currant Restrictions Revisited

Dr. Mike Ellis brought to our attention that he and Leona Horst recently completed Home Yard & Garden Fact Sheet #3205-98 - *White Pine Blister Rust on Currants and Gooseberries*. These are Ohio's "currant" regulations to suppress and control White Pine Blister Rust Disease.

(A) The European black currant, *Ribes nigrum* L. or any variety of this species is hereby declared to be a public nuisance, and it shall be unlawful for any person to possess, transport, plant, propagate, sell, or offer for sale, plants, roots, scions, seeds, or cuttings of these plants in this state.

(B) Recognized varieties, e.g., "Consort," produced by the hybridization of *Ribes nigrum* L. or a variety

thereof with a resistant or immune species, known to be immune or highly resistant to the White Pine Blister Rust fungus, (*Cronartium ribicola*, Fischer) are exempt from the restrictions imposed by paragraph (A) above.

Note: Ohio law does not prohibit the planting of red currants or gooseberries within the state.

Sonia Schloemann, University of Massachusetts, will soon be updating us on Massachusetts' proposed Ribes Regulations. Hearings are scheduled for April 8, 1999 for the purpose of receiving testimony on proposed changes to the regulations governing currants and gooseberries.

Straw Removal from Strawberries

Straw should be removed from strawberry beds before the plants grow enough to cause yellowing of foliage. Rake most of the straw off the tops of the beds and into the row middles. Leaving some straw on top of the beds for plants to grow up through provides a clean surface for fruit. Studies done in Illinois indicate that the proper time to remove straw is when the soil temperature at 4 inches averages about 40-43 degrees F. This temperature is usually reached in March for most areas of the state. Allowing the leaves to become etiolated (yellowed with long petioles) due to late straw removal can reduce yields by as much as 25%. However, uncovering the plants early may promote early growth and increase chances of frost or freeze injury. This is a judgment call that growers have to make for themselves. After the straw is removed, the frost protection irrigation equipment should be set up.

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