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THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

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Calendar

July 10: Ohio Fruit Growers Society Summer Tour, Hirsch Fruit Farm, Chillicothe, OH. Registration for the Summer Tour begins at 8:00 a.m. Member fees are $15 per family & $10 per individual; nonmember fees are $20 & $15. The Ohio State University Extension Fruit Team will be selling fruit bulletins, and Specialists will be available to answer your questions.

As an extension of the Summer Tour, OSU's Piketon Research & Extension Center has scheduled an afternoon tour of their facilities. Beginning at 3 p.m., there will be tours of horticulture & soil & water demonstration plots, aquaculture research, and business & learning center facilities. More information about the centers at Piketon is available at http://www.ag.ohio-state.edu/~prec/. For more info about the summer tour, call Tom Sachs at 614-249-2424.

July 23: Licking County Twilight Fruit School, Branstool Orchards. Contact Howard Siegrist at 740-349-6900 for more information.

Using Quadris

Source: Mike Ellis, OSU Plant Pathologist

I think our growers are aware of Abound (azoxystrobin) damage to sensitive apple varieties such as Cortland, MacIntosh, and Gala. Quadris is the same fungicide as Abound. What concerns me is that many apple growers also have pumpkins and other cucurbits, and many of them raise sweet corn. Quadris is labeled for use on all of these crops and it is very effective. Thus, growers will probably use it.

It is very important that apple growers applying Quadris to other crops DO NOT use the same sprayer to apply anything to apples. Also, great care needs to be taken to prevent drift of Quadris onto apple trees. Even low concentrations can be very phytotoxic to sensitive apple varieties. It is like spraying them with a contact herbicide like Gramoxone (paraquat).

Strawberry Renovation

Source: Bruce Bordelon, Purdue Horticulturist, Facts for Fancy Fruit 2002-08, June 19, 2002

Matted row strawberry plantings must be renovated after harvest to establish new crowns for next year's crop. For best results, renovation should be started immediately after the harvest is completed to promote early runner formation. The earlier a runner gets set, the higher its yield potential. Renovation should be completed by mid-July in normal years. Harvest is winding down in southern areas so growers should begin renovation as soon as the last marketable berries are harvested. The following steps describe renovation of commercial strawberry fields.

1. Weed control: Annual broadleaf weeds can be controlled with 2,4-D amine formulations. Check the label, as only a few products are labeled for use on strawberries. (e.g. Formula 40 [2,4-D alkanolamine salts plus 2,4-D Triisopropanolamine salt (4 lbs/gal)] or Amine 4 [Dimethylamine salt of 2,4-D (3.74 lb/gal)] at 2 to 3 pts/acre in 25-50 gallons of water applied immediately after final harvest. Be extremely careful to avoid drift when applying 2,4-D. Even though the amine formulation is not highly volatile, it can volatilize under hot, humid conditions and can cause damage to desirable plants a considerable distance from the site of application. Some damage to strawberries is also possible. Read and understand the label completely before applying 2,4-D amine. If grasses are a problem, sethoxydim (Poast) will control annual and some perennial grasses. However, do not tank mix Poast and 2,4-D. See the *Ohio Commercial Small Fruit Spray Guide* and the product label for rates and especially for precautions.

2. Mow the old leaves off just above the crowns 3-5 days after herbicide application. Do not mow so low as to damage the crowns.

3. Fertilize the planting. A soil test will help determine phosphorus and potassium needs, but foliar analysis is a more reliable measure of plant nutrition. For foliar analysis, sample the first fully expanded leaves following renovation. Nitrogen should be applied at 25-60 lbs/acre, depending on vigor. It is more efficient to split nitrogen applications into two or three applications at regular intervals, rather than apply it all at once. A good plan is to apply about half at renovation and half again in late August.

4. Subsoil: Where picker traffic has been heavy on wet soils, compaction may be severe. Subsoiling between rows will help break up compacted layers and provide better infiltration of water. Subsoiling may be done later in the sequence if soils are too wet now.

5. Narrow rows: Reduce the width of rows to a manageable width based on your row spacing, the aisle width desired, and the earliness of renovation. A desirable final row width to attain at the end of the season is 12-18 inches. Wider rows lead to low productivity and increased disease pressure. This means

that rows can be narrowed to as little as 6 inches during renovation. Use a roto-tiller or cultivator to achieve the reduction. Since more berries are produced at row edges than in the middle, narrow rows are superior to wide rows. Narrow rows will give better sunlight penetration, disease control, and fruit quality.

6. Cultivate: Work in straw between rows and throw a small amount of soil over the row by cultivation. Strawberry crowns continue development at the top, and new roots are initiated above old roots on the crown, so 1/2 to 1 inch of soil on the crowns will facilitate rooting. This also helps provide a good rooting medium for the new runner plants.

7. Weed control: Pre-emergence weed control should begin immediately. Dacthal, Sinbar, or Devrinol are suggested materials. See the *Ohio Commercial Small Fruit Spray Guide* and check the product labels carefully. Devrinol must be incorporated by irrigation, rainfall, or cultivation to be effective. Rate and timing of Sinbar application is critical. If regrowth has started at all, significant damage may result. Some varieties are more sensitive to Sinbar than others. If unsure, make a test application to a small area before treating the entire planting. Use 2 to 6 oz/acre/application and no more than 8 oz/acre/year total. Sinbar should not be used on soils with low organic matter, or on sensitive varieties like Guardian, Darrow, Tribute, Tristar and possibly Honeoye. If Sinbar gets onto strawberry leaves, irrigate to wash it off.

8. Irrigate: Water is needed for both activation of herbicides and for plant growth. Don't let the plants go into stress. The planting should receive 1 to 1-1/2 inches of water per week from either rain or irrigation.

9. Cultivate to sweep runners into the row until plant stand is sufficient. Thereafter, or in any case after September, any runner plant not yet rooted is not likely to produce fruit next year and is essentially a weed and should be removed. Coulter wheels and/or cultivators will help remove these excess plants in the aisles.

10. Adequate moisture and fertility during August and September will increase fruit bud formation and improve fruit yield for the coming year. Continue irrigation through this time period and fertilize if necessary. An additional 20-30 pounds of N per acre is suggested, depending on the vigor.

The Codling Moth in Ohio: Historical and Ecological Aspects

Source: Dr. C. R. Cutright, Research Bulletin 969

The 1877 Annual Report of the Ohio State Horticultural Society named the codling moth as the greatest obstacle to successful apple growing in the state. Records of early recommendations for codling moth control are almost nonexistent, but from farm papers that were circulated in Ohio prior to the Civil War it is known that pasturing livestock in the orchard or collecting and feeding dropped fruits to animals was a common practice. Also, some use was made of hay twists or bands which were placed around the tree trunk to trap the larvae. It was recommended that these bands be removed from the trees every 7 to 10 days and burned.

Hay twists or bands were made by starting with a handful of hay at the edge of a pile of hay or a hay stack and twisting it. As the twist formed the person making it backed away from the stack continuing the twisting. With some practice a twist or band up to 5 or 6 feet in length could be obtained in a few minutes. Dr. Cutright made such bands, which were used in a experimental comparison with burlap-faced paper and corregated cardboard bands. In these experiments the hay bands were inferior to the others, in

that they did not trap as many codling moth larvae.

The first Ohio Spray Schedule was issued in 1897 as part of a bulletin which dealt with disease and insect pests. Paris green or London purple were recommended for use on apple and were to be mixed with Bordeaux mixture or lime. The general use of lead arsenate, which started around 1900, greatly reduced the injury by codling moth and most growers and entomologists felt that the problem was solved for all time. This solution proved to be short-lived.

In 1926 Dr. Cutright was assigned the problem of controlling apple insects, and he began a 37-year study of the codling moth at Wooster. When he summarized the records for those 37 years, he stressed the great differences in infestations that existed from season to season, between areas, and among orchards in the same area. He found that spring generation moths began to emerge as early as May 1 and as late as May 31 at Wooster. Emergence ended as early as June 8 and as late as July 10. Peak emergence occurred as early as May 6 and as late as June 5. Once underway, emergence continued from 6 weeks to 2 months. (The spring generation overwintered as a fully developed larvae. Pupation occurred about the same time as bloom, with adults first active in late April in southern Ohio and in early May in northern Ohio).

Emergence of the summer brood, again at Wooster, began as early as July 2 and as late as July 28. Emergence ended as early as August 19 and as late as September 16. Peak emergence occurred as early as July 18 and as late as August 13. Interestingly, the earliest emergence (July 2) was recorded in 1962, which was the year of the latest emergence (September 16).

Dr. Cutright divided the ecological factors that affected codling moth activity into two groups - climatic conditions and non-climatic conditions. He subdivided the non-climatic conditions into factors that favor the codling moth and those that do not. Climatic factors he cited were temperature, rainfall, humidity, evaporation, wind, and the intensity of light. When considered either alone or in combination with the other climatic elements, temperature is the most important factor that influences codling moth behavior.

Among the non-climatic conditions, the factors favoring the codling moth include mono-culture, annual bearing (yearly food source), light apple crops, concentration of apple orchards, large trees, varieties, interplanting, heavy initial populations, orchard sanitation, harvesting practices, and resistance to insecticides. Factors that aid in codling moth control include pruning, thinning infested fruits, and natural enemies. Predators, parasites, nematodes, and diseases are natural enemies of the codling moth.

The factor of heavy initial populations was explained with this discussion: "The number of moths that successfully emerge following the pupation of overwintering larvae is considered as the initial population for the oncoming season. If this population is numerous, chances for severe damage are much greater than if the population is low. Since numbers present is a factor of importance, it is necessary that some method of determining the population be known. Possibly the most accurate and simple method to use is based on the amount of damage caused by the codling moth during the previous season. (This report dates from a time before the widespread use of pheromone traps).

"For example, if the crop of fruit was large and was damaged to the extent of 0.5 percent, this would mean a relatively low initial population. However, if the damage amounted to 5.0 percent , a serious problem might develop due to the much greater number of insects that would be present. With a light crop, 1.0 percent injury should not be too alarming, but if the damage were 10 percent, then the opposite condition would exist.

"In all cases it should be borne in mind that weather conditions affect the development of the population. Favorable weather may increase the damage done by a low population while unfavorable conditions will decrease the harmful effects of a high population. Nevertheless, the initial population should always be

taken into account."

Aphids - Green Apple & Wooly Apple

Source: Art Agnello & Harvey Reissig, Entomology, Geneva, NY, Scaffolds Fruit Journal, June 24, 2002

Green Aphids: Apple aphid, *Aphis pomi* De Geer; Spirea aphid, *Aphis spiraecola* Patch

Although small numbers of these aphids may be present on trees early in the season, populations generally start to increase in mid- to late June. This trend has been evident once again this year, as the plentiful rains and recurring heat have resulted in a profusion of succulent terminal growth much favored by these insects. Large numbers of both species may build up on growing terminals on apple trees during summer. Both species are apparently common during the summer in most N.Y. orchards, although no extensive surveys have been done to compare their relative abundance in different production areas throughout the season.

Nymphs and adults of both species suck sap from growing terminals and water sprouts. High populations cause leaves to curl and may stunt shoot growth on young trees. Aphids excrete large amounts of honeydew, which collects on fruit and foliage. Sooty mold fungi that develop on honeydew cause the fruit to turn black, reducing its quality.

Aphids should be sampled several times throughout the season starting in June. Inspect 10 rapidly growing terminals from each of 5 trees throughout the orchard. Record the percentage of infested terminals. No formal studies have been done to develop an economic threshold for aphids in N.Y. orchards. Currently, treatment is recommended if 30% of the terminals are infested with either species of aphid, or at 50% terminal infestation and less than 20% of the terminals with predators. An alternative threshold is given as 10% of the fruits exhibiting either aphids or honeydew.

The larvae of syrphid (hoverflies) and cecidomyiid flies (midges) prey on aphids throughout the summer. These predators complete about three generations during the summer. Most insecticides are somewhat toxic to these two predators, and they usually cannot build up sufficient numbers to control aphids adequately in regularly sprayed orchards. Check Tables 5 (p. 50) and 12 (p. 57) in the Recommends for toxicity ratings of common spray materials. Both aphids are resistant to most organophosphates, but materials in other chemical classes control these pests effectively, including Asana, Danitol, Dimethoate, Lannate, Provado, Thiodan, and Vydate.

Woolly apple aphid: *Eriosoma lanigerum* (Hausmann)

WAA colonizes both aboveground parts of the apple tree and the roots and commonly overwinters on the roots. In the spring, nymphs crawl up on apple trees from the roots to initiate aerial colonies. Most nymphs are born alive to unmated females on apple trees during the summer. Colonies initially build up on the inside of the canopy on sites such as wounds or pruning scars and later become numerous in the outer portion of the tree canopy, usually during late July to early August.

Aerial colonies occur most frequently on succulent tissue such as the current season's growth, water sprouts, unhealed pruning wounds, or cankers. Heavy infestations cause honeydew and sooty mold on the fruit, and galls on the plant parts. Severe root infestations can stunt or kill young trees but usually do not damage mature trees. Large numbers of colonies on trees may leave sooty mold on the fruit, which

annoys pickers because red sticky residues from crushed WAA colonies may accumulate on their hands and clothing.

During late June, water sprouts, pruning wounds, and scars on the inside of the tree canopy should be examined for WAA nymphs. During mid-July, new growth around the outside of the canopy should be examined for WAA colonies. No economic threshold has been determined for treatment of WAA. *Aphelinus mali*, a tiny wasp, frequently parasitizes WAA but is very susceptible to insecticides and thus does not provide adequate control in regularly sprayed commercial orchards. Different rootstocks vary in their susceptibility to WAA. The following resistant rootstocks are the only means of controlling underground infestations of WAA on apple roots: MM.106, MM.111, and Robusta.

WAA is difficult to control with insecticides because of its waxy outer covering and tendency to form dense colonies that are impenetrable to sprays. WAA is resistant to the commonly used organophosphates, but other insecticides are effective against WAA, including Thiodan and Diazinon.

Rosy Apple Aphid

Source: Common Tree Fruit Pests by Angus H. Howitt

This is an old European species introduced into the United States about 1870. It became a major pest of apples near the end of the 19th century. To thrive, this species must have an abundance of its summer host plant, the narrow-leaved plantain. A remarkable parallelism exists between the introduction and spread of rosy apple aphid and the narrow-leaved plantain.

The rosy apple aphid (RAA) overwinters in the egg stage with the eggs hatching with the opening of apple buds in the spring. The young RAA feed on buds, first feeding on the outside of the leaf bud and leaf bud clusters until the leaves begin to unfold. Then they work their way down inside the clusters and begin sucking the sap from the stems and newly formed fruits. Their feeding causes the leaves to curl, protecting the aphids from sprays and some enemies. The severe curling of the foliage caused by this species is probably the most characteristic feature of its work.

The second generation are mostly wingless females. A majority of the third generation, which are produced in June and early July, develop wings and migrate to the narrow-leaved plantain. In some seasons, wingless females of the third generation produce a fourth generation on apple.

The adult varies considerably in color markings. The general color is rosy brown, with a pinkish cast due to a powdery covering. Some of the older adults are almost purple, while the younger adults are decidedly reddish pink.

The rosy apple aphid causes more damage and is more difficult to control than either the green apple aphid or the wooly apple aphid. Large numbers of any type of aphid can stunt new growth and cause sooty mold to develop on fruit and leaves. However, the potential damage from the RAA is greater because of the toxin it injects with its saliva that causes the leaf to curl and the fruit to abort or to be small or distorted.

Pest Phenology

Coming Events	Degree Day Accum. Base 50F
Peachtree borer flight peaks	506-1494
Apple maggot adult 1st catch	629- 1297
Redbanded leafroller 2nd flight begins	656-1381
Codling moth 1st flight subsides	673-1412
Spotted tentiform leafminer 2nd flight peak	701-1355
Oriental fruit moth 2nd flight begins	772-1215
San Jose scale 2nd flight begins	893-1407
Codling moth 2nd flight peak	931-1698

Thanks to *Scaffolds Fruit Journal* (Art Agnello)

Degree Day Accumulations for Ohio Sites - June 26, 2002

Location	Degree Day Accumulations Base 50F	
	Actual	Normal
Akron-Canton	876	901
Cincinnati	1189	1298
Cleveland	896	876
Columbus	1161	1067
Dayton	1095	1108
Kingsville Grape	788	784
Mansfield	883	904
Norwalk	845	933
Piketon	1193	1206
Toledo	974	870
Wooster	954	823
Youngstown	858	807

SkyBit® Sooty Blotch Prediction for North-Central Ohio

Observed:
June 1-26: active, but no infection

Predictions based on weather forecasts:
June 27-30, July 1-6: active, but no infection

SkyBit® Fire Blight Prediction for North-Central Ohio

Observed:
June 1-2, 9-10, 19: not active
June 3-4, 6-8, 13, 16, 18: active, but not infection
June 5, 11-12, 14-15, 17, 21-22, 25-26: possible infection & damage

Predictions based on weather forecasts:
June 27-30, July 1-6: possible infection & damage

Fruit Observations & Trap Reports

Insect Key

AM:	apple maggot
CM:	codling moth
ESBM:	eye-spotted budmoth
LAW:	lesser apple worm
LPTB:	lesser peachtree borer
OBLR:	obliquebanded leafroller
OFM:	oriental fruit moth
PTB:	peachtree borer
RBLR:	redbanded leafroller
SJS:	San Jose scale
STLM:	spotted tentiform leafminer
TABM:	tufted apple budmoth
VLR:	variegated leafroller

Site: Waterman Lab, Columbus
Dr. Celeste Welty, OSU Extension Entomologist

Apple: 6/19 to 6/26/02
RBLR: 37 (down from 38)
STLM: 43 (up from 41)
CM (mean of 3 traps): 10.3 (down from 11.7)
TABM: 3 (up from 2)
SJS: 0 (same as last week)

VLR: 0 (down from 3)
OBLR: 2 (up from 1)
AM (sum of 3 traps): 12 (up from 10)

Peach: 6/19 to 6/26/02
OFM: 2 (down from 3)
LPTB: 11 (up from 4)
PTB: 3 (up from 2)

Site: East District: Erie & Lorain Counties
Source: Jim Mutchler, IPM Scout

Apple: 6/18 to 6/25/02
CM (mean of 3 traps): 12.2 (up from 6.0)
STLM: 875 (up from 342)
SJS: 0 (same as last week)
OFM: 1.0 (up from 0.7)
RBLR: 11.9 (up from 0)
ERM (infested leaves per 25 leaf sample): 0

Peach: 6/18 to 6/25/02
OFM: 0.3 (up from 0)
RBLR: 2.3 (up from 0)
LPTP: 45.0 (up from 33.0)
PTB: 1.3 (up from 0)

Beneficials present - native lady beetles, green lacewing eggs and adults, orange maggots

Site: West District: Huron, Ottawa, Sandusky Co.
Source: Gene Horner, IPM Scout

Apple: 6/18 to 6/25/02
CM (mean of 3 traps): 5.7 (down from 6.3)
STLM: 44.3 (up from 14.6)
OFM: 2.0 (down from 3.0)
RBLR: 17.2 (up from 1.6)
SJS: 0 (same as last week)
OBLR: 6.2 (first report)
ERM (infested leaves per 25 leaf sample): 0

Peach: 6/18 to 6/25/02
OFM: 1.2 (up from 0.4)
RBLR: 33 (up from 0.6)
LPTB: 11.6 (up from 8.4)
PTB: 2.6 (up from 2.0)

Beneficials present - native lady beetles, green lacewing eggs and adults, banded thrips

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