

PLANT & PEST ADVISORY

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INSIDE

California Peaches, Nectarines, Rootstocks, and Pluots 1

Nut Trees - Budded or Grafted vs. Seedling Trees 2

Brown Rot Part II: ID Inoculum Sources 3

Blueberry Insect Management Update 4

Fruit IPM 4

California White Fleshed Peaches, Nectarines, Rootstocks, and Pluots

Jerome L. Frecon, Gloucester County Agricultural Agent

While in California, I had the opportunity to visit two packing houses handling white fleshed peaches. One was very new, built specifically to handle white fleshed fruit; the second was modified to handle white fruit but also yellow fleshed peaches and nectarines. The first house was packing Arctic Rose, a variety with high sugar and much speckling referred to as sugar bumps or spots. The fruit was picked in a two to three layer plastic lug holding 22 to 25 pounds of fruit. All lugs had wire loops where pickers inserted harness straps to stabilize picking in the boxes. The fruit was packed to meet the California "well matured" label. Lugs were nested in bins holding 9 to 12 lugs per bin, which were hauled on bin trailers. Fruit in one packing house was dry dumped from a twisting conveyor belt on to a flat belt. The lugs were lifted manually out of the bins on to the twisting belt that gently dumped the fruit. In both houses the fruit being packed was not pre-cooled. The second house was packing White Lady, the white peach with the greatest volume. Summer Sweet was also being packed. This variety is firmer than White Lady, ripens a few days later with Sugar Lady, and has a smoother tip and lower chilling requirement than White or Sugar Lady. Fruit with a high chilling requirement greater than 850 hours had a pronounced suture.

All belts were adjusted slower to grade white fruit. Pads and brushes are used to soften movement between equipment and reduce the rotation of the fruit. All white fruit was sorted with optic color sorters. White Lady, Arctic Rose, Sugar Lady and Summer Sweet did not have the amount of red color that they do in my variety block. Other white varieties observed were Arctic Sweet, Arctic Jay, and Arctic Star. All fruit was waxed but no fungicide was used in the wax. A detergent soap was used to wash the fruit in the newer packing house.

Fruit was machine trayed in plastic panta trays holding 18 to 27 fruit. Fruit was packed in very attractive, private label, one layer corrugated boxes. Fruit was turned with the dorsal (tip) end up in the tray. Packed fruit is immediately pre-cooled in storage. All of the white fleshed fruit I observed did not have PLU stickers. One packer stamped his boxes with IPM that were shipped to foreign markets. The packers did not feel they had to sticker this fruit because domestic demand exceeds supply. Prices received by packers was \$10 to \$12 per box for

SEE CALIFORNIA ON NEXT PAGE

Nut Trees - Budded or Grafted versus Seedling Trees

Jerome L. Frecon, Gloucester County Agricultural Agent

For many years I have listened to the debate on budded versus seedling nut trees.

While seedling deciduous fruit trees are not sold, many nurseries sell seedling chestnut, walnut, pecan, and hickory trees. In general, seedling nut trees are quite variable in nut size, shape and flavor with different ripening times, growth habits, and pollination requirements. It is difficult to predict pollination needs on seedling trees of walnut, pecan, and hickory. Seedlings may have male flowers that bloom when female flowers are not receptive and vice versa. This can happen from one seedling tree to the next. True to name, grafted trees have known pollination requirements. Some may even be self pollinating and self fruitful. When you plant a tree you want it to produce nuts!

Some growers have selected "preferred" or "superior" seedling trees in their orchards and then rogued out the poorer seedling trees. Some seedlings perform quite well and exhibit many of the same characteristics of the clonally propagated parent. However, the genetic differences found in seedling trees could cause problems for the commercial orchardist. Budded or grafted cultivars offer uniformity in growth, nut quality, size, shape, flavor, and ripening times.

Of key importance with a budded or grafted tree is the compatibility of the scion (or variety) with the rootstock. Good compatibility is achieved by budding or grafting the named variety on to a known compatible to seedling or clonal rootstocks. Trees clonally propagated by grafting or budding should be planted in a commercial nut producing orchard. □

CALIFORNIA FROM PAGE 1

fruit in the domestic market, and \$15 to \$20 per box for fruit shipped to Far Eastern Countries.

◆ Varieties

I saw literally hundreds of white fleshed peach and nectarine selections in breeding programs. One program was focusing on low acid and sub acid selections for Asian countries who desire this mild sweet fruit. The three most widely planted varieties of white nectarine varieties have clingstone flesh which breeders feel have firmer flesh, better size, and less browning around the pit for better storage life. Most of the important white fleshed peaches have freestone flesh although I saw many beautiful unnamed selections with clingstone flesh. I was pleased to see one relatively new breeding program with some outstanding selections of aromatic, high acid, white fleshed freestone nectarines.

Dave Wilson Nursery in Reedley and Hickman, California has the most extensive collection of named white fleshed peaches and nectarines. Most of these varieties originated at Zaiger Genetics in Modesto, California where I evaluated fruit in both their test grounds and in various commercial orchards and test plantings. A number of nurseries selling in New Jersey contract trees with Dave Wilson. Bright's Nursery in LeGrand, California also offers some outstanding varieties of white fleshed nectarines all of which were bred and developed at Bradford Farms in LeGrand. At least 4 other large farming operations and two nurseries have their own breeding programs. Many of these are not interested in having their varieties tested in New Jersey since the varieties are developed for their growers who market through the company's packing house.

Peach Rootstocks- The variety Citation was developed by Zaiger Genetics and is used extensively on apricots, plums and interspecific hybrids of these two. I did see one nice seven year old planting of nectarines on Citation. However, growers concede that it is not uniformly vigorous enough to produce long lasting orchards.

Viking and Atlas are two peach x plum rootstocks that are being extensively used on almonds. They are very vigorous and tolerate alkaline soils. They are being widely tested on peaches but do not tolerate *Phytophthora sp* any better than other peach rootstocks. Most of the peaches planted in California in 1997 will be on Nemaguard rootstock.

Pluots - Interspecific hybrids with more than 50 % plum and less than 50% apricot are called pluots. Fruit with more than 50% apricot and less than 50% plum are called apriums. Flavor Supreme pluot looks very much like a plum but has over 20% sugar. I have had this variety planted since 1989 but have had little success getting it to fruit. More attractive pluot varieties like Flavorich, Dapple Dandy, and Flavor King are being planted by growers. All of the varieties set fruit more heavily than Flavor Supreme if pollinated by plums. Fruit is being packed like plums.

Nectarines - I toured two farms that were packing 1200 to 1500 1/2 bushels boxes of nectarines per acre. Trees were planted 8 to 10 feet in the row with 14 to 16 feet between rows on a perpendicular V. All fruit wood is grown along two main scaffold branches. Shoots are mowed 3 to 4 times during the growing season to contain vigor and encourage light penetration for development of new fruiting wood. One grower was applying all his nitrogen through the foliage with "Corin" nitrogen sprays.

Flameglo harvest was just beginning. Honeykist and Diamond Ray Harvest was just ending. All are beautiful varieties but Honeykist has outstanding flavor.

Many growers are grafting over Fuji apples to Pink Lady in the San Joaquin valley due to difficulties in growing Fuji and the late maturity and quality of Pink Lady, and Australian apple. □

Brown Rot Part II: Identifying Inoculum Sources

Norman Lalancette, Ph.D., Tree Fruit Pathology

In our brown rot discussion last week, three factors were stated as influencing the severity of fruit infection by the brown rot pathogen, *Monilinia fructicola*: inoculum level, fruit susceptibility, and environment. This week we'll describe how to identify the various inoculum sources. In future issues of P&PA, we'll tackle the remaining two factors.

In part I, we examined the importance of inoculum level as it related to disease pressure. Emphasis was on quantifying the amount of inoculum in an orchard block. Once we had an estimate of the amount of inoculum from all potential sources, we could then better determine the appropriate fungicide spray program.

In order to assess the amount of inoculum, we must first be able to identify the diseased tissues which harbor the fungal spores: blighted blossoms, mummies, and stem cankers. Additional sources of inoculum also need to be investigated, such as infected green fruit on the tree or dropped on the orchard floor during thinning.

◆ Blighted Blossoms

Brown rot blossom blight can be found during bloom or soon thereafter. On peach, the flower anthers are invaded first by the fungus, which then proceeds into the floral tube, ovary, and eventually the peduncle (stem attaching flower to branch). On apricot, plum, and prune, all flower parts can be attacked. Blossom susceptibility, from most to least, is as follows: apricot, prune, sweet cherry, peach, source cherry, and plum.

Once infected, blossoms initially wilt and turn brown. These would be the symptoms during or soon after bloom. However, to assess the amount of infected blossoms at this time of year, look for shriveled flower parts that have turned dark brown or black. Often, the flowers are attached to the twig by a mass of tree gum. Also, if the weather has been recently wet, look for grayish to tan spores covering some or all of the blighted blossoms.

◆ Mummies

Most growers should be able to readily identify mummies. When fruit are attacked by the brown rot fungus, water loss can sometimes occur rapidly. If this tissue is not invaded by other microorganisms, the rot will be dry instead of wet. Under these circumstances, the fruit often clings to the tree and its skin becomes dry, leathery, and dark brown. The infected fruit has become a "mummy" in which the fungus can overwinter.

During spring, the fungus in these mummies sporulate profusely, producing inoculum during the blossom blight phase. Normally, this is the period during which mummies are an important source of inoculum, espe-

cially if a significant number of mummies were formed during last season. In a recent (mid-June) examination of a number of commercial NJ orchards, I have noticed mummies still clinging to the trees. Thus, when assessing the inoculum level in your orchard, don't forget to count mummies.

◆ Twig Cankers

Once the fungus has colonized the blossom, it often enters into the twig or branch and forms an elliptical canker. The margins of the canker have much gum formation, upon which the flower parts often stick. If this canker is able to girdle the twig, then the leaves distal to the canker will die. These leaves usually turn tan to brown and remain attached to the branch.

Another canker that is commonly found on this year's fruiting wood and that can also cause blighting of shoots is fusisporium canker. So how does one tell them apart? Fusisporium cankers began last fall by infection through a leaf scar. Thus, the cankers are centered about a bud or node instead of a blossom. Furthermore, fusisporium cankers tend to be sunken and often have a zonate pattern visible on the surface. Finally, although fusisporium cankers can sometimes exude gum, it's never as profuse as on brown rot cankers.

One final note on brown rot cankers. If the fungus does not girdle the branch, the surrounding healthy tissue will produce callus, thereby "walling off" the canker from further spread. At first, this sounds great ... the branch won't be killed. But these cankers will continue to produce spores over the next couple of years, thus contributing to future brown rot epidemics. Worse yet, these cankers may be colonized by the more aggressive canker-causing fungi, *Leucostoma cincta* and *L. persoonii*. These fungi, which are causal agents of Cytospora canker, can severely weaken and kill limbs, reducing the overall vigor of the tree.

◆ Green Fruit

Although brown rot seldom occurs on immature green fruit, they can become infected under certain circumstances. First, fruit that fails to pollinate correctly often becomes infected and covered with conidia. Second, green fruit that may have been injured by a late frost can become diseased. And finally, any insect damage that causes wounding can allow the fungus to invade and colonize the immature tissue. In all cases, look for small, immature fruit covered with grayish to tan colored spores.

Another potential inoculum source is the green fruit dropped on the orchard floor during thinning. I have already noticed in some commercial orchards infected green fruit on the orchard floor that were sporulating profusely. Of course, this inoculum source is not as well situated as the blighted blossoms, cankers, mummies, and infected green fruit located in the tree canopy. However, if many of the thinned fruit became infected, the sheer volume of spores produced could contribute significantly to infection of the maturing crop. □

Blueberry Insect Management Update

Sridhar Polavarapu, Ph.D., Entomology and IPM

✓ **Blueberry maggot (BBM):** Trap catches in commercial fields in Atlantic and Burlington Counties have remained very low. However, trap catches in abandoned sites in Burlington County are increasing. We are now very close to the peak period of adult activity. Commercial fields that are close to abandoned sites may run the risk of adults migrating and laying eggs. Insecticide applications should continue at 10-14 day intervals to adequately protect the fruit from these migrating adults. Insecticide choices include Malathion, Sevin, Lannate, and Imidan.

✓ **Aphids:** Aphid levels are showing a slight increase in many scouted fields. These low populations do not require an insecticide application. Use Malathion in your BBM sprays if aphids are also present. Predators such as ladybird beetles, lacewings and syrphid flies play an important role in regulating aphid populations. Unnecessary insecticide applications can only do more harm than good by destroying the predator populations leading to a resurgence of aphid populations.

✓ **Leafrollers:** Pheromone trap catches of Redbanded leafroller (RBLR) and Obliquebanded leafroller (OBLR) are decreasing in all monitored fields. Larval populations in monitored fields have remained extremely low so far. Insecticide treatments specifically for RBLR and OBLR control are not required at this time.

✓ **Scarab beetles:** Oriental beetles, Japanese beetles, and Asiatic garden beetles have been active in several commercial fields in both Atlantic and Burlington Counties. Foliar applications of Sevin 50WP or Sevin 4F will control Japanese beetles and Asiatic garden beetles. Please be warned that Sevin will also kill aphid predators such as Asian lady bird beetles which are the most important aphid predator in blueberry fields at the present time.

✓ **Sharp-nosed leafhoppers (SNLH):** SNLH trap counts are decreasing in all monitored fields. The flight of the first generation is now virtually over. □

Fruit IPM

Week Ending 7/12/96

Dean Polk, IPM Agent - Fruit

◆ Apple

✓ **Spotted tentiform leafminer (STLM):** The adult flight is decreasing, while the level of sap feeding mines has increased slightly. While few orchards show blocks with economic populations, leaves should be closely watched over the next week. Blocks with mine counts that approach .5 total mines per leaf have populations that will need to be treated. The majority of active miners should only be visible from the bottom leaf surface (sap feeders) in order for insecticide treatments to work. Vydate L @ 2 pt/A worked well on 1 block of small to medium size trees.

✓ **Tufted apple budmoth (TABM):** Adult activity is minimal on most farms. This insect can be found in various larval stages at the present time. These larvae will mature and pupate with a second adult flight starting during the last of the month to the first part of August. From .5 to 1% fruit injury is common in southern counties, with most larvae about half grown. One farm in Gloucester County had over 5% fruit injury.

✓ **Codling moth (CM):** Trap counts indicate low levels of adult activity in most southern locations. Traps indicate that populations are above treatment levels on many farms in northern counties. Since we are in between codling moth generations, high trap counts at this time may indicate that even higher pressure will be present in a few weeks when the second flight emerges. Growers who have high codling moth pressure should not decrease insecticide rates, and should make sure to treat any time that trap levels exceed 5 males per trap per week. Insecticide treatments that target the second generation should be applied from 1250 to 1300 °D after first catch. This will be around 7/15-18 in southern counties and about a week to 10 days later in northern counties.

✓ **European red mites (ERM):** Both the small black lady beetle mite predator *Stethorus punctum* and the predatory mite, *Amblyseius fallacis* are present in significant numbers where ERM is present. One Warren County farm had over .3 *A. fallacis* per leaf. Since these are very efficient predators, 1/4 to 1/2 a predator mite per leaf is considered significant. Miticides are usually not needed when *A. fallacis* populations reach these levels.

◆ Peach

✓ **Oriental fruit moth (OFM):** While trap counts have decreased for a second week, higher levels of activity are present near poorly managed and abandoned blocks. Slightly less than 1% fruit injury was seen in one such location in Gloucester County. Growers with plantings near or adjacent to abandoned or poorly sprayed blocks should maintain regular insecticide covers. OFM pressure is low in most locations and does not deserve treatment on most farms.

✓ **Tufted apple budmoth (TABM):** Larvae may be found under leaves webbed to the fruit surface in a number of orchards in southern counties. One farm in Gloucester County had between 2 to 3% fruit injury. Trying to control 3rd instar TABM larvae is generally not worthwhile. However, some control is possible with dilute applications of Lannate. Under extreme conditions, Asana may also be used. B.t.s (Biobit, Condor, Dipel, Javelin, MVP, Sok, Thuricide, and Xentari) may be used alone or in combination with Lannate if applications are made

closer than 14 days pre harvest. Any B.t. application should always be applied dilute (150 to 200 gal/A).

✓ **European red mites (ERM):** Mites are generally not a problem, although there are high levels in some blocks. Predators are present, but are not as common as in apple plantings. The material of choice at this time of year is Apollo. While Carzol is labeled, it does not usually work well when temperatures exceed 80 to 85 °F. Vendex is not suggested for rescue treatments.

✓ **Brown rot:** Overall samples of green fruit show from .5 to 1.5% brown rot infection. Mature fruit shows slightly higher levels, especially if pits are split. See previous newsletters for control suggestions.

◆ Blueberry

✓ **Leafroller larvae:** Leafroller larvae are showing up in field samples at very low levels. Only 2.5% of our field samples had significant leafroller larval populations.

✓ **Sharpnosed leafhopper:** Adult trap captures in monitored commercial plantings have decreased since last week and are in the single digits. However, significantly more adults are being found in wild sites. Growers who are surrounded by wild or abandoned blueberries may wish to use insecticides that are effective for leafhoppers.

✓ **Blueberry Maggot:** Maggot fly adults have continued to show very low activity levels in commercial plantings. Adult activity has increased in our monitored wild sites. No commercial fields have trap averages that exceed our provisional threshold of 1 fly per trap per week.

✓ **Oriental Beetle:** This insect continues to show a wide variation of activity. One farm each in Atlantic and Burlington Counties showed trap catches in excess of 1700 adults per trap, while the low catch site last week continued to catch only 1 to 2 beetles per trap.

◆ Insect Trap Captures

Week Ending	5/31	6/7	6/14	6/21	6/28	7/5
Tree Fruit - Southern Counties						
RBLR	0.5	0.5	0.5	26.8	54.8	36.7
STLM	76.6	283.1	1005	1876	1734	1071
TABM-A	29.0	76.3	75.7	59.4	37.4	10.7
CM	6.3	1.4	1.6	4.3	1.4	0.2
AM	—	—	—	1.0	0.0	0.1
OFM	10.7	2.7	4.5	8.4	8.0	3.7
TABM-P	70.1	78.9	68.5	46.3	30.0	8.6
LPTB	67.1	44.7	72.9	102.2	55.1	36.8
PTB	0.02	0.2	2.3	3.5	7.0	3.2
Tree Fruit - Northern Counties						
RBLR	4.0	3.1	0.0	9.8	25.5	19.2
STLM	43.9	13.1	352.5	1085	932	794
TABM-A	10.5	12.6	26.5	32.2	25.5	10.0
CM	8.4	8.0	7.2	11.5	7.5	5.1
AM	—	—	—	—	.04	.02
OFM	4.8	6.4	3.9	9.5	6.3	4.9
TABM-P	15.2	2.2	18.2	52.0	3.7	20.0
LPTB	13.3	28.4	105.8	74.8	30.4	9.5
PTB	3.2	7.0	17.0	13.2	16.3	8.0
Blueberry - Atlantic County						
RBLR	0	0.2	27.3	178	141	6.5
OBLR	—	13.3	22.8	31.0	15.0	2.3
CBFW	1.5	2.4	0.7	1.2	0.02	0.08
SNLH	—	0.9	3.8	2.3	2.1	1.2
BBM	—	—	—	0.2	0.16	0.2
OB	—	—	—	403	831	774
Burlington County						
RBLR	0.3	0.0	0.1	41.5	96	73.4
OBLR	0.6	10.3	34.1	46.5	21.4	7.0
CBFW	2.6	21.9	12.7	2.9	0.8	0.0
SNLH	—	0.5	2.9	7.9	7.5	1.8
BBM	—	—	—	0.0	0.11	0.2
OB	—	—	—	—	509	449
Abandoned Fields (both counties)						
RBLR	0.0	0.0	3.0	38.3	70.0	47.0
OBLR	0.5	3.0	14.3	59.0	34.5	15.5
CBFW	0.3	1.5	1.0	1.7	0.0	0.0
SNLH	—	12	15.0	53.2	38.5	22.5
BBM	—	—	—	0.0	3.2	6.8

Insect Degree Day Accumulations as of 7/8							
Insect	Site & County						
	Biofix Date plus Degree Days Since Biofix						
	Bridgeton Cumb.	Hammonton. Cam.	Hardingville Glou.	Richwood Glou.	Princeton Mercer	Oldwick Hunt.	Morristown Morris
OFM ₄₅	4/20 hit 200 on 5/2 hit 400 on 5/19	4/5 hit 200 on 4/27 hit 400 on 5/13	4/19 hit 200 on 5/1 hit 400 on 5/18	4/17 hit 200 on 5/1 hit 400 on 5/18	4/19 hit 200 on 5/3 hit 400 on 5/19-20	4/22 hit 200 on 5/9 hit 400 on 5/22	4/24 hit 200 on 5/14 hit 400 on 5/24
TABM ₄₅	5/4 - 1455 hit 490 on 6/4 hit 625 on 6/9 hit 763 on 6/14 hit 898 on 6/18	5/3 - 1462 hit 490 on 6/3 hit 625 on 6/9 hit 763 on 6/14 hit 898 on 6/18	5/2 - 1482 hit 490 on 6/2 hit 625 on 6/8 hit 763 on 6/13 hit 898 on 6/17	5/2 - 1485 hit 490 on 6/3 hit 625 on 6/8 hit 763 on 6/13 hit 898 on 6/17	5/13 - 1315 hit 490 on 6/9 hit 625 on 6/13 hit 763 on 6/18 hit 898 on 6/23	5/20 - 1194 hit 490 on 6/12 hit 625 on 6/16 hit 763 on 6/22 hit 898 on 6/27	5/23 - 1077 hit 490 on 6/15 hit 625 on 6/20 hit 763 on 6/26 hit 898 on 7/1
CM ₅₀	5/8 - 1106 hit 250 on 5/28 predict 1250 on 7/15	5/8 - 1102 hit 250 on 5/28 predict 1250 on 7/15	5/8 - 1108 hit 250 on 5/28 predict 1250 on 7/15	5/8 - 1110 hit 250 on 5/28 predict 1250 on 7/15	5/11 - 1065 hit 250 on 5/31 predict 1250 on 7/16	5/20 - 945 hit 250 on 6/7 predict 1250 on 7/20	5/20 - 920 hit 250 on 6/7 predict 1250 about 7/25

All reported accumulations based on Skybit Inc. data with some ground verification. 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 gen. and 2228, 2415, 2605, 2795 °D after biofix - 2nd gen.
 CM: 250 °D after biofix and again 2 - 3 weeks later; 2nd gen. at 1250 - 1300 °D after biofix + another spray 14 to 21 days later.

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