Note: Some of the information provided on products/pesticide use below, is from other states and thus the products may have no current Hawaii registration. Always read the label before making any product/pesticide applications. Due to environmental effects the effectiveness of particular products may also vary across locations. Also note that recommendations developed for northern climates may not be directly applicable to Hawaii.

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1.0. CTAHR Vegetable Web site updated

The CTAHR Vegetable Extension Web site is back on-line and has been updated. This web site contains all of the issues of this newsletter and its predecessor (the Vegetable Growers Update newsletter), beginning with the first issue in April 1991. The web site also contains reports from some of our vegetable variety evaluations, reports on sustainable and organic farming research, and crop production guidelines for several vegetable crops.

Thank-you to Christine Crosby- da web master- for developing and maintaining this web site. http://www2.hawaii.edu/~hector/

2.0. ORGANIC STANDARDS EFFECTIVE OCTOBER 21

The USDA has put in place a set of national standards that food labeled as "organic" must meet, whether it is grown in the United States or imported from other countries. When buying food labeled as "organic", it was produced using the highest organic production and handling standards in the world. Organic food is produced by farmers who emphasize the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations. Organic meat, poultry, eggs, and dairy products come from animals that are given no antibiotics or growth hormones. Organic food is produced without using most conventional pesticides; petroleum-based fertilizers or sewage sludge-based fertilizers; bio-engineering; or ionizing radiation. Before a product can be labeled "organic", a government-approved certifier inspects the farm where the food is grown to make sure the farmer is following all the rules necessary to meet USDA organic stand...
standards. Companies that handle or process organic food must be certified, too. Consumers must look at package labels and watch for signs in the supermarket. Along with the national organic standards, USDA developed strict labeling rules to help consumers know the exact organic content of the food they buy. The USDA Organic seal identifies that a product is at least 95 percent organic. Excerpted from the USDA National Organic Program website, http://www.ams.usda.gov/nop/, where further details and lists of certifiers are available. In Arizona, the Dept. of Agriculture will not be an accredited certifier while it has adopted a neutral position regarding certification of producers and handlers and any enforcement issues.

(Kai Umeda, ed., Arizona CES, Maricopa County, VEGETABLES NEWSLETTER vol IX, issue no. 10, October 11, 2002)

3.0. Organic tea production in China

An organic tea development centre was established in the National Tea Research Institute in Hangzhou to monitor international organic tea movements and to establish research and demonstration plantations in China. China produced 800 tonnes of organic tea in the year 2000.


4.0. Organic Acreage in the US

How much acreage in the U.S. is certified organic?

ANSWER: Farmers in 49 States used organic production systems and third-party organic certification services on 1,346,558 acres of farmland in 1997 and were raising certified organic livestock in nearly half of the States, according to a recent Economic Research Service report, U.S. Organic Agriculture. Two-thirds of the farmland was used for growing crops, with Idaho, California, North Dakota, Montana, Minnesota, Wisconsin, Iowa, and Florida as the top producers. Colorado and Alaska had the most organic pasture and rangeland.
Organic farming has made deeper inroads in the fruit, vegetable, and specialty grain sectors than in other farm sectors. While only 0.1 percent of U.S. corn and soybean crops were grown under certified organic farming systems in 1997, over 1 percent of oats, dry peas, and tomatoes were grown organically and about 2 percent of apple, grape, lettuce, and carrot crops were organic. In addition, nearly a third of the U.S. buckwheat, herb, and mixed vegetable crops were grown under organic farming systems in 1997.

More recent reports from some of the U.S. certifiers indicate that the momentum seen in organic certification from 1992 to 1997 has continued:

California Certified Organic Farmers estimates 1999 acreage at 96,878, up 38 percent from 1997.

The Idaho Department of Agriculture estimates its 1999 certified organic cropland (excluding wild-harvested herbs) at 85,061, up 55 percent from 1997.

Farm Verified Organic, a private certifier operating in multiple states and headquartered in North Dakota, estimates they certified 99,987 acres in 1999, also up 55 percent from 1997.

Preliminary estimates from the Washington Department of Agriculture show their 1999 certified acreage at 30,000, up 150 percent from 1997.

(IN: Hawaii Vegetables, August 2002, National Agricultural Statistics Service)

5.0. Inert Ingredients in Organic Farming pesticides

Organic Growers Facing Loss

The deadline set by USDA for reformulating inert ingredients used in organic produce is rapidly approaching.

ORGANIC growers are facing a loss of approximately one quarter of the pesticides currently available to them if manufacturers do not reformulate certain inert ingredients by Oct. 21, 2002. The reason for the reformulation, which was set by USDA in a December 2000 ruling, is to ensure products used in organic ag contain only inert ingredients.
identified by EPA as of minimal concern, or List 4 (see Must Be A Minimal Risk).

EPA has been working to reclassify the inerts to meet List 4 standards in order to take some of the pressure off biopesticide manufacturers, but will it happen in time?

"EPA may not be done by the deadline, and industry members don't think the deadline will be extended by USDA," says Gary Libman, director of regulatory affairs at Emerald BioAgriculture and a member of the Biopesticide Industry Alliance. Even though EPA handles the reformulation and reclassification process, USDA has the final say. This is because the National Organic Program, provider of national standards for organic food production, falls under USDA authority.

**Overcoming A Challenge**

"It could be a considerable problem," says Emily Brown Rosen, director of policy at the Organic Materials Review Institute (OMRI). "Twenty five pesticide products were removed from OMRI's Brand Name Product List (www.omri.or ) because they contained List 3 inerts, though we believe the majority of these will qualify in time for USDA's October implementation date." However she cautions that manufacturers of some products may need to reformulate the products with inerts that do not make it to List 4. In an industry like biopesticides this could be difficult because most of the companies are small and lack funds for reformulating to organic standards. If an ingredient needs to be reformulated, generally speaking, it must go through seasonal efficacy trials, which takes approximately six months, says Libman. "And a lot of the biopesticide companies don't have the money to do that," he adds.

List 3 products that don't make it to List 4 will be dropped from the allowable products for organic growers. So while some manufacturers are in the process of reformulating to meet List 4 standards, others are waiting to see if EPA will reclassify the inert ingredient used in their product.

Inert ingredients that are currently going through the risk assessment process include copper fungicides, botanicals, such as Neem (Amvac), and several types of sodium. But Brown Rosen is confident with the progress being made. "The total number of pesticide products available, and the percentage with the problem inert ingredients is declining" - it
was originally thought that as many as half of the available products could be lost.

"We also have some alternative products in each of the major categories that will still be available for growers," Brown Rosen adds. "It may not be the preferred product, but at least there is a product available."

Fruit growers should contact manufacturers to find out the latest information since the manufacturers are not required to list inerts on labels, she says.

**Must be a Minimal Risk**

INERT ingredients of pesticides are classified into four lists. Under USDA regulations, those available for use in organic agriculture must meet EPA's list 4 requirements by Oct. 21.

List 1- are those of toxicological concern
List 2- are those potentially toxic and are a high priority for testing
List 3- are inerts of unknown toxicity (these are the products currently under scrutiny)
List 4- are those of minimal hazard or risk
(Laura Elia, Fruit Grower, June 2002, pg. 27)

6.0. **Chefs reject Biotech fish**

-- Chefs, Grocers Shun Genetically Modified Fish; Report to UK Government Urges Commercial Ban

Some 200 chefs, grocers, restaurants, and seafood distributors in 40 states pledged last month not to buy or sell fish altered through genetic engineering, joining some environmental groups and fisheries that oppose GM seafood (New York Times, September 18; ENN, September 19, www.enn.com). Led by the Center for Food Safety, Clean Water Action, and Friends of the Earth, the boycott's chief concern is environmental—that transgenic fish could escape from fish farms and out-compete or interbreed with native species. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have joined the National Research Council in warning of potential problems with transgenic fish, the Times wrote. The Food and Drug Administration is currently reviewing a
request from a Massachusetts fish farm to market Atlantic salmon genetically engineered to grow twice as fast as its non-GM counterpart, which is already dwindling in the wild. More information on the GM fish boycott is online from the Center for Food Safety, www.gefish.org.

Earlier in the month, UK government advisors recommended banning 'GM super salmon' from British fish farms (London's Guardian, September 4, www.guardian.co.uk, along with other controls on GM and cloned animals. The chair of the Agriculture and Environment Biotechnology Commission (AEBC) told London's Financial Times (September 4) that action to protect the marine environment from GM fish must be international. The Commission "was particularly concerned that genetic modification should not be driven by commercial motives alone" and argued that "all developments in livestock farming should have a clear purpose and be seen in the context of society's wider relationship with animals, whether they involve traditional or new techniques" (The Scientist, September 5, www.the-scientist.com). "Animals and Biotechnology" from the AEBC is available online at www.aebc.gov.uk. (Alternative Agriculture News, Volume 20, Number 10 (October 2002))

7.0. Why Farmers Succeed

WHY FARMERS SUCCEED

It's worth re-visiting an article written several years ago by Susan Butler in the North American Strawberry Growers Assn. newsletter that summarized important characteristics of successful farmers. Here are a few. They know their actual costs. They know how to control their costs. They keep accurate financial and production records. They approach their enterprises as profit managers not asset accumulators. They recognize their weakness as financial experts and get reliable support in this area. They don't tolerate assets that don't produce. They keep their level of risk under control. They plan ahead. In short, the most consistently successful ag operators are executives - they spend time learning, thinking, analyzing and planning. They're information seekers always looking for reliable advice and guidance. (VERMONT VEGETABLE AND BERRY NEWS, October 15, 2002 Compiled by Vern Grubinger, University of Vermont Extension)
8.0. Country of Origin Labeling Starts

The USDA this week issued Interim Voluntary Country of Origin Labeling guidelines for certain commodities, as required in the 2002 Farm Bill.

Under the federal guidelines, which took effect this week, retailers can label as U.S. products fresh and frozen muscle cuts of beef, veal, lamb, and pork, fish, fruits and vegetables and peanuts. The guidelines also provide guidance for products of mixed origin, including products produced both in foreign markets and in the United States as well as labeling for blended or mixed products.  
(Steve McAvoy, ed., SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE, October 16, 2002)

9.0. Effect of pH on Success performance

A decline in Success insecticide residual performance occurs when applied in acidic spray solutions. The reasons for this drop in residual activity is apparently related to the Success formulation. Success is formulated as a suspension concentrate made up of suspended granules, each granule containing many spinosad monomers. When Success is mixed in spray solutions at a pH above 6, the Success granules remain intact, thus protecting it from UV degradation. However, when in a acidic environment (pH < 6), the granules break, exposing the spinosad monomers to rapid degradation. Thus, knockdown mortality is not immediately affected, but residual mortality becomes reduced as the sprayed product is exposed to UV light for a length of time. In experiments, 5-9 days of exposure in both spring and fall weather was enough to significantly reduce residual mortality. The use of buffers or acidifying agents should be avoided and the product should not be mixed in acidic spray solutions. This can be particularly important when Success is used in tank-mixes with phosphorus-based foliar nutrient sprays. Furthermore, tank mixing with other pesticides like MSR, dimethoate or Aliette* fungicide could result in problems if pH is not adjusted. Finally, it is highly recommended that pH levels of all spray mixes should be measured before being applied.  
(Kai Umeda, Arizona County CES, VEGETABLES NEWSLETTER vol IX, issue no. 9, September 13, 2002)
10.0 Birds in Corn and Tomato (Mass)

Growers are reporting problems with crow damage in tomatoes and melons, and blackbird damage in sweet corn. Bird damage in sweet corn and other crops tends to be worse in a dry year. It is better to take action in advance of the problem, because once birds get in the habit of feeding on your crop, it will be harder to stop them! These are smart and persistent pests that require several tactics to deter them (“controlling”, or even “managing” birds is a bit too strong a word...).

However, it is possible to prevent damage, and the key points to remember are:
- Birds invade sweet corn fields about three days before picking. Time any control techniques so they are in place BEFORE harvest, and stay until harvest is complete.

- Use multiple tactics that reach more than one sensory mode. For example, combine scare-eye balloons with auditory repellents like shell crackers or distress calls. This is likely to be more effective than using one tactic alone.

- Move devices frequently. Birds can learn and become habituated to any device that is used for a long time in one place.

- Good insect control will reduce the corn's attraction to birds. Birds eat insects, which are good, but they also like succulent grains of sweet corn and apparently can't tell the difference.

- Use enough devices to get the intensity of deterrence that you need. One scare eye balloon per field won’t do it. Eight or 10 or 12 will be fine.

- Provide an alternative feeding place to the crop you want to protect. In corn, let birds scavenge in the block you just harvested. After harvest, scare devices can be removed from one block and concentrated in the next block. A method that some growers say works is to rotate mow or disc the interior blocks of the previously harvested fields. Birds like to feed on the ground because it is easier than clinging to an ear, but they prefer perching nearby for protection and rest.

Below are a number of devices and tactics that growers can use. (Note: The supplier contacts were accurate a year or two ago, but it is possible that some have changed; I did not have time to call them to check. There
may be other suppliers; no endorsement is implied or intended by inclusion on this list, or lack or endorsement from not being included on the list. RVH)

Visual scare devices: Eyespot balloons and reflective mylar ribbons are effective and fairly economical for small fields. Many growers are now using these silent deterrents and the general feeling is that with variety and timing of use these methods are fairly effective. Growers report that the following methods make balloons more effective: Use at least 8 balloons per acre, place them in the field several days before harvest, and leave the previous block standing, without balloons, to allow birds to feed in older corn. Predator models act in a similar way. These are available from many agricultural suppliers and can also be found online.

Mirrors: A device with a rotating pyramid of mirrors, described in the May 27 newsletter for preventing crow damage to seedling corn, can also be used on a platform to prevent harvest damage. The trade name is the "Peaceful Pyramid Bird Scarer" and a local distributor is Fenant Farm Machinery, 545 West Hill Rd., Troy, NH, 603-242-6417.

Auditory Scare Devices: Exploders are gas-fired cannons placed in the field and fire with automated discharge timings. These can be quite affective. Cannons are available from some agriculture supply sources. Do check with your farm neighbors and the local police to let them know what you are going to do. Cannons are very loud.

Shell Crackers: Are 12-gauge shotgun shells in which the lead shot has been replaced with a bulldog firecracker. When fired from a shotgun, this firecracker travels 75 to 150 yards and explodes in the air with a loud report. Use a single shot, inexpensive 12-gauge shotgun, as the loads are very corrosive. Firing a few rounds early and late in the day will unsettle birds. Federal permits are not required. Again, notify local police and neighbors to let them know what you are doing. Check on local town ordinances. For a more detailed fact sheet on shell crackers, contact Laura Henze at the APHIS Animal Damage Control Office (413-253-2403).

Three sources for shell crackers: Reed-Joseph International Co., P.O. Box 894, Greenville, MS 38702, (800) 647-5554; Margo Supplies Ltd., Site 20, Box 11, RR#6 Calgary, Alberta, Canada T2M4I5, (403) 285-9731; Sutton Ag Ent., 1081 Harkins Rd., Salinas, CA 93901, (408) 422-9636.
Distress Calls: Recordings of distress calls or the calls of predatory birds, which repeat at regular or random intervals and operate on battery or solar-power, can be quite effective. Because flocking birds are very responsive to the signals from others in their flock, a distress call from one bird is a sign to all the others that an area is unsafe. The sources listed above also sell auditory and visual frightening devices, and here are others: Weitech/JWB Marketing, LLC, 101 Hurlbut St., Westwood, NJ, 07675, 1-800-343-2659; Bird Busters, 300 Calvert Ave, Alexandria, VA 22301, (703) 299 8855; Bird-X, Inc, 300 Elizatbeth Ave., Chicago, Ill 60607, (800) 662-5021; http://www.pestproducts.com/bird_repellents.htm; Gemplers', 100 Countryside Dr., PO Box 270, Belleville, WI 53508, (800) 382-8473.

R. Hazzard, with information from Laura Henz, APHIS, & Alden Miller, formerly UMass Extension.
(Vegetable IPM Newsletter, University Of Massachusetts Extension Vegetable Program, August 8, 2002, VOLUME 13, NUMBER 15)

11.0. Fruit Fly area-wide program in Hawaii

STORY LEAD:
Zapping Hawaii's Pesky Fruit Flies, Grid by Grid

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ARS News Service
Agricultural Research Service, USDA
Marcia Wood, (301) 504-1662, MarciaWood@ars.usda.gov
October 10, 2002
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A quartet of exotic tropical fruit flies--Oriental, melon, Mediterranean and Malaysian--can easily turn what should be a fresh, luscious tropical fruit or vegetable into a disgusting mess. That's because the fruit flies' tiny, wriggling maggots spoil what would otherwise be a delectable crop.

Agricultural Research Service scientists and their University of Hawaii collaborators are targeting these troublesome flies in an Areawide Integrated Pest Management Program on Fruit Flies in Hawaii. The goal is to give Hawaii's growers the latest and best science-based, environmentally sound strategies to reduce crop losses and, at the same time, lessen the need for insecticides.
The program will help farmers keep the fruit flies under control in carefully delineated suppression grids. These grids include not only participating growers' fields and orchards, but also nearby vegetation where significant numbers of the fruit flies live and breed, according to ARS entomologist Eric B. Jang. Jang and ARS entomologist Roger I. Vargas lead the program. They are based at the agency's U.S. Pacific Basin Agricultural Research Center in Hilo.

The program's approaches for going after fruit flies in the suppression grids are practical, affordable and workable. Using grids is very different from attempting to obliterate the fruit flies everywhere they live in the Hawaiian Islands chain.

Today, ARS scientists and co-investigators are employing such control methods as sanitation, to remove as much infested fruit as possible, and male annihilation, accomplished with traps that contain a lure that's irresistible to male fruit flies plus a second compound that kills them once they touch or eat it.

Other control techniques include applying protein-based bait sprays, which are added to a compound that kills the flies, and rearing and releasing a beneficial wasp, Fopius arisanus, that attacks fruit flies. In addition, scientists are turning loose laboratory-reared, sexually sterile, male melon flies to mate with wild, fertile females. That causes melon fly populations to crash, according to ARS geneticist Donald O. McInnis. For this purpose, McInnis developed a unique, exclusively male line of melon flies at the center's Honolulu laboratory.

ARS is the U.S. Department of Agriculture's chief scientific research agency.

12.0. Air Pollution Damage on Vine Crops

Air Pollution Damage on Pumpkins and Other Vine Crops
(Bob Precheur)

Growers may be starting to notice some unusual leaf color patterns on their pumpkins and other vine crops. We first noticed these symptoms about two weeks ago and since then the area affected has increased in
size. Our small bush type pumpkins seem to be affected more than the large pumpkin types. Symptoms first appeared a few days after an ozone alert was issued by the weather service. There have been 2 or 3 alerts so far this season. At first, symptoms appear to be similar to spider mite damage but no mites have been found after several inspections.

Symptoms vary dependent on the pollutant. Ozone damage appears on the upper leaf surface which usually have a yellow netted appearance due to loss of chlorophyll. The leaves may also exhibit a bronze like color and the main leaf veins remain green. Ambient oxidant injury is initiated as a diffuse chlorotic mottle on the upper surface which deepens until the leaf turns almost white. Leaf veins remain green. Our pumpkin symptoms appear to be similar to ambient oxidant injury. A watermelon sample was recently submitted to the Plant and Pest clinic and the leaf symptoms also appear to be air pollution injury.

Sensitivity to ozone among cucurbits varies with watermelon and squash the most sensitive. Pumpkin and muskmelon are intermediate in sensitivity. Cucumber is the most tolerant to ozone injury. Depending on the timing and extent of injury, yield may or may not be affected. In the case of our pumpkins, we expect no yield reduction since most of the fruit are full size and starting to show color.


13.0. Ridomil in Strawberries (N. Carolina)

Ridomil use: If a field has had a previous history of P. cactorum, crown rot, then it is recommended that metalaxyl (Ridomil Gold) EC be injected through the drip system just BEFORE transplanting at one pint per treated acre (for drip application to strawberry plasticulture beds covering 50% of an acre this would amount to 1/2 pint per acre). A second fall season injection of Ridomil Gold may be needed about two weeks later. (Strawberry Plasticulture August 16, 2002, Volume 3, Number 51, E. Barclay Poling, Extension Strawberry Specialist)
14.0. Phytophthora in Florida Veggies

Growers on the east coast and in southwest Florida are reporting some losses due to damping off attributed to pythium on a variety of crops including tomato and pepper. Incidence and severity has mostly been low unless a field directly under a storm cell and the grower happened to be the unfortunate recipient of several inches of rain.

There have been a few reports of transplants coming infected with pythium from the transplant house. The combination of abundant soil moisture and elevated temperatures conspire to make the fall planting season a prime time for vegetable growers in Florida to encounter problems with Pythium spp. on a variety of vegetables. Pythium typically attacks roots causing damping off, seedling blights, root rots and wilting of affected crops. In some instances, Pythium may affect the above ground portions of crops.

Pythium myriotylum and P. aphanidermatum are generally most abundant in Florida because they are adapted to high soil temperature. The optimum temperatures for their growth and infection of plants range between 86 and 98 °F.

The host range for Pythium spp. is extremely wide. Vegetable crops commonly infected include beans cucurbits, peppers, southern peas, strawberries, and tomatoes. A number of broadleaf and grassy weeds may host Pythium spp. and serve as important sources of inocula.

Pythium is one of the “water molds.” It thrives in moist soils and multiplies and spreads rapidly under wet conditions. Although Pythium is capable of producing several spore types, zoospores and oospores are most important. Zoospores are mobile. They are produced rapidly and in great numbers and contribute to the organism’s ability to cause disease almost “over night.” Zoospores may be detected within half an hour after a site is flooded and can “swim” for up to 30 hours and move three or more inches through soil.

Oospores are extremely durable and can survive in soil and infected crop debris for more than 10 years. Pythium is often associated with root rots and pre emergent and post emergent damping off. One of the characteristics of tissue infected with Pythium spp. is the presence of water-soaked or greasy appearing tissue. This is distinct from the orange to red to dark, sunken lesions caused by Rhizoctinia solani.
Infection with *Pythium* spp. also causes wilting of numerous crop species. Plants affected by *Pythium* root and stem rots commonly exhibit yellowing of the lower leaves.

In small plants planted thickly, such as greenhouse transplants, *Pythium* can infect and colonize the plants with the result that the entire plant is destroyed. Look for water-soaked tissue in this situation. It is also common to see white mycelial growth in such situations. Excess fertilizer, flooded soils, insect feeding, and nematode feeding may also contribute to dysfunctional roots. For accurate diagnosis, it is best to submit samples to a reputable diagnostic laboratory.

Resistant cultivars do not exist so control of *Pythium* depends on a variety of tactics. Crops should be planted on raised beds in well-drained soils. Pre-plant soil fumigation is effective if applied correctly. Soil solarization has successfully suppressed *Pythium* in some cases. If a solarization or a soil fumigant is used, raised beds are important since fumigated soil has minimal or no beneficial organisms to compete against pathogens.

A number of chemical treatments are available for the control of damping off. Seed treatments containing mefenoxam (Apron) work best. Mefenoxam should be used in combination with a broad-spectrum fungicide to avoid the development of resistance.

Fungicidal drenches such as Ridomil Gold and Ultra Flourish (mefenoxam) are effective for the suppression of seedling blights and root rots if applied before infection occurs. Several biological control agents, including actinomycetes and other bacteria and fungi, are available commercially for suppression of *Pythium* and other soil borne pathogens. Their success rate has been variable.

Some soils are naturally suppressive to diseases caused by *Pythium* or may become suppressive by increasing organic matter or manipulating soil pH. Incorporation of cover crops prior to planting may support competing organisms in the field, but in some cases may result in increased populations of the pathogen. Sunn hemp has been implicated in this regard.

With the anticipated loss of methyl bromide as a soil fumigant, it is likely that crops that are now commonly grown with methyl bromide/chloropicrin fumigation, such as tomatoes, peppers,
strawberries, will incur greater incidence of disease problems from Pythium spp. (Gene McAvoy, ed., SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE, September 17, 2002)

15.0. Bacterial Leaf Spot in Pepper

Growers in all areas are reporting mostly low levels of bacterial spot on pepper and tomato. A few respondents are reporting higher incidence in fields that had received high rainfall totals.

Bacterial spot is one of the most serious diseases of tomato and pepper in Florida because it can spread rapidly during warm periods with wind driven rains, and because fruit symptoms reduce marketability. Bacterial spot is caused by the bacterium, Xanthomonas campestris pv vesicatoria. Entry into the plant occurs through natural plant openings or wounds made by wind driven soil, insects, or cultural operations. Bacterial spot can be seed transmitted, but most inocula comes from volunteers or infected debris from tomatoes or peppers in the soil. Temperatures of 75-87°F are ideal for bacterial spot but infections can occur at higher or lower temperatures.

Symptoms of bacterial spot appear as small, water-soaked, greasy spots about 1/8 inch in diameter on infected leaflets. On tomatoes, distinct spots with or without yellowing occur. Individual leaf spots may coalesce with each other, resulting in the browning of entire leaflets. Fruit spots often begin as dark specks with or without a white halo. As spots enlarge, they become raised and scab-like.

In pepper, symptoms are similar to those in tomato, except that spots may be lighter in color and fruit lesions may appear blistered. In mature plants, leaflet infection is most concentrated on older leaves and defoliation may occur in severe infections.

Other diseases may cause leaf spots that appear similar to those of bacterial spot. Positive diagnosis requires lab tests.

An integrated approach is needed to manage this disease. Sanitation is important. Pepper and tomato volunteers and solanaceous weeds should be destroyed between crops. Transplant houses should be located well away from tomato or pepper fields. Purchase only certified disease-free transplants. Since water movement spreads the bacteria from diseased to
healthy plants, workers and farm equipment should be kept out of fields when fields are wet because the disease will spread readily under wet conditions.

There are commercial pepper varieties that are resistant to races 1, 2 and 3, but researchers have identified no fewer than ten different races of Xanthomonas campestris. Since no variety incorporates resistance to all known races, it is important that growers use varieties that have resistance to races that occur in their area. Research indicates that use of resistant varieties over time will cause a shift in the make-up of bacterial spot populations toward races for which a given cultivar lacks resistance. The race situation is similar but less clear in tomato. No resistant tomato varieties are available commercially.

It is important to apply sprays before and during rainy periods. If conditions are favorable, frequent spraying may not be sufficient to maintain bacterial spot below damaging levels. Tests support the traditional recommendation of copper and maneb or mancozeb for bacterial spot control. Attention to application techniques is as important as choice of material in achieving adequate control. In trials, bacterial spot control was better with applications twice a week compared to once a week. The effectiveness of copper is limited, because of the widespread occurrence of copper tolerance among strains of X. campestris pv. vesicatoria.

Some respondents are reporting good results using copper rotated with Oxidate for bacterial spot control. Growers should be aware that the use of organosilicate adjuvants and applications of magnesium might increase the incidence and severity of bacterial spot infections.

Recent trials at the UF/IFAS North Florida Research and Education Center using a combination of bacteriophage and the SAR elicitor Actiguard have demonstrated promising results. When using Actiguard, experience in the field indicates that it is important to follow labeled rates and to hold off on applications until plants are well established in the field and have grown out of transplant shock to avoid yield suppression.

Some growers have reported success, using bacteriophages (bacterial virus) for the control of bacterial spot. Phages are most effective when applied at night or very early in the morning as they are rapidly deactivated by sunlight and drying. Work by Dr Tim Momol at UF/IFAS North Florida Research and Education Center has shown that applying
phage in conjunction with powdered skim milk and sucrose can significantly enhance UV stability.
(Gene McAvoy, ed., SOUTH FLORIDA VEGETABLE PEST AND DISEASE HOTLINE, September 17, 2002)

16.0. Beet armyworm (Florida)

The beet armyworm Spodoptera exigua H. originated in Southeast Asia. It was first discovered in North America about 1876, and reached Florida in 1924. Seasonal activity varies considerably according to temperature. In Florida, all stages can be found throughout the year, although development rate and overall abundance are reduced during the winter months. The life cycle can be completed in as few as 24 days, and six generations have been reared during five months of summer weather in Florida.

Eggs are laid in clusters of 50 to 150 eggs per mass. Normal egg production is about 300 to 600 per female. Eggs are deposited on the lower surface of the leaf, often near blossoms and the tips of branches. The eggs are greenish to white in color, and covered with a layer of whitish scales that gives the egg mass a fuzzy or cottony appearance. Eggs hatch in two to three days during warm weather.

There normally are five larval instars. The larvae are pale green or yellow in color during early instars, but acquire a dark lateral stripe during the fourth instar. The larva of beet armyworm may be confused with southern armyworm, Spodoptera eridania, but southern armyworm can be distinguished by the presence of a large dark spot laterally on the first abdominal segment that disrupts the lateral stripe.

The moths are moderately sized, the wingspan measuring 25 to 30 mm. The forewings are mottled gray and brown, and normally with an irregular banding pattern and a light colored bean-shaped spot. The hind wings are a more uniform gray or white color, and trimmed with a dark line at the margin.

The beet armyworm has a wide host range. Susceptible vegetable crops include asparagus, bean, beet, broccoli, cabbage, cauliflower, celery, corn, cowpea, eggplant, lettuce, onion, pea, pepper, potato, radish, spinach, sweet potato, tomato, and turnip. Weeds suitable for larval
development, include lambsquarters, mullein, pigweed, purslane, Russian thistle, and parthenium.

Larvae feed on both foliage and fruit. Young larvae feed gregariously and skeletonize foliage. As they mature, larvae become solitary and eat large irregular holes in foliage. Tomato fruit is most susceptible to injury, especially near fruit maturity, but beet armyworm is not considered to be as threatening to tomato as is the corn earworm, Helicoverpa zea.

Pheromone traps can be used to detect the presence of adult beet armyworm. The Florida Tomato Scouting Guide recommends an action threshold of 1 larvae per 6 plant pre-bloom and 1 larvae or egg per field post-bloom. Regular monitoring of crops, probably about twice per week, is recommended because adults frequently invade from surrounding crops or weeds.

Numerous native natural enemies have adapted to this pest. These include both predators and parasitoids. Fungal diseases and a nuclear polyhedrosis virus may also inflict some mortality. The important mortality factors vary among crops, and among geographic regions.

Insecticide resistance has become a problem in management of this insect and growers are advised to rotate insecticide classes. Intensive use of insecticides for armyworm control in vegetables may also stimulate outbreaks of other pests, such as leafminer.

B.T. products provide fair control. Only products made from the aizawai strains such as Agree and Zentari are recommended.

In recent years, a number of new effective lep materials based on “new” chemistry have been released. These include Avaunt, Confirm and Spintor. The new chemistry has several advantages over Bt’s including rainfastness, and some translaminar activity. In addition, these products are somewhat selective and relatively soft on beneficials.

Some the older products also have a place in a rotation. These products are very active, quick acting, economical, and have broad-spectrum activity. They are especially useful in getting things back under control when pressure is high or population get out of control. Includes in this group are the synthetic pyrethroids – Ambush, Asana, Baythroid, Fury, Mustang, Pounce etc., the carbamates – Sevin, Lannate and the OP’s – Diazinon, Guthion, Lorsban, and Monitor. (Gene McAvoy, ed., SOUTH FLORIDA VEGETABLE PEST AND DISEASE, HOTLINE, October 2, 2002).
17.0. Pesticide Updates from Florida

Pesticide Label Updates

- **Avaunt, DuPont**: REI: 12 hours; PHI: three days; for control of tomato fruitworm, beet armyworm, southern armyworm and loopers in eggplant. Note: Do not apply more than 14 oz. of Avaunt per acre, per crop. Minimum spray interval is five days.

- **Avaunt, DuPont**: REI: 12 Hours; PHI: three days; for control of beet armyworm (low numbers), diamondback moth, cabbage looper, imported cabbageworm in Chinese leafy and root vegetables (Chinese broccoli, napa, Chinese mustard cabbage and kohlrabi). Do not apply more than 14 oz. (four applications at the maximum rate) per crop per season. Minimum interval between sprays is three days.

- The EPA has granted a specific exemption under Section 18 for the use of Sandea for the control of purple and yellow nutsedge in tomato. A total of 43,200 acres of tomatoes may be treated in Florida. A maximum of 0.094 lbs. of active ingredient or 20x. of Sandea 75DF may be applied per acre per year. Applications are to be made using ground equipment. Aerial applications are prohibited. A total of two applications per year of Sandea 75DF may be applied as either: (1) one pre-transplant soil surface of 0.5 to 0.75 oz. Sandea 42DF, (2) one “over-the-top” application 14 days after transplanting of 0.5-0.75 oz. product or (3) post-emergence application(s) of up to 1 oz. product to the row middles between planted rows of tomatoes may be made.

- **Dual Magnum** just received a TPR label for use under mulch in pepper. For pre-transplant application, apply as a directed spray to pre-formed beds. Apply to the soil surface of the bed as the last step immediately prior to the plastic-laying operation. Apply using non-air assisted ground application field sprayers only, at a maximum rate of 0.064-0.95 lbs. AI per acre in a minimum of 10 gallons of water per acre. Do not harvest within 60 days of application or make more than two applications per crop. Authorization and waiver agreements must be obtained from TPR, 407-894-1351, and signed prior to use.

18.0. Beet armyworm in Ohio Peppers

Beet Armyworm Infesting Ohio Peppers (C. Welty)

The beet armyworm, a well known pest of vegetables in the southern USA, has shown up in Meigs and Greene County, Ohio. The worms in Greene County this week were abundant, feeding on leaves and in fruit, and were not killed by Pounce or Orthene. This pest has also been present in Meigs County peppers and tomatoes for the past several weeks.

Beet armyworm larvae are green and vary in striping pattern but most have some dark stripes down the side. When fully grown, they are 25-30 mm, or just over one inch long.

In addition to peppers, beet armyworm can infest alfalfa, beans, beets, cole crops, corn, lettuce, onion, potatoes, peas, and tomatoes. Beet armyworm is much disliked by growers because it is difficult to control by the insecticides commonly used on commercial vegetables.

For control of beet armyworm on peppers, Confirm (tebufenozide) and SpinTor (spinosad) are superior to other products. Confirm works well on worms of all sizes; it has a 7-day PHI. SpinTor is excellent against small larvae but only good against large larvae; it has a 1-day PHI. B.T. products provide fair control, and only products made from the aizawai strains are recommended; Agree, XenTari, Ketch are aizawai products. Lannate, Baythroid and other pyrethroids are poor. In Kentucky, the number of treatments needed has ranged from 1 to 4. Beware that
Confirm and SpinTor are considerably more expensive than Orthene, Pounce, and other materials.

The key to good control is early identification. Growers should scout the peppers for early signs of leaf damage to the upper most buds. They will attack the youngest leaves, window paning from the upper surface, and some light webbing on the emerging leaves. They attack hot peppers as well as bell peppers. We are grateful to Ric Bessin, Extension Entomologist in Kentucky, for this information on control and scouting. (Robert Precheur, ed., Ohio State University Extension Vegetable Crops VegNet Vol. 9, No. 23. September 19, 2002)

19.0. Cover Crops Corner: Sources for Hairy Vetch

COVER CROPS: SOURCES FOR HAIRY VETCH SEED
Sooner or later we’ll have enough soil moisture to plant winter cover crops. It’s time at least to order seed and make plans. If you interested in planting hairy vetch and are looking for an inexpensive source, we have come across a number of options.

Ernst Conservation Seeds, out of Meadville, PA, is selling hairy vetch seed at $0.50/lb. Contact: www.ernstseed.com; 1-800-873-3321.

Welter Seed Co. out of Southeastern Iowa, is selling hairy vetch seed at $0.70/lb. Their variety is called Haymaker Plus and the recommended rate of use is 30lb/acre. Contact: 1-800-470-3325 Pam Westgate, Stephanie DeGray (Vegetable IPM Newsletter University Of Massachusetts Extension Vegetable Program August 15, 2002 VOLUME 13, NUMBER 16)

20.0. Onion Weed Control

ONION WEED CONTROL RESEARCH. One of the foundations for an effective weed control program for dry bulb onion production is using a preemergence herbicide like Dacthal at planting to provide the slowly emerging crop any chance of beating competitive weeds. Prefar is also labeled but does not offer control of a broad spectrum of weeds as Dacthal. Prowl or trifluralin are not labeled for use at planting time as severe stand reduction will often occur. The two yellow herbicides should be used as a layby treatment when the onions have 2 true leaves.
For postemergence weed control, Buctril and Goal can be effective against smaller sized weeds when the onions are at the 2 leaf stage. Research studies have been conducted and preliminary results indicate that very early postemergence applications of very low rates of Buctril or Goal before the 2 leaf stage of onions (as early as flag-leaf stage onions) offer excellent weed control with good safety on onions. In the meantime, Buctril and Goal should be used as labeled and expected onion injury may occur but the crop should recover and yields should not be affected. If forgoing herbicide use and attempting to grow organic onions, select only clean fields and be prepared to cultivate and hoe frequently. (Kai Umeda, ed., Arizona CES, Maricopa County, VEGETABLES NEWSLETTER vol IX, issue no. 10, October 11, 2002)

21.0. Sweet corn consumer survey

"A recent survey shows that bicolor sweet corn, which made up 21.7 percent of sweet corn grocery sales in 2000-01, may jump to 30.1 percent of sales in 2005-06. Other findings in "Market Development Strategies for Fresh Sweet Corn," a research report submitted to the Southern Supersweet Corn Council, show consumers with larger households and higher incomes ($70,000 and above per year) are more likely to buy sweet corn. As income increases, so does a preference for white and bi-color corn." (The Grower, May 2002, pg. 50)

22.0. Drip Irrigation Tips

TRICKLE IRRIGATION DURING PERIODS OF HIGH MOISTURE STRESS

Trickle irrigation has several advantages. Water use can be reduced because less soil is wetted and there is less loss due to evaporation. Once the system is set up, there is little or no pipe to move, reducing labor needs and allowing for timely water application. Also, trickle irrigation lends itself to application of fertilizer.

However, with trickle irrigation, water is applied in relatively narrow bands. This causes the crop roots to concentrate in an area that is more restricted than with overhead application. As the plants extract water, the soil dries quickly because the roots are taking water from a small area
with limited storage capacity. This requires that water be applied frequently to maintain adequate soil moisture levels. Crops such as squash and pumpkins have leaves covering nearly the entire field, but with trickle irrigation, the roots are taking moisture from a narrow zone. To meet the moisture needs of the crop, the root zone must be constantly moist, but not soggy. Monitor soil moisture in the root zone and apply water before it is depleted. The water demands of the crop and the water holding capacity of the soil will determine the amount and frequency of application. When moisture stress is high it may be necessary to run the trickle irrigation system every day for up to three or four hours on some soils.

In the long term, you can improve a soil’s water holding capacity by increasing organic matter. For each percent organic matter, the soil can hold another 16,000 gallons of water! That’s why soils with high organic matter are more drought resistant. Organic matter increases capillary movement of water in the soil. This improves the horizontal movement of water and increases the width of the bands that a wetted by trickle irrigation. The size of the root zone is increased and there is a greater area from which crops can draw water.

With a restricted root zone there is also less area supplying nutrients to crops. Fertilizers, which are beyond the reach of roots, are not available to crops. It may be necessary to supply more nutrients through the trickle irrigation system to meet the crops needs. As with moisture, nutrient uptake can be enhanced by increasing the width of the wetted area by building soil organic matter.

John Howell, UMass Extension Vegetable Specialist
(Ruth Hazzard, ed., Vegetable IPM Newsletter
University Of Massachusetts Extension Vegetable Program
August 22, 2002, VOLUME 13, NUMBER 17)

23.0. Water Conservation tips

HOW FARMERS CAN CONSERVE WATER: SHORT TERM AND LONG TERM OPTIONS

Once planted, crops need the right amount of water, at the right times, for successfully harvesting acceptable yields and quality. Water conservation is always a good stewardship practice. However, water
management is even more critical during drought emergencies. This year’s drought conditions only serve to emphasize how critical water management is for the success of vegetable farms.

Water should only be used when necessary and in amounts that sustain plant growth without loss of yield. Irrigation system evaluations are always recommended to improve and maintain system efficiency for sustainable crop yields. The following are some assessments and low cost actions farmers can take to conserve water and reduce waste in the short term:

• Frequently check all system components for visible signs of leaks or damage and make repairs accordingly. Carry out regular maintenance on pumps and power units and evaluate irrigation system efficiency and uniformity by measuring flow rates and pressure.

• Irrigate in the early morning or evening. Avoid the use of overhead irrigation during the hottest or windy hours of the day.

• Irrigate less frequently where feasible. This may encourage deeper root system growth - using water from deeper soil layers that would otherwise be lost to deep percolation. (Currently, given shortages of water sources, this may be a necessity, not a choice.)

• Do not over irrigate. Excess water will run off or percolate beyond the root zone.

• Take extra caution not to irrigate non-target areas, particularly roads and pavements. Use part circle sprinklers on field ends or stop the traveler before it reaches the road.

• Limit water use for non-irrigation purposes.

In the long term, many of the measures that farmers can long-term planning and installing improved irrigation systems, all the way from the water sources to delivery to the crop. These can involve substantial costs. Vegetable growers are eligible for cost-share assistance in irrigation systems from the Natural Resources Conservation Service through their Agricultural Management Assistance program. Cost share for irrigation systems, to offset the risks from drought, is the number one priority for this program. Technical assistance is available for assessing water needs, water sources, and system capacity, as well as in designing a new system. 75% cost share is available for the actual or average costs of wells,
irrigation pits, irrigation water conveyance, sprinkler systems, and trickle systems. Incentive payments may also be available for implementing other conservation practices that improve water management. Although the deadline has passed for applications for this fiscal year, NRCS is continuously accepting applications for next fiscal year. Contact your local NRCS field office for more information.


24.0. Snail control in Aquaculture ponds

Snail Treatment Reduces Fish Disease in Commercial Production Ponds
A new treatment against a freshwater snail that carries a deadly fish parasite reduces the threat of the parasite to farm-raised channel catfish nationwide.

Infected fish develop small cysts in their flesh, often seen as bumps just below the skin. The disease can kill smaller fish and reduces growth among infected fish that survive. Currently, there is no cure. Andrew J. Mitchell, a fishery biologist at the Agricultural Research Service's Harry K. Dupree Stuttgart National Aquaculture Research Center in Stuttgart, Ark., found that if he could reduce the vector, he could control the disease.

Mitchell's treatment is a shoreline application of copper sulfate and citric acid to production ponds. The formula is applied in the waters around the pond's edge, where the snails live. The concentrated treatment kills the snails, but it dilutes as it disperses throughout the pond and so does not harm fish.

The parasite is Bolbophorus confusus, a flatworm found in the intestinal tract of the American white pelican, a migratory, fish-eating bird found throughout the United States and in the lower Mississippi River Delta during winter months. Flatworm eggs are released into catfish ponds, where they hatch and form larvae that infect an intermediate host, the rams-horn snail, Planorbella trivolus. When the larvae mature in the snail, they are released as larval trematodes called cercaria that infect fish. The cycle begins again when the fish are eaten by pelicans. Reducing the
rams-horn snail population breaks the parasite's life cycle midway through its development. The parasites cannot be transmitted from one fish to another.

More than 90 percent of snails were killed in studies. The shoreline treatment is approved for use by the Environmental Protection Agency, and it is being widely used in the Mississippi Delta area. Copper sulfate is already commonly used to curb the growth of nuisance algae in fish ponds.

ARS is the U.S. Department of Agriculture's chief scientific research agency. More information on the research is in the September 2002 issue of Agricultural Research magazine, available online at: http://www.ars.usda.gov/is/AR/archive/sep02/snail0902.htm (ARS News Service, Agricultural Research Service, USDA, Jim Core, (301) 504-1619, jcore@ars.usda.gov September 4, 2002)

25.0. PUMPKIN AND WINTER SQUASH HARVEST AND STORAGE

Winter squash and sugar pumpkin harvest is well underway. In many fields, full-sized pumpkins have matured and are ready for harvest. Fruit may need to be held for several weeks before it can be marketed. There can be extra work involved in bringing fruit in early, especially for growers who normally have pick-your-own harvest, but we recommend that growers harvest as soon as crops are mature and store under proper conditions, if it is feasible. With the bouts of heat and intense sun of the past few weeks, sunscald may be a problem in some varieties of winter squash. At the same time, nights below 50 contribute to chilling injury of winter squash.

Attention To Curing And Handling will go a long way toward improving the life of winter squash and pumpkin fruit. In fields where pumpkins are turning orange, it is worthwhile to cut and windrow the pumpkins and bring them in out of the field. This will allow the handles to cure and will protect fruit from insects, vertebrate pests, and diseases. Pumpkins are not marketable if the handle is broken off or dried up. If you need to leave pumpkins in field for pick-your-own, cut the handles from the vine to save them from advancing powdery mildew and reduce shrinkage.
Curing Pumpkins: As long as pumpkins are starting to turn color, they will ripen off the vine. If necessary, pumpkins can be ripened in a well-ventilated barn or greenhouse. The best temperatures for ripening are in the seventies or even low eighties during the day. Night temperatures should not drop below the sixties. In a greenhouse, temperature can be managed with ventilation on sunny days. Unless it is quite cool, heat is not likely to be needed if the house is closed up at night.

Holding In The Field: Often it is not feasible to harvest pumpkins early and store them until they can be marketed, and so they must be ‘stored’ in the field. If vines are healthy, storage in the field can be successful for a few weeks. If the vines die back, damage to the fruit from sun and insects is more likely. In any case, it is important to scout for insects feeding on the fruit, which may include squash bug nymphs or adults, or striped cucumber beetle. Control them if damage is evident. In fields that have a history of Phytophthora blight, Fusarium fruit rot, or black rot, field storage may increase the incidence of these problems, particularly if we have a period of wet weather or a major storm. This has been one of the causes of significant losses in recent years, and one reason that we recommend bringing fruit in as soon as it is mature.

Winter Squash Harvest: Fruit that are free from disease and haven't been subject to much chilling (below 50o F) should be selected for long-term storage. Sorting fruit in this manner requires extra labor and may not be economical, but it should not be too difficult to separate bins of squash according to good and poor fields or areas of fields. Fruit from fields where Phytophthora is present are not the best choice for storage.

Storage life depends on the condition of the crop when it comes in and your ability to provide careful handling and a proper storage environment. All fruit placed in storage should be free of disease, decay, insects, and unhealed wounds. When harvesting squash and pumpkins, it is important to handle the fruit with care to avoid bruising or cutting the skin. Despite its tough appearance, squash and pumpkin fruit are easily damaged. The rind is the fruit's only source of protection. Once that rind is bruised or punctured, decay organisms will invade and quickly break it down. Place fruit gently in containers, on pallets or in pallet boxes.

Curing Winter Squash: A period of curing is important for extended storage life. This may be done in windrows in the field - especially with a series of warm, dry days - or by placing squash in a warm dry atmosphere (70-80 degrees F) such as a greenhouse for up to two weeks.
This pre-storage treatment permits rapid drying of the outer cell layers, and when combined with a dry atmosphere for storage inhibits infections that can take place at this time. Removal of the stem from squash (butternut, Hubbard, etc.) will also decrease the amount of fruit spoilage because the stems frequently puncture adjacent fruit, facilitating infection. Furthermore, any clean cuts during the curing period often heal over and are no longer a source for injury or infection.

Chilling Injury: Take care to avoid subjecting squash to chilling injury. Chilling hours accumulate when squash is exposed to temperatures below 50 degrees F in the field and in storage. Injury increases as temperature decreases and/or length of chilling time increases. Chilling injury is of particular concern with squash intended for storage because it increases the likelihood of breakdown.

After Curing: Move squash or pumpkins to a dry, well-ventilated storage area. Pressure bruises can also reduce storage life, so avoid rough handling, tight packing, or piling fruit too high. Fruit temperature should be kept as close to the temperature of the air as possible to avoid condensation, which can lead to rot. Ideally, the storage environment should be kept at 55 degrees F with a relative humidity of 50-70%. Anne Carter’s studies of stored butternut squash found that 55 to 60 degrees improved storage life. Low relative humidity increases water loss, resulting in reduced weight, and if excessive, shriveling of fruit. High relative humidity provides a favorable environment for fungal and bacterial decay organisms. Under the right conditions, disease-free pumpkins or butternut squash fruit should have a storage life of 8-12 weeks or more. Even if it is difficult to provide the ideal conditions, storage in a shady, dry location, with fruit off the ground or the floor, is preferable to leaving fruit out in the field.

--John Howell, R. Hazzard; with information from Liz Maynard of Purdue University

26.0. Sunscald on Pumpkins

Sunscald on Pumpkins (R. Precheur)
The recent spell of very hot weather with at least 5 days in the mid to upper 90's have caused more problems for pumpkin growers. The intense heat and bright sunshine has damaged or scalded the surface of mature fruit. Pumpkins without irrigation and certain varieties seem more susceptible. The affected areas start as small dark red patches on the surface. Soon these areas become sunken and start to soften. The soft areas of the fruit are susceptible to secondary infections and eventually the fruit collapse. For a review of these symptoms, go to the VegNet website and click on: "Problem of the Week". If hot temperatures and bright sunshine persist or return, remove fruit to a location where you can provide adequate storage conditions. These include: dry conditions with good air circulation and cool air. The September heat spell probably caused temperatures on the surface of the fruit to exceed 100 degrees. Respiration rates rapidly rise at this elevated temperature causing rapid breakdown of the fruit. The return to much cooler weather should help the current situation. The ideal storage conditions for pumpkins are warm and dry with temperatures 55 to 60 degrees and a relative humidity about 50%. (Robert J. Precheur, ed., Ohio State University Extension Vegetable Crops, VegNet, Vol. 9, No. 22. September 13, 2002).

27.0. Harvesting Indian Corn

INDIAN CORN: HARVESTING AND HANDLING INDIAN CORN
This is information from a University of Kentucky Cooperative Extension Publication, “Ornamental Corn Production in Kentucky”, Terry Jones, John Strang, Brent Rowell, Ric Bessin, Bill Nesmith, Steve Isaacs, Extension Specialists, and William Witt, Professor of Agronomy, University of Kentucky. Contact Alan Erb at (716) 652-5400 ext. 139 for a copy of this fact sheet. Thanks to Pestminder,CCE Lake Plains Veg. Program, for this article.

Ornamental corn must be harvested by hand when the husk is dry. When ears of ornamental corn have lost their green color and begin to dry down, they have reached full maturity. If warm, dry weather is expected, the ears may be left on the plants until sales are expected. To harvest, break off ears with a quick downward motion. Be careful not to damage the ear or husk attached to it. Pick ears carefully so that the kernels are not damaged. Spread the ears out to dry in a shallow pile where there is good air circulation and under cover if the weather has been damp. Pull the husk back if it is not completely dry at harvest. Be careful not to tear the husks because they contribute to the value of the ears. The husk and
Ear may become moldy if they are not handled properly. Pulling the husk back allows slightly damp husks and ears to dry quickly. When husks and ears are dry, tie the ears together with twine or rubber bands in bunches of two or three around the base of the ears and allow them to dry in a warm, dark, airy place. If husks are too dry, they tend to pull off or break easily from the ears, decreasing their value. Should this occur, wait for a humid or rainy day to prepare the ears for sale. DO NOT box or bag ears when they are first harvested or they may mold. Mold may occur on both the husk and ear if proper handling and storage techniques are not used. Ears Accumulated Growing Degree Days (G.D.D.) can be used for ornamental purposes after a week of drying. During and after drying, ornamental corn may be stored in open wooden apple or cabbage bins. Growers with small quantities often suspend the ears in cabbage or onion sacks in a dry location until time for marketing. The ears are usually sold in groups of three. The three ears are held together with rubber bands, wire twists, or with a plastic sleeve similar to that used for dried flower arrangements.


28.0. Alkaline Degradation of Pesticides

Some pesticides are chemically denatured by mixing with alkaline water, or in alkaline soil. As an example, the label of Azatin XL mentions that dilute solutions should be maintained at a pH between 3 and 7, and applied soon after preparation. It states that the diluted solution must not be stored for later use. In order to use this product effectively, you will have to correct the pH of your water before mixing. Azatin is not the only pesticide that degrades rapidly in alkaline water (pH greater than 7). The carbamates and organophosphates are generally more susceptible than chlorinated hydrocarbons or pyrethroids.

The first step in preventing alkaline hydrolysis is to determine the pH of the water used for measuring chemicals. Because of the seasonal variability, it is important to measure the pH several times over the course of the growing season. Samples should be collected in a clean, non-reactive container, such as a glass bottle or jar. The water should be representative of the water used for spraying, so let the water run long enough to flush out the water that was standing in the hose and pipes.
The pH should be determined soon after collection, because it can change if it is stored too long.

The most accurate way to measure pH is to use an electronic pH meter. However, soil test kits and pH paper are less expensive and more practical in the field. In general, the indicator is mixed with or dipped into the water and the resulting color is compared to a chart. It is often necessary to do a preliminary test with a wide range indicator included in the test kit to make a rough estimate. An indicator with a narrower range is then used for a more precise determination.

Buffering agents are available to add to the tank water if the spray chemical is subject to alkaline degradation. Chemical breakdown can take place quickly, before the tank is emptied. If you are using a tank mix, it is important to know that susceptible materials should not be mixed with anything that raises the pH of the solution, such as lime sulfur and liquid ammonia. Also, fixed copper fungicides such as Bordeaux mixture should not be acidified. Copper is more soluble under acid conditions, and so if acidified, more copper will dissolve and could be phytotoxic.


**Information on Stability of Pesticides**

Diazinon is most stable in pH 7 water, with a half life of 10 weeks; at pH 5, it is 2 weeks.

Chlorpyrifos (Dursban) at pH 8.0 has a half life of 1.5 days.

Malathion is stable at pH 5.0-7.0 but rapidly hydrolyzes in more acidic or alkaline conditions.

Carbaryl (Sevin) has a half-life of 24 days at pH 7.0, but only 1 day at pH 9.

Bendiocarb (Dycarb) can be less effective if alkaline spray water is used.

Azadirachtin (Azatin XL) should be maintained at pH 3-7, and applied soon after mixing.

Iprodione (Chipco 26019) rapidly hydrolyzes at pH above 8.0.
Mancozeb (Dithane) is most stable at pH 5.5-6.0.

Maneb may be sensitive to alkaline hydrolysis.

Author: Jana S. Lamboy, IPM Extension Educator, Cornell University, Geneva, NY


29.0. Urban Sprawl- US loses 2 acres each minute

SPRAWL CONSUMING TWO ACRES A MINUTE

According to a new study by the American Farmland Trust, the United States is losing two acres of mostly prime farmland every minute to development, the fastest such decline in the country's history. That loss has been on the edge of the outer suburbs, where some of the country's best fruit farms are being replaced by houses on large lots, linked by new roads, highways and malls. The report pointed out that sprawl, not development is the problem. Using census data as well as Agriculture Department information about crops and soil, the study found that more than half of the lost farmland is being carved into 10-acre lots, paralleling a increasing economic divide between the rich and urban poor. Keith Collins, the chief economist for the Agriculture Department, said that the loss of farmland has been a concern for years because it destroys open spaces and local food production. The AFT can be viewed at: http://www.farmland.org/farmingontheedge/index.htm (Defenders Rural Updates! October 11, 2002)
30.0. Ornamentals Corners: Mites control

Mites Are Not Insects

Mites are in the class called arachnida with spiders and scorpions. They live in almost all habitats including ocean floors, deserts, hot springs, deep soil, mountaintops and tundra. Most are predatory or parasitic on other animals including humans, with only a few feeding on plants. Over 30,000 different mites and ticks have been described and thousands remain undescribed.

Unlike insects which have 6 legs and three body segments, adult mites have 8 legs and one main body part with no head. The front of the body has a feeding structure called a gnathosoma. Most mites that feed on plants are very small and require a microscope to see and identify. They damage plants by sucking the contents of individual plant cells.

Scout! Scout! Scout! To avoid an explosive outbreak of mites growers have to be looking for them. Scouting the crops on a regular basis enables growers to take early action to avert disaster. Once the mite population has developed into a heavy infestation, it is very difficult to regain control and damaged crops may not be salvageable. Walk through the crop at least once a week. Make it a ritual on a specific day and time to spend at least a half-hour or more looking for mites. Look closely at individual leaves and flowers. With a good naked eye many mites look like tiny moving dots. You can often spot the mites on leaves even with very little or no damage. Remember that many mites do not damage plants!

Spot the mites before you spot the damage. Early detection can allow spot treatments that reduce the amount of pesticides required to gain control. That saves time and money. An essential piece of equipment used in scouting is a hand lens. A 10x, 15x, 20x or a 2" x 4" magnifying glass can be used. Tapping a leaf or plant over white paper will knock some mites off. They are easier to see walking around on the paper. Yellow sticky traps cannot be used for most mites. By recognizing that mites are present, causing damage and identifying the species you can select the best method of controlling them.

Mark indicator plants that you check before and several days after pesticide applications to determine the effectiveness of your miticides. Select plants that are in the middle of the row as well as in the aisles to
ensure you are getting good coverage. Watch for trends over time and take notes of your observations. Using a rating system helps to quantify your observations and help you make decisions about control options.

The spider mites in large numbers produce silk webbing, which is usually visible. This webbing is used for protection and as a sail to aid in their dispersal. They cause leaf stippling, which is a number of very small white or yellow spots. If the mites are not stopped, the damage continues until the spots merge and give a bronze or tan coloring to the leaves. If enough of the leaves are damaged, the plant will defoliate and may even die. However, the aesthetic and economic damage can occur much earlier.

Spider mites migrate via the wind or movement of plant material. Scout the plants around doors and openings where they might blow in.

Carmine Spider Mite, Tetranychus cinnabarinus attacks nearly 100 cultivated crops and weeds. It is a serious pest on many flowers and ornamental plants such as carnation, chrysanthemum, cymbidium, gladiolas, marigold, pikake, and rose, as well as many vegetables and fruits in Hawaii.

According to Dr. L. Goff, the carmine spider mite has the largest host range of all Tetranychidae species in Hawaii and is of greatest economic importance. Adults and nymphs feed primarily on the undersides of the leaves. The mites tend to feed in "pockets" often near the midrib and veins.

The carmine spider mite can complete a life cycle from egg to adult in about a week. All stages of this mite are present throughout the year. Reproduction is most favorable when the weather is hot and dry.

Adult females are about 1/50 inch long, reddish, and more or less elliptical. The males are slightly smaller and wedge shaped. They have a black spot on either side of their relatively colorless bodies. The adult female may live for up to 24 days and lay 200 eggs.

The two-spotted spider mite (TSSM) or Tetranychus urticae is probably the worse over all ornamental mite pest. It has over 300 host species including many ornamentals and weeds. TSSM also thrives in hot, dry weather and seems to have a particular affinity to water stressed plants. They are less then a millimeter in size (1/25 of an inch) and have two distinct spots on each side of the body.
For color pictures and more information on Spider mites on the internet check out: http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7405.html.

False spider mites, also known as flat mites are related to spider mites, but do not spin webs. In general they are half the size of the carmine spider mites and reddish in color with black patterns. When they feed, the leaves become silvery followed by a tanning then a blackening. Females lay only 40-60 eggs, and the life cycles range from 26-30 days. Because of their longer life cycle and lower fecundity they are usually not as big of a problem as the spider mites. The Phalaenopsis mite, Tenuipalpus pacificus is found in this group.

The thread-footed mites are so named because the fourth pair of legs on the females end in two thread-like hairs. Cyclamen and Broad mites are the two in this group that cause problems for ornamental growers. They are very small mites being only 1/100 of an inch long. They are susceptible to low humidity and direct sunlight.

Because they are often protected in the buds and distorted plant tissue, contact miticides are not very effective in their control. Also because of their small size and location on the plant, it is very difficult to identify them. A 20x lens or dissecting microscope is needed.

The Cyclamen mites hide in protected locations like buds and flowers. They attack foliage plants, African violets, ivy, mums, and begonias. The buds of affected plants become curled and distorted. Often the damage looks like thrip damage or a chemical burn. The life cycle is 5 to 21 days and the females lay from 12 to 50 eggs.

Broad mites, sometimes called the tropical mites, are in the same family of mites as the Cyclamen mite and cause a similar damage. When they feed on leaves, a puckering, curling or wilting will occur. They often attack the growing point or terminal end of flower sprays causing distortions and death to the buds. The symptoms may be misinterpreted to be a virus, some other disease, or chemical phytotoxicity. They are often a problem on begonia, azalea, geraniums and African violets. The life cycle is 4 to 6 days and the females lay about 20 eggs.

Lewis mites are a problem on Poinsettias and other greenhouse plants. They are slender, straw or greenish colored with several small spots along each side of the body. They are smaller than the two-spotted spider mite, and also produce webbing. They cause leaf stippling and
yellowing, and the leaves' upper surface often is mottled or speckled. In severe infestations, leaves will turn completely yellow and fall off the plants.

The CTAHR web site at:
http://www.extento.hawaii.edu/kbase/crop/Type/mitemenu.htm has more information about some of these and other mite species.

To control mites early detection and identification is essential for effective and efficient control.

Natural enemies of mites often keep them in check in times when the environmental conditions do not favor them, and when chemical pesticides have not killed them. The major natural predator of the carmine spider mite is a Stethorus beetle. This beetle feeds on all stages of these mites and in laboratory conditions each individual beetle consumed an average of 2,400 mites. The feeding activity of the predatory beetle is greatest in crops with smooth leaves on their undersides. There are a number of other ladybird beetles which feed on mites, but they are not as effective as Stethorus.

Predacious mites, such as Phytoseiulus macropilis, are also effective on many crops in controlling carmine spider mites. There are also several species of predatory thrips that feed on mites. And you thought all thrips were bad. There are certain flies and general predators such as the minute pirate bugs, bigeyed bugs and lace-wing larvae that attack mites. Although some of these are available commercially, we are prohibited from importing them to Hawaii.

We can however take measures to conserve their populations by using selective pesticides instead of broad spectrum ones that kill everything. Some insecticidal applications will kill off the predatory insects and allow mite populations to increase rapidly. Some like carbaryl actually stimulate spider mite reproduction. Also carbaryl, some organophosphates, and some pyrethroids apparently favor spider mites by increasing the level of nitrogen in the leaves. Insecticidal soap has a reputation of being easy on many predators. Use spot applications that allow predators to survive in the unsprayed areas.

Cultural controls can help in reducing mite populations. Because of the wide range of host plants for many plant-feeding mites, it is very important to eliminate weeds, which are alternate hosts. If you sell plants as opposed to cut flowers, it is sometimes better to discard heavily
infested plants that cannot be sold rather then try to salvage them in the next crop cycle. Make sure incoming plants are free of mites before placing them near other crops.

Spider mites thrive in dusty conditions so keep dust down by using water to clean off walkways and other dusty areas. Directing a forceful spray of water at the plants will keep populations down. Remember to do this when the plants can dry, and the weather conditions don't favor fungal and bacterial diseases. Overhead irrigation may help, but most mites are protected under the leaves.

Chemical controls should be used when plant-feeding mite populations have reached a threshold where the cost of chemical application exceeds the cost of their economic damage and other controls have failed to stop their increase. Select a miticide that targets the particular species of mite that is causing the problem. Consider the growth stages of the mites and which miticide controls those stages. Try to select a chemical that does not affect beneficial organisms.

In applying the miticides, be sure you cover the plant part where the mites reside, especially if you use a contact miticide. Often this means spraying the undersides of the leaves. Effective spider mite control requires two sprays, 7 - 10 days apart. For false spider mites a 14 to 21 day interval can be used.

Mite resistance to various chemicals has been reported in a number of species - especially in the spider mites. To avoid mite resistance developing, rotate miticides from different classes with different modes of action. For more information about mite resistance management see the article at: http://www.olympichort.com/ohp_research_mites.html. Whenever using any pesticide, study the label including the fine print and follow all the instructions.

References:

Hara, A., 1985 Mite Management on Ornamentals, Proc. 3rd Fert. & Orn. Short Course
KnowledgeMaster a U.H. website produced by EXTension ENToMology & UH-CTAHR Integrated Pest Management Program.
31.0. Organic Seed Production and PI Breeding Conf. 11-02

ECO-PB (European Consortium for Organic Plant Breeding) are organising the first international symposium on organic seed production and plant breeding to be held at Humboldt University, Berlin on 21-22 November 2002.

Further details and booking information are available from the ECO-PB website www.eco-pb.org.

32.0. Upcoming Events

TRI-STATE GREENHOUSE IPM WORKSHOP

January 15, 2003. UVM Entomology Research Laboratory, Spear St., Burlington, VT.

"On-Site Testing for Diseases and pH, and IPM for Herbs." 6 pesticide credits. Call Margaret Skinner at 802-656-5440 for more information. The program: On-site Disease Testing: Focus on Tospovirus and Western Flower Thrips; pH Management for New Vegetative Material Using the Pour-thru Method; IPM for Herbs - Mites and Aphids: Recognition, Prevention & Remedies; IPM for Herbs - Powdery Mildew, Botrytis and Fusarium: Recognition, Prevention & Remedies; What Does a Professional Scout Do?; Do Western Flower Thrips Survive Northern Winters?

ECOLOGICAL CUT FLOWER GROWING WORKSHOP
January 10 to 12, 2003, and ORGANIC VEGETABLE FARMING SYSTEMS FROM SEED TO MARKET January 31 to February 2, 2003. Both at Ballston Spa, near Saratoga Springs, NY. Contact the Regional Farm & Food Project, (518) 427-6537 or farmfood@capital.net

NORTH AMERICAN DIRECT MARKETING CONFERENCE

The 2003 North American Farmers' Direct Marketing Conference and Trade Show will be held Feb. 3 - 10 at the Adam's Mark Charlotte in Charlotte, N.C. Conference organizers are expecting at least 1,000 direct marketers from around the world to attend. For registration information, call Jonathan Bates at (413) 529-0386, e-mail: nafdma@map.com, or visit www.nafdma.com

The Deep South Fruit and Vegetable Conference will be December 4-6 in Biloxi, MS, at the President Towers Hotel & Convention Center.

The complete program and pre-registration application for the 2002 Deep South Fruit & Vegetable Growers Conference is posted on the Mississippi Fruit and Vegetable Growers Association web site at http://www.msstate.edu/dept/cmrec/mfvga.htm

American Farmland Trust (AFT) is now accepting registrations for our upcoming national conference, which will be held March 10-12, 2003, at the Asilomar Conference Center on the Monterey Peninsula in Pacific Grove, California. Entitled Farming on the Edge: Finding the Balance, this conference will explore how communities can support agriculture while addressing complex growth and environmental priorities. The goals of the conference are to share new information and offer proven tools, techniques and successful strategies to keep land in agricultural production, manage growth, address environmental concerns and strengthen agriculture.

The conference is targeted to agricultural and natural resource professionals, concerned citizens, environmentalists, farmers and ranchers, farmland protection program managers, land trust staff and volunteers, public officials and policymakers, planners, researchers and educators.

More information is available on our Web site at www.farmland.org or by calling Doris Mittasch at (413) 586-9330. Please note early registration rates are in effect until November 22, 2002.