UMASS EXTENSION

VEGETABLE IPM MESSAGE

JULY 19, 2002 VOLUME 13, NUMBER 12

CROP CONDITIONS

Everything is dry. Irrigation pipelines are stretched to the limit, as are growers' working hours. Irrigating, harvesting, packing, delivering, cultivating, and planting late-season crops such as brassicas, root crops, and greens are keeping everyone busy. Surface water sources such as ponds are shrinking. Virtually no rain fell throughout the state this past week, and most areas have received very little in the past four weeks. Pockets of central Mass did receive over an inch of rain and some unwelcome hail this week. Sweet corn harvest schedules are filling in more than expected for some growers. Harvests include sweet corn, cucumbers, field and greenhouse tomatoes, carrots, beets, beans, broccoli, cabbage, and other brassicas, beans, chard lettuce, squash, early potatoes, and blueberries. **Japanese beetles** are active.

Over eighty people turned out for the UMass Vegetable Research Field Day. They enjoyed the culinary delights of a wide range of international foods and viewed the specialty crops that can be grown in Massachusetts and used to cook these dishes. (If you missed this event, you will have another chance to see these crops at the September 4 twilight meeting in Dartmouth, MA.) The tour also featured trials in potato, pumpkin, brassica greens, rice, and sweet corn. Many thanks to all those who helped organize and staff this event!

REMINDER: NEXT TWILIGHT MEETING: JULY 25, HAMILTON ORCHARDS

On Thursday, July 25 from 5 - 7:30 p.m. Hamilton Orchards, located at 25 West Street in New Salem, MA, will host a Twilight Meeting. The tour features new production methods for raspberries (containerized production of cold-sensitive varieties) as well as field production of blueberries and raspberries. Contact Sonia Schloemann at 413-545-4347 for more information or see the July 3, 2002 issue of the newsletter.

MASSACHUSETTS FLOWER GROWERS SUMMER FIELD DAY, JULY 30, 2002

On Tuesday, July 30, 2002 1 to 7 PM the University of Massachusetts Extension and the Massachusetts Flower Growers' Association will co-sponsor the Massachusetts Flower Growers Summer Field Day on the beautiful grounds at Elm Bank Reservation, Dover MA. For more information please see our June 13 issue or contact Tina Smith at 413-545- 5306.

CRITICAL STAGE FOR IRRIGATION

Sometimes a choice has to be made about which crops get water first, or get water at all. Many crops can suffer some dryness during a certain part of their growth, but most have critical periods when water is needed to get a good yield or good quality. The chart on the next page provides details for the optimum times to water vegetable crops.

CRITICAL PERIODS OF WATER NEED

Crop	Critical Period
Beet	Root enlargement
Carrot	Root enlargement
Onion (dry)	Bulb enlargement
Snap bean	Pod enlargement
Pea	Pod enlargement
Pepper	Planting to fruit set and enlargement
Tomato	Early flowering, fruit set and
Cabbage	Head enlargement
Cucumbers	Fruit enlargement
Lettuce	Head enlargement
Eggplant	Flowering and fruit enlargement
Asparagus	Fern development after harvest
Sweet corn	Tasseling, silking and ear development
Potato	Tuber set and tuber enlargement

Adapted from Ontario, Wayne, Yates, & Steuben Counties Weekly Vegetable Update - 7/10, C.R. MacNeil & J. Kikkert.

NESARE SEEKS PROPOSALS FOR FARMER/GROWER GRANTS IN 2003

The **Northeast Sustainable Agriculture Research and Education Program** has announced its call for proposals from farmers across the region for on-farm research projects in 2003. This program supports agricultural producers who want to try something new on their farms---a technique for adding value, a new crop, a method of direct sales, or a new production method for example. The goal of the program is to help farmers explore sustainable and innovative production and marketing practices that are profitable, environmentally sound and beneficial to the community. Proposals can address a broad range of agricultural or farm-forestry-related production or marketing issues.

Each farmer must have a technical advisor for the project (e.g. extension educator, crop advisor, NRCS staff). Each year several grants are made to several NY farmers. In 2002, NE SARE awarded a total of $260,000 to support farmer projects. The average grant was $5200. The smallest was $763. The maximum award in 2003 will be $10,000.

Proposals must be submitted on or before December 9, 2002. Questions? Contact Dave Smith at rds4@cornell.edu, or 607-255-7286) or nesare@uvm.edu.

From Brian Caldwell, Farm Education Coordinator, Northeast Organic Farming Association of New York.

TOMATO

Despite the dry conditions, it is advisable to maintain a fungicide schedule on tomato to reduce **Early Blight**. Do not wait for symptoms to develop! Disease severity values have been accumulating at a rate of 1 or 2 per day, steadily for the past two weeks. Dew periods have been ranging from 9-12 hours at South Deerfield. Although nights have been relatively cool this past week (lows of 47-63° F) they are warm enough for early blight to develop. If you sprayed 11 days ago, or longer, it is time to apply a fungicide again. If **bacterial disease** is present in your field, include a copper product. Use of stake and weave systems also helps reduce the severity of early blight.

DSV update: DSV VALUES, July 2 - 17, 2002
SOUTH DEERFIELD RESEARCH FARM

Date	DSV's/Day		Date	DSV's/Day
July 2	2		July 11	2
July 3	2		July 12	2
July 4	2		July 13	1
July 5	2		July 14	1
July 6	1		July 15	1
July 7	1		July 16	1
July 8	1		July 17	2
July 9	1		**Days to reach 15 DSV's**	**11**
July 10	2		**Cumulative DSV's since May 24**	**63 DSV's**

S. DeGray, R Hazzard

POTATO AND EGGPLANT

Watch out for the last of the **Colorado potato beetle l**arvae from the first generation. In eggplant especially, a few larvae can cause significant damage to leaves. Fortunately we have a good selection of effective, low-risk materials to choose from (Raven, Novodor, Spintor, Provado). Remember that this beetle wins all the prizes for rapid development of resistance, and that it is what you apply on your farm that will be the major cause of resistance in your population of beetles. Therefore, rotate materials! We can expect new adults to begin to emerge anytime, and these beetles are hungry! Watch for emergence holes in the soil (about ½ inch across) and adults with softer shells than usual.

SPECIALTY CROPS SERIES: JILO

Jilo (*Solanum gilo*) is in the Solanaceae family and resembles eggplant in growth habit. It turns orange-red when ripe. This plant is originally from Africa and was brought to Brazil with the slave trade. It is still grown in Africa where it is known as "garden eggs".

The official language of Brazil is Portuguese; however, other Portuguese-speaking peoples, such as people from the Azores, Madeira, Portugal, or Cape Verde, do not use jilo.

Production: Grow jilo just as you would eggplant. The fruit is usually harvested immature, before turning orange or red. The fruit becomes more bitter as it matures.

Seed Sources: Thompson & Morgan Inc, P.O. Box 1308 Jackson, New Jersey 08527-0308, 1-800-274-7333 www.thompson-morgan.com/seeds/us/. It is listed in their catalogue as: Aubergine : Red Egg

Frank Mangan, UMass

GOOD AGRICULTURAL PRACTICES: TRANSPORTATION OF PRODUCE FIELD TO MARKET SANITATION

Good sanitation practices while transporting fresh produce will help to reduce the risk of contamination by harmful microorganisms. Microorganisms such as ***Salmonella*** and ***E-coli*** *0H157* can cause food borne illness. If you are not the one who transports your produce then it is a good idea to talk to your transporter about their sanitation practices. Fresh produce can be contaminated by other foods and by non- food sources during loading, unloading, storage and transport. Transporters should separate fresh produce from other foods and non-food products. Trucks should be clean, free of odors, dirt and debris. Proper temperatures should be maintained to ensure the freshness and quality of the produce. It is important to handle produce carefully to minimize physical damage.

Take a walk around your facility and check for signs of potential food safety hazards: A truck that is dirty and or smells of manure or other animal wastes; A truck that is in disrepair; A transporter who is not aware of the potential food safety risks associated with transporting fresh produce; Careless handling of produce; Workers/transporters with poor personal hygiene.

What can you do?: Ensure that transportation vehicles are clean and sanitary. If there are your own vehicles set up a regular cleaning and maintenance schedule. Do not ship fresh produce in trucks that have carried livestock or harmful substances such as chemicals or fertilizers. If this is your only option, be sure to thoroughly wash, rinse and sanitize them before using to transport. Use refrigerated trucks when possible. Train your employees to practice good personal hygiene.

From the New England Extension Food Safety Consortium.

SCARAB BEETLES IN VEGETABLE CROPS

Japanese Beetles are emerging now and congregating in various crops and non-crop habitats. They can cause damage in greens and peppers. We have been seeing **Oriental Beetles** in vegetable fields as well. One grower complained that they were

banging into him as he cultivates. Below are descriptions of several scarab beetles found in New England.

JAPANESE BEETLE adults are about half an inch long, with a metallic green head. The wings are shiny copper or bronze color, and there are a few tufts of white "fur" along the side of each wing when it is folded back over the body.

ORIENTAL BEETLES normally fly at night but may occasionally be seen at dusk or in the soil when weeding. The beetles are just a little smaller than Japanese beetles, and usually are a rather mottled gray with black splotches. (Occasionally an individual will be almost all black or almost all gray.)

ASIATIC GARDEN BEETLES are about half as long as a Japanese beetle adult, and somewhat more "plump" in appearance. They are reddish-brown or copper-colored. They often are found near roots of plants when one is weeding.

A fourth species may also be found: **EUROPEAN CHAFERS,** which are slightly larger than Japanese beetles and are a fairly dull brown or tan in color. They are night fliers but can be seen in large numbers just at sunset, when they congregate in large numbers in favorite trees (such as locust or willow).

The **life cycle of the Japanese beetle** fits most of the species of grubs we encounter in New England, with minor variations depending on the species and the location. They have a one-year life cycle, with adults emerging in early July in most of Massachusetts (slightly earlier further south and slightly later further north). The adults are active in daylight and begin feeding on many different kinds of plants, including roses, grapes, lindens, purple-leafed plums, and crabapples. In vegetables, they can be found in many crops including corn, peppers, green beans, collards, basil, and other herbs and greens.

The females return to the soil (often in or near wide expanses of turf grass) and lay eggs, usually beginning in late July. Eggs hatch into tiny grubs (cream-colored larvae, C-shaped, with brown heads). The first grubs usually appear around late July or early August and begin feeding on roots of grasses and other plants (especially corn). After about two weeks of feeding, the grubs molt to a second "instar", and feed for another three weeks. The grubs molt once more, to the "third instar" (or large grub) around the middle of September, and continue feeding until the soils begin to cool down.

In late fall the grubs migrate downward through the soil profile, staying below the frost line throughout the winter. In the spring as the soils warm up, the grubs move back into the root zone and resume feeding for about six weeks. By the middle of June, most grubs have completed their feeding requirements and pupate (still in the soil) for about a week before emerging as new young adults.

Japanese beetles are the most common and widely distributed scarab species in New England and until about 10 years, they were the primary grub species in most of New England. Recently, we are also finding some relatively new "imports" into the region. The Oriental beetle is found throughout Connecticut and Rhode Island, as well as Long Island. More recently we have found several populations in the Connecticut River Valley. The biology of this insect is very similar to that of the Japanese beetle. However, the oriental beetle tends to be less sensitive to several of the insecticides that are commonly used in turf.

The **Asiatic garden beetle** (AGB) is gradually becoming a nuisance in many areas throughout New England. While we are not sure what is going on, we suspect that it is not particularly vulnerable to insecticides, so when other grubs are killed, the AGB moves into the vacated niche.

Controls: On turf, insecticide controls normally target young grubs just as they begin to emerge from eggs. In vegetables, managing the grub stage may not be feasible since the grubs are most likely feeding elsewhere. Adult beetles normally do not cause economic damage but they may need to be controlled if numbers are high and damage is significant. Insecticide options include carbaryl (Sevin), which has a broad vegetable label, and is labeled for Japanese beetle on some vegetable crops; however, it is not labeled for these beetle species on most crops. On organic farms, rotenone is an option for controlling adults. Insecticide should be applied in the evening for night-feeding beetles, or in the morning for day-feeders.

Pat Vittum, Turf Entomologist, UMass, and Ruth Hazzard

GOOD AGRICULTURAL PRACTICES:
PACKING OR PROCESSING FACILITY TEMPERATURE CONTROL

Temperature control is an important way to maintain the quality of produce and minimize the growth of pathogens. Monitoring produce and water temperatures is critical when cooling produce, washing and packing it, during cold storage, and when it is displayed at the point of sale.

If you use a water bath to cool produce, make sure the water temperature is not greater than 10° F cooler than the produce pulp temperature. Some produce draws water into its stem areas when cooling water temperature is much lower than the temperature of the produce. So if there is a pathogen on the fruit or vegetable or in the water, it can be drawn into the produce interior along with the water. Tomatoes, peppers, apples, and potatoes are of highest concern.

Think about this - Do you?: Have a metal stem thermometer or digital thermometer to check the temperature of produce and water baths?; Have alcohol wipes to sanitize the thermometer before, between, and after using?; Do you calibrate your thermometers regularly?; Do you have at least two thermometers in the cooling rooms – one in the warmest area and one in the coolest area – and monitor them regularly?; Keep records of temperatures in storage areas, during cooling?

What Can You Do?: Find out which thermometers are appropriate for use in your operation. You may need refrigerator or cool room thermometers (some refrigeration equipment have built in thermometers, sometimes with temperature recording devices and alarms to signal when something is wrong). Dial type bimetallic, thermistor, or thermocouples thermometers can be purchased at restaurant supply stores. These can be used to test the temperature of fruit or cooling water. Ask your local or state sanitarian for advice when choosing a thermometer.

Cool fruits and vegetables quickly after harvesting to maintain quality and minimize the growth of pathogens. If you use ice to cool produce, it must be made with potable water. If you use cooling water baths to cool produce, avoid water temperatures that are greater than 10° F cooler than the produce pulp temperature. Monitor temperature of wash, rinse, and cooling water.

Check refrigeration storage temperatures at least once a day to make sure produce is stored at temperatures that maintain quality and minimize pathogen growth. Be careful not to overload refrigeration rooms beyond their cooling capacity. Monitor temperature of coolers. Use refrigerated trucks for transport and monitor truck temperature.

From the New England Extension Food Safety Consortium.

CRUCIFERS

Keep an eye out for a new caterpillar pest: Late in the 2001 season, a 'new' caterpillar showed up in crucifers in southern New England. This pest has been identified as **Cross-striped Cabbageworm** (*Evergestis rimosalis*). Normally this moth is a southern species, which ranges north to Long Island. This was its first appearance in Connecticut and Southeastern Massachusetts, and it reportedly had a banner year there. Caterpillars reach about ¾ inch in length, have a gold head capsule, with yellow markings on each side and brown markings on the back. They can do significant feeding damage in foliage and in heads.

CROSS-STRIPED CABBAGEWORM

CUCURBITS

Powdery mildew has been observed widely in summer squash and zucchini, and we have the first reports of occurrence in pumpkin. Scout for powdery mildew in all vine crops, especially searching lower, older leaves for symptoms. Search 25-50 leaves across the field, both upper and lower surfaces, in groups of 5 leaves in 10

locations throughout the field. Look for light green to yellow blotches on the upper surface, or a **white to gray, powdery covering (talcum-like) on the upper or lower leaf surfaces**. These powdery areas most often start on the underside of the leaf, often as small as a quarter.

Where early cucumbers, zucchini and summer squash are near the end of their harvest period, sprays may not be warranted. However, where the crop still has a long way to go before harvest (pumpkin, winter squash, melons), we recommend foliar applications on about a 10-day schedule, starting at the first appearance of the disease. The last week of July and first two weeks of August are when powdery mildew typically shows up in pumpkin and winter squash. These sprays will also protect fruit from black rot on fruit and other fungal diseases.

Powdery mildew tends to develop resistance to systemic fungicides such as Benlate, Topsin M, NOVA, Quadris, and Flint. Once resistance develops, that material will remain ineffective for a long time – so the best approach is to prevent it from developing in the first place. Limit repeat sprays with systemic fungicides, and do not use two from the same chemical family. Quadris and Flint are in the same chemical group (the strobilurins), and should not be rotated with each other, but may be rotated with NOVA, which has different chemistry. Use no more than two applications of Quadris/Flint. NOVA also provides systemic activity against powdery mildew and can be rotated with other systemics, but should be used with a broad-spectrum protectant fungicide such as Bravo. Chlorothalonil (Bravo), used alone, can provide good control of powdery mildew and black rot. Use adequate water, higher pressure and slower speed to penetrate foliage and reach the fruit. As an alternative, Armicarb 100 or Kaligreen can be used for powdery mildew control and gives adequate control. These materials are allowed for organic growers. Two varieties of pumpkins (Magic Lantern and Merlin) show resistance to powdery mildew, as does calabaza squash.

We are seeing more and more symptoms of **bacterial wilt** in squashes and pumpkins. Not much can be done now, but note which varieties seem more susceptible or more resistant. We observed severe wilt in the zucchini variety 'Eight ball' this week.

FIELD DAY IN CENTRAL NEW YORK: ORGANIC CROPS AND SOILS ON AUGUST 14, 2002

Visit the farms of Klaas and Mary-Howell Martens and their neighbors in Penn Yan, NY on Wednesday, August 14, 2002 for an informative Field Day at one of the Northeast region's largest organic cash grain farms. Klaas and Mary-Howell Martens grow 1,300 acres of organic grain along with processing vegetables on the western slope of Seneca Lake near Penn Yan, NY. They and their neighbors share expertise to grow nearly 8,000 acres of certified organic grain production in Yates County. The Martens also started a value-added feed mill and seed cleaning business to process area organically grown crops and increase markets. Hear from the farmers and see their crops on August 14.

The program will feature talks by organic farmers explaining how they grow their crops without chemical inputs, and by University researchers who will demonstrate the principles behind the results. We will tour farm fields for a first hand look at large-scale organic grain production. The field day is co-sponsored by the Northeast Organic Network (NEON), New York Certified Organic (NYCO), and The Northeast Organic Farming Association of New York (NOFA-NY). We will meet at the Yates County Fairgrounds, on Old Rt. 14A just South of the village of Penn Yan. Tour buses will then take us to field stops at the Martens' and their neighbors' farms. For more information, please call Brian Caldwell at 607-564-1060.

Brian Caldwell, Farm Education Coordinator, Northeast Organic Farming Association of New York

UNIVERSITY OF MAINE EXTENSION: FIELD DAY JULY 23 AT HIGHMORE FARM

Tour University of Maine's research farm at Highmore Farm, west of Augusta in Monmouth Maine, on Tuesday July 23, 8:30 am to 3:00 pm. Variety trials, cover crops, fall-laid plastic for tomato and pepper, organic soil amendments, and other trials will be featured. For more information call 207-933-2100.

SWEET CORN

Wherever possible, try to keep up with irrigation in taselling and silking corn, as this is a critical period for water.

Watch for **aphids** in tassels. Wherever possible, select insecticides for caterpillars that conserve natural enemies of aphids. These include Dipel ES, Spintor 2SC, and Avaunt. I have spoken with several growers who have tried spinosad for the first time this season, and have heard very positive reports.

Silking corn is safe at this moment. **European corn borers** are in the pupal stage between generations, and no new eggs are being laid. However, continue to scout blocks that are reaching the pretassel stage (tassels just poking up). Some growers are finding infestations over threshold, with the last borers from the first generation. **Corn Earworm** captures are below threshold throughout the state. We're all on corn earworm watch now that we've reached mid-July, more and more acreage of sweet corn is in silk, and storm fronts could bring us corn earworm at any time. Corn earworm moths arrive already mated and ready to lay eggs, which may hatch and get down into the ear in 3-4 days. Last year we waited till late August for them to arrive – and growers saved a lot of sprays!

A corn earworm trap and lures for your own farm could be the best investment you could make! Seventy dollars buys you a trap and lures for a season, a tool that can save you hundreds of dollars of ear damage in each acre of corn. You'll see new flights the day they arrive. Use the Heliothis Scentry white nylon net trap, baited with the Hercon luretape for corn earworm (*Helicoverpa zea*). Place in *freshly silking corn* with the base at ear height. Lures should be replaced every 2 weeks for optimum catch. Two sources for traps: Gempler's, (800) 382-8473;Great Lakes IPM, (517) 268-5693.

Sweet Corn Trap Captures and Scouting Data July 12-18, 2002

Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	FAW	% PT
		Iowa	New York				
Berkshire Region							
Sheffield, MA	July 17	0	0	0	2	-	-
Conn. River Valley North to South							
Walpole, NH	July 17	0	1	1	0	0	12
Plainfield, NH	July 17	16	0	16	0	0	6
Westminster, VT	July 17	2	0	2	0	-	12
Hatfield	July 17	0	2	2	1	-	-
South Deerfield	July 17	0	0	0	-	-	-
Sunderland	July 17	0	1	1	1	-	2
Hadley #1	July 17	0	1	1	-	-	6
Hadley #2	July 17	0	0	0	0	0	6
Feeding Hills	July 17	0	0	0	0	0	2
East/Central MA, North to South							
North Andover	July 12	7	0	7	0	0	30
Ipswich	July 11	2	1	3	0	0	14
Dracut	July 18	2	0	2	0	-	-
Lancaster	July 18	1	0	1	0	0	16
Still River	July 17	0	0	0	0	0	-
Concord	July 15	0	2	2	0	0	17
Leicester	July 16	0	0	0	0	0	20
Northbridge	July 16	0	0	0	0	0	10
Belchertown	July 18	1	0	1	-	-	-
Dighton	July 17	0	0	0	0	-	-
Rehoboth	July 17	0	0	0	-	-	-
Sharon	July 17	0	0	0	1	-	-

Check traps at least twice week. Count moths and convert to a nightly or weekly number. Note that 'non-target' moths may also be captured in pheromone traps. In July we often see gypsy moths. The distinctive features of corn earworm moths are:

- If they are alive, *bright green eyes*,
- Light tan or buff color on both body and wings, wingspan about 1 1/2 inches,
- Single darker spot toward the front of the forewing (the one on top),
- Hindwing (underneath) is lighter, and has a dark border at the tip,
- Antennae are NOT feathery (gypsy moths have feathery antennae).

CEW egg hatch and temperature. Corn earworm moths lay eggs on all parts of the plant, but fresh silk is preferred. Creamy, globe-shaped eggs are laid singly, attached to the silks. When the egg hatches, the first-instar caterpillar moves down the silk into the ear to feed. The egg will require 2-6 days to hatch, depending on temperature. Lab studies in which eggs are held at a constant temperature have determined the following hatch times:

Avg Daily Temp (°F)	Days to hatch
65	6.8
70	4.6
75	3.6
80	2.9
85	2.5
90	2.2

In an intense summer heat wave, the average daily temperatures may be around 80 to 83 degrees (with daily highs of 95-98° F). At other times, summer average temperatures range from 68 - 72° F. These temperature differences mean the difference between egg hatch in 2-3 days vs. 5-6 days. This is why spray schedules can be extended in cooler weather.

These numbers can be converted into degree-days or degree hours to hatch. A "degree day" is the number of degrees accumulated during a day, above the minimum temperature at which insects develop. Corn earworm eggs do not develop below 54° F, so this is considered the base temperature. Usually minimum and maximum temperatures are averaged to determine the temperature for a twenty-four hour period. The formula for degree-days, then, is: [(Max.Temp + Min.Temp) /2] – Base Temp. = Degree Days. To convert this to "degree hours", multiply by 24. Lab research has shown that corn earworm eggs hatch in about 1800 degree hours.

CORN EARWORM THRESHOLDS

Moths/Night	Moths/Week	Spray Interval
0 - 0.2	0 - 1.4	no spray
0.2 -0.5	1.4 - 3.5	6 days
0.5 - 1	3.5 - 7	5 days
1.0 - 13.0	7 - 91	4 days
over 13	Over 91	3 days

Note: spray intervals can be lengthened by one day if daily maximum temperatures were below 80° F for the previous 2-3 days.

NET TRAP FOR CORN EARWORM OR EUROPEAN CORN BORER MOTHS

This trap is set up in a grassy border, for ECB captures. For CEW, place in freshly silking corn. This trap can save you sprays and sleepless nights!

Vegetable IPM Newsletter, Ruth Hazzard, Editor and Stephanie DeGray, Assistant Editor. The Vegetable IPM Newsletter is published weekly from May to September and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted; author is R. Hazzard if none is cited.

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