UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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In this issue:

Crop conditions

Intermittent rain and sun have punctuated the week. This is of most concern in strawberries, where this season's excellent crop could suffer from excess moisture during harvest. Most crops are growing well, benefitting from long days and moderate temperatures. Tomatoes are being staked, pruned and tied, transplants continue to go in for main season summer crops as well as succession lettuce and greens, and seeding of succession crops continues. Harvest has begun for early peas, broccoli, scallions, summer squash, and zucchini, and is winding down for rhubarb and asparagus. Colorado potato beetle eggs are hatching, and in warmer areas CPB larvae are beginning to reach the stage of 3rd and 4th instars, which are the stage that causes the most feeding damage. Scout and time sprays to prevent damage, according to conditions in your area. Across the state, potato leafhopper has arrived from points south – scout potatoes, beans, and eggplant for adults. Aphids are on the move, usually followed closely by their predators. Avoid applying row covers to plants that might be already infected, whether they are coming out of a greenhouse where a pest may have already discovered the plants, or have been in the field for a few days where they can pick up aphids or other pests. One example observed this spring: early May chard and beet transplants appear to have been infected with spinach leaf miner eggs in the greenhouse, then set out under row cover. Row covers can keep pests in, as well as keep them out.

Cover crops for early summer

Buckwheat and sudangrass

Summer may seem an odd time to use cover crops because it is the time when the main crops are growing. But summer may be the right opportunity to improve fields with a cover crop. If the soil is wearing out, summer is when a soil-building crop can be a lot more beneficial. Also, if the crop rotation leaves an opening in the summer, using a short cycle cover crop is much better than leaving the field subject to rain erosion and weeds that are going to seed.

There are two early summer opportunities to sow cover crops: one is in late May or early June before vegetables such as pumpkins, broccoli, or late cucumbers. The other is after lettuce, peas, early beans, spinach or small grains are sown.

For planting in June, there are really only two choices. One is sudangrass, or sorghum-sudangrass, and the other is buckwheat. Both grow rapidly in the summer warmth.

Making the choice

Buckwheat and sudangrass have different properties, so the management goal and field condition will determine which is the right one to use.

What does your soil need? Sudangrass is often chosen for improving soil organic matter. It produces a strong root system and lots of biomass. The deep root system helps reduce subsurface hardness. Sudangrass is also a good choice for reducing root-knot nematode pressure.

If weed suppression is the main goal, buckwheat is preferable. Buckwheat is best known for weed suppression and mellowing the soil. It covers the ground earlier than sudangrass, especially in early June, and outcompetes weeds that may establish in sudangrass. Sudangrass requires a higher seeding rate for effective weed suppression.

When will the cover crop be planted? The amount of time until the fall crop is to be planted is a significant decision factor. As a cover crop, buckwheat is in the ground for 35-40 days. It can be sown as early as May 20. Sudangrass needs 60-70 days to be effective, and is most worthwhile if planted once June has become thoroughly warm. Both cover crops should be mowed after about 40 days. This is the end of the season for buckwheat, but the beginning of major root growth for sudangrass. Sudangrass needs a final flail mowing and immediate incorporation to suppress nematodes.

What is the current condition of your soil? If the soil is hard or the field is prone to standing water, sudangrass is a good choice, but buckwheat will do poorly. However, if the field is low in nitrogen and phosphorous, buckwheat will do well without additional fertilizer, while sudangrass needs about 40 lb of nitrogen to give satisfactory performance.

What are the needs of the fall crop? If the crop to follow the cover crop needs a fine seedbed, it will be easier to produce after buckwheat. Buckwheat mellows the soil for easy working and decomposes quickly after incorporation. Sudangrass crowns take some time to break down, so the following crop needs to be one that can be sown in a somewhat lumpy field.

What production risks are you willing to take? The main production risks associated with buckwheat are a failed stand and letting it go to seed. The failed stand usually follows a heavy rain around the time of emergence. It will be obvious two weeks after planting. If the seedlings are not doing well then, till them in and plant again. To avoid volunteer buckwheat seed, kill the crop before there are filled green seeds on the plant. This takes about 40 days from a July planting or 50 days from a June planting.

The main production risk associated with sudangrass is that the crop gets too big to mow or to incorporate after frost has killed it. This crop grows very fast, so keep an eye on it. Mow the first time when it reaches 3 feet and the second time while the flail mower can still chop it well. If sudangrass gets too big to control, it will be killed by frost and make a nice winter mulch. However, the biofumigant effect will be lost.

- Thomas Bjorkman, Rutgers

LATE BLIGHT FORECASTING: TIME TO BEGIN POTATO FUNGICIDES

Late Blight Forecast Modeling

Date	Location	Rainfall 7 days (inches)	7-day SV	SV -Season total
15-Jun	Pittsfield*	2.2	11	22
15-Jun	Ashfield	3.8	9	54
15-Jun	S Deerfield	2.3	11	23
15-Jun	Dracut	2.2	7	16
15-Jun	Tyngsboro	1.7	8	18
15-Jun	Bolton	1.5	10	30
15-Jun	Northboro	1.2	12	19
15-Jun	New Bedford*	1.2	1	15

** Data from airports*

Most areas of the state have reached the threshold for first fungicide applications to protect potato from late blight. This is based on onsite weather station data that forecasts the first possible initation of spore release IF there were infected foliage present (such as overwintered, infected potato tubers that regrow in spring.) There are no reports of late-blight infected field tomato or potato in New England to date this season, although two occurrences of late blight in greenhouse crops were reported (in Maine, May and CT, March).

The first appearance of late blight (caused by *Phytophthora infestans*), and periods of late blight favorable weather can be "predicted" using relative humidity, rainfall and temperature data collected from an electronic weather monitor or a hygrothermograph. The weather data is converted into units called "severity values" (SV) for the purpose of predicting late blight outbreaks.

Late blight is first expected to appear within 1-2 weeks after 18 SV have accumulated since the emergence of green tissue from the source of late blight inoculum. The source of inoculum could be plants growing from infected tubers in a cull pile, volunteers growing from infected tubers that survived the winter, or infected seed tubers. Fungicide applications to protect potatoes and tomatoes should be initiated as soon as possible after 18 SV have accumulated. Most locations in MA exceed 18 SV, and also have an accumulated 7-day SV of 8 or more.

To date, no infections have been reported in field crops in New England. If late blight is reported in the area, fungicide ap-

plications should begin immediately.

Begin a spray program using protectant fungicides such as chlorothalonil or mancozeb. Reserve products with special efficacy against late blight until late blight has been reported in the region, if or when that occurs.

Once 18 SV have accumulated and the first fungicide has been applied, SV accumulations over a 7 day period, combined with the amount of rainfall during that period, can be used to estimate how favorable weather conditions have been for late blight spore production and infection. The recommended spray interval depends upon both of these factors; a 5-day spray interval is recommended when conditions are highly favorable, and a 10-14 day interval is recommended when the risk of late blight is low.

Table 1 indicates the recommended spray intervals (from University of Maine Cooperative Extension Potato Program).

Total rain/irrigation for past 10 days	Total severity values during last 7 days					
	<3	3	4	5	6	>6
	Spray Interval for late blight control (in number of days)					
>1.2 inches	10-14	10	7	5	5	5
<1.2 inches	10-14	10-14	10	7	5	5

Table 1

Because weather conditions can vary depending on topography and altitude, the forecast information will be most accurate very close to the weather monitor. For locations that are not close to a weather monitor, forecast information should only be used as a *general indication* of how favorable weather has been for late blight. If the location of the station is more open or higher than your farm, periods of RH>90% are likely to be shorter and SV lower than would be appropriate for your farm.

UMass Extension is part of the NEWA weather monitoring and forecasting system, with numerous on-farm weather stations set up and linked to the NEWA website. You can look for weather a weather station close to your farm online at http://newa.cornell.edu/index.php?page=station-pages. We are currently collecting data from airports and from 14 UMass Extension weather stations. Additional stations will be rolled out over the next two years. To see the accumulation of late blight severity values in your area, click on the station closest to your farm. You will be directed to a page where you can choose to see the late blight forecast, as well as a number of other pest forecasts for that area.

If rain is forecast, be sure that all foliage has received a fungicide application within the last 7 days, especially if late blight has been found in the area. Late blight spores can be carried on storm fronts, and if large numbers of spores are deposited on unprotected tissue a lot of infections can get started.

Irrigation can create late blight favorable conditions in a field that a weather monitor will not be taking into account. Irrigation that starts when the leaves are still wet from dew in the morning, or continues after dew has fallen at night will extend the wetting period for that day and must be taken into consideration when weekly severity value accumulations are calculated.

Severity Value Accumulation Using Wallin's System of Forecasting Late Blight

Average Temp. Range F*	Hours of RH > 90%						
	0-9	10-12	13-15	16-18	19-21	22-24	25 +
45-53	0	0	0	1	2	3	4
52-59	0	0	1	2	3	4	4
59-80	0	1	2	3	4	4	4
Above 80°F	No severity values accumulated						
* Average temperature during period of relative humidity (RH) of 90% or greater							

WATCH FOR THRIPS IN ONION AND BRASSICAS

Onion thrips (Thrips tabaci) were first observed in onions in the Connecticut Valley -- at very low numbers – about two weeks ago. Other Ct Valley fields that have been scouted over the past two weeks suggest that numbers are gradually increasing. Other parts of the region and more isolated farms may have very different populations, but seasonally it is time to scout onions for this pest. In Brassicas, we typically do not see damage until later in the season but growers should be aware that thrips can move into cabbage and other cole crops. Peas are also sensitive to feeding damage. Onions are the preferred host crop.

Onion thrips are tiny insects that range in color from yellow to black and are only 1/16" in length. They spend the winter as adults in crop remnants, alfalfa, wheat, greenhouses and weeds along the border of crop fields. Adults lay eggs singly in the epidermis, adults and nymphs feed on leaves, and pupation occurs in the soil. There are at least two generations per year in the Northeast. Thrips have rasping mouth parts which they use to tear open plant cells to feed on plant juices. Populations are favored by hot, dry weather. Heavy rain or overhead irrigation can lower populations.

Cultural practices that have been shown to reduce the thrips include incorporating or removing crop residue at the end of the season, rotate fields annually, avoid use of last year's onions for sets, avoid imported transplants which may be infested with thrips from southern areas, eliminate volunteers, and using straw mulch, and alternating onion rows with carrot rows. Providing adequate water is key for onion growth; dry conditions worsen the effects of feeding damage. Growing onions on plastic mulch may help with reducing the effects of thrips on yield. Avoid planting onions near alfalfa, wheat or clover, because these crops can harbor large populations of thrips, which may migrate to onions when these crops are cut or harvested. Lacewing larvae, pirate bugs and predatory thrips are important natural enemies.

Damage. In onions, damage is caused by adults and nymphs piercing cells and removing cells contents along leaf blades. Symptoms are irregular, blotchy whitening of the leaves (known as 'blast'), and, with heavy feeding, leaf curling or twisting and overall stunting of plant growth. The result is reduced bulb size and lower overall yields, or if severe enough, plant death. Feeding that occurs mid-season during the period of rapid bulb expansion has the most effect on yield. Scallions are particularly sensitive because the whole plant is marketed. In peas, silvering or whitening of edible podded peas can be attributed to thrips feeding. In addition to direct injury, thrips damage can increase occurrence of purple blotch (Alternaria porri) of onions, as fungus can penetrate the plant through wounds caused by feeding.

Monitoring. Scout plants along field margins where infestations build early, as well as checking across the field. Scout weekly to determine if populations are increasing. Look closely between the leaf blades to find the light yellow nymphs or darker adults. Though tiny, they are visible moving about on the leaf when the leaves are parted. Count number per plant and note number of leaves per plant to determine if thresholds are reached. The number that constitutes an economic threshold varies with the stage of plant growth, efficacy of insecticide to be used, water availability, and health of the plants. A widely used threshold is 3 thrips per leaf or 30 per plant.

If repeat applications are needed, use a 7 to 10 day spray interval. Rotate between insecticide groups after 2 applications to help prevent resistance. Use a shorter interval in hot weather. Wetting agents or spreader-sticker are recommended to improve coverage and control. Apply in early evening, using moderate to high pressure, 100 gal water/A, and appropriate nozzle spacing to achieve best possible control. Note that products labeled for thrips control are not exactly the same for onions and Brassicas.

For detailed information on current chemical control recommendations, please see the 2010-2011 New England Vegetable Management guide. You can visit the guide online at nevegetable.org and find crop-specific recommendations under the 'crops' menu.

MANAGING STRIPED CUCUMBER BEETLE IN VINE CROPS

Striped cucumber beetle is our most serious early-season pest in vine crops. These beetles spend the winter in plant debris in field edges, and with the onset of warm days and emergence of cucurbit crops, move rapidly into the field. Densities can be very high, especially in non-rotated fields or close to last year's cucurbit crops. Adult feeding on cotyledons and young leaves can cause stand reduction and delayed plant growth. The striped cucumber beetle vectors Erwinia tracheiphila, the causal agent of bacterial wilt, and this can be more damaging than direct feeding injury. Crop rotation, transplants, and floating row cover are cultural controls that help reduce the impact of cucumber beetles. Perimeter trap cropping

gives excellent control with dramatic reduction in pesticide use.

Avoid early season infection with wilt. Cucurbit plants at the cotyledon and first 1-2 leaf stage are more susceptible to infection with bacterial wilt than older plants, and disease transmission is lower after about the 4-leaf stage.

Thresholds and foliar controls. Beetle numbers should be kept low, especially before the 5-leaf stage. Scout frequently (at least twice per week for two weeks after crop emergence) and treat after beetles colonize the field. The threshold depends on the crop. To prevent bacterial wilt in highly susceptible crops, we recommend that beetles should not be allowed to exceed one beetle for every 2 plants. Less wilt-susceptible crops (butternut, most pumpkins) will tolerate one or two beetles per plant without yield losses. Spray within 24 hours after the threshold is reached. Proper timing is key. There are a number of broad spectrum insecticides which can be used for foliar control (including Capture 2EC, Decis 1.5EC, Asana, and Sevin). See 2010-2011 New England Vegetable Management Guide for more details.

Organic insecticides. OMRI-list insecticides available for use in organic cucurbits include kaolin clay (Surround WP), pyrethrin (Pyganic Crop Spray 5.0 EC), and spinosad (Entrust). In 2009 spray trials comparing these three products at the UMass Research Farm, kaolin was the most effective in reducing beetle numbers and feeding damage. There was a trend toward Surround WP being more effective when Pyganic or Entrust was mixed with it, but never significantly better than Surround alone. Surround should be applied before beetles arrive because it acts as a repellent and protectant -- beetles do not "recognize" the plant and so do not feed -- not a contact poison. With direct-seeded crops, apply as soon as seedlings emerge if beetles are active. Transplants can be sprayed before setting out in the field.

Systemic controls. Two systemic neo-nicotinoid products, imidacloprid (Admire Pro) and thiamethoxam (Platinum), are registered for use in cucurbits. In New England, Platinum is labeled for use specifically for striped cucumber beetle only in MA and CT. These are systemic insecticides that may be used as an in-furrow, banded, drench, or drip irrigation application to the seed/seedling root zone during or after planting/transplanting operations. DO NOT apply as a foliar spray.

Using systemics in direct seeded crops. It is important to get the insecticide into the soil to avoid photochemical breakdown; placing it in the furrow or irrigating it in can accomplish this. One of the most efficient systems for an in-furrow treatment is to attach an injector to the planter for placement at the seed level after the furrow is opened and before the seed drops. This has the advantage of one trip through the field and very precise targeting of material. Where it is applied to the soil surface, it should be watered in with irrigation (or rainfall) to move it to root depth for seedlings.

Using systemics on transplants. The best time to treat is about 1 day prior to planting in the field. We have observed effective results at rates of 0.01 ml Admire Pro per plant. See label for application rates. Caution should be used because phytoxicity can occur at high rates. Note: there are 29.6 milliliters (ml) in one fluid oz.

Another way to apply imidacloprid to transplants is through a water wheel planter. Use the same rate per plant as you would for a transplant drench and the rate of water per plant that fits your planter (e.g. 8 oz). Multiply by the number of plants and mix the total insecticide needed with the total water needed in the tank. Make sure your workers wear protective gloves and allow time for uptake (1+ days) into leaves. Note that the highest rate of uptake will be into new growth.

Systemic seed treatments. A relatively new treatment is the Farmore DI-400 seed treatment from Syngenta, which combines a systemic insecticide with three different fungicides in a seed treatment. We haven't tested it ourselves, but we've heard that results are good, with 20-25 days of SCB control and no reduction in germination or plant health. The price is relatively low, as the seed treatment adds about $2-$3 per 1,000 seeds. It's available on a limited number of varieties this year, mostly pumpkins and winter squash, but demand is high so we'll likely see it become available on a wider selection of vine crops & varieties next year.

Drip application. A drip system can be used for Admire or Platinum applications to either direct seeded or transplanted crops. Know your system well enough to know how long it will take to inject a given amount of concentrated solution (eg one bucketful) and to soak the area between emitters. Apply early enough to allow the plant roots and leaves to take up the material before beetles arrive. The system should be primed with water first, and the insecticide injected slowly for even distribution. Make sure to use enough water to soak the area between emitters. More emitters provide a more even distribution of product.

Calculate the total needed based on the rate per 100 or 1000 ft of row and the number of row feet of line that will be treated. Place the total amount in the bucket with enough water for 20-30 minutes of injection. Charge the system with water first to get the soil wet. Turn on the Venturi or other injector, to inject slowly for even distribution (20 or 30 minutes). Then flush lines with clear water and to move product out and down.

Non-target effects. Bees are very susceptible to imidacloprid and thiamethoxam and could be affected by its presence in pollen if it is still at high levels in the plants at the time of flowering. Bees intoxicated by Admire or Platinum, like beetles, show unusual behaviors such as tremors, staggering, and falling over before dying. This could happen with bees at excessively high rates of these insecticides. We have not observed it at the rates suggested in this article. The foliar formulation of imidacloprid (Provado)is not labeled for cucurbits, and the foliar formulation of thiamethoxam (Actara) has a label for cucurbits but may not be sprayed during bloom. Carbamates such as Sevin and synthetic pyrethroids should not be used during bloom to avoid killing bees. Given the high losses of hives over the past several years – which seems to be from multiple causes, only one of which is the pesticides used on crops that bees visit – taking precautions to protect both native and domestic bees is an especially important concern. Note that the 2010 edition of the New England Vegetable Management Guide gives rating for bee toxicity in Table 20 (pg 49).

Resistance from overuse. The down side of systemic products might be that they are 'too easy'. That's not necessarily a bad thing for growers who are always too busy! However if these are overused on a routine basis, these products may well be lost to resistance in a fairly short time. Furthermore, they are not cheap. For a truly IPM approach, combine or alternate these materials with crop rotation, perimeter trap cropping, and field scouting followed by foliar sprays with other classes of insecticides to reduce the likelihood of resistance and keep use rates low. Perimeter trap cropping provides a large, untreated refuge which can delay resistance.

-Ruth Hazzard & Andrew Cavanagh, University of Massachusetts, updated for 2011.

Corn report

Location	Z1	EII	Total
CT Valley			
Amherst	3	1	4
Hadley (1)	2	2	4
Hadley (2)	3	10	13
Central & Eastern MA			
Millis	2	1	3
Sharon	1	1	2
Rehobeth	1	58	59
NH			
Litchfield, NH	4	0	4
Hollis, NH	7	0	7
Mason, NH	4	0	4

The earliest sweet corn is starting to show silk. In these fields harvests are anticipated for the Fourth of July holiday. Most corn is in whorl stage or entering pretassel. Succession planting will continue for several more weeks. The last of three trichogramma ostrinea releases were made this week with the hopes of targeting the peak of the European corn borer flight.

European corn borer flights have remained low into this week throughout the state with trap counts below double digits in most areas with the exception of Rehoboth with trap captures at 58. Thank you David Rose for calling in your numbers and keeping us up to date with what's going on in the Eastern part of the state! Next week we will have more numbers to report. We recommend trapping on your own to get an accurate picture ECB activity on your farm. We find significant differences in trap captures from one field to the next. Nine corn earworm moths were found in Hadley MA this week. We also have seen some CEW caterpillars feeding on pollen in the silks of some plants. We often find a small overwintered population that makes an appearance early in the season. This population is so small that control is not necessary.

ECB infestation levels above threshold were found in fields with emerging tassels. Recommendations to spray were made with growers waiting for tassels to fully emerge before pesticide application happens. This is the best time to hit caterpillars that are feeding since they are fully exposed. Fist, second and third instar caterpillars were found which tells us that hatch occurred a few days to a week ago and is continuing. Continue to scout fields for damage counting all live caterpillars and fresh damage. Once 15% or more of the field is infected, it is time to take action. To conserve natural predator populations in your fields, try using a less toxic material with active ingredients such as spinosad or bt. Once a spray has

been made, a second scout should happen to ensure that the population is under control. Only count new feeding damage and live caterpillars on the second scout. Usually this is the time of year we are at or past the peak of the ECB flight, so it is possible that we will not see a large flight this June. The borers that have hatched are now busy feeding within the whorl and in the developing tassel, making their way down the stalk. Continue to scout. Visit our website at www.umass-vegetable.org for more information on developing a sweet corn scouting program on your farm.

- A. Brown

UPCOMING MEETINGS

Eastern CRAFTS Meeting

June 22 4-6pm

Waltham Community Farm

Organic insect management with Ruth Hazzard. Includes backpack sprayer calibration. Bring insect samples and ques¬tions. For more information contact Amanda Cather, Waltham Fields farm manager 781-290-8521 or UMass Extension Vegetable Program at 413-545-3696. Sponsored by Eastern Mass CRAFTS & UMASS Extension. Open to all farmers.

Massachusetts Beekeeper's Association Field Day Meeting

Saturday June 25

UMASS Agronomy Farm, 89-91 River Road North ``South Deerfield, MA

Hosted by: Franklin County Beekeepers' Association

Admission free. Lunch requires preregistration. The menu will be pulled pork sandwich, beans, cole slaw or potato salad and corn bread, and bottled water. For more information see www.massbee.org

Mass. Farm to School Project Invites Distributors/Vendors to Discuss Institutional Demand for Locally Grown Foods

Wednesday June 29th, 2:00 - 3:30 pm

Rovezzi's Ristorante, 2 School St. Sturbridge, MA

Farmers with an interest in selling products to institutions are welcome to join a statewide "shoptalk" meeting with distributors, aggregators, and trucking operations. In preparation for Mass. Harvest for Students Week (Sept. 23-27), we'll discuss procurement and promotion of locally grown products, transparency and traceability of food from the farm to the customer, recently-passed legislation mandating local food purchasing by state agencies, and more. Primarily intended for businesses interested in being a "go-to source" for local product for institutions, we will hear from the procurement director of a college about his local foods requirements.

This meeting is free and refreshments will be served. Please RSVP to info@massfarmtoschool.org or by calling 413-253-3844.

Mid New England Grain Conference and Festival: 'Bread, Beer & Biodiversity'

July 14 - 15, 2011 9:00 a.m. – 4:30 p.m.

Join us for our two day event to learn about the reintroduction of grains into NE farming systems and to celebrate the harvest with a festival on the second day. Come and listen to a variety of speakers whose expertise in grain breeding, production, marketing, and value-added products will have you planting your own field of grain in no time!

Day 1: July 14 – Growing Local Grains Conference

UMass Crops, Animal, Research and Education Farm, 89-91 River Rd, North of RT. 116, South Deerfield MA (Exit 24 on I-91)

Day 2: July 15 – Community Grain Festival

Colrain Seed Farm, 400 Adamsville Road, Colrain, MA 01340

Cost is $25* per day per person or $40* for both days per person. (* includes lunch)

Please Mail Registration by July 8, 2011 to:

Att: Jacqui Carlevale University of Massachusetts Extension

305 Bowditch Hall, 201 Natural Resources Rd., Amherst, MA 01003-9294

If you have questions or would like to register by phone or email,

Phone: 413-545-5221 Email: jcarleva@psis.umass.edu

For further information visit: http://extension.umass.edu/vegetable/

Fruit Growers Summer Meeting

Monday July 18, 9:00 - 2:00pm

Parlee Farm, Tyngsborough MA

For more information contact Fruit Growers Association, Wes Autio 413-545-2963 autio@pssci.umass.edu.

UMass Vegetable Growers Field Day

August 3

UMASS Crops Research & Education Center

Stay tuned for details!

Vegetable Notes. Ruth Hazzard, editor and Amanda Brown and Andrew Cavanagh, assistant editors. Vegetable Notes is published weekly from May to September and at intervals during the off-season, 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 and photographer is R. Hazzard if none is cited.