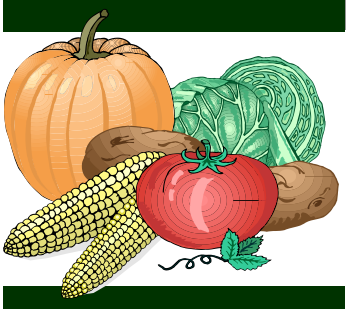

Cornell University
Cooperative Extension
Regional Vegetable Programs

March 2011 **Volume 7, Issue 3**

Veg Edge

Your Trusted Source for Research-Based Knowledge

Spring Management of Overwintering Cover Crops: *Don't Wait!*

Thomas Björkman, Cornell

One of the frightening things about using a rye cover crop is when it rains all spring, and the rye is over your cap by the time you can get to it. Rye that tall is really challenging to manage, and even when you get the ground worked, it takes a long time for the ground to be good for vegetables. Fortunately, there is no need to cut it close on killing that winter cover crop. Most overwintering cover crops give you the most value if you kill them quite early. April is the best time to kill many cover crops. They can be killed with an herbicide that works at lower temperatures, and smaller plants can often be killed with shallow disking. April weather doesn't offer lots of chances to get on the ground, but it is worth taking those chances when they happen.

For getting nitrogen value out of grains like rye, the best time to kill them is when they have recently greened up and have just started to grow - perhaps six to eight inches tall. When rye is larger than that, the nitrogen concentration drops, leading to N tie-up when your crop needs it. An early kill can give you 30 to 50 lb N credit (yes, from those little plants!), while killing at boot can be a significant debit. Killing at boot also makes the rye slower to break down, gives less time for it to break down before you need to plant, and the crowns make it more difficult to prepare a seedbed. The risk of missing the chance to kill it also goes up.

Annual ryegrass, on the other hand, only becomes sufficiently sensitive to glyphosate when it's warm enough for it to really grow. Once that happens, don't delay because the young growth is the source of nitrogen.

Fall-sown crucifers usually die in the fall (radish, mustard) or early spring (turnip). The latter is better for recovering N. In either case, there is little regrowth in the spring. The reason to control them early in the spring is to avoid volunteers from stray survivors. If you see yellow (or pink radish) flowers in the field, it should be a signal to act.

The boot stage is a commonly recommended age for killing that is usually much too late. It is relevant in two situations: if the rye (usually a rye-vetch mix) is to be killed by mowing or rolling, the stems are susceptible at this point. The vetch is also at its maximum nitrogen content. I consider that a special case where the late kill is appropriate.

In my research program, we tested whether the crop inhibition is reduced if one uses triticale or wheat, which are less allelopathic. We killed all of them with herbicide at early to mid-boot, incorporated and let them break down. We transplanted tomatoes, peppers and cabbage, and direct seeded corn, beans and cucumber. All these crops showed about *a 25% reduction in growth* in the first month. It made no difference which cover crop. That result shows how deleterious late control of small grains can be, and it is not all allelopathy.

It may seem premature to kill cover crops before they put on much biomass in the spring. You do forego some addition of active carbon. However, the cost of adding the extra organic matter just before planting is too high. It is better to get the nitrogen value and the soil improvement for the extensive root growth, and to work on organic matter production at the end of the growing season. ■

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Veg Edge is a shared publication of two Cornell Cooperative Extension teams, the **Cornell Vegetable Program**, serving 12 counties in Western & Central NY, and the **Capital District Vegetable & Small Fruit Program**, serving 11 counties in the Capital Region of NY

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Pesticide Classes

The 2011 Empire State Fruit & Vegetable Expo

NYS Farmers' Direct Marketing Conference and Becker Forum:
Immigration Issues Confronting New York Agriculture

Speaker summaries for all of the Expo sessions are now available at: http://www.nysaes.cornell.edu/hort/expo/proceedings.php

Dry Edible Beans: Tillage Options

Excerpt from Agronomy Guide for Field Crops, OMAFRA, Ontario, Canada

Dry beans grow best in soils that are friable, loose and well aerated. The seedbed requirements are similar to those for soybeans, including a firm seedbed to enhance a uniform planting depth. The best stands come from beans that emerge within a week of planting. To accomplish this, it is important to have:

- uniform soil moisture
- good soil-to-seed contact
- secondary tillage limited to minimum required for seedbed preparation
- surface conditions that minimize risk for soil crusting

White and black beans can be successfully grown using either a conventional or reduced-till system. Conventional tillage is more important for large-seeded bean types that are usually harvested by the pull and windrow method. In reduced-till systems, dry beans respond to some form of tillage in the seed zone at planting. This is largely due to their inherently small and poorly developed root system. The ripper unit, and tillage coulters on the ripper and/or the planting unit, will provide the necessary seed zone tillage. Row cleaners on the planter will move large debris out of the way of the planter.

Beans may be shorter when grown in a reduced-till system and therefore are more suited to narrow row production. Rolling the soil following planting may be important for dry edible beans where direct harvesting is planned and for dry edible beans planted reduced-till into corn stubble. Rolling will prevent stones, cornstalks and contamination from dirt when combining. Land planted to dry edible beans in wide rows may be susceptible to soil erosion, depending on the residue present. For beans in wide rows, a crop canopy may only fully cover the soil during August.

Crop Rotation Considerations

A good crop rotation is the most important detail for high edible bean yields. Factors to consider when selecting a field for dry edible beans:

- soil type , structure, stoniness and drainage
- disease history
- weed control and herbicide carryover

Soil Type and Structure

Dry edible beans are one of the most responsive crops to good soil structure. Heavy soils that have poor drainage, crust or are hard to till risk uneven emergence and poor stands. Soil remaining saturated for 24 hours will lead to severe damage to seedlings. Uneven emergence results in uneven ripening, delayed harvest and immature beans that increase the "pick" and result in lower grade and price when marketed.

Avoid growing dry edible beans in fields where compaction is a concern. Soil compaction is a serious dry bean production issue that restricts root growth, promotes root disease and increases risk of herbicide injury. Yield reductions from compaction and poor soil structure can be as high as 30%-50%. Compaction takes time to overcome and cannot be alleviated with tillage alone.

Disease

A rotation where beans (or other legumes, soybeans, etc.) are grown only once in 3 years (or longer) is essential to avoid the build-up of diseases. The most common diseases encouraged by short rotations are root rots and white mold *(Sclerotinia)*. Soybeans, canola or sunflowers are not the best rotation crops since they are all susceptible to white mold. Root rots are challenging to control through rotation because they have a wide crop-host range. The organisms that cause root rots are often invasive, infecting plants that are under stress. Soil compaction, poor drainage, frequent cropping to beans and other factors cause plant stress that favors root rot.

When all the factors have been taken into consideration, most often the ultimate rotation crop for dry edible beans is corn; forages or cereals also make a good rotation crop. A previous crop of corn provides a good opportunity to control weeds and an effective break in edible bean diseases. A cereal crop in which weed control was good would be preferred over a corn field where compaction following a wet harvest might be an issue. Forages provide the best soil structure, but soil insects and weed pressure can be an issue. For more information on appropriate crop rotations for dry edible beans and precautions under different tillage systems, consult with your vegetable/dry bean crop specialist.

(edited by C. MacNeil, CCE, Cornell Vegetable Program) ■

Come to the **2011 NYS Dry Bean Meeting on March 3rd in Stafford, NY** *for information on new and old bean pests, breeding progress, AgroOne soil testing, fertilizers for beans, and more.* ***2.75 DEC credits available.***

For more information, 585-394-3977 x426 or aep63@cornell.edu

2011 Berry Crop Label Updates

Laura McDermott, CCE Capital District Vegetable & Small Fruit Program, and Cathy Heidenreich, Cornell

There are many new pesticides available for use on berry crops this season. Below is a list of those that have new labels, or a supplemental label within the last year or two. Also included are materials that have 2(ee) labels, and materials with impending changes in availability. Basic use information is listed to provide the user with an idea of how this product might fit into their pest control arsenal; by no means should a grower rely on these brief statements when applying these materials. As always, please read the label thoroughly and call your extension agent if you have questions.

Herbicides

Prowl H20 (strawberry) - Supplemental label for strawberries was approved in 2009 and will expire on Dec. 31, 2011. Supplemental labels are the vehicles that chemical manufacturers must use as they amend the original label, so the hope is that strawberry uses will be added to the Prowl H2O label permanently in 2012. Applicators need to follow instructions on both supplemental and primary labels. See label for special instructions for application of Prowl H2O through sprinkler irrigation systems. Prowl H2O can be used as follows:

1. Before planting strawberries. Apply to the soil surface before planting to prevent most annual grasses and suppress several broadleaves like velvetleaf or purslane. Irrigate after application to activate herbicide OR shallowly incorporate. Do not apply to soil that will be covered in plastic, but applications to row middles between the beds are allowed. Post transplant applications may be made ONLY if no foliage on dormant plants are exposed to spray. A 2nd application between rows may be applied 35 days before harvest, but material must not come in contact with foliage.
2. Apply to strawberries in fall or winter dormancy. Do NOT apply if new seasonal growth has appeared.

Insecticides/Miticides

FIFRA Section 2(ee) labels on pesticides mean that they are classified for restricted use only in New York State. The label should be in the applicators possession.

Danitol 2.4EC 2(ee) for Brown Marmorated Stinkbug control on bushberries and strawberry. Danitol 2.4EC can be used at the 0.2-0.3 lb ai/A for bushberries and 0.2-0.4 lb ai/A for strawberries as a foliar spray. Control can be improved by using a non-ionic surfactant and increasing spray volume. Begin applications when 1st pest activity is noticed, repeating as needed and increasing rates under severe pest pressure. Danitol also has a Supplemental label which now includes bushberries and caneberries. Do not use more than 2 applications of Danitol 2.4 EC per season as part of a resistance management program.

Entrust 2(ee) for Spotted Wing Drosophila control on bushberries and caneberries. Entrust should be used as a foliar application at a rate of 1.25-2 oz/A.

Platinum 75 SG Supplemental label – Not for use on Long Island. This insecticide is legal for use in NYS on bushberries, low growing berries including strawberries and vining berries (not including fuzzy kiwi). It is not labeled for use on cane berries, and in NY it is NOT labeled for grapes. The pre-harvest interval is quite long – 50-75 days depending upon the berry category, but because of the granular nature of the product and the fact that you apply early in the season, it may be very handy for growers. Apply a surface band on each side of the row to drip-line. Irrigate immediately after application. Rate varies according to berry crop. This material can provide control or all types of grubs including Japanese beetle. It will also control aphids, leafhoppers and mealybugs.

Portal 2(ee) for Cyclamen Mites for low-growing berries subgroup including strawberries, cranberries, lingonberries (subgroup 13-07G). Apply 2.0 pts per acre in minimum spray volume of 25 gallons water

per acre. No more than 4 pints per acre per season. Allow at least 14 days between the 2 seasonal applications. Do not use adjuvants and do not apply through irrigation or by air.

New Registrations include:
Actara for all berries to control a wide variety of insects including stink bugs, Japanese beetles, tarnished plant bugs, whiteflies, weevils and aphids. Application rates vary depending upon type of berry targeted, so please refer to the label.

Altacor for caneberries and climbing vine berries (NOT fuzzy kiwifruit) for the control of omnivorous leafroller and raspberry crown borer. Apply 3.0-4.5 oz/A with a limit of 9 oz/A/ season using no more than 3 applications. Allow a minimum of 7 days between applications and use 100-150 gallons water per acre for best results.

AzaSol, a water soluble bio insecticide from Neem can be used on all berries for control of many pests. Rate is 6 oz in 50 gallons of water/A applied as a foliar spray or a soil drench.

Changed Registrations include:
Endosulfan registration To Be Cancelled - Endosulfan is an organochlorine insecticide that has been used on a wide variety of vegetables and fruits. EPA concluded that endosulfan's risks to wildlife and agricultural workers outweighed its benefits to growers and consumers. EPA is working out the details to terminate all endosulfan uses while considering growers' needs as they change their pest control practices.

Avaunt had the label expanded in 2010 to include bushberries and cranberries for the control of cranberry fruitworm, cherry fruitworm and winter moth. Avaunt can be applied using overhead irrigation in cranberries only.

Guthion use on blueberries was restricted in 2010. No aerial applications are allowed and , 1.5 lb maximum application rate. **Note:** Guthion may not be used on highbush blueberries after 9/30/2012.

Fungicides
Rampart was labeled for the control of downy mildew, phytophthora, pythium and other diseases on blueberries, caneberries, cranberries, currants, elderberries, gooseberries and strawberries. Rampart is a phosphoric acid material that has a wide variety of acceptable application methods which vary according to the disease and crop in question. Please refer to label for details.

Agri-Fos , a phosphorous acid fungicide with systemic properties was labeled for use on strawberries to control leather rot and other Phytophthora diseases. Recommended rate is 1-3 quarts in 50-100 gallons water per acre for foliar spray while 1.25 quarts in 100 gallons of water is the recommendation for a foliar dip when used to control red stele.

Agri-Star Sonoma 40WSP has been approved for use in caneberries, currants, gooseberries and strawberries to control powdery mildew, rust diseases, leaf spot and leaf blight and gooseberry anthracnose. This material should be used as an early season preventative spray. Rates vary according to disease and fruit, so please refer to label for specific instructions.

PropiMax was labeled for the control of certain diseases, including leaf spot, rust, mummyberry and powdery mildew on blueberries, caneberries and cranberries. Application rate is 6 fl oz/A and applications should begin when conditions favor disease development or prior to bloom. Do not apply more than 30 fl oz/A per season and not within 30 days of harvest.

A listing of berry crop label alerts may be found at: http://www.fruit.cornell.edu/berry/labelalerts/. ■

Weed Control Before Organic Strawberries

Molly Shaw, CCE Tioga, South Central NY Ag Team

Thank you to NESARE for funding this trial.

Controlling weeds in the strawberry planting is one of the biggest challenges to strawberry growers. At Cobblestone Valley Farm in Cortland County, weeds have been a perennial (literally) headache. Paul and Maureen Knapp run an organic dairy; the organic strawberries and pastured poultry are additional farm enterprises. They grow a lot of forage crops, so their soils are in great shape, as shown by the Cornell Soil Health test **(figure 1.)** Typically strawberries are planted in June after a 2-3 year old red clover field is plowed down. The main weakness in this rotation is that perennial weeds have plenty of windows to establish and make seeds. Dock, dandelion and yellow rocket (in the mustard family) were the main offenders, all weeds that can start as seedlings in the fall and grow quickly early in the spring.

In 2009, we decided to try two different cover crop strategies to see if we could decrease weed problems in the strawberry years. We focused specifically on disturbing the soil multiple times with cultivation, and having a good thick shady cover in the fall when many of the perennial weeds would germinate. The old hay red clover field got split into three sections:

- **The Usual—Oats and Red Clover** Oats seeded with red clover in late June 2009, oats mowed off at the end of July and red clover used for forage until spring 2010.
- **Oats alone** Oats planted late June 2009 and mowed off at the end of July. Oats left to regrow, and eventually winterkill.
- **High Disturbance—Buckwheat and Brassica** Buckwheat planted in late June 2009 and mowed off at the end of July, followed by a forage brassica in late August. We used Appin and Pasja because they were supposed to have the best palatability for dairy cows.

Establishment: All the crops were seeded with a drill and established well in 2009. The oats were nice and thick. Clover came back well after the oats were mowed. By mid August, the buckwheat was tall, thick, and flowering. The Brassicas were a little too thick, so consequently the turnips were smaller, but both crops covered the ground well.

Fall Weediness: At the November 2009 assessment, the red clover looked pretty nice, without many weeds. Where the oats had been mowed off and left to regrow, quite a few perennial weeds had managed to take hold. The section with the fewest weeds was the buckwheat/Brassica. Where the seeder missed a swath the yellow rocket and henbit were vigorous, but under the Brassica shading was good and there were only a few small henbit seedlings.

Spring Soil Preparation: Spring 2010 came and the Brassicas had not winterkilled. It was milder than normal winter 2009-2010. They plowed under easily in mid-late May when they were flowering (before they set seed), but it was good to find out that overwintering was a possibility in our area. Oats had winter-killed, and the overwintering red clover was plowed down in the spring. *(Note: Tillage radish varieties are not as hardy as forage turnips and are*

much less likely to overwinter. Ed. C. MacNeil, CCE, CVP)

Weeds in Strawberries: June 2010 strawberries were planted on the cover crop plots and cultivated and hand weeded. In early August you could still see a line in the field where the buckwheat/Brassica had been the year before—there were visibly fewer weeds than in either of the other plots. Especially significant was that there was hardly any dock and very little quackgrass where the buckwheat/Brassica had been, while those weeds were present in the oats and in the red clover sections. There wasn't as clear a line between the red clover plot and the oats plot.

The winners: The buckwheat followed by fall Brassica plot was the clear winner in our trial. The combination of quick-growing shady cover crops with frequent soil disturbance seemed to really help. "Help" is the key word to remember here. The field still received cultivation and two hand weedings, but the buckwheat/Brassica section was quicker and easier to weed than the other sections.

Cobblestone Valley has recently noticed some root rot problems in young strawberries. Verticillium, a root rot pathogen that goes to both clovers and strawberries, was identified with the help of Kerik Cox, Cornell Plant Pathologist. In 2010 Paul trialed a biofumigant mustard cover crop on part of a field. We'll see what trial results show in 2011.

Consequently, their soil health test showed really high quality soil conditions. The one item of concern, low available water capacity, is an intrinsic feature of southern tier gravelly valley soils. ■

Figure 1: Cobblestone Valley uses soil-building forage crops like alfalfa and red clover in their rotations.

	Indicators	Value	Rating	Constraint
PHYSICAL	Aggregate Stability (%)	74	98	
	Available Water Capacity (m/m)	0.11	18	water retention
	Surface Hardness (psi)	0	98	
	Subsurface Hardness (psi)	0	100	
BIOLOGICAL	Organic Matter (%)	4.0	65	
	Active Carbon (ppm) [Permanganate Oxidizable]	690	66	
	Potentially Mineralizable Nitrogen (µgN/gdwsoil/week)	15.3	100	
	Root Health Rating (1-9)	2.5	88	
CHEMICAL	*pH	6.6	100	
	*Extractable Phosphorus (ppm) [Value <3.5 or >21.5 are downscored]	14.5	100	
	*Extractable Potassium (ppm)	63	100	
	*Minor Elements		100	
OVERALL QUALITY SCORE (OUT OF 100):			86.0	Very High
Measured Soil Textural Class:==> silt loam				
SAND (%): 44.7 SILT (%): 51.9 CLAY (%): 3.4				
Location (GPS): Latitude=> 0 Longitude=> 0				

* See Cornell Nutrient Analysis Laboratory report for recommendations

Cornell's Soil Health Test

Soil is a wonderfully complicated ecosystem, and the health of that ecosystem impacts how well soils perform for us when we're growing crops. Yet our traditional soil tests only measure the chemical properties of the soil.

Cornell's Soil Health Team came up with a soil test that would measure the overall health of the soil, not just the nutrients available. Over several years the team has developed and farm-tested methods to measure the physical and biological health of soils. "Good soil aggregate stability" means the soil is crumbly and friable, and when rain hits the ground, it soaks up the rain and the soil doesn't melt and dry into an impenetrable crust. "Low subsurface hardness" means there isn't a hard pan restricting root growth. "High potentially mineralizable nitrogen" means the soil organisms are alive and actively breaking down residues and releasing nitrogen to be used by your crops. There are 12 indicators the team uses that combined give your soil a score, and pinpoint where your soil needs improvement.

If your soil health test shows that your soils could use improvement, it also prescribes ways to improve physical and biological characteristics, adding organic matter, increasing cover crops or decreasing tillage. Other recommendations come up from time to time, such as deep ripping to break up a hardpan, or growing a specific type of cover crop.

To learn more about soil health testing and the Cornell soil health team, visit www.hort.cornell.edu/soilhealth. To get a soil health test done on your vegetable or crop farm, see the Cornell soil health website for the sampling protocols and fees. ■

2010 Broccoli Variety Evaluation Available

Christy Hoepting, CCE Cornell Vegetable Program

In 2010, CVP specialists, Christy Hoepting and Katie Klotzbach took on a major project when they evaluated 27 broccoli varieties. As far as we can tell, Cornell Cooperative Extension has not done a broccoli variety trial in 25+ years. After this summer, we understand why – it was A LOT of unrelenting work!

27 varieties:

- Submitted from 7 seed companies (American Takii, Bejo, Harris Moran, Johnny's, Sakata, Seedway and Syngenta/Reeds)
- Included 5 industry standards (Diplomat, Gypsy, Green Magic, Imperial, Windsor)

3 plantings: (1st – planted May 19, harvested in July; 2nd – planted June 17, harvested in August, 3rd – planted July 15, harvested in September)

Report Information includes:

- Lots of photos
- Relative maturity and days to harvest
- Harvest maturity
- Head diameter and weight, and trim weight
- Head characteristics (color, firmness, bead size)
- Heat stress (yellow eye, inner leaves in head, etc.)
- Re-growth potential
- Canopy characteristics
- Scaled diagrams and other easy to read/interpret presentation of information

Best Broccoli Varieties in Trial:

Bay Meadows
Emerald Pride

Where to Get the Results:

A final report in handout or Power Point presentation format are available for viewing and downloading at the Cornell Vegetable Program website: http://cvp.cce.cornell.edu. From the side menu, go to "Crops, Soils and pests", then "Crops" and then "Cabbage & Cole Crops", and you will see the broccoli information. If you would like a copy sent to you, contact Christy Hoepting at cah59@cornell.edu or 585-721-6953. ■

2009-2010 Storage Cabbage Variety Evaluation Available

Christy Hoepting, CCE Cornell Vegetable Program

17 varieties:

- From 5 seed companies (American Takii, Bejo, Reeds, Seminis, Syngenta)
- Amtrak and box types
- Common and cold (refrigerated) storage evaluations

Information includes:

- Lots of color photos
- Field information – plant characteristics, off-types and rots
- Head size and yield
- Onion thrips tolerance
- Storability – shrink loss, trim loss, internal disorders and color

Best Storage Cabbage Variety in Trial:
B2792

Where to Get the Results:
A final report in handout or Power Point presentation format are available for viewing and downloading at the Cornell Vegetable Program website: http://cvp.cce.cornell.edu. From the side menu, click on "Crops, Soils and Pests", then "Crops" and then "Cabbage & Cole Crops", and you will see the 2009-2010 Storage Cabbage Variety Evaluation. If you would like a hardcopy sent to you, contact Christy Hoepting at cah59@cornell.edu or 585-721-6953. ■

New York Fresh Vegetable Value Ranks 6th in Nation

www.nass.usda.gov/ny

The value of all New York vegetable production in 2010 totaled $409 million, according to King Whetstone, Director of USDA's National Agricultural Statistics Service, New York Field Office. New York is fifth in the nation in area harvested and sixth in value of principal fresh market vegetables. The value of the Empire State's principal fresh market vegetables totaled $361 million this year. Fresh market production in 2010 was estimated at 14.2 million hundredweight (cwt.). Planted acreage increased from 68,230 acres in 2009 to 69,890 acres in 2010. Processing vegetables were valued at $47.6 million in 2010 and production totaled 245 thousand tons.

NY onion yields averaged 325 cwt. per acre, down from 2009. Year 2010 production is estimated at 3.32 million cwt., down from 2009. Value is down 20% to a total of $54.2 million. NY's fresh market cabbage production for 2010, estimated at 4.34 million cwt., is up from 2009's production of 3.42 million cwt. New York ranked second in the nation for fresh market cabbage production in 2010. Fresh market sweet corn acreage was up in 2010. A total of 22,800 acres were harvested, a 6% increase from last year. Yields increased from 100 cwt. per acre in 2009 to 120 cwt. per acre in 2010. Total value was at $71.1 million, up 22% from last year. NY is ranked third in the nation on value of the 2010 New York fresh market snap bean crop, at $39.2 million. Harvested acres remained at 6,700 acres. Yield increased from 40 cwt per acre to 70 cwt per acre. Total production was 469,000 cwt., up 75% from last year due to higher yields. Pumpkins showed a value of $35.1 million, first in the nation. There were 6,800 acres harvested for a production of 1.46 million cwt. Value of production in 2010 increased 61% from 2009. ■

USDA - Crop Insurance Deadline for NY Spring Crops

Risk Management Agency News Release

New York farmers are reminded that the **final date to apply for crop insurance on most insurable spring-planted crops for this year is March 15, 2011**, according to the Raleigh Regional Office, USDA Risk Management Agency. Current policyholders also have until March 15 to make any changes to their existing contracts. Crop insurance provides protection against losses due to natural perils such as drought, hail, wind, and excessive moisture. The March 15 sales closing date applies to Spring Barley, Cabbage, Corn, Dry Beans, Forage Seeding, Fresh Market Beans, Fresh Market Sweet Corn, Grain Sorghum, Green Peas, Oats, Potatoes, Processing Beans, Processing Sweet Corn, Processing Tomatoes, and Soybeans. Beginning with the 2011 crop year, the Crop Revenue Coverage (CRC) and Indexed Income Protection (IIP) plans of insurance have been discontinued. Producers are strongly urged to contact a local crop insurance agent as soon as possible for premium quotes and more details. For a list of crop insurance agents in your area, contact the local USDA Farm Service Agency office or log on to the Risk Management Agency web site at: http://www3.rma.usda.gov/tools/agents/. General USDA Risk Management Agency info can be obtained at 919-875-4880, or http://rma.usda.gov.go.ronc ■

Plan for Profit in 2011

Crystal Stewart, CCE Capital District Vegetable & Small Fruit Program

I was recently surprised during a financial planning session when some of the mentors in the room, experienced farmers who were there to help guide their less experienced counterparts, indicated that they did not have the necessary information to determine which of their crops were most profitable, how much labor was allocated to each crop, etc. Some had looked at their finances carefully in the past and now just compiled the information that the accountant needed; others had never taken the time to tease out the expenses (or even revenue) associated with each specific enterprise. They knew, on the whole, whether the farm was making or losing money, but they did not know which crops contributed the most profit. If this sounds like a familiar story, read on…

Tracking income and expenses by enterprise is easy enough when only growing a couple of crops. However, it naturally becomes more complicated for more diversified farms, and for smaller farms where the burden of tracking falls to the farmer, not to a bookkeeper, this can seem like a task that is not worth doing. Highly diversified or not, if you do take the time to break down your enterprises and you find that, for example, eliminating certain crops and focusing more on others is going to generate you significant profit, you might find yourself moving this task up on the to-do list. Another benefit of taking a hard look at the numbers is that it can help you identify weak "links" in your chain of production (your farming), in your marketing, or even in your post-harvest handling. After looking over all your numbers, you may realize that the added cost in labor or lost yield associated with not having a certain implement, washer, etc. could add up to the cost of purchasing that equipment far quicker than previously realized. Or, you may find that you could easily be selling more of a certain highly profitable crop without any added marketing expense. But how would you ever know if you just looked at total dollars in and out at the end of the year?

Getting started:

Profit = Income – Expense

How much money do you need to make next year to support your farm and your quality of life (yes, I'm talking about that week in a sunny warm place in early February)? Do you have a plan to make that much money? Or are you going to farm your hardest and then see what's left at the end of the day? These are the questions I like to start beginning farmer financial planning sessions with, and they are usually met with some pretty serious silence. If you don't start off with a number in your head—a goal for how much you are going to make—how will you get there? You make a production plan, so why not make a profit plan? After thinking about that number that you'd like to reach, create enterprise budgets to predict whether you are going to be able to get there. If possible, do one for each different crop. You can have different income

streams included on this one budget: wholesale, retail, CSA, etc. Usually income is the easier part (though not always, since most people don't keep track of farmers' market sales by crop). After you have your incomes figured out, tackle the expenses. Figure 1 is an example of just some of the items you might include. Remember to expand the categories to include every expense, from the seed through to the saleable product. Fixed costs, or those expenses that would exist whether or not you grew a single thing this year, should be included in your final profit calculations, but do not have to be included if you are just comparing enterprises. This is because you ultimately want the enterprises to cover the total expenses of the farm (land, house, tractors, etc) but you don't need to include them to see which enterprises are most lucrative in comparison to your other enterprises. Labor is often misrepresented, so it is best to make a best estimate and then verify your numbers during the season by having workers track time spent on certain crops or tasks.

After creating your enterprise budgets and estimating your profits, hopefully you come out close to where you wanted to be. If you anticipate being more profitable than expected, fantastic! If you are less profitable than expected, now is the time to try to make adjustments that you think will make you more profitable. This step may require some creative problem solving, and is often benefited by bringing in some "new eyes" to look at your operation. Are there ways to reduce labor or input costs without sacrificing quality? For example, improving irrigation systems, trellising systems, or even harvesting systems might shave off labor hours or increase yields later in the season without incurring large costs. Or, are there ways to increase total farm revenue without significant cost increases? Look to the enterprise budgets, and adjust your crop plan accordingly. Are there diseases or pests that consistently cause you losses or increase your costs? Talk to someone (your Vegetable Team would be great!) about new solutions that you could try this season.

Enterprise budgets are just one step in the financial planning process, but they are an important tool to help you hone your operation to become more profitable. Creating these budgets will pay off by helping you prioritize crops, equipment purchases and upgrades, and market channels. So sharpen your pencil (or open your laptop) and see what your numbers tell you. *(For an Excel file of the worksheet in Figure 1, contact Angela Parr at aep63@cornell.edu.)* ■

Figure 1. A simple enterprise budget template. Expand each section to list all costs associated with each task. For example, Seed/Transplant may have subsections including seeding (labor cost and materials costs), planting (labor and materials costs), and transplanting to the field (labor and machinery costs). List labor as hours worked times a standard rate (include benefits, taxes, etc) For machinery costs, figure out how much it costs to run your tractor or other equipment for one hour, then multiply by the hours used.

Crop Specific Enterprise Budget

Crop:

Cropping year:

Costs	**Labor Cost**	**Machinery Cost**	**Product/Materials Cost**	**Total $**
Soil Preparation				
Seed/Transplant				
Cultivation				
Harvesting				
Delivery to wholesale markets				
Retail Sales Costs				
Fixed Costs				
Total Costs				
Sales	**# of Units**		**Price per Unit**	**Total $**
Retail				
Wholesale				
Other				
Total Sales				
Net Profit (Total Sales -Total Costs)				

What To Do if ICE is at the Door

Sandy Buxton, CCE - Washington County

If you are an employer who may be employing someone who may be stopped and held by law enforcement agents, it is important to know and understand some of the procedures. The end results may turn out fine but knowledge helps everyone survive a pressure-packed situation. Remember, as long as you have a completed I-9, it would be illegal to assume or comment on the veracity of the documents you have seen unless you are a document expert.

According to Mary Jo Dudley of the Cornell Farmworker Program, it is important to remember that you cannot control the actions of the police. But you can control your reactions. Remain calm, try to understand what is happening and think about the consequences.

All people in the United States have rights. They are: the right to remain silent, the right to an attorney, the right to due process and the right to be free from unreasonable search and seizure.

If an employee encounters an immigration official, they should remain silent. Only say their true name. DO NOT LIE!

If the warrant is for the employee and they are charged on an immigration offense, they will have a series of court hearings which could lead to deportation. The first thing that happens is the party will be given an A-number (Alien Registration Number). This 10 digit Alien Registration number is the only way the person will be referred to during the process and is the only way to find and communicate with them. The employee needs to write it on their hand and memorize it. When allowed to make a phone call, the employee must communicate the A-number to someone who is reliable on the other end of the landline phone.

There is only ONE phone call and it will take place after the employee's possessions have been confiscated. The employee must have memorized a phone number to a landline phone which will allow him to communicate all of the crucial information.

- Who arrested you? What color car picked you up?
- Local police, Sheriff, State Police, ICE?
- What is the A-number?
- Where are you located?

Actions the employee can take to help themselves:

- Ask to speak to a lawyer.
- Do not sign ANY documents without knowing what the documents say.
- Request Bail (usually $5,000). And request reduced bail (usually half of the amount) which is allowed as long as the person states financial need, is not dangerous, attends court dates and does not flee.

Remember being out on bail allows time to prepare oneself, get paperwork in order and the employee to earn money. But, bail must be paid by a documented person who gets a receipt in Buffalo, Albany or NYC.

- Each employee must memorize several key phone numbers to make sure they can communicate with their network. Do not rely solely on cell phones since they will not be available.

If procedures allow a person to make it all the way to deportation, there will be two choices: Voluntary Departure or Deportation.

- Voluntary Departure – requires the employee to pay his expenses to travel back to his home country. The employee will be banned from the U.S. for 5 years.
- Deportation – has more of a criminal taint. The government will pay all expenses to return the employee to the border and the employee is banned from the U.S. for 10 years.

Allowing the process to unfold in a managed way will provide some time to arrange and organize some of the issues and choices that will need to be made: collecting personal possessions, dealing with minor children, and a myriad of other activities.

Understanding and being prepared for a possible event is like a fire drill. One hopes the information will never be needed but knowing what might happen and how to react will keep everyone in a better state of mind during the actual event. This emergency planning approach can be helpful for any emergency, such as an automobile accident, an on-farm accident or an immigration detention. So take the time and have the discussion, it may help everyone sleep a little easier.

If you would like to learn more about this topic, go to http://devsoc.cals.cornell.edu/outreach/cfp/.

This article is not designed to provide all of the information required to make decisions about potential situations, rather to provide a basic understanding about some issues and situations. This information should help prepare you to discuss your specific situation with legal professionals. ■

Workshops Available: Immigrant Rights & Emergency Planning

Mary Jo Dudley, Cornell Farmworker Program

Cornell Farmworker Program conducts on-farm workshops on immigrant rights and emergency planning

Emergency Planning workshop topics include:

- Discussions of state and federal regulations as they relate to farmworkers
- Spanish language skits that provide information about ways to respond if detained by a law enforcement official
- Assistance for parents who wish to assign guardianship for their children
- Overview of the purpose and process for assigning power of attorney
- Role playing exercises about how to respond to emergencies such as a car accident, farm accident, or an immigration detention
- Information on health, education, legal, and other services for farmworkers

For more information and to schedule a workshop, contact Mary Jo Dudley, Director, Cornell Farmworker Program, 607-255-9832, 607-254-5194 or farmworkers@cornell.edu. Fee schedule is negotiated according to number of workshop participants.

For educational materials and resources, visit www.farmworkers.cornell.edu. ■

NY Seed Potato Crop Directory Online

Keith Perry, Cornell

The most recent annual NY Seed Potato Crop Directory is available online, listing all the new certified seed produced by NYS growers, what each grower has, and how to contact him. In addition, the website describes the workings of the Uihlein Farm of Cornell University. The mission of the Uihlein Farm is to serve the potato growers of NYS and the U.S. potato industry by supporting the development of potato varieties resistant to pests. Go to the bottom right of the website and click on 2010 NY Seed Potato Crop Directory: http://www.cals.cornell.edu/cals/plpath/about/facilities/uihlein/index.cfm ■

USDA Removes Two NYS Towns from GN Regulations

Greg Rosenthal, APHIS Public Affairs Specialist, Riverdale, MD

By itself, it would have been great news when USDA's Animal and Plant Health Inspection Service (APHIS) at http://www.aphis.usda.gov/ recently announced the **absence of golden nematode in the townships of Elba and Byron in Genesee County, NY, and removed these areas from regulation.** APHIS and the New York State Department of Agriculture and Markets have been working together since 1944 on an aggressive survey, quarantine, and control program to combat one of the world's most damaging potato pests from the State. The success in these townships demonstrates the effectiveness and importance of these continuing cooperative efforts.

But there's even better news in store for New York's potato growers and other producers. The deregulated areas—about 68 square miles—are just the beginning of a process that will free many more farmers from the regulatory requirements for this pest. **APHIS now has the science-based methods and criteria it needs to safely remove—over the next 3 years—up to 90% of the land currently under regulation for golden nematode in New York.** As a result, potato farmers and other growers in deregulated areas will no longer be required to steam clean their equipment prior to leaving their fields to remove soil that may carry the pest. In addition, potatoes and other commodities will no longer need to be inspected and certified for interstate movement. This will directly reduce production costs, freeing those resources for other priorities. Removal of the restrictions will also open up additional opportunities for exports of these commodities.

APHIS' new tool in this effort is an agreement that USDA signed with Canada in June 2009 called the "Guidelines on Surveillance and Phytosanitary Actions for Potato Cyst Nematodes." It's the result of years of research, and it establishes science-based survey methods and criteria for determining that an area is free of this pest. Using these guidelines, APHIS can deregulate most of the currently regulated areas in NY, leaving just the infested fields and fields immediately adjacent under regulation. Then APHIS and its State partners will turn their full attention to those fields. To learn more about the specific changes to the quarantine areas, please visit: http://www.aphis.usda.gov/plant_health/plant_pest_info/nematode/index.shtml ■

Consumer Response to Advertising Programs

Brad Rickard, Jura Liaukonyte, and Harry Kaiser, Cornell, and Tim Richards, Arizona State University

Introduction

Fruit and vegetable consumption rates in the United States are significantly lower than what is recommended by nutritionists and health experts. Of the six groups traditionally included in the food recommendation pyramids, fruits and vegetables are significantly under-consumed. Fruits and vegetables receive very low levels of advertising funding relative to the other food groups, especially compared to the Grains Group. Therefore, we examine the role of advertising as a way to influence the purchase of fruits and vegetables.

Fruit and Vegetable Marketing

With few exceptions, promotion efforts for fruits and vegetables have been very small, have been commodity-specific, and have been generic. There have been recent discussions in the United States about implementing a mandatory "broad-based" promotion program for all fruits and vegetables. Broad-based campaigns for fruits and vegetables, such as the "Fruit & Veggies: More Matters" campaign, have been supported by voluntary donations and have had relatively little media exposure.

Advocates suggest that commodity-specific programs compete for consumption share and that a large broad-based program may increase demand for the entire fruit and vegetable category. Among those questioning broad-based campaigns, there are concerns that particular fruit and/or vegetables might benefit, rather than increase demand for all fruits and vegetables.

Experimental Design

We designed an experiment that showed samples of promotional efforts for fruits and vegetables to research participants. We recruited 271 adult subjects and asked them to participant in several computerized auctions and to submit bids that reflect their maximum willingness to pay for one pound of selected fruit or vegetable products. Subjects were placed into one of six treatments. Each treatment was comprised of three 90-second video clips of the television series, *The Simpsons*, interspersed with up to two minutes of advertisements for fruits and vegetables. Advertisements for fruits and vegetables were either commodity-specific, broad-based, or a mixed approach that included commodity-specific and broad-based efforts. The six treatments were: 1) Control (no ads), 2) Broad-Based Ads, 3) Apple Ads, 4) Broad-Based + Apple Ads, 5) Potato Ads, and 6) Broad-Based + Potato Ads. At the end of the experiment each subject completed a 25-question survey that included demographic questions and questions about food preferences.

Effects of Broad-Based and Commodity Specific Advertising

Table 1 shows the average price subjects were willing to pay for the eight fruits and vegetables (apples, oranges, grapes, bananas, tomatoes, potatoes, carrots, and bell peppers) under each treatment. Here we see that the average bid was $0.74 per pound in the control group (no advertisements), and did not exceed this level in the treatments showing commodity-specific advertisements. However, in the three treatments that include broad-based advertising, we see a significant increase in price that consumers were willing to pay.

Our results show that the average willingness to pay across the eight fruits and vegetables was 41% higher among subjects in the broad-based group compared to the control group. Our treatment that combines potato advertising and a broad-based campaign provides evidence

Table 1. Results from our experiment

Treatments	Willingness to Pay ($/lb)
Control	0.741
Broad-Based Ads	0.836
Apple Ads	0.692
Broad-Based & Apple Ads	0.832
Potato Ads	0.740
Broad-Based & Potato Ads	0.814

that a mixed advertising strategy may also lead to a significant increase in the average willingness to pay for fruits and vegetables. However, the increase in demand associated with this mixed strategy is very similar to the shift in demand associated with adoption of a broad-based program.

Conclusion & Industry Implications

Our study provides support for the advocates of a broad-based promotional campaign who argue that such advertising would raise overall demand for fruits and vegetables. In fact, we find that the fruit and vegetable industry may be better off without any commodity-specific advertising. For these reasons, a cooperative strategy whereby producers of fruits and vegetables pool their advertising funds and promote their products generically is apt to be more profitable than a series of competing commodity-specific messages. For policy makers interested in food intake, obesity, and changing dietary habits, our results suggest that using additional resources for a broad-based promotional program may be an effective way to increase consumption of fruits and vegetables.

Funding for our project was provided by the Consumer and Market Demand Network ■

"Smart Marketing" is a marketing newsletter for extension publication. It reviews elements critical to successful marketing in the food and agricultural industry.

Vegetable Grower Winter Meeting - March 7th

Veg Grower Winter Meeting

Monday, March 7

12:30 - 5:30 pm

CCE Niagara County
4487 Lake Ave, Lockport

Topics to be covered: Diseases of 2010, Phytophthora, Weed Management and Herbicides, Broccoli Production and Variety Trial Evaluation, Swede Midge, Sweet Corn Trial Evaluation, and more. DEC credits will be available.

Cornell Vegetable Program enrollees - $15; Non-enrollees - $25. Registration at the door. For more information contact Robert Hadad 585-739-4065, or rgh26@cornell.edu or visit the Cornell Vegetable Program website, http://cvp.cce.cornell.edu ■

Strawberry Webinar Series

The webinar series is sponsored by NASGA with Cornell Department of Horticulture. **Webinars are at 1 pm** for about 1 hour and 15 minutes. **Registration is FREE, but you must pre-register** at: http://www.nasga.org. For info: Cathy Heidenreich, 315-787-2367, mcm4@cornell.edu or Kevin Schooley, 613-258-4387, info@nasga.org

Day Neutral Strawberries
March 4, 2011

- Diseases - Frank Louws, NC State
- Insect and Mite Management for Day Neutral Strawberries - David Handley, U of Maine

Emerging Pests: ID & Management
March 11, 2011

- Brown Marmorated Stinkbug - Tracy Leskey, USDA ARS
- Fusarium and Charcoal Crown Rots - Steven Koike, U of California Cooperative Extension, Monterey Co.

Emerging Pests: ID & Management
March 18, 2011

- Strawberry Viruses - Robert Martin, USDA ARS, Corvallis, OR
- Management of the spotted wing drosophila in the small fruits – Mark Bolda, U of California Cooperative Extension, Santa Cruz Co.

Emerging Pests: ID & Management
March 25, 2011

- Nematodes and Root Rots - James LaMondia, Connecticut Ag Experiment Station
- Advances in Root Weevil Management - Richard Cowles, Connecticut Ag Experiment Station ■

Communications Workshop for Farmers

FREE Communications Workshop for Farmers & Conservation Partners

Thursday, March 24

10:00 am - 3:30 pm, Lunch included

CCE Albany County
24 Martin Rd, Voorheesville 12186

FOCUS: Communicating Your Benefits
This workshop will help you convey how your efforts go beyond the farm and beyond the watershed to the benefit of all New Yorkers. Leave with a toolkit to communicate your message more effectively! Learn the basics, OR bring your skill set to the next level.

Don't miss what may be the last opportunity to attend this FREE training by top communications professionals. **REGISTER by: Friday, March 18th.** EMAIL: susan.lewis@ny.nacdnet.net or call 518-765-7923, or barb.silvestri@agmkt.state.ny.us or call 518-457-3738. ■

Farm Energy Forum

Farm Energy Forum

Friday, March 4

9:30 am – 2:00 pm

The Generation Center
15 Center St, Batavia

Topics: Farm Energy Audits - Energy Savings, Wind Opportunities, Solar Energy & Funding Opportunities, and other NYSERDA Incentives.

Program is FREE and sponsored by WNY and FL Energy $mart Communities, independent contractors to NYS Energy and Research Development Authority (NYSERDA).

Pre-register NOW. Contact Gary Carrel, WNY Energy $mart Communities, 716-652-5400 x136, gcc55@cornell.edu or Sharon Bachman, CCE Erie Co, 716-652-5400 x150, sin2@cornell.edu. ■

Garlic Grower Meeting - Moving Forward with Garlic Bloat Nematode

Hear what we know about garlic bloat nematode's distribution, damage, and implications. We will have an interactive discussion about developing a seed certification program in New York, and will ask growers for input on research and outreach needs. Cost: $5/person. Pre-registration requested. Specify which Polycom site you will be attending if you can't meet in Geneva or Saratoga.

March 17th, 9 am to 12 noon– Geneva, NY
Barton Lab, Room 134A
NYS Ag Experiment Station - Cornell
630 W. North St, Geneva, NY 14456
Contact Crystal Stewart at 518-775-0018 or cls263@cornell.edu

OR

March 25th, 9 am to 12 noon—Saratoga, NY
Meet at the Saratoga CCE office:
50 W. High St, Ballston Spa, NY 12010
Contact Crystal Stewart at 518-775-0018 or cls263@cornell.edu

Meet by Polycom at the Highland Research Lab
3357 Route 9-W, Highland, NY 12528
Contact Teresa Rusinek at 845-340-3990 or tr28@cornell.edu

Meet by Polycom at the
Suffolk County Extension Education Center
423 Griffing Ave, Riverhead, NY 11901
Contact Sandy Menasha at 631-727-7850 ext.316 or srm45@cornell.edu ■

Tomato Grafting Workshop

Tomato Grafting Workshop

Friday, March 18

1:00 – 3:00 pm

NYS Ag Experiment Station at Highland, Hudson Valley Research Lab
3357 Rt. 9W, Highland

Judson Reid of the CCE, Cornell Vegetable Program, who has extensive research and practical experience in grafting tomatoes, will be the instructor.

Pre-register by Wednesday, March 16th by calling Teresa Rusinek at 845-340-3990. Send your check for $15 payable to "*CCEUC*" to Cornell Cooperative Extension, 10 Westbrook Lane, Kingston, NY 12401, Attn: Tomato Grafting. $20 at the door.

DEC credits requested. ■

Adaptive N Management & Cornell Soil Health Test Interpretation

Adaptive N Management & Cornell Soil Health Test Interpretation

Wednesday, March 23

8:30 am - 4:30 pm

Mann Library, Conf Rm 102, Cornell

FREE - Lunch provided

Adaptive Nitrogen Management Session, 8:30 am -12:30 pm
An interactive discussion of adaptive N management strategies. Learn how to use the Adapt-N web-based tool for N fertilizer adjustment. Bring your field info.

Soil Health Session, 1:30 - 4:30 pm
Learn soil management practices. Interpret the Cornell Soil Health Test Report to diagnose soil constraints, and make management decisions.

Pre-register by March 20 to Larissa Smith, lls14@cornell.edu, 607-255-2177. Questions? Bob Schindelbeck, rrs3@cornell.edu, 607-227-6055 Details at: http://soilhealth.cals.cornell.edu/ ■

Pesticide Applicator Training & Recertification - Erie Co.

Pesticide Applicator Training & Recertification

Thursday, March 24

8:15 AM to 12:15 PM
1:00 pm – DEC Exam

Cornell Cooperative Extension of Erie County
21 South Grove St, East Aurora, NY

This session is for individuals planning to take the Core and Category Pesticide Certification Exam. **Pre-register by March 21**. $22 for Ag Program enrollees; $27 for non-enrollees. To register contact Sharon Bachman, 716-652-5400 x150 or sin2@cornell.edu or Deborah Murphy, 716-652-5400 x176 or dam36@cornell.edu. If you are planning to take the exam, call the NYSDEC Pesticide Division at 716-851-7220 to discuss eligibility. If you are eligible, DEC will send you a sign-up packet, which you must return to them with your exam fee of $100. You must be pre-registered with DEC to take the exam. To purchase CORE and/or Commercial Category Manuals to study ahead, contact Cornell's Pesticide Management Education Program at 607-255-7282 or patorder@cornell.edu or visit https://psep.cce.cornell.edu/store/Manuals/. ■

Special Permit Training for Non-Certified Applicators & Handlers of Federally Restricted-Use Pesticides

Wayne County	Orleans County
Wednesday, April 13	**Thursday, April 14**
English Session - 8:30 am to 12:00 pm **Spanish Session - 12:30 pm to 4:30 pm**	**English & Spanish sessions** **8:30 am to 12:30 pm**
CCE Wayne Co., 1581 Rt. 88N, Newark	**Orleans Co. Coop. Ext. Fairgrounds Trolley Bldg, Rte. 31, Knowlesville**

Certified Supervisors are required to attend the first 30 minutes of training!
Note: In Wayne County, supervisors who attend the first 30 minutes of training in the English session do not need to repeat the training in the Spanish session
$20 per DEC Special Permit

DEC Special Permit allows non-certified workers to apply and handle federally restricted use pesticides: The Special Permit does not relieve the responsibility of the certified applicator that supervises these employees, but it does relieve the requirement of "on-site, within voice contact" supervision while these pesticides are being applied.

What are federally restricted-use pesticides?
There are several reasons why pesticides may be federally restricted including avian, fish or aquatic toxicity, acute human oral/inhalation/dermal toxicity (poison), ground and surface water concerns, reproductive effects or tumor causing. Several of the **pyrethroid, organophosphorous and carbamate insecticides** such as Warrior, Capture, Diazinon, Lorsban and Lannate, and a few herbicides such as Gramoxone and Atrazine, are federally restricted-use materials.

DEC Special Permit training
At Special Permit trainings, we review with non-certified applicators Worker Protection Safety (WPS) handler training and for each federally restricted-use pesticide the potential hazards to non-target species and the environment, and how to prevent the risk of exposure. Trainees also receive a packet with summaries of this information. **A DEC Special Permit is valid for one year and needs to be renewed every year unless the pesticide applicator becomes certified.**

For more info, contact Christy Hoepting: 585-721-6953 or cah59@cornell.edu ■

Pesticide Applicator Training & Recertification - Orleans County

Pesticide Applicator Training and Recertification

March 21 - 8:15 am – noon
March 21 – 12:30 – 3:45 pm
March 22 – 8:15 am - noon
Exam – March 22 – 1:00 – 4:00 pm

Orleans Co. Fairgrounds Trolley Bldg, Knowlesville/Rt. 31

Pre-register separately for the meeting and the exam. $20/training session or $50 for all sessions for Ag Program enrollees. $45/training for non-enrollees. Make checks payable to *Orleans Co CCE* and mail to: Attn: Kim Hazel, Orleans Co. CCE, 12690 NYS Rt. 31, Albion, NY 14411. To pre-register for the trainings or to order CORE or Category Manuals to study, contact Kim Hazel at 585-798-4265 x26, or Vicki Jancef at x33. To order manuals on-line go to: https://psep.cce.cornell.edu/store/manuals/ If you are planning to take the exam, pre-register with the NYSDEC Pesticide Division at 585-226-5424. Exam fee is $100. ■

Pesticide Training & Exam - Wayne County

Pesticide Training & Exam

March 15-16, 2011

1:00 - 4:00 pm

CCE Wayne County
1581 NYS Rt 88N, Newark

Exam: March 24 at 1:00 pm

CCE Wayne is offering a training and exam to become a certified pesticide applicator. **This training is only for those with experience.** Call the DEC, 585-226-5411, to determine work experience. Training workshops cost $50 plus additional costs for manuals and exam. **Pre-register NOW for workshops.**

See www.ccewayne.org, search "agriculture" and "pesticide certification" for more information or call 315-331-8415.

Exam: March 24, 1-5 pm for $100, payable to the DEC. An official photo ID is required for the exam. ■

Pesticide Recertification Class - Niagara County

Pesticide Recertification Class

Thursday, March 31

12:45 - 4:15 pm

CCE Niagara Co., 4-H Training Rm, 4487 Lake Ave, Lockport 14094

3 DEC credits have been requested

Topics: Understanding pesticide formulations, applicator mistakes, perils of pesticides and pesticide transportation, plus an update on regulations. Participants are encouraged to bring their core pesticide manual for reference.

$20 for Niagara Co Ag enrollees; $25 for non-enrollees. Registration and payment to Karen Krysa,4487 Lake Ave, Lockport, NY 14094. Phone 716-433-8839 x221 or kmk27@cornell.edu. ■

Stop the Rot! Cultural Practices to Reduce Bacterial Bulb Decay in Onions

Christy Hoepting, Judson Reid, Kathryn Klotzbach, CCE Cornell Vegetable Program, and Beth Gugino, Dept of Plant Pathology, Pennsylvania State University

Narrow plant spacing reduced bacterial bulb decay by up to 64%

Narrow plant spacing reduced bacterial bulb decay by 53 to 64%
Do you know how easy this is? A simple modification to adjust your planting configuration is all it would take to drastically reduce losses from bacterial bulb decay. Our studies showed that when plant spacing was reduced from 6 or 8 inches to 4 inches with 3 or 4 rows per 3-foot plastic mulch bed (row spacing: 4 rows = 6 inch; 3 rows = 8 inch), this provided 53 to 64% control of bacterial bulb decay at harvest (Table 1). Marketable yield also increased by 1.4 to 2.4 times, representing an increased net economic return of $43 to $258 per 100 feet of bed, due to increased weight of marketable jumbo-sized bulbs (Table 1). We learned that wide plant spacing produces big bushy plants with more leaves, thicker necks, delayed maturity and bigger bulbs. Unfortunately, it was these bigger bulbs that rotted! By narrowing plant spacing, we got fewer colossal-sized bulbs, which we more than made up for by having significantly more healthy jumbo-sized bulbs to market (Table 1).

Alternatives to black plastic reduced bacterial bulb decay by 59 to 75%
This is also a very simple and easy modification for small-scale growers producing onions on plastic mulch to make to their cultural practices that could go a very long way towards reducing bacterial bulb decay. Our studies showed that reflective silver mulch, biodegradable black plastic and bare ground had significantly 1.8 to 2.8 times higher marketable yield than black plastic (Table 2). Reflective silver and biodegradable black plastics had significantly 3.7 and 3.6 times, respectively, higher jumbo weight than black plastic, which resulted in an increased net return of $96 to $215 per 100 feet of bed compared to black plastic (Table 2). All of the alternatives to black plastic had significantly lower soil temperatures compared to the black plastic; we suspect that the higher temperatures of the black plastic are more favorable for development of bacterial diseases.

Bacterial bulb decay is a serious problem in onion production
Small-scale diversified fresh market growers who grow onions intensively in New York and Pennsylvania are constantly challenged by yield losses due to bacterial diseases, which

Table 1. Evaluation of onion spacing for reducing incidence of bacterial bulb decay and improving profitability in onion, Interlaken, NY 2009 & 2010 and New Holland, PA, 2010: marketable yield and grade, incidence of bacterial bulb decay at harvest and net return.

At harvest, per 100 feet of bed:	Onion Spacing			Total Marketable Yield (lb)	Onion Grade (lb)				% bacterial bulb decay by weight	Net Economic Return[5]		
Planting Density (inch²/bulb)	No. rows /bed[6]	Plant Spacing (inch)	No. plants /100 ft of bed		Colossal (>4")	Jumbo (3-4")	Medium (2.25-3")	Small (<2.5")		Cost of transplants[2]	Variable Price[3]	Uniform Price[4]
Interlaken, NY: 2009 (cv. Nebula) on silver plastic												
24 inch²	4	4	1200	510 a[1]	130 b	330 a	36 a	10 a	13.3 % b	$40.50	$229	$410
32 inch²	3	4	900	460 a	270 a	190 b	10 b	2.0 b	13.8 % b	$30.38	$230	$384
48 inch² standard	4	8	600	330 b	270 a	50 c	6.0 bc	0.0 b	37.3 % a	$20.25	$160	$277
60 inch²	4	10	480	220 bc	200 ab	20 c	0.0 c	1.0 b	41.5 % a	$16.20	$111	$181
80 inch²	3	10	360	160 c	130 b	10 c	1.0 c	0.0 b	53.6 % a	$12.15	$70	$132
		P Value (α=0.05):		***0.0001***	***0.0352***	***0.0000***	***0.0000***	***0.0046***	***0.0064***	--	--	--
Interlaken, NY: 2010 (cv. Candy) on silver plastic												
24 inch²	4	4	1200	873 a	399	434 a	39 a	0	3.1 %	$40.50	$412	$745
32 inch²	3	4	900	716 b	447	253 b	16 b	0	6.0 %	$30.38	$348	$614
36 inch²	4	6	800	697 bc	510	182 b	4.7 c	0	3.6 %	$27.00	$346	$600
48 inch²	3	6	600	559 c	497	59 c	1.3 c	0	7.3 %	$20.25	$283	$483
48 inch² standard	4	8	600	595 bc	525	67 c	4.0 c	0	6.4 %	$20.25	$303	$516
64 inch²	3	8	360	369 d	349	20 c	0.7 c	0	23.3 %	$15.19	$202	$317
		P Value (α=0.05):		***0.0001***	***NS***	***0.0000***	***0.0001***	*--*	***NS***	--	--	--
New Holland, PA: 2010 (cv. Candy) on black plastic												
24 inch²	4	4	1200	339 a	0.0	187	108 a	43 a	29.5 %	$24.00	$315*	$242
32 inch²	3	4	900	277 ab	8.7	197	54 b	17 b	29.4 %	$18.00	$110*	$216
36 inch² standard	4	6	800	151 bc	6.7	122	21 b	1.3 b	63.1 %	$16.00	$57	$118
60 inch²	4	10	480	90 c	8.7	65	15 b	0.7 b	70.8 %	$9.60	$34	$71
80 inch²	3	10	360	77 c	25	43	6.7 b	2.0 b	70.1 %	$7.20	$31	$60
		P Value (α=0.05):		***0.0178***	***NS***	***NS***	***0.0012***	***0.0002***	***NS***	--	--	--

[1]Numbers in a column followed by the same letter are not significantly different, Fisher's Protected LSD test, p <0.05.
[2]**Cost of Transplants:** NY **-** $1.35 for 40 plants or $0.03375 per plant (plugs); PA - $0.02 per plant (bare roots from Texas).
[3]**Variable Price:** According to PA Simply Sweet prices: Colossal - $0.55/lb; Jumbo - $0.50/lb; Medium - $0.40/lb; Small - $0.20/lb; no more than 30% total marketable weight can be sold as small + medium.
[4]**Uniform Price:** According to Interlaken road side stand prices: all grades except small (<2.25" not marketable) - $0.90/lb.
[5]**Net return:** gross (data not shown) minus cost of transplants.
[6]Row spacing: 4 rows = 6"; 3 rows = 8".

greatly compromise profitability. If bacterial diseases cannot be managed, this onion industry will not be sustained or expanded. Bacterial diseases are also an economically very important disease of large scale onion production, as occurs in New York predominantly on muck soil.

In New York, Sour Skin caused by *Burholderia cepacia*, is the most common cause of bacterial bulb decay, although *Pantoea ananatis* and *Enterobacter cloacae* have also been identified, and several others are likely part of the complex. In Pennsylvania, the most frequently isolated bacterial pathogens include soft rot pathogens, *Pseudomonas marginalis* and *Pectobacterium carotovora*; and center rot pathogens, *Pantoea ananatis* and *P. agglomerans*; *Xanthomonas axonopodis* and *Pseudomonas viridiflava*. Bulbs with bacterial decay are not marketable, although sometimes they are sold unknowingly to detriment, because, a single internal scale can be infected as the outer scales remain firm making the decay undetectable. Losses to bacterial bulb decay have increased steadily over the past decade where onions are grown intensively on plastic mulch. It has become common for the incidence of bacterial bulb decay to be 35 to over 50% in parts of both PA and NY. In 2008 in PA, 34 growers lost a total of $140,000 to bacterial bulb decay. In NY, large scale onion producers report annual losses of 20 to 30% due to bacterial bulb decay.

It is very important to note that this simple technique of reducing plant spacing was equally effective at reducing bacterial bulb rot with different bacterial pathogens. In NY, *B. cepacia* was the main bacterial pathogen with a few *P. ananatis* identified, while in PA, *P. carotovora*, *P. marginalis* and *P. agglomerans* were the main pathogens with some minor *B. cepacia*.

How does plant spacing work to reduce bacterial bulb rot?

We don't know for sure, but we suspect that narrow plant spacing pro-

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duces plants that are less suitable hosts for bacterial diseases to become established and to develop and spread. Our studies showed that wider plant spacing produces larger plants with more leaves, thicker necks with delayed maturity (data not shown). Large bushy plants are more conducive to holding water in the leaf axils, which can favor bacteria entering into the plant. Thick necks take longer to dry and remain succulent and green for a longer time, which provides ideal conditions for bacterial diseases to spread from the leaves into the bulb. Delayed maturity interferes with proper lodging and curing of the neck and bulbs, allowing for increased risk for bacterial infections in the leaves to spread into the bulbs. Alternatively, the smaller plants with thinner, tighter necks that mature earlier in narrow plant spacing configurations are less conducive to bacterial bulb decay.

Does narrow plant spacing reduce bacterial rot for large-scale production of onions?

We suspect that it would make a difference, but have not yet researched this phenomenon in large-scale onion production on the muck. Our results from small-scale production suggest that bacterial bulb decay decreases when planting density is higher than 36 inch^2 per bulb, and continues to decrease as planting density increases (Table 1). This could explain why we often see higher incidence of bacterial bulb decay in transplanted onions than we do in direct seeded onions of the same variety. For example, direct seeded onions planted at 7 seeds per foot with 15 inch row spacing have a planting density of 26 inch^2 per bulb, which is 2.3 times denser than transplanted onions that are planted at 3 plants per foot with the same row spacing (60 inch^2 per bulb).

Our data collected from Interlaken, NY in 2010 suggests that row spacing is a very important factor related to rot: when we increased row spacing from 6 inches (4 rows per bed) to 8 inches (3 rows per bed), incidence of bacterial bulb decay at harvest increased 2 to 4 fold for each plant spacing (4", 6' and 8"). Therefore, in direct seeded onions, would onions planted with 12 inch row spacing (= 21 inch^2 per bulb) have less bacterial rot than onions grown with 15 inch row spacing (= 26 inch^2 per bulb)? Another unknown is whether row type (single vs. double) effects bacterial bulb decay?

Our results from small-scale production suggest that reducing planting density to 36 inch^2 per bulb or less greatly reduces incidence of bacterial bulb decay at harvest. Therefore, with respect to large-scale production of onions from transplants, our data suggests that if growers decreased their row spacing from 15 inches (= 60 inch^2 per bulb with 4 inch plant spacing) to 8 to 6 inches, and adjusting plant spacing to achieve a planting density of 36 inch^2 per bulb or less (e.g. 6 inch row spacing with 5 or 6 inch plant spacing = 30 to 30 inch^2 per bulb) would result in 50% or more control of bacterial bulb rot. It would be very interesting to see whether bulb size could still be met with these different planting configurations on onions grown on muck. We also do not know the effect that the number of plants per hole (1 vs. 2 vs. 3) has on incidence of bacterial diseases.

How does mulch type reduce bacterial bulb decay?

Growers' standard black plastic absorbs sunlight, thus increasing soil temperature, which in turn, promotes early crop development of onions. However, during the heat of June and July, the warmer soil temperatures provided by the black plastic may actually be creating a more favorable environment for bacterial diseases to develop and spread. In contrast, reflective silver mulch keeps soil temperatures cooler, and black biodegradable mulch provides early season added heat, which gives way to cooler soil temperatures as it degrades during the heat of summer. The lower temperatures provided by these alternative mulches could be the difference between optimum and below optimum temperatures for bacteria to grow. Similarly, soil temperatures of bare ground would be cooler than under black plastic, but extra effort would be required to provide effective weed control.

How does the mulch study relate to large-scale production?

Our theory is that the significantly warmer temperature of the black plastic compared to the reflective silver plastic, biodegradable plastic or bare-ground is creating a microclimate that is more conducive to the development and spread of bacterial disease. If black plastic is somewhat analogous to the dark color of the muck soil, than theoretically, onions grown on muck soil would have less bacterial rot if it was possible to reduce the temperature of the muck. In our work with developing a minimum tillage production system for onions, we found twice as much rot in the conventional system (58.1% bacterial canker) compared to the minimum tillage system (27.5% bacterial canker) which had 30% ground cover of winter wheat residue and was cooler.

Ultimately, an integrated approach is needed to manage bacterial disease of onions

We are not telling you that all you have to do is reduce your plant spacing and bacterial diseases will be a thing of the past. Ultimately, managing bacterial diseases of onions will

involve an integrated approach for both small and large scale producers. We have several projects planned that are designed to develop different components of an Integrated Pest Management (IPM) program for managing bacterial diseases of onions. Plans starting in 2011 include:

1) Small-scale grower demonstration and adoption of narrow plant spacing configurations;
2) Continue trialing alternatives to black plastic to elucidate which consistently performs best;
3) Trial combinations of narrow plant spacing and alternatives to black plastic in combination;
4) Elucidate the relationship between bacterial disease of onions and nitrogen fertility. We have anecdotal evidence and preliminary data that shows that as soil nitrogen increases, incidence of bacterial bulb decay increases.
5) Determine the most important sources of bacterial pathogens and how they infect onions. Soil, transplant samples, onion thrips, weeds and seeds will be assayed for presence of bacterial pathogens of onions. We eventually will also study the effect of wind, herbicide and onion thrips injury on incidence of bacterial bulb decay.
6) Various chemical tactics including Actigard and other plant defense inducers, copper bactericides and antibiotics will be trialed for their ability to control bacterial bulb decay of onions. Used alone, chemical tactics have provided virtually no relief from bacterial decay in onions. When used as part of an IPM program that incorporates various cultural tactics including alternative mulches, narrow plant spacing and reduced nitrogen fertility, and starting with clean transplants, etc., proper timing of chemical tactics could prove effective.

Table 2. Evaluation of different mulch types for reducing incidence of bacterial bulb decay and improving profitability in onion (cv. Candy), New Holland, PA, 2010: marketable yield and grade, incidence of bacterial bulb rot at harvest and net return.

At harvest (Jul-20-2010) per 100 feet of bed:

Treatment	Total Marketable Yield (lb)	Onion Grade (lb)				% bacterial bulb decay by weight	Net Economic Return[6]		
		Colossal (>4")	Jumbo (3-4")	Med. (2.25-3")	Small (<2.25")		Cost of Mulch/ herbicides[3]	Variable Price[4]	Uniform Price[5]
Black plastic (std)	119.5 c[1]	13	65 a	24 c	16 b	57 %	$2.38	$64	$90
Silver Plastic	331 a	27	242 b	46 bc	16 b	23 %	$4.20	$166	$279
Biodegradable Black Plastic	321 a	14	231 b	54 b	22 b	17 %	$7.00	$160	$262
Bare ground	213 b	0	85 a	82 a	46 a	14 %	$0.11	$121	$150
P Value (α=0.05)	***0.0008***	***NS[2]***	***0.0011***	***0.0026***	***0.0063***	***NS***			

[1]Numbers in a column followed by the same letter are not significantly different, Fisher's Protected LSD test, p <0.05.
[2]NS: Not significant, Fisher's Protected LSD test, p > 0.05.
[3]cost of herbicides: Prowl H2O @ 8 fl oz + Goal Tender @ 24 fl oz = $16.67 per acre.
[4]Variable Price: According to PA Simply Sweet marketing program: Colossal - $0.55/lb; Jumbo - $0.50/lb; Medium - $0.40/lb; Small - $0.20/lb; no more than 30% total marketable weight can be sold as small + medium.
[5]Uniform Price: According to Interlaken road side stand prices: all grades except small (<2.25" not marketable) - $0.90/lb.
[6]Net Economic return: gross (data not shown) minus cost of mulch/ herbicides.

Funding for these projects was provided by NESARE Partnership and NE IPM Partnership grants. ■

Making Reduced Tillage Work on Your Vegetable Farm

Anu Rangarajan, Cornell, and the Cornell Reduced Till - Vegetables Team

Growers who have tested deep zone tillage have found savings in labor (between 25 and 60%) and fuel costs (between 25 and 70%) compared to their conventional tillage systems (moldboard plow plus other passes). While cost savings are significant, growers report the most important benefit of reduced tillage (RT) is the greater flexibility afforded early in the season. By speeding up primary tillage and field preparation, growers can be timelier with planting, be more efficient with labor, have lower equipment maintenance needs, and improve early-season cash flow. All growers we have worked with plan to expand RT acres on their farms. In some cases, growers have been able to expand total farmed acres because of the efficiencies and benefits afforded by reduced tillage systems.

Trying to find equipment to test RT has been a barrier for many growers. To help, we have identified several equipment dealers around NY who will have deep zone builder units available in the summer of 2011 for rental. Cornell also has three two row units available. Spring will be here before long!

The *NY Farm Viability Institute* has funded this project for 2011. Cost-share money for equipment rentals will be available.

Questions? Betsy Leonard, Project Coordinator, Expanding Use of Reduced Tillage on NY Vegetable Farms, 607-254-8943, bai1@cornell.edu. ■

Do an On-Farm Trial

If you are interested in testing reduced tillage on your farm, please work with your local Cornell cooperative extension educators. Eastern NY: Chuck Bornt, 518-272-4210, ext 125, cdb13@cornell.edu. Western NY Carol MacNeil, 585-394-3977 x406, crm6@cornell.edu. The *NY Farm Viability Institute* has funded this project for 2011. Cost-share money for equipment rentals will be available.

Zone Till Rental and Loaner Units available for on farm trials

Z & M Ag and Turf Tom Kelsey Alexander and Oakfield, NY 800 241 1670 tkalexander@zahmandmatson.com	Capital Tractor Dick Skellie 1135 State Rt. 29, Greenwich New York 12834 Phone: 518-692-9611 Toll Free: 866-30-TRACT rskellie@capitaltractorinc.com
Lakeland Equipment Chad Walker Hall, NY Chad Walker 585-526-6325 chadwalker@lakelandequipment.com	Columbia Tractor Stu Kinne 841 Route 9 H Claverack, NY Phone: (518) 828-1781 skinne@columbiatractor.com
Central NY- 2 row Unverferth and Cornell 2 row zone builder, contact Betsy Leonard, bai1@cornell.edu , 607-254-8943	Eastern NY- Cornell 2 row zone builder, contact Chuck Bornt, cdb13@cornell.edu , 518-272-4210, ext 125
Long Island- 2 row Unverferth, contact Sandy Menasha, srm45@cornell.edu , 631-727-7850	

This project is possible in part due to grant funds from the NY Farm Viability Institute, NYS Department of Agriculture and Markets Specialty Crop Grant and USDA Sustainable Agriculture Research and Education Program.

Reduced Tillage Expo Session Online

On the last day of the Empire State Fruit & Vegetable Expo did you miss out on the great panel of growers describing how they use reduced tillage for just about every vegetable crop one could grow? Catch their talks online at: http://www.youtube.com/profile?user=CornellHorticulture Summaries of their presentations are also available at: http://www.nysaes.cornell.edu/hort/expo/ or from Carol MacNeil, CCE, Cornell Vegetable Program at 585-394-3977 x406 ■

Recording of Recent Annual Organic Farming & Gardening Conference Sessions Available

NOFA-NY Fresh News Online

Recordings of almost all of the workshops and keynote speeches at the recent Organic Farming & Gardening Conference are available for purchase as a CD or mp3. For info or to place an order contact them at http://organicvoices.com/ ■

Mind the Gap: Cover Crops & Black Plastic Mulch

Molly Shaw, CCE South Central NY Ag Team

Thank you to NE SARE for funding this trial.

Black plastic mulch (either regular plastic or the biodegradable version) has become a staple on NY veggie farms. We love how it provides a weed barrier around plants and heats up the soil. But what about that aisle area, that gap of bare soil between rows of mulch? There are three basic options: keep the soil bare all summer, mulch with straw, or allow something to grow on it. Bare soil can be maintained with cultivation or herbicides. A few farms use the straw mulch, though on a large scale this can be pricy as well as a haven for voles. The default option is weed cover, and we see that on plenty of farms, often interfering with harvesting. But what if you could opt for a low-cost, low-maintenance green cover that actually improves the soil?

That's the cover crop technique that one vegetable farm in Owego (Southern Tier NY) has trialed for the last couple years. This particular farm is blessed with an amazing soil type—silty loam without stones in a creek valley that rarely floods. For the last couple decades the fields have been intensively used for vegetables, many on black plastic. The aisles have been maintained as bare ground with a rototiller, usually rototilling at least four times per season…or until selling at farmers markets becomes all-consuming and the weed control slips. Because of the intensive tillage, the soil health test from this farm showed very low organic matter. (See sidebar for test results.) This farm sees crusting on their soil. They also had a hard-pan at the rototiller depth, which on a wet year lead to water ponding in the field after a rain.

Cover crops with fibrous root systems (like sods) that can be left in place for long periods of time tend to be the best at increasing aggregate stability and active carbon, but this farm is land-limited and wants to crop (or double-crop) every piece of ground every year. So we decided to try cover cropping half the field at once—the aisleways—which would at the same time reduce tillage, and hopefully be lower maintenance than rototilling. We chose annual ryegrass and planted it in April, as early as we could (right after the plastic was laid). Annual ryegrass fills in quicker than clovers, so usually competes better with weeds right off the bat. The farm mowed the ryegrass 6 times during the season, though many other farms that use ryegrass between the plastic are satisfied with 2-3 mowings. Bare ground aisleways were rototilled 4 times.

Pitfalls to cover cropping the aisle: My mental image of cover crops between black plastic is an immaculate green lawn between straight rows of mulched tomatoes adorned with red ripe fruit. But many times attempts at cover cropping the aisleways don't end up looking like this. Why not? We've made the mistake of waiting too long to plant the ryegrass, and when planted in late May it has a much harder time holding its own against annual weeds like ragweed and pigweed. One key to making this work is planting the ryegrass early, when soil temps are cooler and there tends to be more moisture. This means

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laying plastic early. Another farm that uses annual ryegrass extensively lays all their plastic (even biodegradable) early so they can get the ryegrass established, even if they don't plant warm season crops until a month or more later.

It's best to spread the ryegrass before the crops are planted on black plastic. It's hard to keep the grass seed out of the planting holes otherwise. Spreading seed before the plastic is planted also has the advantage that any seed that falls onto the plastic blows onto the bed shoulder, hopefully making the ryegrass thicker in this tricky-to-mow area. Sometimes with raised beds the bed shaper leaves a bumpy aisle between the beds with really steep sides next to the plastic. It's best to smooth this out with a cultivator before planting the ryegrass, otherwise mowing is an arduous task. Using a hand-held weed wacker for acres of black plastic isn't fun. Some farms opt for the weed wackers that are mounted on a set of wheels.

Other tips:
We raked the ryegrass seed into the soil after planting, but if planted early with good soil moisture this step isn't necessary. Often the ryegrass seed comes up best where foot and tractor traffic has squished the seed into the soil as the black plastic mulch is being planted. I try to leave 1-3 seeds per square inch. When ordering seed, I'd aim for 50-60 lbs/acre of between-plastic area. This is 2-4 times the recommended (15-30 lb/A) seeding rate. Spring is a hectic time of year, but remember that spreading ryegrass seed with one of those over-the-shoulder spinner spreaders is really quick, basically as fast as you can walk the row-middles. If you delay, it often just doesn't get done. So order your seed now and mind that gap between black plastic beds this spring.

	Indicators	Value	Rating	Constraint
PHYSICAL	Aggregate Stability (%)	20.6	22	aeration, infiltration, rooting
	Available Water Capacity (m/m)	0.24	93	
	Surface Hardness (psi)	145	63	
	Subsurface Hardness (psi)	294	49	
BIOLOGICAL	Organic Matter (%)	2.2	16	energy storage, C sequestration, water retention
	Active Carbon (ppm) [Permanganate Oxidizable]	303	5	Soil Biological Activity
	Potentially Mineralizable Nitrogen (µgN/gdwsoil/week)	10	42	
	Root Health Rating (1-9)	3.5	75	
CHEMICAL	pH (see Nutrient Analysis Report)	5.9	56	
	Extractable Phosphorus (see Nutrient Analysis Report)	14.5	100	
	Extractable Potassium (see Nutrient Analysis Report)	127.5	100	
	Minor Elements (see Nutrient Analysis Report)		100	

Soil Health test results for this intensively-tilled mixed vegetable field from 2007. Notice the low aggregate stability of 22%, low organic matter, and low active carbon. The chemical soil properties look pretty good which means that a normal nutrient test wouldn't have shown any concerns besides the low organic matter. Note: A hedgerow sample on this soil (considered the best condition this soil can be in, with no tillage or traffic) had an aggregate stability of 41%. To learn more about the Cornell Soil Health Test visit: www.hort.cornell.edu/soilhealth. ■

Saving Time & Fuel During Tillage

Matthew Digman, Machinery Systems Extension Specialist, UW-Madison, WI

There are many ways to save fuel in the field this fall: not tilling, choosing a minimum tillage operation over a conventional one, and ensuring your tractor and implement are set up properly. As with any farm operation, the value of tillage must be weighed against its cost. The first costs to consider are labor, fuel and machinery. These costs are estimated to range from $9 to $19 per acre, depending on the field operation and equipment used. Additionally, tillage can increase costs of subsequent field operations as loose soil reduces tractive efficiency adding further cost to operations such as planting. Finally, some tillage costs are harder to quantify, including the risk of soil erosion and nutrient loss. Conversely, tillage can have many positive impacts on crop production. These impacts can include remediating soil compaction, managing crop residues and providing favorable spring planting conditions.

Tillage is one of the least fuel-efficient field operations. It's estimated that only 20% of the energy in diesel fuel is available at the tractor's drawbar depending on engine and transmission setup. Furthermore, only 2% of that energy is converted into turning the soil. Combining those two efficiencies tells us that only .4% of the energy in diesel fuel is actually converted into breaking up the ground! Therefore it is important to properly manage your tractor and implement setup to get the most out of tillage operations.

The first step to improving your tractor's efficiency starts before heading out to the field. Proper ballasting and tire pressure are critical to ensure your tractor is efficiently transferring power to your implement. First, start with ballast (weight). Over-ballasting a tractor increases rolling resistance, drive train wear and soil compaction. Rolling resistance is increased as the tractor sinks into the ground and consequently must use more energy to climb out of its tracks. Under-ballasting leads to excessive tire slip as the tractor struggles to grip the soil. The amount of ballast needed depends on the draft requirement of the field operation, but a general rule is 120, 145 and 180 lb per hp for light (greater than 6 mph), moderate (5-6 mph) and heavy (less than 4 mph) draft loads, respectively for two-wheel drive (2WD) or mechanical-front-wheel-drive tractors (MFWD). This rule of thumb is logical because increased field speed generally means the operation you are conducting requires less weight. Additionally, at higher speeds soil mechanical properties can withstand only so much force before giving way, leading to wheel slip. The second part of ballasting is to have the weight distributed on the tractor properly. Each tractor design (2WD, MFWD, FWD) and implement hitch point (mounted, semi-mounted, towed) requires a different weight split between the front and rear axle. Your tractor's operator's manual will provide the split needed to get the most out of your setup.

After the tractor is ballasted and hooked up, it's time to check tire pressures. Lower pressures can increase tractor efficiency but can also lower the load rating of the tire. Follow the load and inflation tables provided by your tire manufacturer to ensure you meet their specifications. If you're considering running on the minimum pressure, weigh each axle and divide by the number of tires to be sure the actual weight per tire is what you expect.

Wheel slip is a good measure of how well your tractor is set up for tillage conditions. Optimal wheel slip ranges from 10 to 15% depending on soil conditions. The optimal slip is on the low end of that range for firm soils and higher for tilled and sandy soils. For a quick check in the field, observe that a properly-ballasted tractor will show deformation in the center of the lug track.

Fuel can also be conserved by matching the power output of the tractor's engine to the power needed by the tillage operation. This is known as the "gear up throttle down" practice. The idea is to select the gear and throttle position that will load the engine sufficiently while maintaining the desired speed for the field operation. This technique is useful where the implement doesn't demand too much power from the tractor, such as disking or situations where the tillage tool is undersized for the tractor. One must take care not to overload the engine when practicing this technique. Most diesel engines can operate efficiently at 20 to 30% of their rated engine RPM, but consult the operator's manual for your specific machine. Black smoke and poor engine response to changes in throttle position are common signs of an overloaded engine.

The final strategy for conserving fuel is to minimize overlapping passes by taking breaks so that you can be more attentive as an operator, or by employing a guidance (e.g., lightbar, automatic steering) system. ■

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Voohreesville, NY
Phone: (518) 765-3500

Colombia County CCE
Education Center, 479 Rte. 66
Hudson, NY 12534
Phone: (518) 828-3346

Fulton & Montgomery Counties CCE
55 E. Main Street, Suite 210
Johnstown, NY 12095
Phone: (518) 762-3909

Greene County CCE
906 Green Co. Office Building,
Mountain Avenue
Cairo, NY 12413
Phone: (518) 622-9820

Rensselaer County CCE
61 State Street
Troy, NY 12180
Phone: (518) 272-4210

Saratoga County CCE
50 West High Street
Ballston Spa, NY 12020
Phone: (518) 885-8995

Schenectady County CCE
Schaffer Heights
107 Nott Terrace, Suite 301
Schenectady, NY 12308
Phone: (518) 372-1622

Schoharie County CCE
Extension Center
173 S. Grand Street
Cobleskill, NY 12043
Phone: (518) 234-4303

Warren County CCE
377 Schroon River Road
Warrensburg, NY 12885
Phone: (518) 623-3291

Washington County CCE
415 Lower Main Street
Hudson Falls, NY 12839
Phone: (518) 746-2560

Advisory Members

Albany:	Tim Albright and Tim Stanton
Columbia:	John Altobelli, Bryan Samascott, Jody Bolluyt (organic)
Fulton:	Eric and Stephanie Grey
Greene:	Pete Kavakos, Jr. and Jim Story
Montgomery:	Jim Hoffman and Ken Fruehstorfer (organic)
Rensselaer:	Larry Eckhardt and David Mesick
Schenectady:	Al Lansing and Keith Buhrmaster
Saratoga:	Cyndi Pastore and Craig DeVoe
Schoharie:	Bob and Linda Cross, and Jake Hooper
Washington:	George Armstrong and Rich Moses
Warren:	Kim Feeney
Industry Representatives:	Jay Matthews and Paul Peckham

If you have questions or comments about this publication or the Capital District Program in general, please contact your county's grower advisory member or the Agricultural Program leader of your local Cornell Cooperative Extension office.

Dates to Remember...

March 3 - 2011 NYS Dry Bean Meeting, Batavia Party House, Rt 5, Stafford. *See February Veg Edge, page 12*

March 3-4 - GAPs Training for Fruit & Veg Growers Menands. *See February Veg Edge, page 12*

March 4 - Farm Energy Forum, *see page 16*

March 4, 11, 18, 25 - Strawberry Webinars, *see page 15*

March 5 - Planting & Cultivating Juneberries CCE Ontario Co. Contact Nancy Anderson at 585-394-3977 x427 or nea8@cornell.edu

March 7 - Veg Grower Winter Meeting, *see page 15*

March 10 - Organic Certification Orientation 1 - 4pm, CCE - Broome Co. Pre-register at 607-724-9851

March 15-16 - Pesticide Recertification Classes CCE Wayne County, *see page 18*

March 17 or 25 - Garlic Grower Meeting: Moving Forward with Garlic Bloat Nematode, *see page 16*

March 18 - Tomato Grafting Workshop, *see page 16*

March 18 - Ag Appreciate Banquet, Ontario County Contact Nancy Anderson, 585-394-3977 x427 for details

March 21-22 - Pesticide Class, Knowsville. *See page 17*

March 23 - Adaptive N Management & Cornell Soil Health Test Interpretation, Cornell. *See page 16*

March 24 - Communications Workshop for Farmers & Conservation Partners, *see page 15*

March 24 - Pesticide Class, East Aurora. *See page 17*

March 29 - Ag Tourism: How to Make it Work for Your Farm, CCE Ontario Co. Contact Nancy Anderson at 585-394-3977 x427 or nea8@cornell.edu

March 31 - Pesticide Class, Lockport. *See page 18*

April 13 - Pesticide Special Permit Class, Wayne Co.
April 14 - Pesticide Special Permit Class, Orleans Co.
See page 17

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