RUTGERS COOPERATIVE EXTENSION AT THE NEW JERSEY AGRICULTURAL EXPERIMENT STATION

PLANT & PEST ADVISORY

VEGETABLE CROPS EDITION $1.50 APRIL 28, 2004

INSIDE

The New Jersey Farm to School Initiative

Claire Homitzky, Community Food Projects Director, New Jersey Urban Ecology Program, Rutgers University

In September 2000 the New Jersey Urban Ecology Program (NJUEP) at Rutgers University, as well as several other partners throughout the country, received a grant from the United States Department of Agriculture's Initiative for Future Agriculture and Food Systems (IFAFS) to participate in a project called *From Farm to School: Improving School Meals and Small Farm Viability* (the "Farm to School Project").

The primary goals of the Farm to School Project are to increase access to fresh, locally grown fruits and vegetables in school lunch programs and to improve small farm viability through increased access to institutional markets. We believe such an effort can help provide the highest quality produce (that is, with the greatest freshness, taste, nutrition, and safety) to school children, support New Jersey's agricultural landscapes and livelihoods, and contribute to local economic development.

A key element of this project is the formation of links between New Jersey's farmers and school food service personnel. One type of link is a direct market relationship between a local farmer and one or more schools. While the requirements for participation in this kind of relationship are high on both the supply and demand sides, it is a model upon which many successful farm-to-cafeteria projects have been predicated. Farmers can also be linked to schools through produce distributors that supply locally grown produce to schools when it's seasonally available. Finally, farmers can be linked to schools through state-run food distribution programs.

Most of our work in New Jersey has promoted this last strategy through participation in the Department of Defense (DOD) Fresh Fruit and Vegetable Program. Several years ago, a partnership was forged between the USDA and the DOD that permits the latter to procure fresh fruits and vegetables for several kinds of institutions, including schools participating in the National School Lunch Program. At the state level, this partnership is coordinated by the New Jersey Department of Agriculture's Division of Food and Nutrition. In concert with a produce buyer located at the Defense Supply Center in Philadelphia, the Division annually procures *several hundred thousand pounds of locally grown*

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fruits and vegetables for schools throughout the state of New Jersey. These products are purchased from a combination of sources, including the Philadelphia Regional Produce Market, New Jersey food processors and *directly from New Jersey fruit and vegetable growers.*

Well-organized grower cooperatives that have the capacity to meet the demands of an institutional market are also needed to participate in the DOD Fresh Program. Those that can develop value-added products such as juices and ciders, fruit cups, and minimally-processed, single-serving sized packaged foods such as sliced apples and baby carrots would be particularly well-positioned to access this market. These products reflect the trend in school food service and the food industry as a whole towards convenience foods. They also increase shelf-stability, a critical issue in a state where the harvest season and the academic year barely coincide.

While the primary focus of the Farm to School Project is on K-12 schools, we have also been working with institutions of higher education. In particular, we have forged a partnership with the Division of Dining Services at Rutgers University that is extremely promising. This division commands an impressive budget for food purchases. Leveraging just a portion of that buying power for local producers could have a significant impact on the viability of agricultural operations throughout the state.

Soon, funding for this project will expire. It's time to parlay the experience we've gained and the momentum we've created to institutionalize this initiative. Fortunately, the time is right. Both locally and nationally, there is ever-increasing awareness of and attention to the issues of obesity and diet-related diseases in school-aged youth. This, coupled with dedicated leadership in the New Jersey Department of Agriculture, has created a climate that encourages efforts of this kind. NJUEP is currently seeking farmers, agricultural professionals, food service personnel, students, parents, school teachers, administrators and other interested stakeholders to participate in the New Jersey Farm to School Working Group. The purpose of this group is to consider multiple strategies to overcome the challenges and recognize the opportunities we encounter as we strive to achieve the Project's goals. We welcome your contribution to this important effort.

To learn more about the project contact Claire Homitzky, Community Food Projects Director, the New Jersey Urban Ecology Program, Rutgers University at (732) 932-1688 or homitzky@aesop.rutgers.edu . Your comments and suggestions regarding this project are also welcome and will be gratefully received.

NJUEP works to foster the health of people and landscapes and the diverse economies that nurture them using food- and agriculture-based community development strategies. ❑

Issues and Innovations in Temperature Control

Louis Cooperhouse, Director, NJAES Food Innovation Research & Extension Center, Rutgers University

Temperature is the most important and most obvious criterion for maximizing the shelf life of fresh-cut produce products, and all refrigerated value-added prepared foods for that matter, yet it is frequently misunderstood and overlooked. The temperatures encountered at each link of the chain have a direct bearing on the shelf life, quality, and potential safety of fresh-cut products.

The Cold Chain: From Field to Fork

The cold chain for fresh cut produce truly begins in the field, and does not conclude until the product has been consumed. The importance and dramatic benefits of utilizing rapid cooling techniques immediately after harvest to retard microbial growth and enzymatic activity have been well documented. These include hydrocooling, in which product is sprayed with water that should be chilled and may be chlorinated, and vacuum cooling, in which air is evacuated from an enclosed area to remove moisture and heat. Other techniques include forced-air cooling, in which refrigerated air is moved rapidly over fruits and vegetables, and package icing, where an ice slurry is placed into vegetable containers. Following this first link in the chain, product temperature must be maintained in raw product storage, in the trim/core and washing operation, during packaging, in finished product storage, and during the many points that occur during distribution.

It is generally accepted that the temperature of the water used for hydrocooling is the same as the recommended storage temperature for the produce being cooled. Lower water temperature will result in faster cooling, however, this may result in chilling stress and visual damage.

Temperature Abuse in Distribution

Distribution, including practices that occur at retail, has frequently been regarded as the "Achilles heel" in cold chain management, and has been attributed by many to be a major impediment limiting the potential growth of the fresh-cut category. Despite the standards and information provided by federal, state, and county agencies, minimal education initiatives are in place and various surveys have shown that temperatures of foods in U.S. chilled food distribution channels are frequently in the range of 45°F–55°F. This is simply unacceptable.

Temperature abuse can, and does, occur too frequently during distribution and during the retail sale of fresh-cut produce products. Truckloads of perishable

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items are occasionally shipped above 50°F because of ignorance, negligence, or mechanical breakdowns en route. Abuse can also occur at the loading docks of the processor, during transportation to a regional distribution center, at the loading dock of a regional distribution center, in the cooler of the regional distribution center or warehouse, during transportation in refrigerated trucks to the retailer or foodservice operator, at the loading dock of the individual retail store or foodservice operator, etc. It is also becoming increasingly difficult to schedule supermarket delivery times, and as a result trucks may shut off their refrigeration units during the period prior to offloading. In addition, pallets of perishable goods occasionally may sit on the receiving floor of a supermarket for up to several hours during a mid-summer day until they have been properly placed into refrigerated storage.

Temperature Abuse at Store Level

Although a great deal of temperature abuse can occur at many points during distribution *prior* to the placement of product in the store's retail case, a significant amount of abuse occurs *after* product has been displayed for sale. Many fresh-cut products spend a great deal of their shelf life sitting in a display case at retail. The design and functionality of the retail case itself has a major impact on product shelf life. Most supermarkets and grocery stores have trouble keeping their produce cabinets below 45°F, and studies have shown that the refrigerated cabinets in the produce section of the store maintain some of the warmest temperatures in the entire supermarket…even though products sold there are among the most susceptible to spoilage.

By design, most retail cabinets, especially open cabinets, were developed for the merchandising of fast turnover products, not the effective long-term storage of products. Built into most systems are defrost cycles, lights, ballast, etc. that impair their effectiveness, and air curtains that are easily disturbed during normal operation. Proper circulation of cooling air is essential if temperature control is to be maintained. Unfortunately, overstocking, promotional materials, etc. often impair this circulation. In addition to light-induced temperature changes that can occur, placement of products near lights and ballast can increase product temperature by as much as 10°F. Products located at the bottom of horizontal display cases or the back of vertical display cases are generally the coldest products in the case. This is due to the circulation of colder air, greater distance from store ambient temperatures, and the near absence of radiant heat from lights.

Standard equipment in most refrigerated display cabinets is the display case thermometer, a potential source of both information and deception. These thermometers, usually required by local or state laws, have sensing elements that are frequently situated directly in front of incoming blower air and are therefore, even if calibrated, more indicative of the blower temperature than the actual product temperature. Studies have shown that the average actual temperature of refrigerated product can be as much as 10 degrees warmer than the temperature indicated on a thermometer next to the blower. Similarly, defrost cycles in a refrigerated case have been shown to result in a short-term spike in which product internal temperature briefly reaches 60°F, and this may happen twice a day every day.

Temperature Abuse at Home

Temperature abuse certainly also occurs during the trip from the supermarket to the home, due to outside temperatures and/or lengthened times until products are properly stored. In addition, the home refrigerator is frequently a location for temperature abuse. An Audits International Home Food Safety Study found that lack of education and lack of motivation were typical reasons why refrigerator temperatures are set too high in many homes. Many consumers simply *do not know* at what temperature a refrigerator should hold product. In addition, many refrigerators are set too warm simply because many refrigerators lack a thermometer.

What Can We Do Now?

Temperature recording devices are valuable tools, and should be incorporated in each stage of the cold chain as part of an overall HACCP plan. Many such indicators exist. New systems are now available for distribution that utilize wireless sensors and sophisticated web-based tracking capabilities, and provide a quicker ability for monitoring and alerting should a problem occur.

Other options now available include "Intelligent packaging" systems, which consist of sensors that provide information about the product to the consumer, foodservice operator, or other user. The most widely known intelligent packaging system is the time temperature indicator (TTI's). These indicators track the relationship between time and temperature and their impact on spoilage or some other end-point to product acceptability. They must be individually developed for specific products. The degree of color change will reflect any temperature abuse encountered, integrating time and temperature in an exponential, irreversible relationship.

For any further questions, or to find out additional information about grants for feasibility studies and working capital that are available from USDA Rural Development, please contact the office of the Food Innovation Research and Extension Center at 856-459-1125, or email Lou Cooperhouse at Cooperhouse@aesop.rutgers.edu or Julie Elmer, Food Technology Specialist at Elmer@aesop.rutgers.edu. ❑

Perennial Weed Control Using Cultural/Mechanical Techniques

Bradley A. Majek, Ph.D., Specialist in Weed Science

Weeds cause serious crop losses every year by reducing yield, quality and earliness of grain, forage, vegetable and fruit crops. Perennial weeds include any weed that lives for more than two years. Common perennial grass weeds in the mid-Atlantic region include **quackgrass**, **Johnsongrass**, **Bermudagrass**, and **wirestem muhly**. Common herbaceous perennial broadleaf weeds in the mid-Atlantic region include **Canada thistle**, **milkweed**, **hemp dogbane**, **hedge** and **field bindweed**, **Canada goldenrod**, **white heath aster**, and **horsenettle**. Common woody broadleaf perennials include **Virginia creeper**, **poison ivy**, **creeping dewberry** and other **brambles**, **multiflora rose**, **greenbriar**, and **mulberry tree seedlings**. **Yellow nutsedge** and **purple nutsedge** are two perennial sedges commonly found in the region.

Most annual and perennial weeds reproduce from seed, but many perennials also reproduce vegetatively. Examples of vegetative reproductive parts of weeds include stolens, rhizomes, roots, tubers, bulbs, and nutlets. **Bermudagrass** has stolens, which are above ground horizontal stems. **Quackgrass** spreads by rhizomes, which are underground horizontal stems. **Canada thistle**, **milkweed**, **hemp dogbane**, **horsenettle**, and **bindweed** species have a deep complex root system with distinct vertical and horizontal roots. Wild bean has tubers. **Nutsedge** has nutlets that can live dormant in the soil for several years.

Primary and secondary tillage are effective control methods for annual weeds, but annual plowing and disking or field cultivating prior to planting often only spreads perennials by breaking roots, rhizomes, and stolens, and dragging pieces to uninfested parts of the field, or to other fields. Perennial weed control requires a significantly higher degree of commitment. The grower must make perennial weed control a high priority task. They must recognize that success will require more time, cost more money, and may affect a field's crop rotation sequence to be effective.

Perennial weeds can be controlled by carbohydrate starvation. Perennials emerge in the spring by relying on carbohydrates stored in roots, rhizomes, stolens, tubers, bulbs or nutlets. Control measures should start when the carbohydrate reserves in the weed are at their lowest. This is often after the weed has used stored reserves to overwinter and emerge in the spring. Beginning when the weed shoot(s) break the soil surface, carbohydrate flow continues from the root toward the shoots for an additional 7 to 10 days to establish a leaf canopy. Between 10 and 14 days is a transition period. Within 14 days of emergence, the weed moves carbohydrates from the leaves back down into the root.

STARVATION OF PERENNIAL WEEDS IS ACCOMPLISHED BY NEVER ALLOWING THE WEED TO MOVE CARBOHYDRATES DOWN INTO THE ROOTS. This can be accomplished by tilling (or close mowing of tall upright weeds) every 7 to 10 days until they cease to attempt to emerge. It is critical that NO timing be missed or is late! One single missed tillage can negate all the effort expended up to that point. **EXPECT TO CONTINUE THE EFFORT FOR 4 TO 6 MONTHS!** Success may require more time if the effort was not started when carbohydrate reserves in the weed were low at the start of the process.

Typically, a field is fallowed and shallowly tilled on a weekly schedule for one growing season to eliminate a perennial weed problem. Begin with the first sign of the emergence of the weed in the spring. Maintain a seven (7) day tillage schedule. This time schedule provides about a three to seven day cushion in the event of a wet period when the field cannot be tilled. The schedule MUST be maintained and must be a high priority for the grower. One single missed tillage can negate all the effort expended up to that point. Advance the schedule when wet weather is anticipated rather than suffer a delay. The reason for missing the timing is not important. Preventing ANY carbohydrate from moving from the leaves back into the root is critical for success until the weed is dead.

A field need not be fallowed for the year, provided the grower maintains a seven-day cultivation and hoeing schedule. The weekly tillage cannot be stopped when the crop becomes established. The weekly tillage and hand hoeing must be continued until the weed is dead. ❑

Vegetable Weed Control

Bradley A. Majek, Ph.D., Specialist in Weed Science

✔ **Parsley -** Use Lorox 50DF to control most weeds in parsley. Apply to the soil surface immediately after seeding. Lorox requires rainfall before weeds emerge to make the herbicide available to the germinating seeds. Irrigate if rainfall does not occur within a few days of application. Consult the Commercial Production Recommendations for rates and additional information.

✔ **Sweet Corn -** Early sweet corn that has emerged has been observed yellow or light green in color. The chlorosis may be uniform or appear mottled on the plant. Cold weather is responsible for the injury. Corn cannot make chlorophyll when the temperature fails to climb above 65 to 70 degrees for an extended period. Herbicides are not responsible for the problem. Varietal differences to cold tolerance exist. The corn will turn green when the weather turns warm. ❑

Pest Notes

Gerald M. Ghidiu, Ph.D., Specialist in Vegetable Entomology

✔ **General:** Diazinon is still labeled for commercial uses. All uses of diazinon for home gardens, home use and non-agriculture will be cancelled. However, retail stores can still sell diazinon stocks though 31 December 2004.

Counter 20CR is no longer available and production has stopped for this formulation. Counter 15CR is produced, but supplies are limited and growers are having a difficult time finding this material.

Gowan is producing a new formulation of Lorsban, a 75WP, which is available for growers. This formulation has the same label as other Lorsban WP labels.

The federal EPA has approved two specific exemption Section 18's to control **varroa mites** in beehives. CheckMite Bee Hive Pest Control Strips with 10% coumaphos may be used to control varroa mites and small **hive beetles**. Or, use Apilife VAR with thymol, eucalyptus oil and L-menthol to control varroa mites in beehives. Consult labels for specific directions and restrictions.

Weather conditions are very favorable for development and survival of **seed and root maggots** on vegetable crops. Cool, damp weather followed by warm temperatures are preferred by maggots, and damage may be associated with wet, weedy or recently planted (disturbed) fields. If you have had trouble with maggots in other years, control can be obtained by using any of the various seed treatments for maggots, such as treatments containing chlorpyrifos (Lorsban), clothianidin (Poncho), diazinon (Agrox, Germate, diazinon, Kernal Guard, KickStart), imidacloprid (Gaucho), poermethrin (Kernal Guard Supreme, KickStart VP, Barracuda), or thiamethoxam (Cruiser). Also, various planter box treatments are available, as well as Lorsban and diazinon for at-plant applications. Once maggot damage is visible, control is not possible as maggots are in the seed or stem of the plant, and all further treatments are ineffective.

The accumulated degree days (DD's) are on a normal track this year, and it is likely that the usual spring insect pests will also be on a normal schedule as well. **Maggot flies** are already active, as well as **imported cabbageworms** and **cutworms**. More information will be available in the next newsletter concerning new products for these spring pests. ❑

Brood X of Periodical Cicada

Peter W. Shearer, Ph.D., Specialist in Entomology

Brood X of periodical cicada (a.k.a. the 17-year locust) is set to emerge in the eastern USA this year. This is the largest of the various broods that make their appearance every 17 years. People who have observed them emerge are often awed at first by the incredible abundance of their numbers and then greatly bothered by the loud noises they make while attracting mates. When the process is over, huge piles of rotting cicada carcasses add an aroma to the air that is not pleasant.

These insects are not locusts but are instead large sucking insects. The immature stages (nymphs) feed underground on roots for 17 years. Once nymphs reach their last instar, they burrow to the surface, climb on an upright structure, then molt to adults. This occurs over several weeks and usually starts in mid-late May. Adult male cicada will then fly to trees where they call females with a loud, distinct sound. Following mating, female cicadas will make slits in young tree shoots and lay her eggs. Adults can live about 2 weeks. The eggs hatch in 6-8 weeks and newly hatched nymphs fall to the ground, burrow into the soil, and start the long 17-year feeding process all over again.

Areas that were infested 17 years ago are prime candidates for repeat infestations this year. The abundant egg laying scars can deform young trees when egg infested shoots break off. Flagging on older trees is often not really a huge concern. Currently, pyrethroids are the best bet against these pests but given the cicada's large size and extreme abundance, repeated applications will only get about 50% or so of those cicadas present. ❑

Marketing Matters

Rick VanVranken, Atlantic County Agricultural Agent

Making your product stand out from the crowd often takes some creative artwork to develop a package design and logo that depicts you, your business and/or your product. Logos should be colorful, eye-catching and unique; so unique others might be tempted to copy or use your logo on their product.

Protecting the reputation of your business from misuse of your logo is important, and it could be financially significant to the success or failure of your operation. Logos and other creative works, as well as new products, can be protected under United States trademark, copyright or patent law. Copyrights have been called the 'poor man's patent' because obtaining a copyright is a much less expensive process. However, business logos will afford much greater protection under trademark law. To learn more about obtaining a trademark, copyright or patent, visit the US Patent and Trademark website and look at the page titled 'Basic Facts About Trademarks' at http://www.uspto.gov/web/offices/tac/doc/basic/. ❑

Logos and other creative works, as well as new products, can be protected under United States trademark, copyright or patent law.

Weekly Weather Summary

Keith Arnesen, Ph.D., Agricultural Meteorologist

Temperatures averaged much above normal, averaging 58 degrees north, 59 degrees central and 61 degrees south. Extremes were 91 degrees at Toms River on the 20th, and 37 degrees at Pomona on the 26th. Weekly rainfall averaged 0.87 inches north, 0.94 inches central, and 0.33 inches south. The heaviest 24 hour total reported was 0.95 inches at Freehold on the 25th to 26th. Estimated soil moisture, in percent of field capacity, this past week averaged 89 percent north, 85 percent central and 76 percent south. Four inch soil temperatures averaged 58 degrees north, 59 degrees central and 60 degrees south.

Weather Summary for the Week Ending 8 am Monday 4/26/ 4

	RAINFALL			TEMPERATURE				GDD BASE50		MON
WEATHER STATIONS	WEEK	TOTAL	DEP	MX	MN	AVG	DEP	TOT	DEP	%FC
BELVIDERE BRIDGE	.95	6.48	-.79	86	44	59.	6	106	88	99
CANOE BROOK	.76	7.95	-.08	88	42	59.	6	121	109	96
CHARLOTTEBURG	1.06	7.23	-.63	84	41	57.	7	98	98	100
FLEMINGTON	.74	8.50	.82	88	42	58.	5	108	93	97
LONG VALLEY	.76	6.55	-1.63	86	41	57.	6	91	87	95
NEWTON	.92	6.38	-.61	84	40	56.	5	91	88	100
FREEHOLD	1.44	9.10	1.46	90	42	60.	6	145	115	100
LONG BRANCH	1.34	9.54	1.63	88	44	56.	2	85	63	100
NEW BRUNSWICK	.86	7.42	.11	86	42	59.	4	119	75	98
TOMS RIVER	.44	9.57	1.87	91	43	59.	5	140	116	78
TRENTON	.60	7.72	.79	86	43	59.	3	139	82	85
CAPE MAY COURT HOUSE	.29	7.97	1.24	78	40	59.	4	124	78	77
DOWNSTOWN	.13	7.69	.76	85	40	61.	5	170	109	70
GLASSBORO	.87	10.00	2.70	85	48	62.	6	188	131	94
HAMMONTON	.18	8.43	1.35	87	39	60.	4	174	121	68
POMONA	.27	6.91	.10	83	37	59.	5	143	109	74
SEABROOK	.24	8.28	2.11	83	45	64.	8	205	142	70

WES KLINE — GDD BASE 40 PINEY HOLLOW

Last Week 98 (Ending 4/19/04)

This Week 147 (Ending 4/26/04)

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