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Cultivating Cumberland

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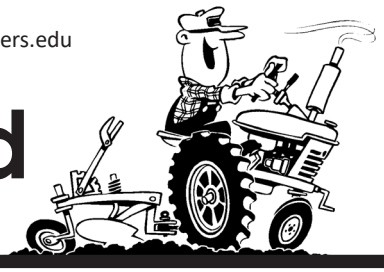

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Note: See attachment for new "Preventing Heat Stress in Agriculture" Fact Sheet 747.

Webinars: Don't Sweat Heat Stress in Agriculture

Plant & Pest Advisory- May 9, 2024- Kate Brown

The New Jersey Legislature is currently reviewing identical bills (A3521/S2422) which would establish an occupational heat stress standard and "Occupational Heat-Related Illness and Injury Prevention Program" under the NJ Department of Labor and Workforce Development. As we monitor the progress of these bills, the Farm Health and Safety Working Group of Rutgers Cooperative Extension has launched an educational program on heat stress mitigation in agriculture which includes weekly "Beat the Heat" articles published in the Rutgers Plant and Pest Advisory E-Newsletter, an update to the Rutgers fact sheet "Preventing Heat Stress in Agriculture" and a webinar series.

In partnership with New Jersey Farm Bureau, we invite you to join us for a two-part webinar series titled "Don't Sweat Heat Stress in Agriculture".

Wednesday, June 5 from 7:00-8:00 PM
An introduction to heat stress issues in agriculture. We will also share tools farmers can use to evaluate heat risk and recommended resources for guidance on heat stress prevention.

Wednesday, June 12 from 7:00-8:00 PM
An overview on signs of heat stress and corresponding first aid, as well as strategies for heat stress prevention. A panel of farmers will discuss their currently used strategies for employee management during periods of high heat.

You must register to attend these webinars by visiting https://go.rutgers.edu/heat-stress-in-ag.

Questions? Contact Kate Brown, County ANR Agent with RCE-Somerset County, at 908-526-6293 x4 or kbrown@njaes.rutgers.edu.

Attachments

- NJ Manure Link 2024 Composting Webinar and Field Day
- Preventing Heat Stress in Agriculture (Rutgers NJAES)
- Highly Pathogenic Avian Influenza (HPAI) A(H5N1)
- South Jersey Nursery IPM Updates

Beat the Heat: Recognize Signs of Heat Illness

Plant & Pest Advisory- May 20, 2024- Kate Brown

Several types of heat-related illnesses can affect workers and symptoms may be non-specific. When a worker is performing physical labor in warm environments, any unusual symptom may be a sign of heat illness.

The chart below from OSHA outlines symptoms and signs that may indicate heat stress. Note that common signs and symptoms include muscle pain, weakness or fatigue, dizziness, heavy sweating, and rapid heart rate.

Heat-Related Illness	Symptoms and Signs	
Heat stroke	• Confusion • Slurred speech • Unconsciousness	• Heavy sweating or hot, dry skin • Very high body temperature Rapid heart rate
Heat exhaustion	• Fatigue • Irritability • Thirst • Nausea or vomiting	• Dizziness or lightheadedness • Heavy sweating • Elevated body temperature or fast heart rate
Heat cramps	• Muscle spasms or pain	• Usually in legs, arms, or trunk
Heat syncope	• Fainting	• Dizziness
Heat rash	• Clusters of red bumps on skin	• Often appears on neck, upper chest, and skin folds

Employers and workers should become aware of symptoms related to heat stress and heat illness. In addition, knowing what to do when someone is showing signs of heat illness is very important. This resource from NIOSH describes the appropriate first aid for each of these illnesses. Prompt action to provide first aid can make a difference in recovery of persons with heat illness. Multiple heat-related illnesses can occur together, and time is of the essence.

When in doubt, place the worker in a cool environment and call 911.

Beat the Heat: Hydration is Key

Plant & Pest Advisory- May 13, 2024- Kate Brown

The body uses water to help dissipate heat through sweat and evaporation of sweat. Water lost as sweat must be replaced through water consumption to help the body maintain temperature regulation. During moderate activity, the CDC recommends drinking at least 1cup of water every 15-20 minutes to replace water lost through sweat.

Sports drinks are likely unnecessary to replenish the body’s electrolytes when adequate hydration is combined with regular meals. However, sports drinks may be beneficial to help balance the body’s water and electrolytes when tasks conducted under hot temperatures result in prolonged sweating over several hours.

Limit consumption of energy drinks, alcohol, and caffeine-containing beverages such as coffee, tea, and soda. These beverages can contribute to dehydration, increasing the risk of heat illness.

Staying hydrated starts before work then continues throughout the day and after work. Attention to personal hydration decreases the risk of heat illness and other risks associated with chronic dehydration, such as kidney stones.

Beat the Heat: Tools for Evaluating Heat Risk

Plant & Pest Advisory- May 6, 2024- Kate Brown

As the weather warms up, prepare yourself to evaluate the heat risk for outdoor tasks. We often use a weather application on our phone to check the daily high and low temperature, but air temperature alone is not sufficient to evaluate heat risk. Heat index is a more appropriate measurement because it combines the effects of air temperature and humidity to indicate the level of discomfort felt by the average person.

One easy way to check the heat index is the Heat Safety Tool (https://www.osha.gov/heat/heat-app) phone app (see photo) developed by the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH). The app calculates heat index at your specific site and displays the risk level to outdoor workers. It also provides in sight into protective measures for the given risk level. This mobile phone app is available for both Android and iPhone.

A similar, web-based tool is the Heat Risk website (https://ephtracking.cdc.gov/Applications/HeatRisk/) created by the U.S. Centers for Disease Control and Prevention (CDC). The Heat Risk homepage has a color-coded map to indicate today's heat risk (no risk to extreme risk) for each county in the U.S. You can also enter your zip code to get the daily and 5-day forecasted heat risk for your site plus corresponding actions to reduce heat-related health risks. Stay tuned for weekly posts on how beat the heat this summer!

plant-pest-advisory.rutgers.edu /beat-the-heat-tools-for-evaluating-heat-risk

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Diagnosing Collar Rot and Alternaria Stem Rot of Tomato

Plant & Pest Advisory- May 15, 2024- Andy Wyenandt

Collar rot (*Alternaria linariae*) or Alternaria stem rot (*Alternaria alternata* f. sp. *lycopersici*) of tomato are common in young tomato plants. Either can be particularly troublesome in seedlings that have been held in transplant flats for an extended period of time before transplanting in hot, humid greenhouses. Collar rot infections often start where a leaflet branch has been broken or pruned which allows a point of infection. Symptoms of Alternaria stem rot include brown circular to irregular lesions on stems with definitive concentric black rings (very similar to Early blight on infected leaves).

Symptoms of Collar rot are similar and may or may not produce concentric black rings. Infections that start in the greenhouse may lead to losses in the field as stems become girdled causing the plant or branches to wilt and die. Most commercial tomato varieties have resistance to Alternaria stem rot. While resistance is lacking to Collar rot, growers should chose varieties with Early blight resistance. Fungicides used to control Early blight are also effective against Collar rot.

Diagnosing Southern Blight and White Mold in Tomato and Pepper

Andy Wyenandt

There have been a few reports of Southern blight (*Sclerotinia rolfsii*) and White mold (*Sclerotinia sclerotiorum*) on tomato and pepper in New Jersey. Southern blight is much more common in vegetable areas south of the state where summer temperatures remain hotter (above 90°F) for longer periods of time. Like white mold, it can survive in the soil for many years. Symptoms of Southern blight include infection at the base of the stem at the soil line. The resulting infection will girdle the plant causing wilt and death. The fungus will produce white, cottony mycelium and very small, spherical sclerotia which are often have a tannish, brown color.

White mold is more common than Southern blight in New Jersey, and like Southern blight,once introduced into a field or high tunnel it can very difficult to control. The pathogen produces large black sclerotia on the surface and inside infected stems. If sclerotia of either pathogen make their way back into the soil, both can survive for years causing significant problems.

All infected plants need to be removed immediately and disposed of properly to help reduce the chances of sclerotia returning to the soil.

For more information on chemical control please see the 2024/2025
Mid-Atlantic Commercial Vegetable Production Recommendations Guide.

Avoid Sunscald Injury in Transplants

Plant & Pest Advisory- May 9, 2024- Andy Wyenandt

Although the weather has been relatively wet these past few weeks, hotter than normal temperatures have already crept in, thus we need to be cautious about sunscald developing on the stems of transplants, especially those being set onto black plastic mulch. With a little planning ahead potential losses to sunscald injury can reduced significantly.

A transplant coming straight out of the greenhouse and directly into the field has not been exposed to much direct sunlight. Add that with black plastic mulch and you have a lot of heat aim directly at the tender tissue of the transplant. All transplants should have sometime to harden-off outside the greenhouse before going into the field, a day or two, is better than none at all, the longer the better if time and space allow.

Sunscald typically appears as the slow bleaching out of the stem that will typically appear only on one side. Often this starts to appear right where the stem meets the black plastic mulch. In many cases if the stem is touching the mulch, the sunburn will start there and the transplant will begin to fall over as if the stem was broken.

When transplanting, make sure the holes in the plastic are wide enough to keep the stem from coming into contact with it. In some cases growers will fill in the transplant hole with soil to help keep the transplant upright before between-row herbicides are applied. ‘Leggy’ transplants that lay across plastic mulch and even those transplanted onto bare ground are prone to sunscald injury.

NEWA Disease and Insect Forecasting System

Plant & Pest Advisory- May 20, 2024- Andy Wyenandt

Since 2011 the vegetable working group has teamed up with Cornell University's NEWA to bring tomato and potato late blight and early blight forecasting to vegetable growers through out New Jersey. Over 50 weather stations from Sussex to Cape May County now offer disease as well as insect forecasting services for numerous important pests.

The website managed by the New York state Integrated Pest Management (IPM) program and Cornell University can be found at http://newa.cornell.edu/. Just click on the map and scroll down to New Jersey and chose a weather station within the closest proximity to your operation. Once you choose a location a new web page will appear with the different forecasting options to choose from. For example, clicking on the potato early blight will automatically generate daily and accumulative P-day values for you for that location. Remember once 300 P-days are accumulated, spray programs for early blight control should be initiated. Clicking on either tomato or potato Late blight will bring up a table which will provide daily rainfall, average temperature, hours above 90% RH and daily and accumulative DSV values for that location. One important thing to remember for the disease forecasting is to track the accumulation of DSV or P-day values based on when you transplanted tomatoes or when potatoes emerged on your farm. To track the progress of Late blight in the US please visit http://usablight.org/.

Understanding and Controlling Rhizoctonia Root Rot

Plant & Pest Advisory- May 16, 2024- Andy Wyenandt

Even though much of New Jersey has had wet weather recently, which is more favorable to Pythium and Phytophthora development, Rhizoctonia root rot has been reported over the past few weeks in a number of crops. Rhizoctonia root rot, caused by *Rhizoctonia solani*, is an important soil-borne fungal pathogen with a very large host range. The pathogen can survive saprophytically on living or dead plant material (organic matter) or as sclerotia in the soil (for more than 3 years). Disease development is favored by warm temperatures, dry (or very well drained) soils and stressed plants. Symptoms of Rhizoctonia root rot may begin as stunted plant growth (with poor root systems) with the appearance of brown lesions at the base of the stem causing wilting with lesions eventually girdling the stem and killing the infected plant. Rhizoctonia root rot infections only extend about an inch above the soil surface, unlike Phytophthora blight infection which can extend much farther up the stem.

Additionally, in root systems infected by Rhizoctonia, the outer cortex of the root system won't slough off, like it does with Pythium root rot infections. Under ideal conditions, the mycelium of the fungus growing can be seen with a 10x hand lens growing along the root surface. Rhizoctonia produces distinct, brown hyphae that almost always branches at nearly 90 degree angles and is a diagnostic feature of the fungus. Rhizoctonia root rot often shows up in transplant production when plug trays are held on the dry side for extended periods, often when growers reduce water to control transplant growth. Infected transplants may not show symptoms until after they are set in the field. Infected transplants or plants infected shortly after transplanting often remain short and stunted with poor root systems compared to healthy plants. This most often occurs when the top of transplant plug has not been sufficiently covered over by soil, the lack of water used in setting the transplant, or when drip irrigation systems have not been hooked up and the soil less media becomes excessively dry for a period of time after transplanting.

Control of Rhizoctonia root rot begins with recognizing its symptoms, so as not to confuse it with other soil-borne diseases, proper watering and irrigation pre-, at-, and post-transplanting, and preventative fungicide control measures post transplanting. For more information on the control of Rhizoctonia root by crop please see the 2024/2025 Commercial Vegetable Production Recommendations Guide.

Phytophthora and Pythium Control During Wet Weather

Plant & Pest Advisory- May 23, 2024- Andy Wyenandt

Most of New Jersey has been wet making current conditions ideal for pathogens such as Phytophthora and Pythium. Unfortunately, Pythium cottony leak and Phytophthora blight can be found on most farms in the southern part of the state. Poor crop rotations with susceptible hosts only make matters worse. The Phytophthora pathogen has an increasing host range that now includes snap and lima beans; and all crops, other than a few resistant bell pepper cultivars, lack any resistance to the pathogen. Under ideal conditions (hot, humid, and wet) Pythium cottony leak can develop on infected fruit.

Phytophthora-infected fruit (on left) and a bell pepper with Pythium cottony leak (on right)

Control of Phytophthora blight and Pythium are extremely difficult (even with the use of fungicides) in the wet weather conditions. In the past few years a number of new fungicides,with new active ingredients, have become commercially-available for use on multiple crops. Mefenoxam or metalaxyl, both once widely-used to effectively control Phytophthora blight has been hit by resistance issues around much of Southern New Jersey the past decade. Growers with a known history of mefenoxam-insensitivity on their farm should use Presidio,Previcur Flex, or Ranman plus a Phosphite fungicide in rotation in their drip application programs. Importantly, if mefenoxam has not been used in particular fields on any crop for a number of years (more than 5+) the fungus may revert back to being mefenoxam-sensitive and control with these products may return. Mefenoxam, metalaxyl, Previcur Flex, and the phosphites are the most systemic of the group and should readily be taken up the by plant via application through the drip. Presidio has locally systemic and has trans laminar activity and should offer some protection of the root system via drip. Ranman has protectant activity and thus will offer some root protection where it comes into contact with. Orondis Gold (oxathiapiprolin + mefenoxam, 49 +4) is the newest fungicide available with a new active ingredient in a new FRAC group. Additionally, in past research trials, mefenoxam, Orondis Gold, Presidio, Previcur Flex, Ranman, Revus and the phosphites in rotation and/or tank mixes have offered very good control of the fruit rot phase of phytophthora blight.

Recommendations

• mefenoxam–1.0 pt Ridomil Gold 4SL/A or 1.0 qt Ultra Flourish 2E/A or metalaxyl (MetaStar)–4.0-8.0 pt 2E/A at transplanting via drip and 30 days later.
• Orondis Gold (oxathiapiprolin + mefenoxam, 49 +4) at 4.8 to 9.6 fl oz/A 1.67S and 30 days after. If applied as drip application it can not be applied as a foliar.
• Presidio (fluopicolide, 43) at 3.0-4.0 fl. oz 4SC/A at transplanting via drip and in rotation.
• Ranman (cyazofamid, 21) at 2.75 fl oz 400SC at transplanting via drip and in rotation.(Ranman can be added to transplant water, see label for specific crop uses)
• Previcur Flex (propamocarb HCL, 28) at 1.2 pt/A 6F at transplanting via drip or directed spray at base of plant. (Previcur Flex can be added to transplant water, see label for specific crop uses). Use in rotation.
• Phosphite materials (FRAC code 33) such as Rampart, ProPhyt, or K-Khite may also be tank mixed with one of the above to help suppress Phytophthora blight.
• If mefenoxam-insensitivity is present, only use Presidio, Previcur Flex, Ranman, Revus,and/or phosphite fungicides.

For more information on these fungicides and specific crop use please see the 2022/2023Mid-Atlantic Commercial Vegetable Production Recommendations Guide.

Recommendations for Organic Growers

Applications of Double Nickel (Bacillus amyloliquefaciens) or Regalia (Extract of Reynoutria sachalinensis) as drenches or via the drip system prior to the onset of disease may help suppress phytophthora and pythium development. Other biopesticides, such as those containing Trichoderma spp. or Streptomyces spp. can also be used to help suppress these pathogens.

Losses Become High?

If Phytophthora losses become high because of the heavy rains, pre-emptive cultural practices need be taken immediately. Rogueing out, discing under, or hitting areas with gramoxone to burn infected plants down will help slow down and reduce the spread of potential inoculum to healthier areas of the block or farm. If beds are chronically wet, plastic can be cut or completely removed to help soils dry out.

Understanding Protectant Fungicides (FRAC groups M01– M12) in 2024

Plant & Pest Advisory- May 12, 2024- Andy Wyenandt

Protectant (contact) fungicides, such as the in organics (copper, FRAC group M01) and sulfur (FRAC code M02); the dithiocarbamates (mancozeb, M03), phthalimides (Captan, M04), and chloronitriles (chlorothalonil, M05) are fungicides which have a low chance for fungicide resistance to develop. Protectant fungicides typically offer broad spectrum control for many different pathogens.

Why wouldn't fungi develop resistance to protectant fungicides? Protectant fungicides are used all the time, often in a weekly manner throughout much of the growing season.

The answer is in their modes-of-action. Protectant fungicides have modes-of-action that prevent fungal development in different manners. In inorganic compounds, sulfur (M02) prevents fungal growth (i.e., spore germination) by disrupting electron transport in the mitochondria. Coppers (M01), on the other hand, cause non-specific denaturation of proteins. Importantly, the overuse of copper on certain diseases can lead to copper resistance development (e.g., copper use and bacterial leaf spot in tomato and pepper).Chlorothalonil (M05) inactivates amino acids, proteins, and enzymes by combining with thiol(sulfur) groups. In all cases, a protectant fungicide's chemistry disrupts fungal growth and development either non-specifically or in multiple manners. Because of this, there is a much lower chance for fungi to develop resistance to them.

Protectant fungicides are contact fungicides, meaning they must be present on the leaf surface prior to the arrival of the fungus and must then come into direct contact with the fungus. Protectant fungicides can be redistributed on the leaf surface with rainfall or overhead irrigation, but can also be washed off by too much of either. Remember, that with protectant fungicides, any new growth is unprotected until the next protectant fungicide is applied, in other words, protectant fungicides are not systemic and do not have translaminar activity like some of the newer fungicide chemistries. For some diseases its difficult to get protectant fungicides where they are needed the most – on the undersides of leaves. Thus,tank mixing protectant fungicides with systemic fungicides or fungicides with translaminar activity is important when disease pressure is high.

Protectant fungicides should be tank-mixed with fungicides with high risks for resistance development. Protectant fungicides used in this manner will help slow (or reduce the chances for) fungicide resistance development on your farm. In any case, it's best to always follow the label and tank mix protectants with high risk fungicides when suggested or required to do so.

As a reminder, the new 2024-2025 Mid-Atlantic Commercial Vegetable Production Recommendations Guide can be purchased at most county offices and is also available for FREE on-line here!

Understanding and Controlling Angular Leaf Spot in Strawberries

Plant & Pest Advisory- May 22, 2024- Andy Wyenandt

Often considered a minor pathogen, angular leaf spot caused by the bacterium, *Xanthomonas fragariae*, can cause serious leaf and calyx infections ruining the market ability of fruit if left uncontrolled. Like all bacterium, the pathogen will infect leaves and the calyx through natural openings or wounds. Primary infections of new growth in the spring originate from systemically infected overwintered plants and dead leaves in which the bacterium survives the winter; or from infested transplants. The pathogen is very resistant to desiccation and can survive in old, dried leaves or infected plant debris buried in the soil. The pathogen will not survive free in the soil so it originates primarily from infected leaf debris and infected crowns.

Infections can often start in production operations and come in on infected bare root transplants or cuttings. Symptoms on leaves include initial small, irregular water-soaked lesions. Young, actively growing leaves are most susceptible, especially on vigorously growing plants. Disease development is favored by moderate to low day time temperatures, low night time temperatures – near or below freezing, and high relative humidity. Long periods of precipitation,overhead irrigation used to establish plantings or protect plantings from freezing, and heavy dews favor disease development.

As disease progresses lesions will enlarge and coalesce forming reddish-brown spots on upper leaf surfaces which later become necrotic and translucent. Holding infected leaves up to the light will reveal this diagnostic feature. Heavily infected leaves may die,especially if major veins become infected. Bacteria exuding from leaf spots under high moisture conditions can act as secondary inoculum and are spread to healthy plants by splashing rain, overhead irrigation, and during harvest. The pathogen can enter the plant via natural openings in the leaves or wounds while suspended in drops of dew, guttation fluids on the margins of leaves, rain, or over head irrigation water.

Importantly, in severe outbreaks in the spring,the bacterium can spread to fruit causing the calyx to turn brown and dry out ruining the marketability of infected fruit.

Strawberry plantings should be scouted on a regular basis, especially if overhead irrigation has been run or persistent rainfall has occurred. Conventional or organic copper-based products can help suppress the development of ALS, and should be applied ata low rate to avoid phytotoxicity in leaves. Weekly, preventative applications of 0.3lb fixed copper have been shown to be effective in reducing ALS if applied early enough when disease pressure was still low. Apply copper only on days only when leaf drying can occur. Discontinue copper applications if phytotoxicity injury occurs, this usually occurs after 4 to 5 applications. Scout fields after each copper applications for injury.

Identifying and Controlling Botrytis in High Tunnel and Greenhouse Tomato Production

Plant & Pest Advisory- May 19, 2024- Andy Wyenandt

Botrytis, or gray mold, caused by the fungus, *Botrytis cinerea*, can cause significant losses in high tunnel and greenhouse tomato production if not controlled properly. The pathogen can rapidly spread during periods when structures are closed and when relative humidity remains high for long periods of time. This often occurs when outside weather remains cool and damp while heating is needed. Gray mold is favored by temperatures from 64° to 75°F and requires only high humidity (not leaf wetness) to become established. The pathogen has a large host range and once established in an enclosed structure it can be very difficult to control (UMASS). The fungus can survive/overwinter as mycelia or sclerotia in plant debris and in organic soil matter (NCSU).

Botrytis is ubiquitous (e.g., found everywhere) and prefers to attack senescing or injured plant tissue. *Botrytis cinerea* is an excellent saprophyte as well as a pathogen. This means that any dying or dead tissue on tomato plants (or any other plant in the structure) can easily become infected. The pathogen will attack flowers, fruit (at the stem end of infected fruit orby causing ghost spot), leaves, and stems; importantly, plants that have recently been suckered or pruned. Stem infections occur during periods of high humidity through leaf scars, cracks, and pruning wounds. Spores can remain dormant for up to 12 weeks within pruning leaf scars and are triggered to germinate during plant stress. Stem lesions may expand in concentric rings to girdle the entire stem causing wilting above the infection site (NCSU).

Botrytis can be controlled by management of environmental conditions, sound cultural practices, and fungicide applications.

As stated above, gray mold is favored by temperatures from 64° to 75°F and requires only high humidity (not leaf wetness) to become established. Keep relative humidity as low as possible by a combination of heating and venting in the evening, particularly when warm days are followed by cool nights. Maintain adequate air flow with horizontal fans. Avoid the overcrowding of plants. Maintain proper fertility programs. Run regular tissue tests. Gray mold is known to be favored by low calcium levels. In particular, calcium to phosphorus levels of less than 2:1 may make the tomato plant more susceptible to gray mold (UMASS).
Please see Table E-11 in the 2024/2025 Mid-Atlantic Commercial VegetableProduction Recommendations Guide.

For images and more information.
NCSU – https://content.ces.ncsu.edu/botrytis-gray-mold-of-tomato

UMASS – https://ag.umass.edu/greenhouse-floriculture/photos/greenhouse-tomato-ghost-spot-botrytis

Ingram and Meister, 2006 – Plant Health Progress – https://www.plantmanagementnetwork.org/pub/php/research/2006/botrytis/

Calendar of Events

• Indicates a newly added event * Indicates Pesticide Credits Offered

- **June 5**
  7:00 pm – 8:00 pm - An introduction to heat stress issues in agriculture. Online register at https://go.rutgers.edu/heat-stress-in-ag Kate Brown 908-526-6293 x4 or kbrown@njaes.rutgers.edu.
- **June 12**
  7:00 pm – 8:00 pm - An introduction to heat stress issues in agriculture. Online register at https://go.rutgers.edu/heat-stress-in-ag Kate Brown 908-526-6293 x4 or kbrown@njaes.rutgers.edu.
- **June 17 and 18**
  8:30 am – 4:30 pm- Sensory Evaluation- In person: Build your sensory evaluation skills Cook Student Center, 59 Biel Road, New Brunswick, NJ 08901 registration@njaes.rutgers.edu.
- **June 20***
  4:00 pm – 8:00 pm- NJ Nursery and Lanscape Association Annual Grower's Meeting. Cumberland Nurseries Pesticide Credits CORE- 2, 1A- 1 , 3A-1, 10-1 and PP2- 1 Jeanne Ondusko njnla.office@gmail.com.
- **June 25-27**
  Practical Food Microbiology- Online: critical points for food safety applications. more information www.cpe.rutgers.edu/food Questions email ocpe@njaes.rutgers.edu.
- **July 10**
  5:30-7:30 pm - Composting Webinar https://www.eventbrite.com/e/nj-manurelink-composting-webinar-field-day-tickets-840165045267 (See attached announcement)
- **July 17**
  5:00-8:00 pm - Composting Field Day https://docs.google.com/forms/d/19Q9odfshISN2OMWdZ74JrJRcG-4N48sdZWd4Vj1NrNE/viewform?edit_requested=true
- **July 22 – August 16, 2024**
  9:00 am – 4:15 pm (Check-in time: 8:30 am)- Grape and Wine Science Certificate Program New Jersey Institute for Food, Nutrition & Health (IFNH), 61 Dudley Rd,New Brunswick, NJ 08901 https://cpe.rutgers.edu/food-science-safety/grape-and-wine-science-certificate
- **September 9-11**
  Biennial International Pepper Conference https://checkout.eventcreate.com/ipc2024/select-buy Michael Mazourek mm284@cornell.edu

NJ ManureLink 2024 Composting Webinar and Field Day

Composting Webinar - Wednesday, July 10th, 5:30-7:30 p.m.

https://www.eventbrite.com/e/nj-manurelink-composting-webinar-field-day-tickets-840165045267

Webinar covering composting basics, manure handling and stockpiling, nutrient management, and introduction to local technical and financial resources.

Composting Field Day - Wednesday, July 17th, 5-8 p.m.

https://docs.google.com/forms/d/19Q9odfshISN2OMWdZ74JrJRcG-4N48sdZWd4Vj1NrNE/viewform?edit_requested=true

1106 NJ-12 Kingwood, New Jersey

David DeFrange's Copper Creek Landscape Management and Nursery

Field day will focus on composting horse manure with pine shavings bedding and include demonstrations of composting techniques, hands-on demonstration stations, and discussion of how to incorporate compost into pasture, crop, and nursery operations.

New Jersey Department of Agriculture, New Jersey Composting Council, USDA Natural Resources Conservation Service, Rutgers Cooperative Extension, and other local resource providers will be assisting with demonstration stations and available to answer your questions.

Field Day Demonstration Stations include:

- Sighting a storage or stockpiling location
- C-N Ratio / recipe
- Moisture content
- Temperature & Oxygen
- Bulk Density and physical parameters
- Time / Curing/ When is it done?
- Nutrient Management, Soil and Compost Sampling

Collaborating Organizations

USDA United States Department of Agriculture
Natural Resources Conservation Service

Rutgers University
Office of Research Analytics

New Jersey Department of Agriculture

NJ Composting Council Inc.
Organics Management Industry Nonprofit

Funding for NJ ManureLink is made possible through the USDA-NRCS, Conservation Innovation Grant # NR222B29XXXXG002

RUTGERS New Jersey Agricultural Experiment Station
COOPERATIVE EXTENSION



Fact Sheet FS747

Preventing Heat Stress in Agriculture

Kate Brown, Agriculture and Natural Resources Agent, Somerset County
Stephen Komar, Agriculture and Natural Resources Agent, Sussex County
Michelle Infante-Casella, Agriculture and Natural Resources Agent, Gloucester County
William Bamka, Agriculture and Natural Resources Agent, Burlington County

Heat exposure can be a serious concern for agricultural laborers when working outside during the growing season. When a person's ability to adapt to heat stress is exceeded, exposure can lead to reduced productivity, mistakes in job performance, increased workplace incidents, and/or heat-related illnesses. Each person's heat tolerance varies and several factors including type of physical activity, fitness level, underlying health issues, and humidity can dramatically impact the potential for heat related injury. To determine the level of heat risk, employers should consider the job, the environment, and the worker. This fact sheet provides basic knowledge about heat stress, first-aid treatment, and preventative measures that are important to both employers and workers.

How the Body Responds to Heat

Sweat is the body's primary method to cool itself and maintain temperature in a narrow range between 97–99°F. Under certain conditions, sweating is insufficient to cool the body, and temperature regulation can be overwhelmed causing a rapid increase in body temperature. Heat stroke, for example, is a life-threatening condition that occurs when the body is unable to cool itself. The result may be a body temperature of 106°F or higher in a matter of only 10–15 minutes. Maintaining a safe body temperature is crucial to the well-being of those working outside. A balance must be struck between heat produced by a body at work and heat lost to or gained from the environment. The initial body response to heat is sweating and circulating blood closer to the skin surface to lower the main body temperature.

When extended heat exposure occurs, a physiological adaptation process called acclimatization occurs in response to increased temperatures. Acclimatization to heat may take weeks, although significant adaptation occurs within a few days of initial exposure. Once acclimatization is achieved, working in the heat results in increased production of a more dilute sweat (lower salt content) and less of an increase in heart rate and body temperature. The body's ability to respond to heat stress decreases with age, obesity, and other health-related factors. Older workers and obese workers are more vulnerable to heat-related illnesses and less capable of working safely in the heat. Pregnancy increases a woman's metabolic demands and may increase sensitivity to heat and humidity.

Other factors that may increase the risk of heat stress include sleep distress, poor physical condition, lack of acclimatization, dehydration, drug and alcohol use. Many commonly used over the counter and prescription drugs may also interfere with the body's response to heat stress. Preexisting medical conditions, such as cardiovascular disease, diabetes, certain skin disorders, and some diseases of the central and peripheral nervous systems, can impair people's normal physiological response to heat stress. Workers should consult their physician for more information concerning the above conditions.

Strategies For Worker Heat Acclimatization

To protect employees from heat-related illness, the following is recommended:

- Schedule new workers for shorter time periods in the heat, separated with frequent break periods.
- Train new workers about heat exposure, symptoms of heat-related illness, and the importance of rest and hydrating with water even during non-work hours.
- Monitor new workers closely for any symptoms of heat-related illness.
- Use a system where new workers do not work alone.
- If new workers talk about or show any symptoms, allow them to stop working. Administer first aid. Never leave someone alone who is experiencing heat stress symptoms.
- These increased precautions should last for 1–2 weeks. After that time, new workers should be acclimatized to the heat and can safely work a normal schedule.

Methods of Heat Gain or Loss

Major physical processes by which the body gains or loses heat in a hot environment include:

- heat production by normal body functioning (metabolism)
- heat loss by evaporation
- heat loss or gain by convection and radiation (Metabolic heat gain is a by-product of both resting and physical exertion)

Evaporation is the cooling (heat loss) of the body that occurs when sweat evaporates from the skin's surface. The rate of this evaporative cooling is usually greatly increased by air movement across the skin with windy conditions outdoors or using fans. During strenuous activities in very hot environments, sweat production may equal one quart per hour; this amount of fluid loss by the body is usually sufficient to prevent overheating. Problems arise in warm humid environments, because humidity and still air interfere with the body's ability to dissipate heat. Sweat that cannot be evaporated from the body, but drips from the skin, will not result in body heat loss.

Convective heat loss or gain is the transfer of heat between the skin and surrounding air. When air temperature is higher than skin temperature, the body gains heat through convection. If air temperature is lower than skin temperature, the body loses heat. The rate of heat gain or loss depends upon the difference between air and skin temperatures and the presence of air movement (wind velocity). The use of fans to continually move cool air next to the skin and move away the air already warmed by the skin is a common method of body cooling.

Radiation is the direct transfer of heat from a hot object (the sun, hot equipment, a furnace, or a warm wall) to another cooler object, such as a human body, without heating the air in between. The greater the temperature of an object, the more radiation it emits and the warmer the person will feel.

Heat-Related Illnesses

Heat Stress

Heat stress occurs when the body builds up more heat than it can handle. High temperatures, high humidity, sunlight, and heavy exertion increase the likelihood of heat stress. Excessive heat can reduce concentration, increase fatigue or irritability, and increase the risk of workplace incidents.

Heat Rash

Heat rash is an early warning signal of heat stress. It is commonly associated with hot, humid conditions in which skin and clothing remain damp from unevaporated sweat. Heat rash may involve small areas of the skin or the entire torso. If large areas of skin are involved, sweat production is compromised, resulting in a decreased capacity to work in the heat. Even after the affected area of skin is healed, sweat production will not return to normal in those areas for as long as 4 to 6 weeks.

Preventive measures are aimed at reducing daily exposure to hot and humid conditions. If heat rash occurs, precautions must be taken to avoid skin infections. Treatments include properly cleaning the affected area and applying antimicrobial ointments to prevent infection. Keeping the skin clean and dry for at least 12 hours each day will help prevent severe heat rash.

Heat Syncope

Heat syncope is characterized by dizziness or fainting while standing still in the heat for an extended period. The condition results from blood pooling in the skin and lower body parts which decreases blood flow to the brain. The most serious aspect of heat syncope is it may cause injury or fall incidents. This is especially dangerous while operating machinery. Treatment consists of resting in a cooler environment. Prevention is based on acclimatization and avoiding long periods of immobility while at work.

Heat Cramps

Symptoms include painful cramps or spasms in the legs, arms, or abdomen. The person will probably sweat heavily. Spasms may occur during work or after work has ended and even when at rest. Heat cramps are often caused by a temporary fluid and salt imbalance during hard physical work in hot environments.

First-aid treatments for heat cramps include:

- Applying firm pressure or gently massaging the affected muscle
- Resting in the shade or a cool place
- Drinking small sips of clear juice, such as apple juice or sports drinks that contain electrolytes. Alternatively, salt water can be an option for heat related muscle cramping (one teaspoon of salt per quart of cool water; plain water should be used for those with heart or blood pressure problems).

Heat Exhaustion

Heat exhaustion results from the reduction of body water content or blood volume. The condition occurs when the amount of water lost as sweat exceeds the volume of water intake during heat exposure. Heat exhaustion usually develops after several days of exposure to high temperatures. A person with heat exhaustion may have some or all these signs or symptoms: heavy sweating; clammy, flushed, or pale skin; weakness; dizziness; nausea; rapid and shallow breathing; headache; vomiting; or fainting.

First-aid treatments for heat exhaustion include:

- Move the individual to a cool area.

- Place the person on their backs with their feet raised above the heart.
- Loosen clothing and apply cool, moist cloths to the body, and fan them to dissipate heat.
- Slowly administer sips of clear juice, such as apple juice or sports drinks that contain electrolytes or salt water (plain water for those with heart or blood pressure problems).
- Call a doctor, especially if the person faints or vomits.

Heat Stroke

Heat stroke is a medical emergency and may be life-threatening. The body may either lose its ability to regulate temperature, due to a failure of the central nervous system to regulate sweat control, or its normal heat-regulating mechanism may simply be overwhelmed. Heat stroke can result in coma or death.

Early signs and symptoms of heat stroke include:

- A high body temperature, 104°F or over
- Hot, dry skin that appears bluish or red
- Absence of sweat in 50 to 75 percent of victims
- Rapid heart rate
- Dizziness, shivering, nausea, irritability, and severe headache progressing to mental confusion, convulsions, and unconsciousness.

A worker who becomes irrational, confused, or collapses on the job should be considered a heat stroke victim, and you should call 911 immediately. Early recognition of symptoms and prompt emergency treatment is key to aiding someone with heat stroke.

While awaiting the ambulance, begin efforts to cool the victim down by performing the following OSHA recommended first aid for heat related illnesses:

- Place worker in shady, cool area
- Loosen clothing, remove outer clothing
- Fan air on worker; cold packs in armpits
- Wet worker with cool water; apply ice packs, cool compresses, or ice if available
- Provide fluids (preferably water) as soon as possible
- Stay with worker until help arrives

Preventing Heat Stress

Evaluate the Risk of Heat Stress

Monitoring the environmental conditions during work times to make management decisions for workers is an important part of preventing heat-related illnesses. Temperature is not the only factor in implementing heat stress management. Humidity is another important consideration. The heat index is a measure of how hot it feels when the relative humidity is factored in with the actual air temperature.

An environmental heat assessment should account for the following factors: air temperature, humidity, radiant heat from sunlight or other artificial heat sources, and air movement. OSHA recommends the use of wet bulb globe temperature (WBGT) monitor to measure workplace environmental heat. OSHA provides this link to calculate the WBGT for a specific location. There is also a NIOSH/OSHA Heat App for Android and iPhone devices that uses the Heat Index as a screening tool.

Management Suggestions for Enhancing Heat Tolerance

1. *Acclimatization* (to heat) is a process of adaptation that involves a stepwise adjustment to heat over a week or sometimes longer. An acceptable schedule for achieving acclimatization is to limit occupational heat exposure to one-third of the workday during the first and second days, one-half of the workday during the third and fourth days, and two-thirds of the workday during the fifth and sixth days. The acclimatization procedure should be repeated if a person misses workdays after days off due to illness, vacation, or other reasons for missing one week or more of job duties.

2. *Fluid replacement*. Provide adequate drinking water for all employees. Recommend to employees they drink plenty of water before work shifts, during work, and after work. Simply relying on feeling thirsty will not ensure adequate hydration. To replace the four to eight quarts of sweat that may be produced in hot environments, people require one-half to one cup of water every 20 minutes of the workday. Potable drinking water kept at a temperature of 59°F or less is recommended.

3. *Physical fitness* is extremely important. The rate of acclimatization is a function of the individual's physical fitness. The unfit worker takes 50 percent longer to acclimate than one who is fit.

Increasing Safe Work Practices

To find management and guidance tools for determining whether to implement heat stress management plans refer to the CDC documents on Heat Stress and Work/Rest Schedules.

The following list of management options should be considered to prevent heat stress for workers:

1. *Limit exposure time*. Schedule as many physical work activities as practical for the coolest part of the day (early morning or late afternoon). Employ additional help or increase mechanical assistance, if possible, to lighten individual workloads.

2. *Minimize heat exposure* by taking advantage of natural or mechanical ventilation (increased air velocities up to 5 mph increase the rate of evaporation and thus the rate of heat loss from the body) and heat shields/shade when applicable.

3. *Take rest breaks* at frequent, regular intervals, preferably in a cool environment sheltered from direct sunlight. Anyone experiencing extreme heat discomfort should rest immediately and be provided with first aid for heat stress.

4. *Wear clothing* that is permeable to air and loose fitting. Generally, less clothing is desirable in hot environments, except when the air temperature is greater than 95°F or a person is standing next to a radiant heat source. In these cases, covering exposed skin can reduce the risk of heat stress.

5. *A buddy system* may also be helpful. It depends on a fellow worker's ability to spot the early signs of heat stress, such as irritability, confusion, or clumsiness. A ready means of cooling should be available in work areas where heat illness might occur.

Worker Health and Education

1. *Periodic medical examinations* may help identify those workers who are at greater risk for heat-related illnesses. This is particularly important for those with preexisting health conditions or older workers.

2. *Drugs* may alter the body's ability to deal with heat stress effectively. Health-care providers can provide important information about possible concerns and make recommendations about safe work practices.

3. *Alcohol use* should be avoided before or while working in a hot environment.

4. *Worker health and safety education*. All agricultural workers exposed to hot environments should receive basic instruction on the causes, recognition, and prevention of the various heat illnesses. Displaying educational posters in multiple languages throughout communal areas can help reinforce training.

References

- Body Temperature Norms. Medline Plus, National Library of Medicine.
- Heat Hazard Recognition. Occupational Safety and Health Administration.
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- Protecting New Workers. Occupational Safety and Health Administration.
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- Heat Stress: Work/Rest Schedules (PDF). 2017. Center for Disease Control and Prevention and National Institute for Occupational Safety and Health. Publication No. 2017–127.

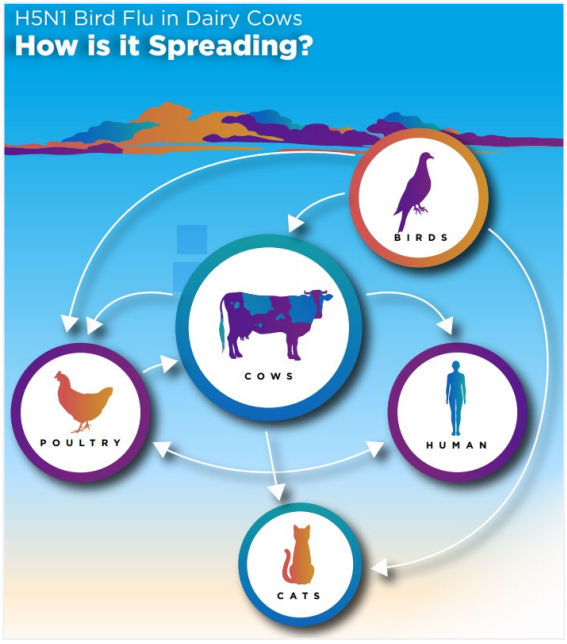
This publication is based on the original work of Wei Zhao, Project Director of Agricultural Safety and Health Program, in consultation with Ann L. Kersting, and was initially made possible in part by a grant from the National Institute for Occupational Safety and Health Program on Agricultural Health Promotion Systems for New Jersey.

May 2024

For more information: njaes.rutgers.edu.

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and Boards of County Commissioners. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

SITUATION SUMMARY: Highly Pathogenic Avian Influenza (HPAI) A(H5N1)



Situation Update as of May 10, 2024

- A single human case of HPAI A(H5N1) was detected in a dairy farm worker in Texas in April; this person had direct exposure to cattle presumed to be infected with HPAI.
  - The patient reported eye redness as their only symptom, consistent with conjunctivitis, and recovered.
  - No additional human cases have been detected.
- CDC continues to assess that the risk to human health for the general public is low.
  - People with close, prolonged, or unprotected exposures to infected birds or other animals (including livestock), or to environments contaminated by infected birds or other animals, are at greater risk of infection.
- As of May 10, HPAI has been detected at 42 diary farms in 9 states:
  - Colorado, Idaho, Kansas, Michigan, New Mexico, North Carolina, Ohio, Texas, and South Dakota

Protective actions for people who come into contact with animals potentially infected with avian influenza viruses as part of the job

PPE Recommendations

- Wear recommended personal protective equipment (PPE) when working directly or closely with sick or dead animals, animal feces, litter, raw milk, and other materials that might have the virus.

While wearing PPE

- Avoid touching yourself above your chest, especially your eyes, mouth, or nose, after touching any contaminated material.
- Do not eat, drink, smoke, vape, chew gum, dip tobacco, or use the bathroom.
- Use separate designated clean areas, one for putting on PPE and another for taking it off.

Monitoring and Testing for People Exposed to HPAI A(H5N1)

- People exposed to infected animals (including people wearing recommended PPE) should monitor themselves for new respiratory illness symptoms
  - Monitoring should begin at first exposure and continue for 10 days after last exposure
- Anyone developing symptoms should call their state/local health department for additional instructions and should stay home and limit contact with others as much as possible until the results of your test are known.
- More information can be found here: https://www.cdc.gov/flu/avianflu/hpai/hpai-interim-recommendations.html

Monitor for any signs or symptoms of avian influenza virus infection for 10 days after last exposure:

- Fever *(temperature of 100°F [37.8°C] or greater)* or feeling feverish/chills
- Cough
- Sore throat
- Difficulty breathing/Shortness of breath
- Eye tearing, redness, or irritation
- Headaches
- Runny or stuffy nose
- Muscle or body aches
- Diarrhea

Additional resources: https://www.cdc.gov/flu/avianflu/h5-monitoring.html and https://www.cdc.gov/flu/avianflu/h5/worker-protection-ppe.htm

South Jersey Nursery IPM Updates: Box Tree Moth

T. Waller, PhD – Cumberland RCE Nursery Agent (twaller@njaes.rutgers.edu)

APHIS Establishes Quarantines for Box Tree Moth (*Cydalima perspectalis*) in the Commonwealth of Massachusetts and Ohio, Expands Quarantines in Michigan and New York, and Establishes Conditions for the Interstate Movement of Regulated Articles of Buxus species.

To: State, Tribal, and Territory Agricultural Regulatory Officials Effective immediately, the Animal and Plant Health Inspection Service (APHIS) in cooperation with State Agricultural Authorities of the impacted States, is updating the box tree moth (BTM; *Cydalima perspectalis*) quarantined areas and establishing the conditions for the interstate movement of regulated articles of Buxus species, commonly called boxwood, from BTM quarantined areas.

This Federal Order establishes quarantined areas in the Commonwealth of Massachusetts and Ohio and expands the quarantined areas in Michigan and New York for BTM to align with interior quarantines established in these States. Specifically, this Federal Order a) establishes a BTM quarantine in the entire Commonwealth of Massachusetts, b) adds all of Clinton, Eaton, Ingham, Jackson, Livingston, Macomb, Monroe, Oakland, St. Clair, and Wayne Counties to the BTM quarantines previously established in Lenawee and Washtenaw Counties and parts of Jackson and Monroe Counties in Michigan, c) adds all of Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Cortland, Franklin, Genesee, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Oneida, Onondaga, Ontario, Oswego, Otsego, Tioga, Tompkins, Saint Lawrence, Schuyler, Seneca, Steuben, Wayne, Wyoming, and Yates Counties to the BTM quarantines previously established in Eerie, Niagara, and Orleans Counties in New York, and d) establishes quarantines in Butler, Clermont, Hamilton, and Warren Counties in Ohio, as well as the portions of Montgomery County, Ohio, to the south of Interstate 70; and the portions of Greene County that are west of SR 68 to the north of Xenia, and west of interstate 42 to the south of Xenia in Ohio. This Federal Order supersedes DA-2022-13 and DA2023-18, to include these new areas and to incorporate changes to the requirements for interstate movement of regulated articles. Boxwood plants may only be moved interstate from a quarantined area from an establishment operating under a compliance agreement, and only if accompanied by a certificate issued by a State Agricultural Authority certifying that the requirements of this Federal Order and the compliance agreement have been met. These requirements will prevent producers and distributors of boxwood from moving infested plants interstate. State Agricultural Authorities may prescribe additional safeguards and protocols. All other regulated articles of boxwood, including plant parts, pieces, cuttings, clippings, debris, and any portion of the plant, alive or dead, except for decorative purposes, are prohibited from movement. **(AS OF 5/23/24)**

Box tree moth, white morph. Szabolcs Sáfián, University of West Hungary, Bugwood.org

Late-instar box tree moth caterpillar with webbing. S.D. Frank, NCSU

Box tree moth damage. S.D. Frank, NCSU

Factsheet (Multi-University): *Search* - "Box Tree Moth: Fact Sheet, Management & Visual Guide"
https://ir4.cals.ncsu.edu/EHC/InvasiveSpecies/BTM_FactSheet_VisualGuide.pdf

Great Video (HRI): *Search* - "Box Tree Moth Demystified"
https://www.hriresearch.org/box-tree-moth-demystified

South Jersey Nursery IPM Updates: Bagworm HATCH

T. Waller, PhD – Cumberland RCE Nursery Agent (twaller@njaes.rutgers.edu)

Bagworms should begin hatching NOW through – 4 weeks in NJ, beginning in the southern regions. Now is an optimal time to get this pest on your radar and prepare materials or approaches to attack first/second instar caterpillars. The control window for this pest is typically between 600-900 GDD50 when they begin to hatch and become airborne, i.e. the "ballooning" phase. It is important to check for egg-hatch prior to applications for greatest chemical efficacy, and to continue scouting as they often hatch and develop at asynchronous rates.

It is critical to target these insects EARLY!

Bagworm management – mechanical: If eggs have not hatched: hand-remove sacs/bags. Typically, female/egg filled sacs are higher in the canopy so keep that in mind while scouting. This removes the problem from the field or landscape.

Treatment options for Lepidoptera (caterpillars) to have at the ready – containing: B.t. (Bacillus thuringiensis), spinosad , bifenthrin), cyfluthrin, carbaryl, chlorantraniliprole, cyclaniliprole, cyclaniliprole + flonicamid, Lambda-cyhalothrin, cyantraniliprole, Indoxacarb.

NOTE – Lethal pesticide doses are important, as sub-lethal doses can trigger early pupation, making the pest all but invincible to chemical or biological treatments. Follow label exactly. IT IS CRITICAL TO ROTATE MATERIALS (Rotate between IRAC groups)

BAGWORMS (600-900 GDD) (*Bagworm hatch prediction as of 5/20/24*)						
Crop type	**Common Name**	**Scientific Name**	**GDD Min (50F)**	**GDD Max (95F)**	**Reference**	**Developmental / Target Stage**
Conifer mostly, many minor hosts	Bagworm	*Thyridopteryx ephemeraeformis*	600	900	RU	Larvae (early instars) – ONLY CONTROL WINDOW
Region	**Location**	**Station**	**Date** (600 GDD)	**Date** (900 GDD)	***Treatment window**	***Bagworm Hatch – Predictions only, SCOUTING is critical! Treat as soon as larvae detected.** *Remove any 'bags' prior to hatch if possible*
South	Upper Deerfield	NJ50	**29-May**	12-June	13 days	
Central	Howell / Freehold	NJ10	**4-June**	19-June	15 days	
North	High Point	NJ59	**11-June**	26-June	15 days	

South Jersey Nursery IPM Updates: Growing Degree-days

T. Waller, PhD – Cumberland RCE Nursery Agent (twaller@njaes.rutgers.edu)

Projected GDD50 accumulation as of 5/24/2024 (for June - July)

CODE	Location	24-May	1-Jun	15-Jun	1-Jul	15-Jul
NJ50	Upper Deerfield (South)	526	676	974	1381	1784
NJ73	Vineland (South)	519	690	981	1380	1775
KMIV	Millville Airport (South)	527	671	959	1354	1746
NJ05	Greenwich (South)	541	697	999	1410	1814
NJ10	Howell (Central)	407	567	832	1202	1576
N59	High Point (North)	361	482	702	1016	1335

USPEST.ORG - Model: ***simple average/growing degree-day*** *, Min: 50F - Max: 95F, NMME forecast*

Forecast: 7-month NMME based seasonal climate forecast (USPEST.ORG) - ***Subject to change regularly = Check Often***

Many scales will have crawlers this month = TARGET

Group	Common Name	Scientific Name	GDD Min (50F)	GDD Max (95F)	Ref.	Developmental / Target Stage / Notes
Scale	Maskell scale	Lepidosaphes pallida	470	-	6	Crawlers (1st generation)
Scale	White prunicola scale	Psedaulacaspis prunicola	513	-	6	Crawlers (1st generation)
Scale	Cottony camellia / taxus scale	Pulvinaria floccifera	520	-	6	Crawlers (1st generation)
Scale	Euonymus Scale	Unaspis euonymil	533	820	RU	Crawlers (1st generation)
Scale	Juniper scale	Carulaspis juniperi	550	700	7	Egg hatch
Scale	Cryptomeria scale	Aspidiotus cryptomeriae	600	800	3	First crawler emergence
Scale	Sprucebud scale	Physokermes hemicryphus	700	1150	4	Crawlers (1st generation)
Scale	White prunicola scale	Psedaulacaspis prunicola	707	1151	RU	Crawlers (1st generation)
Scale	Juniper scale	Carulaspis juniperi	707	1260	RU	Crawlers (1st generation)
Scale	Calico scale	Eulecanium cerasorum	714	-	6	Crawlers (1st generation)
Scale	Oak leacanium scale	Parthenolecanium quercifex	789	-	6	Crawlers (1st generation)
Scale	Cottony maple leaf scale	Pulvinaria acericola	802	1265	5	Crawlers (1st generation)
Scale	Cottony maple scale	Pulvinaria innumerabilis	802	1265	RU	Crawlers (1st generation) - control target
Scale	Japanese maple scale	Lopholeucaspis japonica	829	-	6	Crawlers (1st generation)
Scale	European fruit lecanium scale	Parthenolecanium corni	932	1645	6,RU	Crawlers - control target
Scale	Fletcher Scale (Yew)	Parthenolecanium fletcheri	1029	1388	RU	Crawlers (1st generation) - control target

Soft Scales: Plant and Pest Advisory Post – Key Soft Scales
https://plant-pest-advisory.rutgers.edu/some-key-soft-scale-pests-in-the-landscape/

Armored Scales: Plant and Pest Advisory Post – Key Armored Scales
https://plant-pest-advisory.rutgers.edu/some-key-armored-scales-crawler-emergence/

Recent Plant and Pest Advisory Nursery Update – Red-headed flea beetle, borers, BWB

SCAN HERE for Full – ***Nursery Pest Scouting Guide***

SCAN HERE for Full – ***Conifer Pest Scouting Guide***

SCAN HERE TO REPORT **Observations & Pest pictures!**

References	
Institution	Cited #
Rutgers Univ.	1
Cornell Univ. & Univ. of New Hampshire	2
Penn State Univ.	3
Michigan State Univ.	4
Univ. of New Hampshire	5
Univ. of Maryland	6
Michigan State Univ.	7
Univ. Delaware & North Carolina State Univ.	8
PA Department of Agriculture	9

Please contact for full reference list

South Jersey Nursery IPM Updates: Important Pests

T. Waller, PhD – Cumberland RCE Nursery Agent (twaller@njaes.rutgers.edu)

RHFB – Adult emergence NOW

Red-headed flea beetle – Predictions as of 5/20/24		SOUTH		CENTRAL		NORTH	
		TARGET RANGE		Upper Deerfield (NJ50)		Howell (NJ10)		High Point (NJ59)	
Growth Stage	Gen.	-LOW-	-HIGH-	LOW (DATE)	HIGH (DATE)	LOW (DATE)	HIGH (DATE)	LOW (DATE)	HIGH (DATE)
Egg hatch – larvae	1	242	600	5/2	5/29	5/7	6/4	5/18	6/10
Adults	1	517	1028	5/24	6/18	5/30	6/24	6/4	7/2
Egg hatch – larvae	2	1570	1860	7/8	7/18	7/15	7/26	7/25	8/7
(USPEST.org data compiled by Tim Waller – Cumberland RCE – Agent)									

PPA Nursery Update – Red-headed flea beetle (Management, materials, timings)
https://plant-pest-advisory.rutgers.edu/nursery-update-5-20-24-red-headed-flea-beetle-and-flathead-borer-adult-emergence-boxwood-blight-bagworms-more/

Identification is critical to using the right material

Fungal

RHFB

Bronze Birch Borer for Station UPPER DEERFIELD NJ (NJ50)

NJ50 has 92% data quality score (average since March 1 (temperature only)).

full model online

Model starts Jan 01, 2024.

Date	DDs cumu	Events
Jan 1	1	* START *
Mar 23	252	Prepupal larvae in OW cells under bark
Apr 13	405	Beginning of pupation
May 6	756	First adults exit trees
May 18	961	10% adult emergence
May 20	1003	* NOW *
May 24	1103	50% adult emergence
Jun 5	1411	Beginning of egg hatch and larval tunneling
Jun 12	1610	90% adult emergence
Jun 27	2083	Adult activity and egg hatch ended, larvae continue tunneling

Emerald Ash Borer for Station UPPER DEERFIELD NJ (NJ50)

NJ50 has 92% data quality score (average since March 1 (temperature only)).

full model online

Model starts Jan 01, 2024.

Date	DDs cumu	Events
Jan 1	0	* START *
May 20	548	* NOW *
May 21	563	First adult emergence approx. beginning
May 27	671	10% adult emergence
Jun 6	866	50% adult emergence
Jul 2	1499	95% adult emergence
Aug 6	2517	Last adult emergence approx. end

Emerald and Bronze Birch Borer Adult Emergence