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Preparing for a New Season: Making a List and Checking it Twice!

This comprehensive start-up checklist will help greenhouse growers prepare for a new season.

As a new growing season approaches, there are many items on greenhouse grower's 'to-do' list to prepare for a successful spring production season. Some of them are obvious and easy to remember, such as sweeping the floors and sanitizing the benches, but others are less conspicuous. For example, growers may consider testing the pH and EC of their incoming bags or towers of peat substrate for consistency and for accuracy with the manufacturer's anticipated range. Doing so, will identify a potentially-major problem prior to the hustle and bustle of the growing season. With the help of some of Michigan's greenhouse growers, Michigan State University Extension recommends that greenhouse growers review the following check list as the new season begins.



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Structures and Equipment

- Replace aging greenhouse glazing materials as appropriate. Greenhouse polyethylene film usually needs to be changed every 3 to 5 years to maintain optimal light transmission.
- Prior to installing any new energy-saving equipment (i.e., heat curtains, high-efficiency heaters), verify if there are any energy-efficiency rebates with your utility company
- Sweep the floor and/or benches and take the debris off the premises
- Clean the floors and/or benches with a disinfectant (i.e., Green-Shield, KleenGrow, SaniDate)
- Check heaters prior to first major snowfall
 - Remove spider webs
 - Check for a blue flame
 - Verify that motors are running
 - Inspect for cracks in heat exchangers
- Calibrate pH and EC meter
- Use an infrared thermometer to check is root-zone heating on benches or floors is working properly in propagation or finishing areas, respectively
- Check pH of substrate bags/towers as it is delivered. If a large variation is found between lot numbers, isolate them and test each substrate lot. Keep sample 7-10 days to allow the lime to activate with the moisture and perform another 2:1 test with distilled water
- Check to see that the ventilation is working properly and not blocked
- Consider lubricating vents annually, depending on manufacturers recommendations
- Clean any bugs or residue in ventilation fans between double polyethylene greenhouse layers
- Hand pull weeds in the greenhouse or apply a greenhouse-labeled pre-emergent (i.e., Marengo)
- Do not use any herbicides in the greenhouse that are not labeled for greenhouse use as it can volatilize and cause damage to plants as long as 6 months later.
- Test water alkalinity levels prior to the season
- Disinfect water lines to clear biofilms and hard water residue
- Test flood floors (if applicable)

Structures and Equipment cont.

- Check injector seals
 - Clean the screen or filters in the injector
 - Lube and calibrate
 - Test the electrical conductivity (EC) of water coming out of the end of the hose to verify that the injector is working
- Consider having your heaters periodically serviced by trained professionals. For a thorough checklist, review <http://www.deltatsolutions.com/enews/HeatingTune-upChecklist.html>
- Check walls and the roof for any tears, holes, or gaps. Pay special attention to edges and corners. Repair or seal as needed.
- Ensure double poly film is properly inflated. Are the fans that blow air between the layers operating appropriately?
- Check each lamp to ensure it is working properly. If significant dust has accumulated on reflectors, clean them as recommended by the lighting company.
- If you have an energy or shade curtain, inspect and ensure it opens completely and closes tightly. If materials are torn or highly discolored, consider replacing.
- Check misting and fogging systems, especially the nozzles, to ensure each is working properly.
- Check booms and nozzles on booms to ensure each is working well.
- Check all horizontal air flow (HAF) fans to ensure all are operating and are pointed horizontally (not downwards or upwards).
- Check exhaust fans to ensure they operate appropriately. Pay special attention to the belts and louvers.
- Inspect evaporative pad systems. Are the pads crusty and/or clogged and in need of replacement? Does the water wet the pads sufficiently and uniformly? Is water sufficiently collected and recirculated?



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Plant Health Management

- Check the stock of fertilizers, plant growth regulators, insecticides, fungicides and any other products
- As vegetative cuttings or propagules arrive, scout the plant material for incoming insects (Figure 1)
- If planning on using biological control as your pest management, review your plan with your technical consultant and order the first set of natural enemies to arrive with your first plants (Figure 2)
- Use an infrared thermometer to check the temperature of any incoming vegetative cuttings to verify that they are not too cold or too warm
- Stick vegetative cuttings in order of their sensitivity to ethylene and desiccation.
- Consider dipping vegetative cuttings or rooted liners in mycoinsecticide dips such as BotaniGard and beneficial nematodes (*Steinernema feltiae*). Other products have been shown to be very effective for control of whitefly such as SuffOil-X, but always be sure that dipping is on the label for the products being used.
- Set baits for unwanted mice and voles, especially in propagation areas
- Check incoming rooted liners, plugs, or bareroot perennials for pest and/or diseases
- Establish sanitation stations between greenhouses and tools
- Inspect safety stations and ensure eyewash stations are working properly



Figure 1. Use an IR-thermometer to check the temperature of incoming cuttings and look for signs of pests or diseases.



Figure 2. If implementing a biological control program, create a schedule in advance with your supplier and order your natural enemies 1 to 2 weeks prior to their application.



Business Management

- Review your business plan and mission statement. Post your mission statement prominently so everyone is on board.
- Review and update employee handbook
- Prepare the budgets for the 2018 season and anticipate any cash-flow issues
- Prepare for a new season's paperwork: Update I-9, W-4, Michigan New Hire forms
- Create an asset inventory to prepare for an IRS audit
- Review the new Worker Protection Standards
- Purchase and hang new English and Spanish Worker Protection posters in a central location in your production area (Figure 3)
- Create a chemical inventory and post all Safety Data Sheets (SDS) in a central location
- Train employees using the new Environmental Protection Agency (EPA)-verified videos for workers and handlers prior to starting work on their first day
- Verify that your trucks have passed a Department of Transportation Inspection
- For all employees using full- or half-face respirators or dusks masks, be sure that they have a current medical exam and perform fit testing all respirators (Figure 4). Be sure to keep records of all certifications of health exams and fit tests.
- Plan for any additional staffing that you might need, such as temp agencies (Examples in west Michigan: Forge, Work Box, Michigan Works, FFA (Future Farmers of America) students, Bethany ministries)
- Consider partnering with another agricultural producer who already hires H2-A employees for any additional staffing needs



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Figure 3. All employers need to have a central notification area displaying the updated Worker Protection Standards with the Right to Know and Pesticide safety information.



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Figure 4. All employees who are required to wear a respirator will need to have a qualitative or quantitative fit test in order to ensure that the respirator fits correctly.

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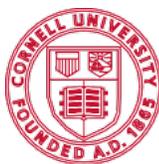
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