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Proper Installation & Maintenance of a Double-Poly Greenhouse Inflation Blower

Proper installation of double-poly inflation systems requires outdoor air to reduce condensation between layers while optimizing energy efficiency and crop production.

Greenhouse growers face numerous challenges in maintaining optimal growing environments, and one critical yet often overlooked aspect of greenhouse management is the proper installation of a double-poly inflation system (Fig. 1). As energy costs continue to rise and climate variability increases, creating an effective thermal barrier becomes increasingly important for sustainable and profitable greenhouse production. A well-designed and correctly installed inflation blower can significantly improve greenhouse performance, reducing heat loss, minimizing condensation, and protecting crops from external environmental stresses. This e-GRO Alert aims to guide growers through the correct installation process of a greenhouse inflation blower, emphasizing the importance of using outdoor air for inflation.



Figure 1. An often-overlooked aspect of greenhouse management is the proper installation of a double-poly inflation system. Photo by: W. Garrett Owen, OSU.

Benefits of Double-Poly Inflation

Inflating double-poly covered greenhouses is a critical step in creating an effective insulation barrier for your greenhouse (Fig. 2). This air layer between the two layers of

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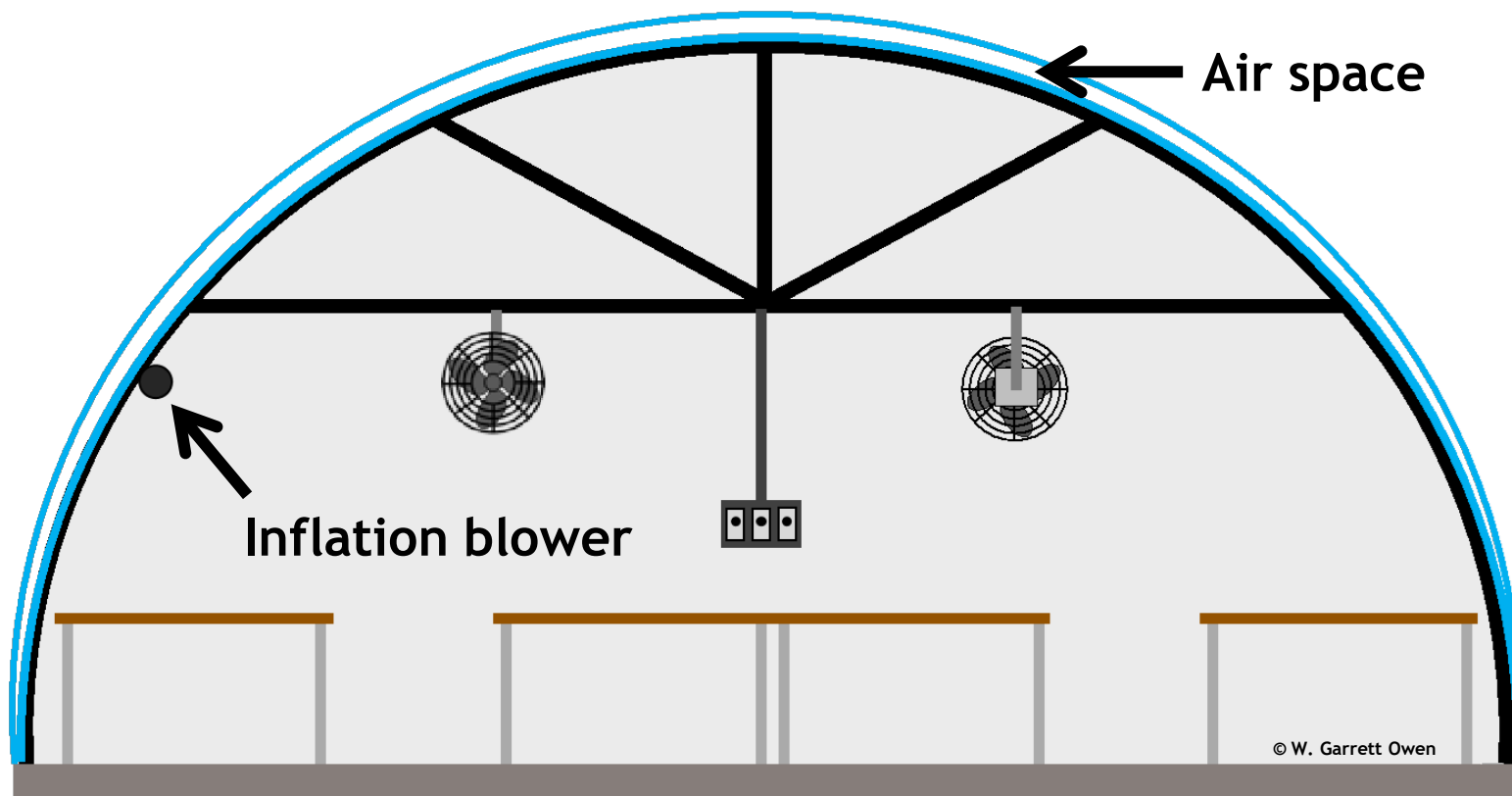


Figure 2. Diagram of a double-poly covered greenhouse with an inflation blower demonstrating the inflation and air space between the two layers of poly to create an effective insulation barrier. Diagram by: W. Garrett Owen, OSU.

poly film helps reduce heat loss, minimizes condensation, and improves the structure's ability to withstand wind and snow loads. The key to maximizing these benefits lies in the correct installation and operation of the inflation blower.

Selecting and Installing the Inflation Blower

When installing an inflation blower, it is important to select a fan with sufficient cubic feet per minute (CFM) capacity to evenly inflate the size of your greenhouse. I have seen 50, 60, 77, and 148 CFM inflation blowers available from various greenhouse manufacturers and supply companies. Once the inflation blower is selected, mount the blower on the interior of the structure. In most free-standing greenhouses, inflation blowers are typically mounted on the first or second bow from an end wall (Fig. 3); however, mounting will vary based on greenhouse manufacturers and space. Additionally, inflation blowers are often manufactured with a damper (Fig. 4) which is used to control airflow and prevent overinflation and damage the glazing material.

Importance of Using Outdoor Air

A critical aspect of the installation process is ensuring that the inflation blower draws in outdoor air rather than greenhouse air (Fig. 5). Using outdoor air prevents moisture from being introduced between the two layers of poly. If greenhouse air is used, its higher humidity levels can lead to condensation forming between the layers (Fig. 6). This condensation reduces light transmission, accelerates poly degradation, and creates an environment conducive to mold growth (Fig. 7). By using outdoor air, growers can avoid these issues and maintain a more efficient and effective insulation barrier. To achieve

this, install an external air intake system. This typically involves cutting a small opening in the greenhouse poly and installing an air regulator assembly that connects to the blower via an intake hose.

Proper Installation and Operation

The blower fan should be securely installed on the greenhouse structure with no air leaks around its connection to the double-poly layers. The intake must be positioned outside the greenhouse to draw in fresh air (Fig. 8). Once installed, the fan should operate continuously, 24/7, to maintain consistent inflation pressure. This ensures proper insulation and structural integrity while preventing deflation during periods of high wind or snow.

Maintenance and Inspection

Regular maintenance is also key to ensuring long-term performance. Inspect the blower fan and double-poly layers periodically for wear or damage, and make sure the fan intake remains unobstructed (Fig. 9). Adjust the damper settings as needed to maintain optimal inflation pressure without over-stressing the poly film. Furthermore, if hoses are used, ensure they are not damaged. I've seen where vinyl drier vent hose was used and UV light deteriorated the hose, thus inflating the double-poly with greenhouse air resulting in condensation (Fig. 10).

Troubleshooting Common Issues

When operating inflation blowers, growers may encounter several common issues. If the poly layers are not inflating properly, check for tears or holes in the poly, ensure the blower is running and drawing in air, and verify that the damper is open. If you notice excessive condensation between layers, confirm that the blower is drawing in outdoor air and not humid greenhouse air. For uneven inflation, check for

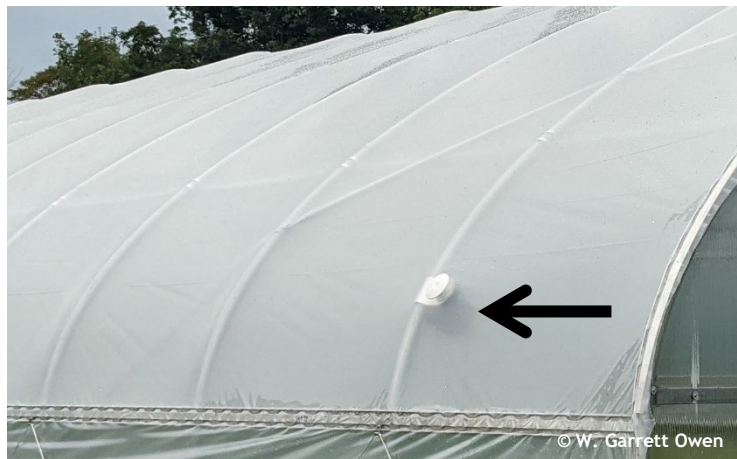


Figure 3. Example of an inflation blower, as seen from the exterior of a free-standing greenhouse, mounted on the first bow from the end wall. Photo by: W. Garrett Owen, OSU.



Figure 4. Example of an inflation blower manufactured with a damper that is used to control airflow and prevent overinflation and damage the glazing material. Photo by: W. Garrett Owen, OSU.



Figure 5. An example of an inflation blower using outdoor air rather than greenhouse air to inflate the two layers of double-poly. Photo by: W. Garrett Owen, OSU.

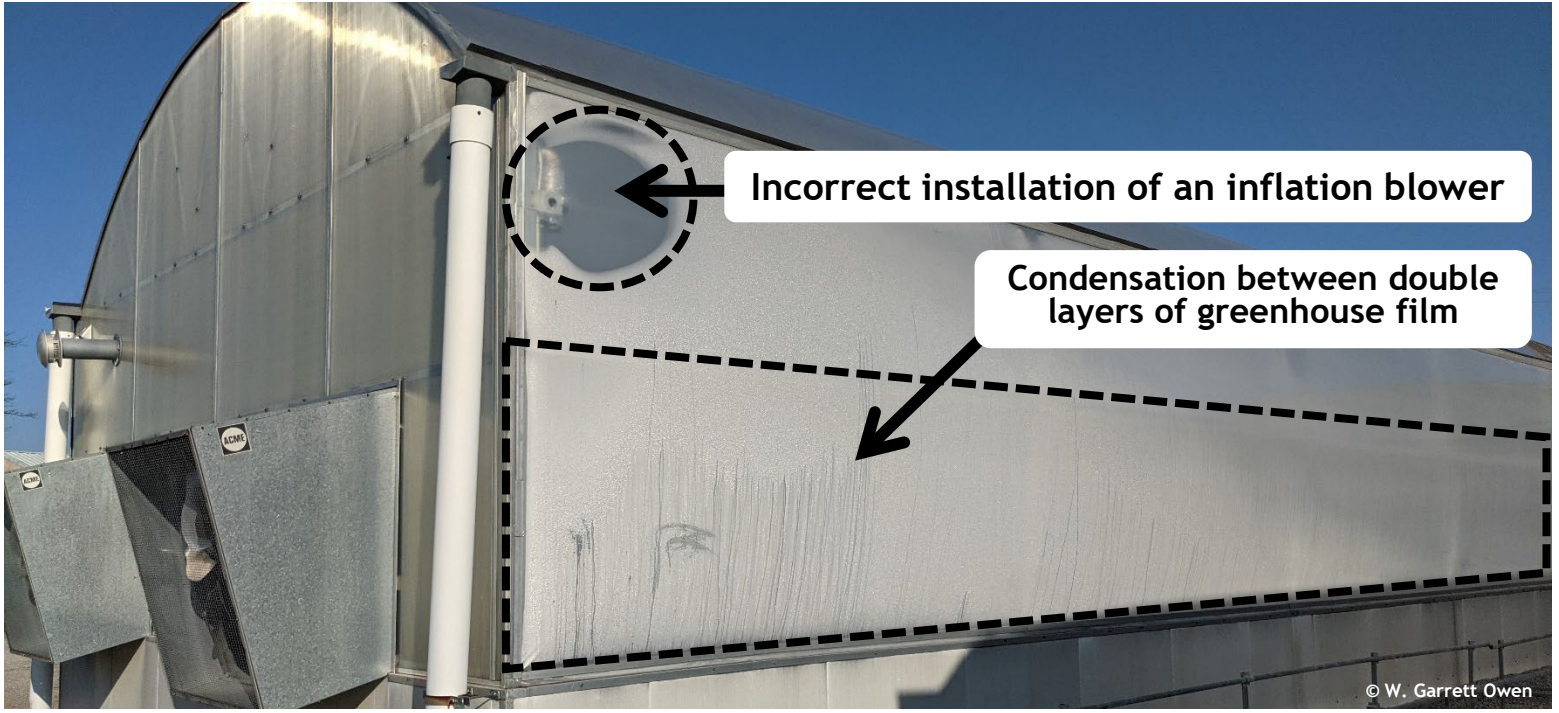


Figure 6. Improper installation of an inflation blower fan in a double-poly covered greenhouse. The fan draws high-humidity air from inside the greenhouse, causing condensation between the poly layers. Photo by: W. Garrett Owen, OSU.



Figure 7. Improper installation of a greenhouse inflation blower fan using humid greenhouse air can cause condensation between double-poly layers, reducing light transmission, accelerating material degradation, and fostering mold growth. Photo by: W. Garrett Owen, OSU.

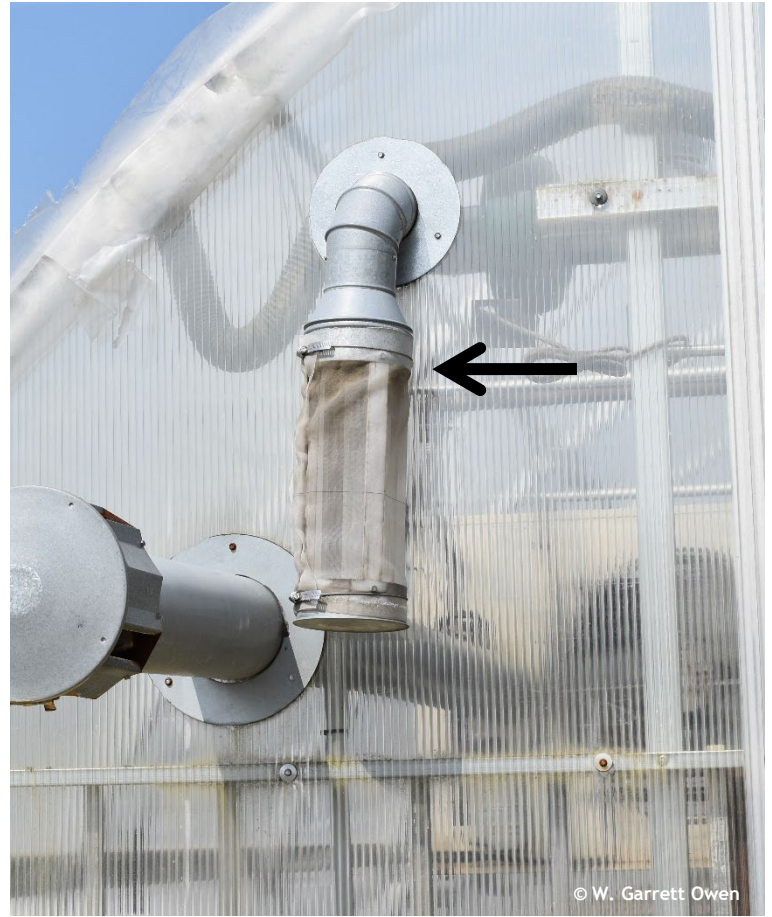


Figure 8. Example of an inflation blower intake positioned outside the greenhouse to draw in fresh air. Photo by: W. Garrett Owen, OSU.

obstructions in the air distribution system and ensure the poly is not overly tight in some areas. If you hear unusual noises from the blower, inspect for debris in the fan or worn bearings. Addressing these issues promptly will help maintain the efficiency of your double-poly inflation system.

Alternative: Greenhouse Spacer Blocks

An alternative to using an inflation blower is the use of greenhouse spacer blocks (Fig. 11). The installation of 5-inch plastic spacer blocks requires two people working in tandem. One person positioned outside the greenhouse places the spacer block at the intersection of a bow and purlin, punctures holes in one layer of film using a screwdriver, inserts cable ties through the holes and around the bow, and secures them. This process is repeated for all spacer blocks, with the number varying based on bow width. Once all blocks are installed, the second layer of greenhouse film is applied. The result is an air pocket between the double-poly layers, which mimics the effect of an inflation blower, providing insulation to the greenhouse.

Using spacer blocks can be particularly useful for smaller structures or in situations where running an electric blower continuously is not feasible. Spacer blocks offer a passive solution that doesn't require electricity, potentially reducing operating costs. However, they may not provide the same level of consistent inflation as a blower system, especially in larger greenhouses.

By following these guidelines for proper installation and maintenance of a greenhouse inflation blower, growers can maximize their greenhouse's energy efficiency, extend the lifespan of their double-poly covering, and create an ideal environment for crop production.



Figure 9. Example of an inflation blower fan intake that was covered with fine-wire mesh to prevent large insects and birds from nesting and obstructing air flow. Photo by: W. Garrett Owen, OSU.



Figure 10. Vinyl drier vent hose was used, and UV light deteriorated the hose, thus inflating the double-poly with greenhouse air resulting in condensation. Photo by: W. Garrett Owen, OSU.



Figure 11. Greenhouse spacer blocks are an alternative to inflation blowers, offering a passive solution that doesn't require electricity, especially if electricity is limited or not available. Photo by: Matthew Kleinhenz, OSU.

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