

## Insect Screening can be an Important Pest Management Tool

Excluding insects from the greenhouse has many benefits including reduced pesticide use, less employee exposure to chemicals and higher quality plants. Screens can be the first line of defense.

With greater resistance to pesticides, effective chemicals are getting harder to find. Environmental concerns and greater regulation on pesticide use are making the grower's job more difficult. When designed and installed properly screens will do a good job of exclusion.

Screens work best with exhaust fan ventilation systems. The positive airflow from exhaust fans gives a constant pressure difference. With a natural ventilation system, the airflow is dependent on buoyancy and wind for movement and varies considerably. This requires a greater amount of screen area.

### Airflow

The airflow through screen material varies with the size of the openings. This is determined by the smallest insect you are trying to exclude. The openings for thrips are less than 0.006 inch, whereas openings for flies can be 0.040 inches. The larger the opening, the less material is blocking airflow. Table 1. shows approximate insect dimensions, typical insect screen openings and air reduction.

**Table 1: Insect screen sizing**

<b>Insect</b>	<b>Thorax width (inches)</b>	<b>Abdomen width (inches)</b>	<b>Typical screen hole dimensions (inches)</b>	<b>Air reduction (percent)</b>
Western Flower Thrips	0.0085	0.0104	0.0059 x 0.0059	45
Silverleaf whitefly	0.0094	0.0222	0.0107 x 0.0304	32
Greenhouse whitefly	0.0113	0.0279	0.0158 x 0.0178	25
Melon Aphid	0.0140	0.0549	0.0158 x 0.0178	25
Citrus Leafminer	0.0171	0.0319	0.0105 x 0.0322	30
Serpentine Leafminer	0.0239	0.0335	0.0237 x 0.0237	15
Bumblebee			0.0395 x 0.158	5

\*Insect dimensions from Dr. Jim Bethke research

To provide adequate air flow for ventilation, the area of the screen that covers the vent/shutter opening has to be increased. This is usually done by providing a frame or structure over the intake that will support additional material. For a greenhouse with fans on one endwall and a vent or shutters on the opposite endwall, adding an extra hoop covered with screen material to

the intake end with provide the extra area. For greenhouse with fans along one sidewall and vent on the opposite side, a lean-to structure or box frame over the vent will usually be adequate. Pleated screens are also available that attach to existing motorized vent windows.

### **Sizing**

The calculations for determining the amount of screen material needed is fairly complex and best determined by computer. Contact the manufacturer or supplier to get the needed size. Factors that affect the amount of screen area include:

**Location** - greenhouses in the south require more ventilation due to greater thermal load. The solar load may be 25% greater in Arizona compared to a location in Michigan. Clouds and smog also affect this.

**Existing greenhouse shading**- less ventilation and therefore screen material is needed is a thermal screen, exterior shade material, whitewash or evaporative cooling is in place.

**Existing ventilation system** - The number and size of fans, their output and air inlet size. After closing all openings except the intake shutters or vents, a monometer should be used to get the pressure drop (inches of static pressure) of the existing system before the screen is installed.

**Size of the greenhouse** - floor area and height.

**Resistance of the screen material** – The opening size for thrips is much smaller required 3 to 4 times the area of material.

**Shrinkage** - Allow for 1 -2% shrinkage when installing the screen.

### **Maintenance**

Keeping the screen system in good condition requires proper maintenance.

1. All openings (doors, gaps under baseboards) other than the screened vents should be closed to reduce access to insects.
2. Dust, dirt and pollen can plug up the tiny screen openings quickly. Washing with water from a hose and nozzle from the inside out works well. Do it on a warm day so that the screen dries quickly. Do not use high pressure from a leaf blower as it may tear the material or alter the hole size.
3. A check on the operation of the system can be made by monitoring and recording the static pressure drop across the screen. When it increases above 0.4 inches of water it probably should be cleaned.

**By John W. Bartok, Jr., Extension Professor- Emeritus, Natural Resources Mgt. and Envir. Dept. University of Connecticut, Storrs, CT. 2016**

Disclaimer for Fact Sheets:

The information in this document is for educational purposes only. The recommendations contained are based on the best available knowledge at the time of publication. Any reference to commercial products, trade or brand names is for information only, and no endorsement or approval is intended. UConn Extension does not guarantee or warrant the standard of any product referenced or imply approval of the product to the exclusion of others which also may be available. The University of Connecticut, UConn Extension, College of Agriculture, Health and Natural Resources is an equal opportunity program provider and employer.