GROWER 101:

Greenhouse
Curtain Systems

Looking to conserve energy? A curtain system might be just what you need. This, the last in our three-part series with the NGMA, will help you decide if a curtain system is right for you.

By National Greenhouse Manufacturer's Association

What are greenhouse curtains? Greenhouse curtain systems are called shades, screens and even blankets. They consist of moveable panels of fabric or plastic film used to cover and uncover a greenhouse. Curtains may cover an area as small as a single bench or as large as an acre. Small systems are often moved by hand, while large systems commonly use a motor drive. Curtains are used for heat retention, shade and day length control.

How do the curtains provide heat retention? Any interior curtain system can be used for heat retention at night when the heating demand is greatest. Blackout systems can serve this purpose, even when day-length control is not a consideration. The amount of heat retained and fuel saved varies according to the type of material in the curtain. Curtain systems can save energy in three ways: they trap an insulating layer of air, reduce the volume that must be heated, and when they contain aluminum strips reflect heat back into the house. A curtain system used for heat retention traps cold air between the fabric and the roof. This cold air falls into the space below when the curtain reopens in the morning. To avoid stressing the crop, it is important to uncover the curtain gradually to allow this cold air to mix with the warm air below. Alternatively, if the crop can tolerate the shade, the curtain can be left uncovered until sunlight warms the air below the system.

How can I attach the curtain to my greenhouse? The fabric panels in a curtain system can be driven gutter-to-gutter across the width of the greenhouse or truss-to-truss down its length. In a gutter-to-gutter system, each panel of curtain material is essentially the size of the floor of one gutter-connected house. In a truss-to-truss system, the panels are wide enough to span the distance between one truss and the next. In either configuration, each panel of curtain material has a stationary edge and a moving edge. The drive system moves the lead edge back and forth to cover and uncover the curtain while the stationary edge holds the panel in place.

How does the gutter-to-gutter system work? The curtain panels are pulled flat across the width of the greenhouse at gutter height. This configuration minimizes the volume of greenhouse air below the curtain that must be heated. These systems require less installation labor than a typical truss-to-truss system, but gutter systems are not ideal for every greenhouse. If unit heaters or circulation fans are mounted above gutter level, the curtain will block them from heating or circulating the air under the system where the crop is. Though the volume of greenhouse space that is heated is reduced, the amount of cold air is maximized. This makes it harder to mix and reheat the air above the system when it uncovers in the morning. Retrofitting can also be a problem if the gas lines, electrical conduits and heating pipes are mounted at gutter level.

How do truss-to-truss systems work? With a truss-to-truss system, the panels of curtain material move across the distance between trusses. There are three ways to configure the truss-to-truss system. First, it can be flat at gutter height, minimizing heated areas and making installation easy. Second, it can be slope-flat-slope, where the profile of the curtain follows each slope of the roof part way up the truss with a flat section joining the two slope segments. The benefit of the slope-to-slope curtain system is that it can be installed over equipment and mounted above the gutter. The third is slope-to-slope, where the profile of the system parallels a line drawn from the gutter to the peak of the truss. This configuration minimizes the amount of cold air trapped above the curtain. ➧

What type of material are shade and retention curtain made of? Covering materials for shade and heat retention include knitted white polyester, non-woven bonded white polyester fiber and composite fabrics. White polyester has largely been superceded by composite fabric made of alternating strips of clear and aluminized polyester or acrylic held together with a finely woven mesh of threads. These panels outperform polyester because their aluminized strips reflect infrared light out of the greenhouse during the day and back into it at night. Composite fabrics include: chemical stabilization against breakdown by UV light, flame-resistant fabrics to meet building code requirement and fabrics with gaps for air circulation.

What type of materials are blackout curtains made of? Blackout curtains include polyethylene film and composite fabrics where all the strips are either aluminized or opaque. Most blackout materials attempt to reduce heat buildup where the curtain system is covered by day-length control in the summer. Knitted polyester is available with aluminum reflective coating bonded to one surface. Polyethylene film is by far the least expensive blackout material, but it is impermeable to water and water vapor. If the greenhouse leaks when it rains, water can build up in pockets of the film, and the weight can damage the curtain. Polyester knits and composite fabrics are porous and allow water and water vapor to pass through, reducing the chance of water-weight related damage and offering a longer life.

What types of exterior curtain systems are available?

There are three types of exteriors curtain systems available. A motor and gear driven shade system can be mounted above the greenhouse roof to reduce the amount of heat and light that enters the structure. A dark colored or aluminized mesh can be stretched over the greenhouse roof and left in place for the duration of the high light season. The curtain system can serve as the greenhouse roof, uncovering for maximum light and ventilation and covering for weather protection. GPN

The NGMA has published an External and Internal Greenhouse Curtains Considerations document that can be obtained by contacting the NGMA at (800) 792-6462 or downloading it off of the Web at www.NGMA.com.

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