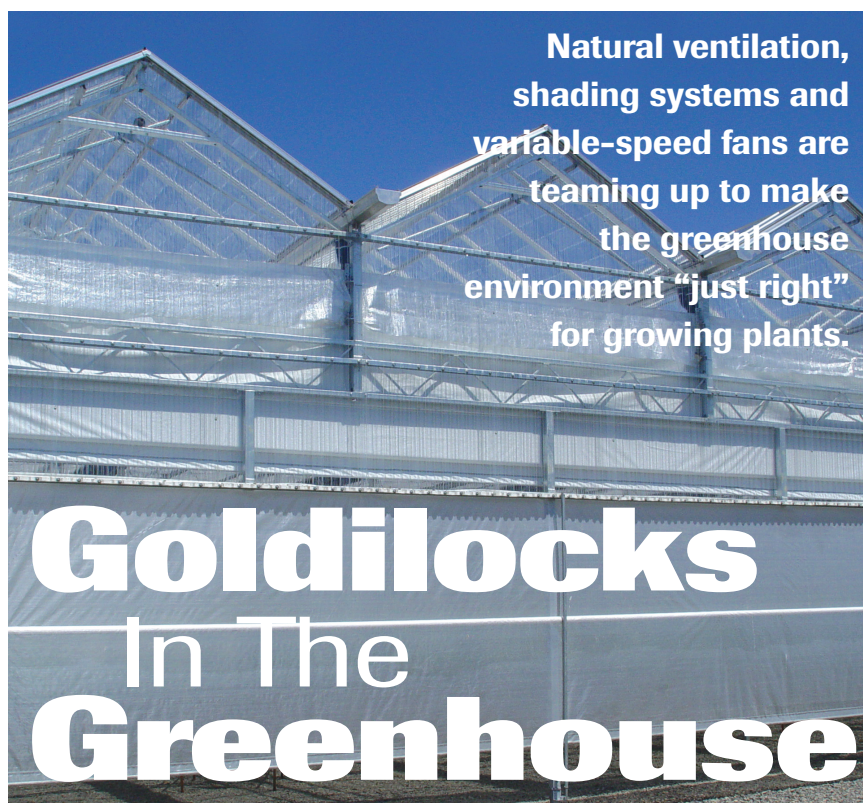


14-PART • SPECIAL  
EDUCATIONAL SERIES

# Control Your



Natural ventilation, shading systems and variable-speed fans are teaming up to make the greenhouse environment "just right" for growing plants.

## Goldilocks In The Greenhouse

by **BRAD KENNEY**, Assistant Editor  
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**G**REENHOUSES are actually quite an unnatural environment for plants to grow up in. The word "nursery" is all too fitting, as plants are watered and fed like babies from plug through bloom. Unfortunately, the word "hothouse" can also sometimes be just as appropriate.

"Everywhere in North America gets hot enough that you're overheating the greenhouse in the summer, so you'll

have to remove excess heat," says Kurt Parbst, president of Svensson Americas. "The first place to start is ventilation, exhausting this overheated air and exchanging it for cooler outside air."

### Take It Off

Natural ventilation approaches of all kinds are continuously evolving. For example, engineers at Ohio-based Rough Brothers are designing open-roof venting strategies to meet the needs of different climates. For gutter-connected ranges, new designs with taller profiles and larger ventilation

areas can now allow growing in virtually any environment. Ridge vents of up to 50 percent of floor area have been built in Australia.

### Best Of Three Worlds

The sometimes schizophrenic North American climate requires constant protection from cold snaps and heat waves, and yet some plants need exposure to harden off. Each need has brought about its own solution, from poly in the winter to shade cloth in the summer, and rolling benches in between. However, as Cravo President Richard Vollebregt points out, retractable roofs allow for flexibility at different parts of the year and provide a growing structure that maximizes the positives to each growing environment while minimizing the negatives.

"If your temperature outside is 40 degrees, what do your plants want? They want a roof over the top," notes Vollebregt. "If the temperature outside is 70, what do they want? Nothing. And if the temperature outside is 85 or 90, and it's hot and sunny, what do the plants want? They want some cooling and shade. You want what they want."

According to research quoted on Cravo's Web site, growers in Oregon have grown a two-year boxwood in one year and growing time for foliage has been reduced up to 30 percent. Timing has always been of the essence for floriculture growers on holiday-centric schedules, and more turns per season means less energy costs per crop.

### The Next Step

"Once you've done all you can with ventilation, next you reduce the source

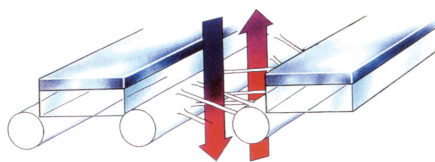
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# Energy Costs

of overheating – solar radiation – by shading,” explains Parbst. “This can be whitewash, shade compounds or reflective shade curtains.” Retractable shade works when the grower needs maximum light, whether in winter,



**Retractable shade curtains like the Svensson F-Series offer airflow between aluminized strips, benefitting the grower in two ways: by reflecting solar radiation and by allowing heated air to escape.**

dim or dull periods, during bad weather or during the morning or late afternoons. According to Patricia Dean of Colorado-based Wadsworth Controls, growers from Texas to Chicago swear by their shade curtains. Such allegiance also extends to grower-retailers, and for good reason. “Pretty much any retailer I talk to says that shade curtains are a must-have if you want customers to shop during the hot part of the day,” she explains.

## On-The-Job Application

According to Parbst, there are three ways of applying retractable shade:

**1 Exterior retractable shade (an Abri system):** This shade goes high enough above the structure so it won't interfere with the vents and uses cloth (such as the Svensson F series) designed to “breathe” and exhaust air between the shading and aluminized reflective components. It is the most

efficient as it reflects radiation before it enters the greenhouse, but is expensive as it requires additional structure to withstand wind loading.

**2 Interior retractable shade:** This allows for even shading (plants dry out evenly) and is primarily used with natural ventilation. The roof vents are opened and the shade completely closed. The greenhouse is ventilated through the shade.

**3 Interior retractable energy/shade:** Regular energy curtains must be left open to match the area opening of the vent position. This will allow a band of unshaded light that may dry out plants on the bench or floor. This

uneven effect may not be so pronounced under light-diffusing glazings as it would under glass, but is nonetheless a factor to consider.

## A Change Of Pace

In order to save energy while homogenizing a variety of greenhouse variables (such as temperature, CO<sub>2</sub>, humidity and aerosol pesticides), many growers are turning to horizontal air flow (HAF) fans. Kurt Becker of Wisconsin-based Dramm Corporation recommends shrouded HAF fans because the shroud allows the fan to use the same energy as a basket fan, but throw the air much farther.

“As a result, we typically use three times less fans to do the same job,” he says. “We’ve put extra HAF fans into a greenhouse before because the grower didn’t think so few fans would work.”

Wadsworth’s Dean sees variable frequency drive (VFD) controls coming into wider use as more growers cede their greenhouse controls to computers. “This is a way to standardize the growing environment and use airflow on an as-needed basis by reducing overuse,” she notes. “The initial investment in a VFD control is higher, but it works.”

Becker also recommends controlling fan speed. “Most important is the need to reduce fan speed, and not just to save energy. Fans moving too fast create more turbulence, more uneven crop drying and stratification of the air, preventing good air exchange or trapping heat up high.” **GG**

## Rebate-Worthy

Rich Hasselman, an energy rebates consultant for Wisconsin’s Focus On Energy, has this observation to make: “At this point we’re basing savings on switching to energy-efficient HAF fans. I’m seeing a split in the HAF fan market in which there is a choice between smaller (10 inches, 12 inches, etc.) and larger fans (24 or more inches). In general, the larger the fan, the higher the efficiency, but I’m more interested in system efficiency that meets the customer’s needs rather than raw individual fan efficiency. A grower may not need 24-inch HAF fans, so a system with smaller fans may be more efficient as the motors will be smaller and it will be sized to meet the needs of the grower.”

