

Revolutionary Pressurized Greenhouse Catching On Fast

David Chelf's plants grow faster and are pesticide-free in his Airstream Innovations greenhouse tunnels. Chelf and his customers credit the 3 mph flow of air across the plants. The air also keeps the 66 by 360-ft. plastic roof inflated. The translucent cover is attached to bases buried in the soil.

"We are getting 30 percent or more increased growth with the same amount of water," says Chelf. "The airflow and diffusion of light under the plastic increases the leaf area exposed to light for increased photosynthesis."

The airflow is produced by two 20-ft. diameter towers at one end of the greenhouse. While the towers capture available wind, 4 adjustable, high-speed fans suspended in each tower keep air pressure constant. A 12 by 16-ft. exhaust door at the other end opens and closes to control the airflow. Wind speed, fan and venting doors are constantly adjusted by a programmable control system.

Chelf says the moving air keeps plants growing and healthy. Incoming air passes through a thick net that captures insect pests. The USDA has certified that the tunnels with their positive pressure protect citrus crops from the citrus psyllid insect, which carries a devastating citrus disease. The airflow also prevents stagnant, humid conditions where diseases flourish.

"The airflow delivers carbon dioxide needed for cell growth and aids transpiration by carrying away water vapor from the leaf's stomata," explains Chelf. "This cools the leaf and maintains the flow of water and nutrients from the roots up the xylem to the leaves. It is controlled transpiration that prevents heat stress from shutting down photosynthesis."

Initially, Chelf tested the Airstream design with his own field of strawberries. Today his plastic greenhouses are creating their own demand, as customers try one and order more,

sometimes before Chelf can get the first one up.

"We're finishing up one for a customer who has already ordered a second and is planning 20 more," says Chelf. "The first tunnel I sold led to 11 more at that property."

For Chelf, sometimes bad luck is the best luck. He tells about an early customer who just finished installation of an Airstream unit when a dump truck ran into the side of it.

"It opened up a 40-ft. hole in the plastic," recalls Chelf. "The control system shut down the venting door and used the new hole to vent. Meanwhile, it adjusted the fans to compensate."

Chelf was able to repair the tear, and the story gave prospects more confidence in the system. Since then he has added cable reinforcing to hold down the plastic, preventing a similar tear from spreading. He has also added a backup generator and batteries in case a power outage should occur.

The greenhouse is extremely robust. It is designed to handle the pressure and force of an 80 mph wind, and the prototype has done just that. Installed at 4,500 ft. elevation, it easily handled an overnight snow that dumped 2 ft. of snow on it.

"It just slid off in the morning," says Chelf.

The Airstream is designed for high-value crops. The basic 66 by 360 ft. unit is priced at about \$5.50/sq. ft. Chelf also markets a larger 100 by 680 ft. unit. Most are those lengths or larger. He has considered selling a smaller, one tower unit, but warns that it would not be appropriate for high-value crops.

"The 2 towers provide a backup," says Chelf. "If one needs maintenance or develops a problem, the second tower can maintain the greenhouse. With a single tower, you are more vulnerable."

Chelf is also marketing the Airstream units for recreational use and aquaculture. All sales



Airstream Innovations greenhouse tunnels are helping plants grow faster at BZ nursery due to the 3 mph flow of air across the plants. Pressurized air also keeps each tunnel's 66 by 360-ft. plastic roof inflated.



Airflow is produced by two 20-ft. dia. towers at one end of greenhouse. Four high-speed fans suspended in each tower keep air pressure constant.

to date are direct through the company. Ave., Suite E, Solana Beach, Calif. 92075 (ph 858 755-1822; www.airstreaminnovations.com).
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He Built A Business With Fire

Gerry Hawkes has built a business cleaning up problem invasive plants and brush using customized fire equipment that includes a flaming system and a commercial shredder/mulcher with protective brush guards he designed.

"With the system I built, 2 guys can flame-kill problem brush all day and not run out of gas," says Hawkes, Forest Savers, LLC. "My tanks and rack system can be mounted to a 3-pt. hitch or a front loader. The shredder/mulcher mounts on the rear. I can couple on up to 100 ft. of hose to reach into wetlands or steep ground."

The design of the brush guards, including 2 forward braces ahead of the operator, is based on years of experience. Full side and rear guards protect the operator as he drives against or backs into brush.

Hawkes is hired to clean up invasive brush, improve wildlife habitat, and build trails. He often works for farmers wanting to reclaim pastures and field edges. Hawkes has even refreshed a cross-country running trail.

"I used the shredder to plane down the exposed and protruding roots," says Hawkes.

A bi-directional rake he designed mounts on the loader arms of his Kubota. It can be used to pull roots from the soil and more. "We've cleaned up old fence lines, hooking on to fences and dragging them out along with posts and brush," says Hawkes. "We push them up into a ball and come back in a year and burn it, reclaiming any steel posts afterwards."

Where Hawkes can't get in with the shredder, the flame system gets the job done. He has used it instead of herbicides, knocking back a big infestation in year one. Then he

follows up in year two to finish it off.

"I can use a long burner wand to reach deep into an otherwise impenetrable clump or thicket and deliver a high intensity flame," explains Hawkes.

While Hawkes operates mostly in and around Vermont, he is confident there is a wider market for the services he offers...and the system he has developed. He points to the spread of tick-borne Lyme disease. There is increasing client interest in controlling or reducing tick habitat. He also sees brush fire risk reduction as another growing opportunity.

"I am looking for a person or persons who can help grow this business," says Hawkes.

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Gerry Hawkes built a business using a flaming system to get rid of buckthorn and other invasive plants and brush.



System includes loader-mounted tanks, as well as a shredder/mulcher equipped with brush guards. It's used to plane down exposed and protruding roots.