



SEARCH

[Advanced Search](#)



Online Magazines

- ▶ [Turf](#)
- ▶ [Turf Design Build](#)
- ▶ [Superintendent](#)
- ▶ [SportsField Management](#)
- ▶ [Tree Services](#)
- ▶ [Farming](#)
- ▶ [Growing](#)
- ▶ [American Nurseryman](#)
- ▶ [Snow Business](#)
- ▶ [MRM SourceBook](#)

Online Communities

- ▶ [LawnSite](#)
- ▶ [PlowSite](#)
- ▶ [TreeServicesSite](#)
- ▶ [FarmingForumSite](#)
- ▶ [DesignBuildSite](#)
- ▶ [NurserymanSite](#)
- ▶ [SportsFieldSite](#)

Social Media

- [Find us on Facebook!](#)
- [Follow us on Twitter!](#)

Subscription



[Subscribe](#)

Article Tools

- [Email Article](#)
- [Print Article](#)
- [Send Us Feedback](#)

[Table of Contents](#)

More in this Issue

Features

- [Connecting Directly with Consumers](#)
- [Seed Sources, Nursery](#)

Special Supplement Greenhouse / Nursery Edition

- [Moveable High Tunnels Add Flexibility](#)

- [Greenhouses & Supplies](#)
- [Packaging & Containers](#)
- [Sanitation and Safety](#)

North Features

- [A Glass a Day Keeps the Doctors Away](#)
- [History of Growth](#)

- [To Buffer, or Not to Buffer](#)

- [Great Lakes Fruit, Vegetable & Farm Market Expo](#)

South Features

- [Lettuce Thinning Machines Move Industry Toward Mechanization](#)

- [Breeding Chile Plants for Mechanical Harvesting](#)

Columns

- [Organic Plant Breeding](#)

Departments

- [Making Connections](#)

Outstanding Seed Company, LLC

Breeder and Producer of PMRR Pumpkin Hybrids™

[Click Here to Learn More](#)

[Share](#) [Tweet](#) [Share](#) [Email](#)

Growing Magazine - November, 2012

SPECIAL SUPPLEMENT GREENHOUSE / NURSERY EDITION

Moveable High Tunnels Add Flexibility

By Dorothy Noble

For years, growers have been enjoying the advantages offered by high tunnels. These structures extend the season, boost quality and yields, and enable growers to produce crops otherwise impossible in their hardiness zones.

Earlier production typically commands higher prices, and the tunnels allow production of crops weeks ahead and stretch harvests well beyond field-grown crops.

In short, almost any crop that benefits from a protected, warmer environment will produce better in a high tunnel. Early production, produce with consistent eye appeal, and unusual and unique produce can establish a grower's reputation and impart a marketing edge.

However, there are disadvantages. Cost is a consideration. Soil salinity builds when crops grow continuously year after year, except in multibay tunnels, such as those by Haygrove, in which the cover is removed in the off-season. Because space is at a premium and costly, cover crops may not even be contemplated. The environmental conditions in a high tunnel favor a few diseases, notably powdery mildew. Plastic mulch and irrigation systems to keep foliage dry have become the norm.

High-value crops, especially tomatoes, tend to be planted repeatedly in high tunnels. Without rotation, disease pressure builds more easily. Consequently, growers may look to moveable high tunnels to address the drawbacks of conventional high tunnels.

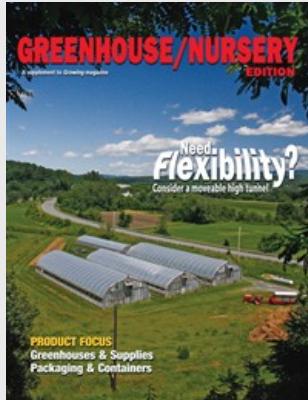
Planting one or more cover crops within a section of the moveable high tunnel's track, then planting a high-value crop and moving the tunnel to cover it, improves soil health and fertility.

Moveable high tunnels also help alleviate the detrimental effects of salinity and make it easy to rotate crops and achieve the benefits of cover crops.

Sherlock's Farm

Tom Sherlock in Abbottstown, Pa., has used his 30-by-48-foot Rimol moveable high tunnel for three years. He moves the tunnel three times during the year. Sherlock's Farm, located in USDA hardiness zone 6b, produces field-grown vegetables and herbs. Harvesting is continuous, with the exception of January.

Sherlock maintains a 30 to 50-member CSA, and partners with Apple Valley Creamery in East Berlin, Pa., to deliver his produce along with the creamery's milk products. Produce is also sold to several upscale restaurants. He and his wife, Lori, also operate a catering and food concession business.



PRODUCT FOCUS:
Greenhouses & Supplies
Packaging & Containers

Specialized.
Diverse.
Innovative.



CLEAN
WATER.



ProducePackaging.com®



Keeping it Green
Made of 100% Recyclable Earth Friendly PETE
1-800-644-8729

CULTIVATORS



Cultivators (Horsedrawn & 3 pt)

WE ALSO CARRY:
Hay Rakes, Tedders
Cover Crop Rollers
Sickle Bar Mowers
Ground Drive Forecarts
Market Garden Tools





Look What's Growing! -
NEW!

New Gear & Goods

Web Exclusive

Retention of DOT
Markings, Placards and
Labels

The News Harvest

Industry news delivered twice a month.

CLICK HERE TO SIGN UP

Phil Brown Welding Corp.



Brownie
Three wheels powered by planetary drives
616-784-3046
philbrownwelding.com



Four Season moveable high tunnel construction—capping phase © Bob Ferguson

At Penn State's research farm, Greg Garbos of Four Season Tools (second ladder from left) directs the capping of the roof hoops onto the previously constructed V-track sidewall panels. Note the 8-inch wide V-track in the foreground. On the ladders, from left, are Professor Mike Orzolek, Garbos, Bruce Dye and Professor Bill Lamont. On the ground are Dennis Reil of Pennypack Farm, left, and Karim Hemady.

PHOTOS BY BOB FERGUSON

Sherlock says, "The moveable tunnel gives me more control over my planting, particularly because the planting window for many crops is small."

Winter vegetables grown throughout fall, winter and early spring include spinach and lots of multicolored, fancy-leaved, fast-growing lettuces.

Tomatoes, cucumbers and eggplant herald the summer season. For this past season's tomatoes, Sherlock focused on Brandywine and Cherokee Purple heirlooms, as well as the Rutgers variety. He grafted them using the rootstock RST-04-105-T, available from Harris Seeds. After moving the tunnel to warm the soil, the tomatoes were transplanted on April 1.

In mid-May Sherlock moves the tunnel off the tomatoes and plants English cucumbers and eggplants. The cukes are trained to grow vertically, producing clean, straight specimens, saving space and facilitating weed control. The eggplant varieties grow well along the tunnel sides.

By late September, Sherlock prepares the tunnel for fall crops. Direct-seeded spinach follows the cleared cucumber area and coexists with the still-producing eggplant. The lettuces come next, in time for Thanksgiving and Christmas harvests.

Sherlock's field crops reflect his flair for food. Vegetables like edamame, endive, radicchio and specialty turnips round out his fall lineup.

The silty loam soil does not drain well, so Sherlock utilizes mushroom compost. Drip irrigation prevails, especially in the tunnel. He relies on crop rotation and soil testing in the tunnel; a cover crop of barley is planned. In the field, oats and white clover are this season's covers. His sustainable methods include Fertrell fish emulsion and kelp plus Super K. Foliar feeding takes place after harvest. Last fall, ground oyster shells were used to correct the excess of magnesium found in the soil.

During winter, Sherlock says the tunnel can heave off the track, so in the spring he aligns the rails. The tunnel is moved using two straps on a 2x4, centered like a horse rig, with two more straps on his tractor. His tunnel has sustained winds up to 50 mph without any damage.

Pennypack Farm

Andy Andrews, farm director of Pennypack Farm in Horsham, Pa., says, "We really like it. We rotate high tunnel crops more and don't worry about salinity buildup." The farm's 30-by-96-foot moveable high tunnel from Four Season Tools was installed last season.



Apricot trees at one of the Four Season moveable high tunnel positions at Penn State's research farm.

LLC
5302 AMISH ROAD
GAP, PA 17527
PHONE : (717)442-9451



DeGrandchamp FARMS

"Virus Tested" Blueberry nursery stock.
Over 30 varieties of blueberry, cranberry, and ligonberry plants
For the commercial and home gardener.

[Click here for more!](#)



Growing
CLICK HERE FOR THE LATEST WEB EXCLUSIVE

Winter salad greens, fall rye and buckwheat were the first crops. After the tunnel was moved in the spring, tomatoes flourished in the summer. Winter greens followed, then another move. Andrews plans a similar rotation next season, and will grow rye and vetch prior to the tomatoes. Winter greens will be planted in a different location, and a cover crop will be planted where paste tomatoes had been grown.

Pennypack Farm's winter greens are comprised of a diverse mixture of lettuces, arugula, beet greens, Claytonia, endive and more. Andrews can get five or six cuttings from them. Paste tomatoes include the heirlooms Speckled Roman and Amish Paste. Transplants are set in about May 1.

Andrews likes the versatility of moveable high tunnels. "After planting one crop, we can move it. It enables us to stay ahead of time periods," he says. They use a tractor to start the movement, and then three or four people push it along the track.

Andrews reports that the entire experience with the moveable high tunnel has been trouble-free.

After yearly soil tests, amendments are added, all organic and often from seafloor deposits. In addition to the fertilizer blends, which include composted chicken manure and a range of minerals, they spread composted leaves and grow cover crops.

About 400 families are CSA members. Located in suburban Philadelphia, Pennypack Farm's clients live within 10 or 15 miles of the farm. Bumper crops are distributed to three food banks and marketed at the Clark Park Farmers' Market in Philadelphia.

Making local, sustainable agriculture a part of the community is a goal of Pennypack Farm & Education Center. The farm accomplishes this through educational programs and numerous events.

Six River Farm

Young farmers Nate Drummond and Gabrielle Gosselin run Six River Farm, a diversified, 20-acre farm in Bowdoinham, Maine. The farm's flat land with alluvial bottom soil is uniform and well-suited to high tunnels. The couple grows vegetables on 10 acres and manages the other 10 with green manures, including oats and clover, to build organic matter and add nutrients to the soil. The cover crops are rotated for the following year's vegetable production.

The farm has two 30-by-48-foot Rimol Rolling Thunder moveable high tunnels. One has been in use for four years, the other for three. Drummond says, "They are pretty effective for our farm operation."

Six River Farm's produce is sold at three farmers' markets in Brunswick, Maine, as well as at local restaurants and natural food stores. The produce is certified organic by the Maine Organic Farmers and Gardeners Association. Drummond says, "High tunnels are a great advantage to organic and high-value fruit and vegetable production."

The tunnels are usually moved four times a year. Six or seven crops in 30-by-50-foot blocks are rotated, with crops on four of the blocks at any one time.

Winter greens are planted in late September and moved under the cover in early November until April. In March, spinach, kale, chard and fast-growing lettuces thrive. By early May, cucumbers, zucchini, sunflowers, basil and parsley grow, and in early June the tunnel is moved for tomatoes, peppers and summer squash. Winter greens and oats and a pea mix cover crop are then rotated into the area.

Weed control depends on the crop. Black plastic and drip irrigation are used for summer crops; overhead mini sprinklers irrigate winter production. Although diseases are minimal due to careful rotations and no rain in the tunnels, Drummond advises ensuring sufficient ventilation.

Two people can move the tunnel, Drummond says, although three or four is better. A small wheel on the base of every arch spreads weight so it moves more easily. Keeping the track area free of weeds and relatively level is important, he notes. Landscape fabric is used to deter weeds. The most difficult time to move the tunnel is early spring, because freeze-thaw heaving can create bumps. If the tunnel slips off the track, Drummond says, "A good-sized auto floor jack can pull it up."

Drummond says the moveable tunnels provide a high degree of flexibility. "When you grow lots of different crops, flexibility is important," he adds.



Tom Sherlock at his second Rimol tunnel position, shown after tomato harvest.



Tomatoes in a Four Season moveable high tunnel at a Penn State site, October 18, 2011.

However, he cautions that they still require management. Moving them necessitates undoing anchors and redoing them, which can take two or three hours to set up. He advises anchoring tunnels well and carefully selecting the site to avoid problems with wind. The farm's Gothic-style tunnels withstand snow better than a Quonset-type. He adds that tunnels should be placed so they don't shade each other.

Juniperdale Farms and The Produce Crib

Experienced growers but new high tunnel users, Brian and Eva Fulmer say their FarmTek moveable high tunnel is "the cat's meow."

Fulmer erected the 30-by-96-foot rolling structure this year. "It's fairly simple," he reports.

He customized the tunnel, using concrete piers to achieve better anchoring. Since it was housing sweet cherry trees, he modified the end walls to facilitate easy movement over the trees. A Gothic style was chosen to minimize snow load.

The Fulmers own Juniperdale Farms and The Produce Crib, located near Nazareth in southeastern Pennsylvania. In the new high tunnel, they grew beets, carrots, gourmet lettuces, onions, peppers, potatoes, summer squash, strawberries and spinach, along with sweet cherries. Several of the crops will produce throughout fall and early winter.



Tom Sherlock, with near end-of-season eggplant inside his 30-by-48-foot Rimol moveable high tunnel. In the foreground, the future third tunnel position is seeded with spinach.

The high tunnel has alleviated issues with birds and rain-induced cracking of cherries. The Fulmers' roadside farmstand customers appreciate having the first local tomatoes and strawberries, plus the high quality of tunnel-grown veggies. Sweet corn, pumpkins and winter squash are field-grown. Some of the farm's produce is also sold wholesale.

Fulmer developed a gravity-fed drip irrigation system for the tunnel. As conventional growers, they follow Penn State guidelines for fertility and pest control. With considerable shale and clay in the soil, the couple sets up 8-inch raised beds with mushroom soil on which crops thrive.

Using high tunnels requires a somewhat altered mindset about growing. Fulmer says, "You think in square feet instead of acres."

Resources

Several universities, including Cornell, Penn State, and the state universities in Iowa, Minnesota and Vermont, have published comprehensive manuals on high tunnels. These cover data on cropping, site selection, testing for salinity, assembly and more. The website www.extension.org can lead to these and other topics on high tunnels and information on season extension methods.

[Home](#) | [Current Issue](#) | [Archives](#) | [Media Kit](#) | [Subscribe](#) | [Dealer/Distributor Directory](#) | [About Us](#) | [Contact Us](#)

Publications

[Turf](#) | [Superintendent](#) | [SportsField Management](#) | [Tree Services](#) | [Turf Design Build](#) | [Farming](#) | [Growing](#) | [American Nurseryman](#) | [MRM Sourcebook](#)
[Online Communities](#)

[LawnSite](#) | [Plot Site](#) | [TreeServicesSite](#) | [FarmingForumSite](#) | [NurserymanSite](#) | [DesignBuildSite](#) | [SportsFieldSite](#)



© 2013 Moose River Media LLC. All rights reserved. [Privacy Policy](#) | [Terms of Use](#)