

Utility Bills Getting You Down? Plant Stuff On The Roof

UNIVERSITY PARK (Centre Co.) — Gardeners are always looking for new planting sites, but a research team in Penn State's College of Agricultural Sciences is aiming higher by developing a system that would replace the tar-and-gravel materials used on flat roofs with a surface covered by living plants — a green roof.

"Europeans have been cultivating vegetation on rooftops for decades," says David Beattie, associate professor of ornamental horticulture. "The roofs of large buildings — flat roofs in particular — are subjected to large swings in temperatures that cause cracking and eventually leakage into the floors below."

Beattie and Robert Berghage, associate professor of ornamental horticulture, are working with JSP International Inc., a Malvern manufacturer of plastics used in automotive bumpers, to create a plastic-based roofing

system that can be used as a planting site for vegetation.

The company uses PEPP, porous expanded polypropylene, which is a compressed plastic mat that can be used as a growth matrix or surface insulator for the vegetation layer.

For the past six months, Beattie and Berghage have tested prototypes planted with sedum, a drought-tolerant succulent plant variety that is related to cactus, and hard fescue, a grass. "We think sedum will be effective because some varieties stay short, don't shed a lot of dead plant material as winter sets in, and are easy to propagate," Berghage says. "The temperatures and winds on top of a building can be brutal, so the best plant material to use should be low-lying and need minimal maintenance."

In a series of tests this summer, the researchers measured temperatures on a gravel roof, on a plastic-sheet roof and on a

planted roof prototype. The temperatures on a sunny day with ambient temperatures around 88 degrees Fahrenheit measured 140 degrees F on the plastic sheeting, 118 degrees F on the gravel roof, and 82 degrees F on the planted roof prototype.

Beattie sees several advantages to installing a green roof.

—Aesthetics: "A green expanse of lush vegetation looks great," Beattie says. "Even in winter, brown plants and soils will look a lot better than a grimy gravel roof."

—Durability: Using a vegetated roof eliminates the large temperature extremes and fluctuations that cause cracking and failure in flat roofs. "Europeans estimate that roof life can be doubled by using green roofs," Berghage says.

—Energy Savings: The insulation provided by an expanse of plants across a roof can reduce the energy load required to heat

or cool the building.

"Vegetation is a natural temperature moderator," Beattie says. "That's why it feels cooler in the middle of your lawn than it does in the middle of your driveway."

According to Berghage, green roofs also can alleviate the temperature rise associated with large metropolitan areas. "In big cities such as Washington, D.C., and Philadelphia, where asphalt, concrete and building materials absorb and radiate heat, the temperature can be 10 to 15 degrees higher than nearby suburban areas," he says. "The loss of green space in cities can be reduced by using green roofs."

Beattie says green roofs require more structural support than a conventional flat roof, but enough support for a vegetative roofing system can easily be built into new construction projects or an extensive re-roofing project. "You have to provide an irriga-

tion and drainage system, which requires additional support," Beattie explains. "Also rain and snow would add weight to the soil."

This winter, Beattie and Berghage will test different plant materials and explore how Pennsylvania's winter conditions affect green roofs. In addition, they will track how, and if, heat is retained within a building outfitted with a green roof. Eventually, the research team hopes to get permission to install a green roof system on an existing Penn State building.

"Using these systems doesn't mean you won't have to pull a few weeds or irrigate occasionally, but that can be handled on a contract basis with the maintenance organization doing the building landscaping," Beattie says. "This isn't zero maintenance, but it is minimum maintenance."

Genesee County Museum Hours Change

MUMFORD, N.Y. — Genesee Country Village and Museum's Historic Village and John L. Wehle Gallery of Wildlife and Sporting Art will be open only for special programs until they reopen May 12 for the 2001 season. The Genesee Country Nature Center will remain open on a limited schedule for the remainder of the year.

Genesee Country Nature Center is open in November and December as follows:

- Saturday and Sunday, 10 a.m.-5 p.m.
- Closed Nov. 25 and 26 and Dec. 24.
- Ski trails will open for the season, weather permitting, Saturday, Dec. 16.

Beginning Jan. 1, 2001, hours at the Nature Center are:

- Thursday and Friday, 10 a.m.-4 p.m.
- Saturday and Sunday, 10 a.m.-5 p.m.

Special programming will be presented Dec. 1-3, 8-10 and 15-17 for Yuletide in the Country: Tours Through Holidays Past (reservations required).

Genesee Country Village and Museum is the largest living history museum in New York State and the largest collection of buildings in the East. The museum is open from mid-May through mid-October. Villagers in period dress interpret 1800s Genesee Country life for visitors. The museum also includes the John L. Wehle Gallery of Wildlife and Sporting Art and Genesee Country Nature Center, with five miles of hiking trails through woodlands, wetlands and meadows. The museum is located in Mumfordsville, New York, 20 miles southwest of Rochester and 45 miles east of Buffalo. Visit the museum on the web at www.gcv.org.

Freight, Farming, Family

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on the racetrack scene. The owners of Jiffy peanut butter, Mr. Coffee, a Lear jet producer, and the developer of Barney have used Brook Ledge hauling for their horses.

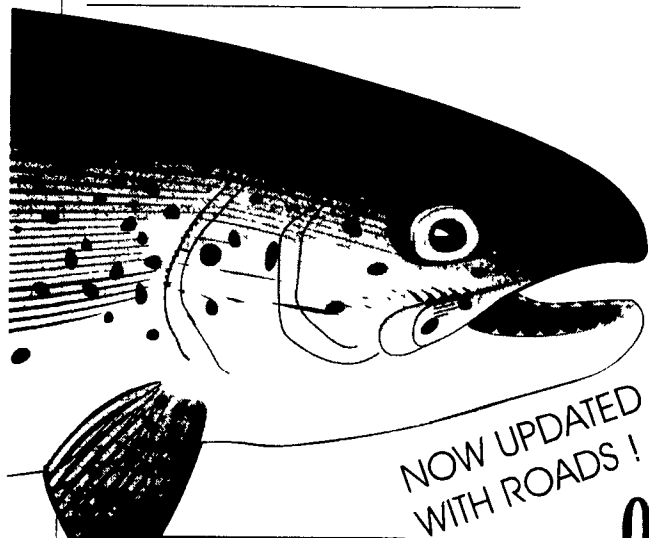
In addition to spending approximately 90 days a year on the road with the trucks, Bill, 68, also helps take care of the farm's resident dairy with the help of a farm manager and her two daughters.

The morning milking starts at 4:45, when more than 100 cows are milked. In addition Bill takes care of the 400 tillable acres of the farm, which yield corn, wheat, alfalfa, and the straw used to bed the trailers. The remaining 100 acres serves as pasture for the dairy.

"I've been involved on a dairy farm since I was 13, off and on," said Bill. He started dairy farming immediately after high school and bought the home farm in 1957.

got milk?

Pennsylvania Streams and Lakes



LOST STREAM MAP

The STREAM MAP OF PENNSYLVANIA was completed in 1965 after a thirty-year effort by Howard Higbee, a former Penn State Professor.

The map is also known as the LOST STREAM MAP to some anglers.

Professor Higbee succeeded in creating a map of the highest detail possible...a map that shows every stream and lake. He painstakingly plotted by hand, the location of 45,000 miles of streams onto a 3 x 5 foot map.

The map sold extremely well -- until it was lost several years later. Incredibly, the printer entrusted with the original drawing and printing plates declared bankruptcy, then carelessly hauled Higbee's 30 years of work to a landfill.

The few remaining dog-eared copies became a prized fisherman's possession. Professor Higbee was offered \$400 for one of his last maps. And state agencies were forced to keep their copies under lock and key.

Experts told Professor Higbee that reprints were impossible, because the maps were printed in non-photographic blue.

Then, in 1991, at the age of 91, Howard Higbee's dream came true. Computers made it possible to reprint the map. Holding an updated map, Howard said, "I never thought I'd live to see this day."

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