Farming under glass

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itially to Japanese, Chinese, and Italian restaurants in the Northeast. These gourmet mushrooms are much larger, darker and firmer than the commercial button mushrooms grown in Pennsylvania. Shiitakes grow on oak logs rather than in compost, and in filtered sunlight rather than in damp, moist darkened beds.

Green Empire plans to build a 1-acre greenhouse next year that will be used to grow these mushrooms during the winter months, and as a warehouse. The Shiitake mushrooms are harvested in spring and fall. The owners plan to control the temperature and lighting in the greenhouse to simulate harvesting-season conditions throughout the winter.

Light and tomatoes

Pepperidge Farm Inc. has been experimenting with supplemental lighting since it built its original 1-acre greenhouse at the Montour site in 1982. The company is using high-pressure sodium vapor and metal-halide lights to determine if supplemental lighting used to enhance the growth of tomatoes is economically practical. PP&L is assisting in this research project.

The Pepperidge Farm tomatoes, which are sold to gourmet markets in the Northeast, are grown hydroponically. During the company's peak season, 50,000 pounds of tomatoes are shipped from the greenhouse each week.

The company expanded its greenhouse to 6 acres in 1983, after market research indicated that the tomatoes would be a profitable product for the company. Pepperidge Farm's long-range plans call for phased expansion of its Montour operation during the next five years.

Bryfogle's Inc. was the first grower to build a greenhouse at the Montour site. The original 3-acre greenhouse was completed in December 1980; a 3-acre addition was completed in late 1983. A wide variety of flowers, including poinsettias, geraniums, gloxinias, bedding plants, Easter lilies and other holiday crops, are raised in the two greenhouses.

Floor-heating system

Both the Bryfogle and Pepperidge Farm greenhouses make use of a unique, warm-water floor-heating system designed by Rutgers University's Department of Biological and Agricultural Engineering. A 20-inch-diameter supply pipeline, buried three feet underground, transfers warm water from the Montour power plant's condenser-cooling system to the greenhouses.

Inside each greenhouse, miles of ¾-inch-diameter plastic pipes are embedded in gravel just beneath a porous concrete floor. The warm water flows from the supply pipeline to the pipes beneath the greenhouse floor, and is then returned to the power plant. The system acts as a heat exchanger to warm the greenhouses.

PP&L leases the land where the greenhouses are located to each of the growers.

The only-waste-heat greenhouse complex in the world that's larger than the Montour project is a 20-acre greenhouse in England. The first commercial waste-heat greenhouse in the United States was built near a power plant owned by Northern States Power Co. of Minnesota. The original 1-acre greenhouse, where roses are grown, was built in 1978 and has since been expanded to 5 acres.

Bryfogle's greenhouse, built two years later, is the second commercial waste-heat greenhouse in the United States. The floor-heating system used in the Bryfogle greenhouse has served as a model for many other greenhouses in the world.

Thousands have toured the Montour greenhouses during the past three years, including scientists, growers, and utility representatives from around the world, state and federal government officials, national news media and area groups, from cub scouts to garden clubs.

It's time to control bagworms

NEWARK, Del. — Be prepared for the annual onslaught of bagworms. These familiar insect pests hatch around the beginning of June. Unless you take precautions, they could damage or even kill your ornamental plants.

Bagworms feed on many kinds of plants. Sycamores, willows, maples and other broadleaved species usually can recover from a complete defoliation. But arborvitae, southern white cedars, red cedars, junipers, spruces and pines cannot.

To control bagworms, you need to understand their life cycle, says University of Delaware extension county agent Bob Hochmuth. Bagworms overwinter in the egg stage inside cases, or "bags", hanging from trees or bushes. After the eggs hatch, the young larvae crawl around the plant, eating foliage and spinning long threads of silk on which they crop to other branches. As they hand suspended on the threads, the wind carries some of them to other trees. This is the way bagworms spread.

Soon after emerging, each tiny larva begins spinning a protective bag around itself, leaving an opening at the head end to permit crawling and feeling. As it feeds, it attaches small pieces of leaves or needles to its case, expanding the case as it continues to grow.

By late August the bagworm is fully grown. Still in its bag, it settles into the resting or pupal stage. During September and early October, males emerge and fly to cases containing females, where mating takes place. Females stay in the bags, where they die, but the eggs remain in their bodies and hatch the following June.

A bagworm infestation usually goes unnoticed until the damage becomes fairly severe, because the insects are inconspicuous when young. Later in the summer their bags are larger and show up clearly against the branches they have defoliated.

Hochmuth says bagworms are easiest to control in late spring, before their bags are fully developed. Look for tiny cases of developing worms attached to leaves and needles of ornamentals in early June. With patience, you can control a light infestation by hand-picking the bags and destroying them. If that's impractical, spray plants with Sevin, Diazinon, Orthene, Malathion, Cygon or Bacillus thuringiensis (Dipel, Thuricide or a similar product), while the insects are still vulnerable, around June 10-15.

Control becomes much more difficult if you don't notice an infestation until late June when the bags are already formed. Hochmuth says a systemic insecticide such as Orthene or Cygon generally offers the best control at this late stage.

Always read the label on any insecticide to make sure the product is effective against your target pest. Also check for cautions against spraying sensitive plants.

Contact the county extension office in Newark, Dover, or Georgetown for further information or a fact sheet on bagworms.