



Native bees prove their worth

STORY AND PHOTOS BY JIM HALE



You've heard the expression

"busy as a bee."

Turns out, some bees are busier than others. A lot busier. For pollinating fruit trees, growers increasingly rely on native wild bees rather than honeybees, which were originally imported from Europe. "Honeybees are actually kind of lazy on apples," visiting only one or two flowers per minute, said Dr. David Biddinger, an associate professor and tree fruit research entomologist at the Penn State University Fruit Research & Extension Center (FREC) just outside Biglerville. In stark contrast, native bees "are like hummingbirds on methamphetamine," belly-flopping onto as many as 15 blossoms every 60 seconds, Biddinger said.

On top of that frantic speed, he said, wild bees have much hairier bodies than honeybees, meaning far more pollen adheres to them for the joyride to the next flower.

These days, more than half of Pennsylvania's growers are choosing native pollinators over honeybees, Biddinger said.

Among them is David Slaybaugh, who represents the fourth generation of his family to operate Mount Ridge Farms. He is president of the business, which is headquartered on Brysonia-Wenksville Road about three miles north of Arendtsville.

"We haven't used honeybees in fifteen years, with no reduction in production or quality," said Slaybaugh, whose operation includes some 600 acres of apples and 60 acres of peaches.

Wild bees are not only "so much more efficient," Slaybaugh said, but they also fly during cooler temperatures than honeybees. "That's crucial

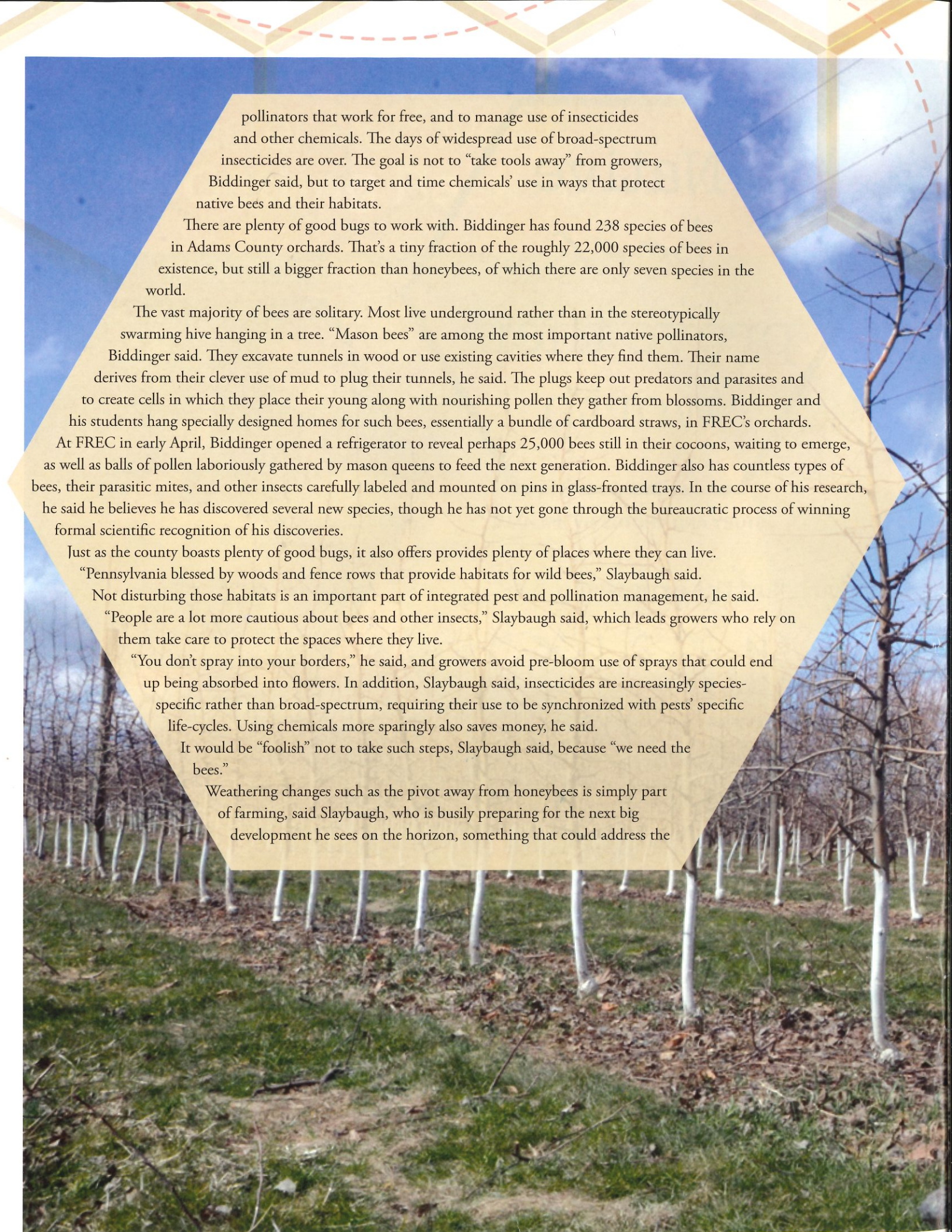
for us," he said, because it means native bees work longer days than late-sleeping honeybees do during the crucial period when trees are in bloom.

Slaybaugh's great-grandfather tended 100 hives of honeybees, but mite infestations eventually killed them all, leading to the use of rented hives. That solution worked fine, Biddinger said, until what seemed like disaster struck. A year came when weather conditions caused Adams County's bloom period to coincide with that in other states, leaving no honeybees available for hire here.

Yet, the Slaybaughs still harvested a crop. Pollination had occurred, even without the honeybees' help. But how? "I started scratching my head," Slaybaugh said, and so did a lot of other growers. Gradually, the buzz about native bees' vital role in pollination spread through the industry, taking on increasing importance as a disease called colony collapse disorder began decimating honeybee hives and driving up the cost of renting them.

How bees work has been at the center of Biddinger's scientific work for some 30 years, leading to development of an approach called "integrated pest and pollination management" for orchards.

With honeybee hives costing approximately \$250 per acre, he said, it makes sense for fruit growers to rely on wild



pollinators that work for free, and to manage use of insecticides and other chemicals. The days of widespread use of broad-spectrum insecticides are over. The goal is not to “take tools away” from growers, Biddinger said, but to target and time chemicals’ use in ways that protect native bees and their habitats.

There are plenty of good bugs to work with. Biddinger has found 238 species of bees in Adams County orchards. That’s a tiny fraction of the roughly 22,000 species of bees in existence, but still a bigger fraction than honeybees, of which there are only seven species in the world.

The vast majority of bees are solitary. Most live underground rather than in the stereotypically swarming hive hanging in a tree. “Mason bees” are among the most important native pollinators, Biddinger said. They excavate tunnels in wood or use existing cavities where they find them. Their name derives from their clever use of mud to plug their tunnels, he said. The plugs keep out predators and parasites and to create cells in which they place their young along with nourishing pollen they gather from blossoms. Biddinger and his students hang specially designed homes for such bees, essentially a bundle of cardboard straws, in FREC’s orchards. At FREC in early April, Biddinger opened a refrigerator to reveal perhaps 25,000 bees still in their cocoons, waiting to emerge, as well as balls of pollen laboriously gathered by mason queens to feed the next generation. Biddinger also has countless types of bees, their parasitic mites, and other insects carefully labeled and mounted on pins in glass-fronted trays. In the course of his research, he said he believes he has discovered several new species, though he has not yet gone through the bureaucratic process of winning formal scientific recognition of his discoveries.

Just as the county boasts plenty of good bugs, it also offers provides plenty of places where they can live.

“Pennsylvania blessed by woods and fence rows that provide habitats for wild bees,” Slaybaugh said.

Not disturbing those habitats is an important part of integrated pest and pollination management, he said.

“People are a lot more cautious about bees and other insects,” Slaybaugh said, which leads growers who rely on them take care to protect the spaces where they live.

“You don’t spray into your borders,” he said, and growers avoid pre-bloom use of sprays that could end up being absorbed into flowers. In addition, Slaybaugh said, insecticides are increasingly species-specific rather than broad-spectrum, requiring their use to be synchronized with pests’ specific life-cycles. Using chemicals more sparingly also saves money, he said.

It would be “foolish” not to take such steps, Slaybaugh said, because “we need the bees.”

Weathering changes such as the pivot away from honeybees is simply part of farming, said Slaybaugh, who is busily preparing for the next big development he sees on the horizon, something that could address the



industry's perennial labor shortage. "We're gearing up for mechanical harvesting and robotics as fast as we can," he said, perhaps as soon as five years from now. Slaybaugh's son Blake got a head start in learning about automation during a year-long internship on the other side of the continent, with the Washington Tree Fruit Research Commission.

At home, Slaybaugh has begun planting trees far closer together than in the past, achieving densities of up to 2,400 trees per acre, and securing their limbs to a complex trellis system fashioned from a network of wires. The goal is to make every apple accessible to a robot's grasp. Camera-equipped machines can already judge an apple's ripeness by color and size, Slaybaugh said, but they can't reach around tree limbs to grab it. At least not yet.

A wealth of information about wild bees is available from a YouTube video featuring FREC and its work. Search for its title, "Native Pollinators." Biddinger also recommended The Xerces Society as a source of information. The society is dedicated to conserving invertebrates. Its website is at xerces.org.