

Identifying, Monitoring, and Enhancing Wild Bees on Apple and Blueberry Farms UMaine Cooperative Extension Factsheet—DRAFT PROFILE

Farmer-to-Farmer: Case Studies of Wild Bee Enhancement in Maine



Photo by Trent Bell.
Figure 1. Robert, Jennifer, Judy, and Everett Dimock at their farm, North Star Orchards, in Madison, Maine. Photo by Trent Bell.

North Star Orchards

Owned and operated by Everett and Judy Dimock

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Farm history. Everett and Judy Dimock own North Star Orchards, a family-run apple farm they operate with their two children, Jennifer and Robert. After graduating from Cornell in 1962 with a major in Pomology, Everett worked for 10 years at orchards in the Champlain Valley of New York before moving to Bennington, Vermont to manage an orchard. During those years Judy worked as a physical therapist and assisted with retail sales at the orchards where Everett was employed. In 1976, the Dimock's moved to Maine and purchased Berry Orchards from the Berry family in Madison, and renamed the farm North Star Orchards. At that

time the orchard was planted in about 40 acres of standard trees. For the last four decades Everett and Judy have gradually transitioned the orchard to dwarf and semi-dwarf trees.

Situated amid forestland at the foot of the Western Mountains, North Star Orchards offers the quintessential Maine orchard experience. In addition to 35 acres of apple trees, the farm includes a farm store operated out of a restored 1800s farmhouse where visitors can purchase apples and a variety of Maine-made items and specialty foods. The farm also includes cold storage, a packing facility, pick-your-own apples, and a cider mill and farm kitchen. Today, North Star Orchards produces a wide range of apple varieties—including McIntosh, Cortland, Paula Red, Ginger Gold, Jersey Mac, Macoun, Empire, Red Delicious, Golden Delicious, and Northern Spy—that they sell through pick-your-own, the farm store, and a number of Hannaford supermarkets throughout Central and Western Maine.

Farm practices and pollination management.

At North Star Orchards the Dimocks practice Integrated Pest Management (IPM). As part of their IPM practices, Everett and Robert are frequently out in the orchard scouting for diseases and insect pests. “We've been doing IPM for 30 years now,” says Judy, “maybe more, and I think over that period of time of scouting insects and looking to see what's happening in the orchard you develop quite a lot of knowledge about what lives in your orchard— animals and insects.” This knowledge has helped them develop an informed pollination management plan.



Figure 2. Photo by Jennifer Dimock.

When Judy and Everett moved to Maine they brought with them eight colonies of honeybees from Vermont. These bees, along with rented honeybees from local beekeepers, supplied the pollination for their orchard. They kept the bees for nearly a decade but found it increasingly difficult to properly care for them with the competing demands of the orchard business. They found the seasonal demands of beekeeping and apple growing to be the same—both peaking in spring and fall—and eventually lost their bees. Today, they continue to rent honeybee hives from a Maine beekeeper to ensure their apple trees are sufficiently cross-pollinated each spring. Yet they have noticed changes in pollination during their 40 years on the farm. “In earlier years we had a very healthy population of wild bees,” says Judy. “I think many of them were wild honeybee swarms that had escaped because honeybees weren't as intensively managed then, so swarms were common and we had a lot of activity even without rental bees in the orchard. That has without question declined dramatically. [Now] you don't see the level of bee activity in the trees that there used to be.”

Minimizing harm to pollinators. The Dimock’s goal is to successfully operate their commercial orchard while simultaneously conserving and encouraging wild pollinators. Despite practicing IPM, the Dimocks worry about exposing wild pollinators to the pesticides that are necessary to produce their crop. “Even if we’re absolutely perfect with our spraying practices,” stresses Judy, “there's going to be some bees in the orchard. You can't help it. So we do everything we can to minimize harm.”

For the Dimocks, minimizing harm involves several approaches. According to Judy, “If you don't mow the row centers [between apple trees] there's a lot of flowers in there that the bees visit. So you're providing food. But at the same time every time you spray you definitely are getting spray material on the row centers. So we've concluded that more mowing is better than less

mowing in the orchard itself and we discourage flowering plants in the areas that we apply pesticide and encourage flowering plants in the areas where we do not spray and do everything that we can to avoid drift.”

Additionally, the Dimocks try to stay current with their knowledge of pesticides and select ones that are known to be least toxic to bees. They apply all pesticides in accordance with best management practices to reduce the impact on bees, such as applying sprays in the evening when bees are least likely to be visiting flowers. Furthermore, in 2014 they worked with the Natural Resources Conservation Service (NRCS) to develop a Pollinator Habitat Enhancement plan for their farm. The plan is helping the Dimocks answer the question of how to grow a conventional crop and also protect and promote wild bees.



Figure 3. Photo by Jennifer Dimock.

Developing a pollinator habitat enhancement (PHE) plan. The Dimock’s worked with a certified Technical Assistance Provider for NRCS to develop the PHE plan for their farm. “The pollinator habitat plan...really has helped a lot in getting us focused on the best things we can do,” says Judy. “We wanted to know what the best options are for us.”

Although NRCS offers cost-share funding for the PHE plans, the Dimocks opted to pay for the plan themselves to expedite the process. Still, the Technical Assistance Provider wrote the PHE plan to be compatible with NRCS requirements. By meeting these requirements, the Dimocks are eligible to apply for cost-share of specific practices should they wish to do so in the future.

In creating a PHE plan for the Dimocks, the Technical Assistance Provider (TSP) used a pollinator habitat assessment guide created by *The Xerces Society for Invertebrate Conservation*. The guide evaluates several aspects of a farm to assess pollinator habitat, such as: (1) native bee nesting habitat, (2) foraging habitat and landscape features, and (3) farm practices. The findings from the assessment are shared with growers in their final PHE plan. For example, in evaluating foraging habitat, the TSP assesses the flowering plants that are available in spring, summer, and fall, and indicates gaps in the season where forage is not available for pollinators. Growers can then implement practices—such as planting specific flowers in buffer zones between fields—to fill this temporal gap in available forage. The Dimock’s final PHE plan includes information about landscape features of the property, best management practices for pesticides, recommendations for possible pollinator plantings and nesting areas to develop for bees, and more. The Dimocks were already implementing some of the practices recommended through the PHE plan, yet it helped them affirm that they were taking the right steps for their farm. They have come to see

the PHE plan as a tool for understanding the conservation options for their farm and figuring out what will work given specific circumstances.

Enhancing habitat for wild pollinators. Years ago North Star Orchard had a forested area in the middle of the orchard where deer would gather and wander into the fields to munch on apples and trees. Red squirrels also liked the perimeter of the woods and were damaging the fruit. To address both problems, the Dimocks cleared the woods and now maintain the clearing



Figure 4. Photo by Jennifer Dimock.

as early successional habitat, which provides excellent forage for wild pollinators. They mow the meadow annually to maintain it in an early successional stage and have spread seed to create a lush pollinator meadow—or bee pasture—full of common milkweed (*Asclepias syriaca*), goldenrod (genus *Solidago*), pin cherry (*Prunus pensylvanica*), pussywillow (genus *Salix*), and aster. They have also found gooseberry (*Ribes uva-crispa*) to be a great bee plant that blooms before apple. Recently, the Dimocks have encountered a challenge in the form of invasive reed canary grass, which has spread rapidly through the bee

pasture as a result of the wet summers of 2014 and 2015. They are currently experimenting with control methods and time will tell what methods are most effective.

Promoting bumblebees and andrenid bees. The wild bees most commonly found at North Star Orchards are andrenid bees (commonly known as mining bees) and bumblebees. One challenge for apple and blueberry growers interested in enhancing wild bumblebee species is that when bloom occurs only queen bumblebees are active. Yet this doesn't appear to be an issue at North Star Orchards, where the Dimocks often see wild queen bees working the apple trees. "We have a planting of Rugosa Roses around the edge of the store and the numbers of bumblebees in those roses in July when they're blooming is remarkable," says Judy. "Every blossom has two or three bees in it early in the morning. It's fascinating and it really made me aware of how many bumblebees we do have. And if there's that many workers there must be plenty of queens."

Andrenid bee species, which are solitary, ground-nesting bees, are also common at the farm and active during bloom. A large sandbox sits outside of the farm store at North Star Orchards, and though meant for children, it has become home to a large population of andrenids. When the Dimocks discovered that andrenid bees were nesting there, Judy says they "spent an inordinate

amount of time in April and May sitting on the edge of the sand box watching these bees come and go.” The lifecycle of andrenid bees makes them ideal wild pollinators for apple and blueberry, because they nest, forage, and pollinate in April and May and are gone by June. Given the presence of andrenid bees at the farm, one of the suggestions in the Dimocks PHE plan is to build a berm for sand nesting bees.

Next steps. Moving into the future, the Dimocks plan to continue learning about wild bees and enhancing habitat for them around the orchards. Furthermore, they have been working on educational materials to share with visitors to the farm store. “The public seems interested in bee welfare which is encouraging,” says Judy. Also, following recommendations from their PHE plan, the Dimocks hope to soon install nesting blocks for mason and leafcutter bees. “We will continue to encourage the native flowering shrubs and wild flowers that currently are already occurring here,” says Judy. “We've saved a lot of seeds of things like swamp milkweed and Joe Pye weed and coreopsis and things like that, and we'll continue to spread those seeds as we have done in the past to try to increase the variety and numbers of flowering plants in certain areas of the farm where we feel spray drift isn't a problem. I think that we're going to be continually investigating, keeping in mind new and better equipment to further limit drift.”