A Tree Beekeeper's Thousand-year-old Hive

And a Renewed Tradition

by M.E.A. McNeil



When the mill worker in Leżajsk, southeastern Poland, sliced into the big oak in 2024, he knew what was looking at as soon as the saw blade stopped: a very old comb-filled beehive. After all, beekeeping is an integral part of Polish culture, no wedding complete without the blessing of honey. But he had no idea how old.

The hive was analyzed at the Polish Biological Research Institute in Kraków and was found to have been made by a beekeeper about 680 A.D. — about 1,340 years ago, measured by carbon-14 dating. The thick layer of biologic material in the bottom of the hive was assayed by morphometrics and declared, with 84% probability, to be from *Apis mellifera mellifera*, the small dark bee still in the area. The find, uniquely preserved because it was buried in a sand pit, is the oldest kept tree hive known, although natural bee trees 200 years older have been discovered.

Above: *A tree beekeeper plies his craft, climbing on ropes secured around the tree and resting on a thin wood seat attached to his ropes to access the narrow hive entrance. (Image credit: Beekeeping Brotherhood)*

"I can explain how it was made," said Piotr Piłasiewicz from the Polish tree beekeepers' association Bractwo Bartne, the Tree Beekeeping Brotherhood. "In the seventh century, someone climbed the tree using ropes and made a cavity inside of the living oak eight meters [26 feet] above the ground. They dug out a cavity and put two sticks as a side entry for the bees. In a few years, he stopped taking care of this hive in the tree. The bees, for the longest time when it was not managed, were still living there. The



This seventh-century beehive is kept at the Museum of Tree Beekeeping Culture (Muzeum Kultury Bartniczej) in Augustów, Poland.

tree, millimeter after millimeter, continued growing and closing the cavity inside. The hollow cavity where the bees lived had completely overgrown and wasn't visible from the outside. Closing up the tree was a process that took about 50 years. The tree, when it died and fell, was 167 years old."

The absent beekeeper from that early medieval period was probably a member of a small tribal community of Slavs who lived when dense forests covered the landscape. Having survived a 50% childhood mortality rate, he may have lived into his 40s. Wood tools were standard, although it is hard to imagine how he could have carved the niche without an iron blade from what was then a rare forge. In any case, lab analysis of the hive debris showed that there was no agriculture in the area in which the bees were flying (no pollen grains from plants known to be grown by people), so he would have hiked the two-or-three-mile flight radius of the bees with his equipment. Honey would have been an important part of his diet, with millet, milk and occasional meat. But famine was frequent and devastating, occurring every few years because of a dependence on a seasonal harvest.



Piotr Piłasiewicz and Pawel Kotwica at the Apimondia pavilion of Bractwo Bartne, the Tree Beekeeping Brotherhood of Poland. They are displaying the oldest known preserved bee colony, 1340 years old. Displayed in the exhibit were bees extracted from the hive, encased in propolis, as well as a fragment of the original honeycomb.

The find, now housed in the Museum of Beekeeping Culture in Augustów, is an example of a once ubiquitous tree-beekeeping tradition. A Russian tomb from the fifth century contained a set of tree beekeeping tools. Eastern European monks left a written account of tree beekeeping in 900 A.D. Soon after, the German King Otto I allowed tree beekeeping in the Grunewald Forest. By the 17th century, tree beekeeping was so developed in the Polish-Lithuanian Commonwealth that the beekeepers formed communities bound by oaths, with their own laws and even some political power. Their registered areas of the forest, called *bartny bórs,* contained 60 tree hives. A beekeeper had an inheritable ownership of his colonies, but it did not extend to the tree or the land. Taxes were paid in wax and honey, which were many times more valuable than wood.



Piotr Piłasiewicz of the Tree Beekeeping Brotherhood explains "where beekeeping began — and to remind everyone that these traditions are still alive, especially in our region." Beyond cultural heritage, he said, the craft has ecological value and scientific relevance.

The economics of wood and honey reversed from the mid-19th century. Wood became more important to fuel war and industrial development. Legal bans on tree beekeeping were imposed by the rulers of Austria, Prussia and Russia to make way for the felling of the trees. Still, the Polish census of 1827 recorded over 70,000 tree hives.

The Białowieża Forest, spanning the Poland-Belarus border, is the last, largest remaining part of the immense primeval forest that once stretched across the European Plain. That forest was exempt from widespread logging as a private hunting ground, first for Polish kings and then for the Russian czar until 1915, when it became a reserve. It is now a major UNESCO heritage forest. But over a century ago, most other forests were harvested for timber, Piłasiewicz said. "Tree beekeepers, our grandfather's fathers, were obliged by the state to put their bees in logs and take them out of the woods to their houses."

The tree-hive tradition in Eastern Europe was all but lost by the 1930s. In the Białowieża National Park, there



The mill yard with the ancient log — slicing was halted when the mill worker discovered that it contained a hive.



Tree beekeeping culture in Poland and Belarus was inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity in 2020.

were 112 empty tree-hive cavities, made before an 1888 ban, their entrances closing. The last Białowieża tree beekeeper, Filimon Waszkiewicz, died in 1967.

Then, in 2002, while setting up a woodland nature reserve, scientists from the World Wide Fund for Nature, Hartmut Jungius and Przemysław Nawrocki, discovered tree beekeeping still being practiced in the Southern Urals of Bashkortostan, Russia. Over 700 tree hives of the Burzyan bee, a cold-resistant type of *A.m. mellifera,* have been found there. The reported figures vary widely, but in an average year perhaps 30% are naturally populated by swarms and managed by the Bashkir.

In Belarus hundreds of log hives remain in trees, and a few tree cavities are alive with bees. Piłasiewicz learned that there were still some old tree beekeepers in remote villages in Belarus and Ukraine, but there were none to be found in Poland. "There was a break of 100 years," said Andrzej Pazura of the European Forest Bee Association, through translation by his daughter Sylvia. "In Poland there were many books but there was no person we could go to to learn the practice." He visited the Bashkir, those still doing traditional beekeeping in the Russian Shulgan-Tash National Park, with a group of young Polish foresters, some of whom remembered family stories of tree-beekeeping great-grandfathers. In 2007 three beekeepers from Russia came to Poland to teach the craft.

The Russians taught the Polish beekeepers how to build their first hollow log hives, carve traditional niche hives in trees and care for the forest bees. By 2012, some of the prepared trees and hollow logs were colonized. In 2018, the Polish government organization State Forests started a project called "Bees Returning to the Forest," involving 100 colonies managed by foresters. For two years, the condition of the forest environment was monitored, and the information was used to create a document regulating forest management to protect the bees. The apiaries were equipped with scales that collected and transmitted daily information — presumably for the log hives. Forage availability and the needs of other bee species were also addressed.

The traditional tree-beekeeping culture of Poland and Belarus was officially entered on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity in 2020.

Beekeeping Brotherhood





Beekeeping Brotherhood

Above: *A tree hive entrance restricted by the beekeeper.* **Left:** *The thousand-year-old hive — cross-sectioned at a mill where it was discovered. Note that the tree became completely closed off over time.*

Now, tree beekeeping has found new life, not only in Poland but in many other areas of Europe. Why this resurgence of interest, when modern hives are available and tree hives are, among numerous disadvantages, labor intensive? The reasons given by its proponents are many: Tree beekeeping is the oldest form of beekeeping, a tradition in a culture steeped in bee lore from prehistory. It most closely respects the innate preference of bees, "very important for biodiversity and for the environment," said Pazura. Advocates cite naturally evolving immunities, and the name of the American bee researcher Tom Seeley comes up. Seeley visited the tree beekeepers in the Russian Shulgan-Tash National Park, which informed his advocacy for "Darwinian beekeeping." A German urban swarm hunter, Ingmar Zech, who learned tree beekeeping from Pazura, said it was a milestone for him to have made a log hive with Tom Seeley in 2018.

Because of the challenges of farmed bees, Piłasiewicz speculates that the protected bees may offer a genetic repository for commercial stock. "In genetics there is nothing for free. In increasing one characteristic, like productivity, we can decrease other characteristics that may be helpful in the future. So keeping part of the population so that they can grow the characteristics that they need, not what we as the beekeepers, the humans, need from them, could be very useful in the future if there could be a significant collapse of the population of the bees."

An important reason given for keeping these bees is protecting the integrity of the subspecies native to the area — *A.m. mellifera* — down to regional variants. Four ecotypes or breeding lines of *A.m. mellifera* are found in Poland: Augustowska, Kampinoska, Północna, and Asta honey bees. Since the 1970s, conservation programs have restricted beekeepers to obtaining queens from dedicated breeders in the Białowieża Forest in the north and Kampinos National Park close to Warsaw. Since 1976, the Augustów Forest serves as a protected area for the Augustów line.

From 2009 to 2014, the European Economic Area Financial Mechanism provided Norwegian funds to restore traditional beekeeping in four Polish forests: Augustów, Białowieża, Knyszyriska, and Piska. The project involved building log hives, constructing educational trails, training new tree beekeepers and conducting scientific research including genetics of forest bees.

But there is no clear confirmation that those lines of *A.m. mellifera* in Poland represent true ecotypes rather than simply breeding lines, according to Bartek Molasy, a member of the Tree Beekeeping Brotherhood, a veterinarian specializing in bees and a member of the team of researchers that examined the ancient hive. "Conservation began in the late 19th century and was based largely on subjective selection criteria. These lines have not been maintained in strict isolation, which has led to hybridization with non-native species. … Currently, efforts are being made to restore these ecotypes to allow them to adapt to local environments. The restoration process is ongoing, and tree beekeeping plays a crucial role in it."

Piłasiewicz has observed that the lines are behaviorally different and cites an example: Unlike the others, the Augustów queens lay in a scattered pattern, and when a frame is pulled, the bees don't stay on the brood but beard down in a teardrop.

From 2021 to 2024 the Augustów forest district partnered with forest districts in Russia, Belarus, Lithuania and Ukraine to restore the Augustów bees. They purchased 23 colonies from dedicated breeders, constructed 15 niche beehives and nine hollow-log hives, created over 50 acres of flower meadows, made ponds and nesting boxes for other pollinators, and installed cameras. There are now about 60 tree beekeepers belonging to a couple of different associations in the Augustów forest.

The new tree beekeepers have been at a loss to replicate only the carved niches that had come before them. Pazura recounted the historic generations-long timeline for the preparation of a new hive cavity in a bee tree. First, the crown of the tree was removed to encourage the tree to grow in girth. It was a subsequent generation that hollowed out the hive and left it open to season. The family line then managed the colony, handing it down to the following generations — many such trees 150 years old.

"I want to bring the bees back into the forest, but the forest is not in good condition," said German tree beekeeper Ingmar Zech. The trees in replanted clear-cut forests are rarely large enough to hold a hive — a necessary height of 4-6 meters (about 13-20 feet) with a stable trunk large enough to hold a hollowed-out cham-

ber not to exceed a third of the cross-sectional area of the trunk. Such a tree would not be chosen as the tallest tree but one with strong protective trees around it.

"We make log hives for forests where there are no sufficiently old and thick trees," said Pazura. So it is that tree beekeepers are mimicking niche hives in logs that they raise to the appropriate height.

Construction of the tree hive starts with a slot that forms the beekeeper's entrance to the hive. In the photo of the cross-section of the ancient hive, it is possible to see, next to the narrow entrance for the bees, a wide wedge that the beekeeper would have removed for harvest. The internal volume of such a hive varies but can be 80-90 liters (about 3 cubic feet). The separate entrance for the bees is about 3x3 inches.

Some tools are special to tree beekeepers: a hand-forged adze, a heavy iron chisel mounted on a long handle to shape the hive, and a circular scraper with a wooden handle used to smooth the interior walls. With the addition of modern tools such as chainsaws, the process of making a log hive can take one to two days. A rope kit, the *lezziwo*, is used for climbing. A long rope is used to make tight loops around the tree to aid the climber. After reaching the hive, the beekeeper ties the rope above the opening to support a narrow wooden seat for working the hive.

Thin, sharp pieces of wood called spales are adjusted to fit tightly inside the cavity as guides for comb. The top third of the comb is positioned above the bee entrance and left undisturbed for brood and winter stores. Any spare honey is harvested from the bottom two-thirds of the comb. In Poland, an average of about three pounds is harvested from a colony in a year. In Ukraine, tree hives can yield over six pounds because of richer forage. To address the imbalance of effort to gain, Piłasiewicz said, "We treat tree beekeeping like an element of our cultural heritage. We have learned an important lesson, to observe nature and try to work with nature, not thinking what we can change to increase productivity, our income. I understand that this will not bring enough money to the growing population."



Beekeeping Brotherhood

Tree beekeepers prepare climbing ropes, called the lezziwo*.*

The final addition to a tree hive is the beekeeper's mark on the tree, a series of incisions in the bark to designate ownership — called by nearly as many names as there are signs, the *signum* or *klejmo*. The mark is unique to the beekeeper, and families could share designs. Pazura learned tree beekeeping from a seventh-generation Russian beekeeper whose sign was composed of one line for each generation. Pazura was permitted to create his own mark based on his mentor's. There is no central registration for these signs, unlike a coat of arms, and it is extraordinary to look at pages of drawings of them and not find two very similar, let alone alike. Piłasiewicz explained that the Slavic

Beekeeping Brotherhood





Beekeeping Brotherhood

Left: *A beekeeper's unique mark for his hive, traditionally signifying ownership of only the hive, not the tree or the land.* **Above:** *Beekeepers' tree marks are unique to the beekeeper. Into the 19th century they were used as signatures on documents as well.*

people, like many tribes and ethnic groups in the early Middle Ages, did not have an alphabet. These signs were used to mark the trees and clay products. They were also used to sign documents well into the 19th century. The new Polish tree beekeepers have designed their own signs to mark their hives.

A concern among modern beekeepers is that tree hives can be reservoirs of diseases and pests. It is only possible to see into the comb to a very limited extent, and the tree beekeepers emphasize minimal interference, going in only twice a year.

When it comes to management, the tree beekeepers have varied oversight from their associations and forest services. They emphasize the givens that provide protection, for example the small size of their colonies, an advantage demonstrated by Seeley's experiments in the Arnot Forest — characterized by frequent swarming that provides a brood break for controlling varroa. Modern beekeepers are now roughing the walls of hives to attract antibiotic propolis; tree niches are so thoroughly propolized that when undisturbed fallen bee trees disintegrate they leave the propolis shell of the hive behind. Low density of forest hives greatly reduces the problem of horizontal disease spread. In the book "Tree Beekeeping Today," Pazura writes, "The distance between hives should be .5 to 1 km [547 to 1093 yds]." The reality is, according to Molasy, the bee vet, spacing is generally decided by the individual tree beekeeper, although forest authorities can intervene and the swarming bees have a say.

There is a paucity of data comparing pests and pathogens in feral and managed bees. L. Bailey of the U.K. Rothamsted Experimental Station summarized the limited data in 1958 to say that "its incidence usually seems to be low relative to that in beekeepers' colonies." Goodwin, in 1994, studied AFB in feral colonies in New Zealand and concluded that they were more likely to be infected by robbing diseased managed hives and were short-lived. A 2023 preliminary study from Texas A&M University compared virus levels between managed bees and feral hives in the Welder Wildlife Refuge in Texas. It concluded: "We found low average virus titers in all wild colonies sampled and no difference in virus titers between colonies at the WWR and those from the managed apiary."

Another study, from the University of Leeds in 2024, compared thermal regulation between tree hives and modern hives using computational fluid dynamics. It showed that tree cavities have significantly greater thermal resistance.

Pazura's three tree beehives are tested for pests and pathogens every year by a visiting professor with students from the Warsaw University of Life Sciences, and so far so good. But what if there is a problem? Molasy points out that sampling can be challenging and treatments would be difficult to apply in tree hives. It is not possible to collect bees directly from brood combs to test for varroa. "From my perspective," Molasy said, "treating bees in tree or log hives is impractical. If the goal is to monitor, treat, feed or harvest honey, it is much easier and more practical to manage bees in modern hives. If the aim is to develop locally adapted bees capable of surviving in a natural environment without management, then active intervention may contradict that objective."

An interest in rewilding plants and animals has blossomed in many parts of the world. Theory and practical skills are offered in tree beekeeping courses in Switzerland, Poland, Germany, the Czech Republic, the Netherlands, Belgium, Lithuania, Belarus, Russia and Israel. And so, log hives are being made and raised into trees in the U.S.

Honey bees are not native to North America; brought by European settlers, the little black *A.m. mellifera* spread across the continent. Honey hunting was the practice — the pillaging of feral hives, not tree beekeeping — although bees were kept in logs in outyards. This movement to put beehives in trees is something different from the revitalization of the historic European practice, under the cooperation of UNESCO, numerous regional forestry services and programmed studies.

In most U.S. states, movable-frame hives are required because fixed-comb hives cannot be adequately inspected for disease, with the practical effect that traditional hive designs used for centuries in Europe and Africa are illegal. Nonetheless, various rewilding organizations such as Beekeeping International are advocates. Apis Arborea teaches the construction of log hives, which they call arboreal nest habitats, and also conducts excursions to observe feral honey bee nests, for example in the Galbreath Wildlands Preserve at Sonoma State University in California.

Questions remain for the Polish beekeepers. Material from the ancient hive is stored at -50°C to preserve the DNA for further testing. Dr. Michał Kolasa from Krakow's National Research Institute of Animal Production said, "We want to know, among other things, what the genetic similarity is between these ancient bees and the lines we protect today." Now you have us curious, too.

References

Bailey, L., Wild honeybees and disease. Bee World 39, 1958, 93-95.

Dickey, M. et al., A preliminary survey reveals that common viruses are found low titers in a wild population of honey bees *(Apus mellifera).* J. Insect Sci, 2023, 23(6): 26; 1-11.

Goodwin, R.M. et al., Incidence of American foulbrood infections and feral honey bee colonies in New Zealand, N.Z. J. Zool, volume 21:1994.

Mitchell, D.M., Are man-made hives valid thermal surrogates for natural honey bee nests? J. Therm. Biol. 122 (2024).

Spała Forest District, Tree Beekeeping Today, 2025, 350pp.



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