



LAND
BRANDENBURG

Ministerium für Landwirtschaft,
Umwelt und Klimaschutz



Flowering time in the Mark

Bees and beekeeping in Brandenburg



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Dear Readers,

If a ranking of the most popular insects were to be drawn up in Germany, the honeybee would certainly be in first position. Bees enjoy special attention and great sympathy among the entire population.

Fortunately, the number of bee colonies has been rising again in Brandenburg for ten years. We are working to ensure that this remains that way. That is why we will continue to support beekeeping directly and subsidize new beekeepers in purchasing original equipment. The conditions for beekeeping are a recurring topic in public debates about an agricultural turnaround. Honeybees react very sensitively to deteriorating environmental conditions in their immediate surroundings. In the struggle to preserve biodiversity, they have become a symbol for the demand for more insect protection.

Many studies show that the way in which we conduct agriculture and forestry has a decisive influence on whether bees can survive in our

cultural landscape, and whether they can produce high-quality, residue-free honey. Farmers want to and must participate when it concerns such a difficult topic like the use of chemical-synthetic pesticides. The promotion of extensive production methods and organic farming support the creation of flower strips, or offers for cooperative nature conservation projects within the framework of contractual nature conservation, are examples of how we are currently creating incentives for farmers, environmentalists, and beekeepers to work together in protecting insects and thus to protect bees. Brandenburg's foresters can make an important contribution to this. One third of our land is covered with forest. Currently the tree species pine dominates. Even honeybees, which are actually forest dwellers, are benefitting from forest restructuring to species-rich forests, which we want to continue to promote in Brandenburg in the coming years. Today, many active beekeepers are of advanced age. It remains a permanent task to attract younger people in the



country who are interested in beekeeping and who practice this old, exciting craft as a main or side-line occupation, or as a hobby. A special request of this booklet is therefore, apart from a current overview of beekeeping in the country, to take the threshold fear before beginning beekeeping.

A handwritten signature in blue ink, appearing to read 'Axel Vogel', written in a cursive style.

*Axel Vogel
Ministry of Agriculture, Environment
and Climate Protection
Potsdam, October 2020*



In the bee colony is little room, but it is harmonious. The hexagonal honeycomb cells can be seen at the bottom. Above are covered brood cells.

*A picture that everyone is familiar with: a honeybee sits on a flower – in this case a finger shrub (*Dasiphora fruticosa*), an ornamental shrub that grows to a height of up to 60 centimetres and blooms profusely.*

The somewhat different pet

Honeybees do not keep to property boundaries, do not know their owner, and do not need daily care. And yet, they need the support of humans today, in the cleaned up or even cleared cultural landscape, more than ever. There is another thing that distinguishes them from other pets: “You can keep a single cow or a single dog, but not a single bee because it would perish in a short time,” as said by Nobel Prize winner Prof. Dr. Karl von Frisch (1886-1982).

Way of life and behaviour

If you open a beehive, you will see not much at first, except masses of bees that seem to swarm around the honeycombs in a completely uncoordinated manner. But on closer inspection, structure is quickly added to the whole thing. In the beehive, the “prey”, as the expert says, grid-like structured panels of wax, the vertically hanging combs, are visible. These are made up without gaps of evenly shaped hexagonal cells. Both their vertical and their cell walls, which are angled at 120 degrees, enable an extremely high support load over many floors, achieved with the least amount of material and with optimum use of space. By applying wax reserves to the cell edges, these are thickened, which further increases their stability, and finally makes the cell openings appear roundly. Thus, a honeycomb in DIN A4 format and a thickness of 2.5 centimetres, built from only 40 grams of beeswax, can hold an amazing two kilograms of honey. That is fifty times the amount!



Because of their shape, the queen's eggs are also called pens. An egg is placed in each cell so that the larva can develop optimally.



Larvae of different ages: The bees go through several breeding stages. On the left the first cells are covered.

But how can such a building be erected without a spirit level and yardstick? Their own body is the measure of all things. If it fits into a cell, the body of other bees also fits into it. And building vertically is really no problem: just follow the force of gravity and everything is okay, at least for the bees. To ensure that the later contents do not fall out of the horizontally lying cells of the vertically hanging combs, they are built with a slight inclination of approximately five degrees diagonally upward. The capillary effect does the rest.

The bees sweat the wax necessary for the building of honeycombs from their own wax glands, which are located on the belly side. With their legs, they remove the wax plates hardened in the air and pass them to the mouth tools, which they knead while building. Their saliva increases the smoothness of the wax and serves as a solvent, so that neither the tender legs nor the mouth parts stick together. Several of these honeycombs arranged in

parallel at a distance of one centimetre form the honeycomb structure of a bee colony. The cells are used according to the current demand. Near the entrance hole, the queen begins to lay eggs on a central honeycomb in ever larger circles, from which larvae hatch after three days. During their six-day development, the foster mothers check 2000 to 3000 times to make sure they are doing well. During these six days the larvae are growing to 1500 times their original body weight. A human baby would reach the size of an adult elephant at the same growth rate!

Rapidly grown, the respective bee larva fills the cell, which is now covered by the master builders, with its body size. The larva is able to spin itself undisturbed, pupate and through metamorphosis transform into a completely different being – from the larva to the pupa to the adult, airworthy bee.

If the development of the bees is finished after three weeks starting from the laying of eggs,



Under the cell lid, the still white larvae pupate (left) and later turn black. In both areas one cell each has been opened. On the right side the bees have already hatched.

A young worker bee has just gnawed off her cell cover to leave her pupa's house. Now her life as a worker bee begins.

they nibble their cell cover open and hatch out of the cell in their final size. Meanwhile, the brood nest developed in such a way is extended to the honeycombs adjacent on both sides. It grows three-dimensional. The brood nest becomes largely spherical, which ensures that little heat is lost. The developing brood needs a temperature of constantly 35 degrees Celsius, in summer, in spring and in autumn, at brooding heat just like in frosty weather.

In the honeycomb cells at the edge of the brood nest, the bees store the collected pollen as protein food. This is available for the brood care in form of the pollen wreath around the brood. Above it is the honey bell, which covers the pollen wreath upwardly and laterally. The honeycomb, together with its contents consisting of brood and supplies, the queen, the drones, and the workers, finally form a unit, the bee colony.

The old master of beekeeping, Ferdinand Gerstung (1860-1925), even coined the term

“Bien” in 1889. That means: The bee colony is not a herd or a pack of individual animals acting together, but a single organism, so to speak a super-organism, without which the individual bee is not viable.

In fact, the three different beings within the colony are so differentiated in physique and function that each bee is specialized in certain tasks from birth on and is, therefore, dependent on the others.

The Queen provides for offspring and is therefore constantly looked after by her court. The beekeeper marks her conspicuously so as not to injure her.

The queen

The only queen, the queen bee of the bee colony, is responsible for the descendants. With an average body length of 20 to 25 millimetres she is somewhat larger than all other inhabitants. Only she lays eggs, which become adult insects through the larval and subsequent pupal stage. Through the exclusive nutrition with royal jelly, a glandular secretion from the feeding juice gland of the workers, she is able to lay 1,000 to 2,000 approximately 1.5 millimetres large, elongated eggs every day. Thereby 1500 eggs correspond to her own body weight of about 0.23 grams. The queen only has about one minute to lay each egg. There is no time to govern.

However, the eggs are not simply laid in a heap, but each egg is placed individually on the vertical bottom of the correct honeycomb cell. To do this, first a cell has to be inspected and measured with the front legs to determine if it is free and sufficiently clean and what the inner dimensions are. In wide cells, the queen will lay unfertilized eggs, from which the thick males, the

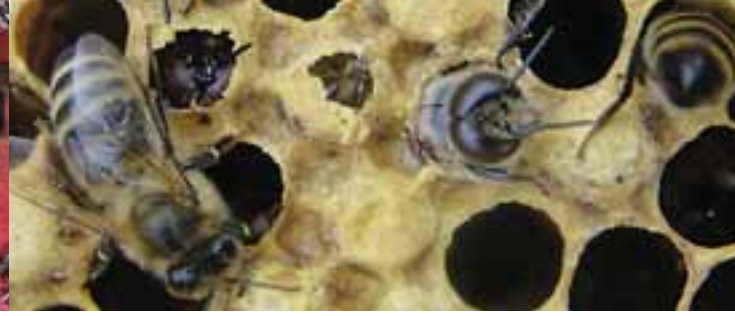
drones, emerge. However, into narrow cells she will lay inseminated and finally fertilized eggs. These always become a female larva, which can grow into a worker or a queen, depending on the amount and the composition of the food.

In order to achieve this enormous task for progeny, the queen is constantly cared for by her court, a group of workers who read all her wishes from her eyes, lips or wherever else and that is the decisive factor, to actually fulfil these wishes. The queen is not only provided with royal jelly, but she is also cared for in the best possible way and thus reaches a biblical age of two to three years, in exceptional cases even five years. However, as with other female species, the queen's fertility decreases with increasing age, so that there are no longer sufficient workers developed, and the population would become weaker. The workers prevent this by raising a new queen in time. This queen becomes in heat at the age of one week, flies out in warm, sunny weather for the mating, and lets herself be copulated successively from approximately





Bees have a guarding instinct. The air-hole guard looks out for new arrivals. Anyone who is not one of them, or at least does not bring anything with them, has no chance of getting through.



Hatching drones: The eyes take up the largest part of the head. Beside the mating apparatus they are their most important organ.

20 drones during the flight in airy height. So, the mating with near relatives, meaning inbreeding, is avoided. While the drones fall to the ground and strike dead there, the sperm migrates into the seminal vesicle of the queen. There, the sperm is preserved for the rest of the queen's life in a way that is still unknown today, and is retrieved individually when needed. She will now replace her mother and lay eggs for the rest of her life.

The drone (male)

As male animals, drones are exclusively responsible for mating with virgin queens. They develop from unfertilized eggs through parthenogenesis. They are 15 to 19 millimetres long and weigh 0.29 grams on average. Since a bee colony raises young queens only in summer, the drones are only needed during this time. They are raised from spring to summer and are tolerated of several hundred to a few thousand in colonies.

In warm, sunny weather they fly out with a booming sound – hence their name – and try to reach their life goal: The passing on of their genetic material to offspring. To make sure they find the object of their desire, they have the biggest eyes. Each of the two compound eyes of the drone is composed of 7000 to 8000 individual eyes. These eyes give it the best possible all-round view. In contrast, queens and workers have only about half as many individual eyes.

Drones reach on average the age of three weeks. However, they can also last up to 60 days. As soon as the bee colony prepares for winter, the now unnecessary eaters are kicked out into the fresh air where they can still be useful as bird or ant food.

A worker takes up liquid with her trunk at the edge of a body of water and carries it home in her tank, the honey stomach.

The worker (female)

Workers in the bee colony are, as the name easily suggests, responsible for the daily work: Cleaning, heating, ventilation, brood care, building honeycombs, guarding flight holes, collecting, and storing food. To achieve the latter, only the workers' legs are equipped with combs, brushes, and baskets. Depending on age and stage of development, they are particularly suited to certain tasks. Nevertheless, in contrast to some human contemporaries, they are quite flexible and work where they are needed. For example, the workers patrol the beehive to see where they can be useful for about a third of the day. They work another third of the day and rest for the last third. Work is of course done seven days a week. The worker bees initially do indoor work and are only exposed to the dangers of field work as they grow older. Because there they can be eaten by a bird or killed by a hailstone and are then lost as a worker for the bee colony. Biologically regarded the workers are auxiliary





A worker bee carries the collected pollen home. On the inside of the right hind leg the pollen brush is clearly visible.



The individual bee flies only to flowers from the same plant species, but other bees use other plants. This ensures a varied diet.

Just like at the flight hole, the pollen sources differ according to the reserves in the honeycomb cells. As a protein, vitamin and mineral concentrate, pollen is essential for breeding.



females without reproductive-tasks, that admittedly originate like queens from fertilized eggs, but show a completely different shape due to not so high-quality nutrition during their raising as well as possessing underdeveloped sex organs. Moreover, they are clearly smaller than the full-females, the queens: The workers are on average 12 to 14 millimetres long, whereas queens, as mentioned before, reach 20 to 25 millimetres. Their weight of about 0.1 grams is less than half the weight of a queen. Only if the queen has died without the workers being able to raise a new one, workers can also become replacement queens and lay a small number of eggs. However, these always remain unfertilized since workers are never mated. Because in this exceptional case, no more new workers can be raised, thus this bee colony will die after several weeks. But its genetic material is passed on via the drones that hatch from the eggs of the workers – a brilliant trick of nature. The number of female workers fluctuates

throughout the year: In winter, there are about 10,000 to 15,000, in summer about 30,000 to 45,000, three times as many. The life expectancy of a female worker is even wider: in summer, in view of all the work, she only lives three to six weeks, she can take it easy in winter and can reach the age of six to nine months. Her short life expectancy in summer and the undisturbed resting period in winter explains a unique phenomenon in domestic animal husbandry: Bees do not know their beekeeper. After all, they see him too rarely. Instead, the beekeeper must learn the behaviour of his protégés and how to deal with them in a species-appropriate manner, even more thoroughly than some dog owners.



The transfer of nectar between female workers is not only used for processing it into honey. Information is also transmitted in this way.



A new queen is being raised here. The climax in the development of a bee colony is approaching – the increase in the number of bees.

Rhythm of the bee colony

If the oviposition only serves the replacement of the dying bees, which are actually nothing else than body cells of the “bee”, how can bee colonies multiply? Honeybees are something special here, too: the development and reproduction of bee colonies follows a fixed seasonal plan that is perfectly adapted to the annual rhythm of the weather and vegetation. After the great flowering in summer, the new bee year begins significantly differing from the calendar year. Already from July and especially from August, besides the last summer bees, mainly winter bees are raised, which live far into March and give the colony a boost in early spring. Thus, they become actually six to nine months old in contrast to the summer bees which live only four to six weeks. The future winter bees must be already cared for optimally as larvae by their foster mothers and must be able to take up plentifully pollen after their hatch. The fat-protein cushion developing in

such a way serves the winter bees as reserve for the brisk start of the brood season in early spring. Because pollen is only stored in small quantities in the honeycombs, a good pollen supply of the colonies by means of late flowering plants is necessary especially in late summer. The food input also promotes the laying of eggs by the queen, so that many young bees can be raised surviving the winter safely. With the cooler becoming days and nights, breeding in the colonies clearly decreases. Frequently the young bees still use the warm days in October to look at their environment for the first time. However, since there is soon nothing more to be collected and the bee colony must live from the reserves, the raising of new brood becomes ineffective. In order to minimize the heat loss, the bees pull themselves together to a close ball, called the winter grape, directly under the winter supply, and stop the brood care to a large extent. Bees creep into the empty cells. Others press



This bee population did not find a suitable cave. The blind window only provides a makeshift protection against rain and not against attacks by crows.



Honeybees also provide food for other animals: This bee has no chance against the hornet.

themselves closely together in the surrounding honeycomb alleys. The fodder above the winter grape is kept warm by their waste heat and is taken up by the bees there, passed on and used as heating material. Thus, the core temperature of the winter grape is held at 30 degrees Celsius, while the temperature at its periphery decreases to ten degrees. Below this temperature, the bees would go into torpor and die. But a bee colony is a welfare state in the truest sense of the word: the bees sitting on the outside push inwards where they can warm up. The bees sitting inside change to the outside. They warm up with their own body: The musculature is contracted. It is alternately tensed and relaxed, similar to athletes. In particular the very pronounced flight muscles of the bees are predestined for this. In order to minimize the energy requirement, the activities and metabolism of the bees are reduced to a necessary minimum. Any external disturbances such as shocks and vibrations must now be avoided because they trigger the defence

instinct and lead to the activation of the metabolism.

Since the bees do not fly out at temperatures below ten degrees Celsius, as clean animals they have to collect the metabolic products in the rectum. However, if this is overloaded by too high metabolic activity, an intestinal disease occurs. In the case of extreme disturbances, the bees even prematurely dissolve the winter residence and freeze to death. In summer, however, the situation is completely different: If the temperature in the brood nest threatens to rise above 35 degrees Celsius, cooling is necessary. Ventilators alike hundreds of worker bees buzz their wings and transport the warm air out through the flight hole while pointing the head inwards and the abdomen pointing outwards. If even this is not enough, other bees carry water in and distribute it on the honeycombs. In order to evaporate, the water absorbs heat and thus reinforces the cooling effect produced by air exchange. Cooling as well as the necessary oxygen supply

Quickly the swarm gathers on a branch to look for a suitable new hom.

is only possible when the flight hole is open. Therefore, it cannot be closed. The transport of colonies also requires additional ventilation space and usually takes place at night so that the bees do not suffer from overheating and lack of oxygen.

The primary goal of a bee colony is to reproduce. As the temperature rises and the length of the days increases, the brooding process begins. If the temperature reaches ten degrees Celsius in sunny weather or twelve degrees when the sky is cloudy, the big cleaning excursion takes place. The winter grape dissolves, and the bees fly out quickly to empty their intestines. Light-coloured surfaces are a special incentive for the insects to do so. The first early bloomers are now enticing with their blossom splendour: hazelnut, cornelian cherry, willow, crocuses, and winter aconite provide the first fresh pollen. While the queen is busy laying eggs, the growth of the bee colony is pre-programmed. Soon it becomes too cramped in the bee housing.



In winter, the bee colony forms a tight sphere so that as little heat as possible is lost.

What then follows is a fascinating natural spectacle and a biological phenomenon, the swarming of the bee colonies. Several thousand bees rise into the air at the same time to form a cloud, the swarm, and finally settle nearby as a swarming cluster, usually on a branch of a tree. From there, track bees fly out to look for a new home.



The honey supply not only serves as an energy-rich food, but, especially in winter, also as heating material. If the bees are doing well, they produce more honey than necessary.

When they return to the swarm, they dance and advertise for a suitable home. Other bees fly there and will also advertise if the evaluation is positive. If various suitable caves have been found, this advertising continues until the majority is convinced of a suitable home, and the decision for the new home is made “democratically”, so to speak. This can take a few hours, but also days. Then the bees move to the new location and build their honeycomb. This division is the natural process of reproduction of a bee colony. It is neither of purely venereal nor purely asexual nature, i.e. neither purely sexual nor purely vegetative, but a combination of both. Finally, this cloning of a bee



Chives: Bees need a large number of flowering plants, especially in midsummer, to be able to get through the winter successfully.

colony was preceded by the breeding of new sexual animals, drones, and queens, which take over the sexual part of reproduction. It is not the young queen who is on the way to the new home, but the old one.

She was previously put on a diet, which led to a sudden reduction in the laying of eggs and to a lower weight of the old queen. Becoming airworthy again. But this is exactly the way to ensure the survival of future generations. After all, the swarm is flying into the unknown: will it find a new, suitable home? Will there be enough food? Into this uncertainty the swarm rises and with it the old queen.

In today's cultural landscape, a swarm of bees has difficulties finding a suitable nesting cave of at least 40 litres, offering the bees protection against rain and enemies. They would be lost without the beekeeper's help. That is why beekeepers try to catch the swarms and place them in suitable housing. But this is not always easy: On the one hand, the bees often sit several metres high up on trees, balconies, or eaves. On



Weeds are not useless: Here a solitary bee collects on common dandelion, which is considered to be a pharmaceutical plant.

the other hand, the beekeeper is often not on site due to professional or other obligations and cannot get hold of the swarm.

In such cases it helps to call the beekeeper and inform him. But who knows the beekeeper in the immediate vicinity? Then the nearest beekeepers' association, which can be easily identified via the beekeepers' associations, should be called.

Each of these colonies, swarm, and mother colony, now has a new goal: namely to overwinter successfully. That is why they will generously build honeycombs, breed intensively, and collect food diligently – in Brandenburg in June, July, and August. Bees need a large number of flowering plants, especially at the height of summer, in order to successfully survive the winter season. The single flowering mignon dahlias, wild-roses, composite plants such as coneflower, sun-bridge and suneye, but also various kitchen herbs and finally the fat-leaf plants are best suited for this purpose.

Wild Bees – the big relatives

When you think of bees, you think of honeybees. And when you think of wild bees, you think of wild colonies. But far from it. The European honeybee, also known as the Western honeybee, is just one species among many. However, it is the only species of bee in Europe that produces honey – hence its name.

The scientific name given to this industrious animal by the great botanist and zoologist Carl von Linné (1707-1778) is *Apis mellifera* – for *Apis* = bee and *mellifera* = honey-bearing – already indicating that there must be other bees besides honey producing bees. The scientific name is not quite correct. Today it is known that the honeybee does not carry honey into its beehive, but nectar and pollen, in order to prepare the tasty dessert from it only when the public is excluded.

In Germany alone, there are about 550 wild bee species in addition to the honeybee. These include both bumble bees and single, i.e. solitary, species, which are therefore called

A bumblebee hive looks far less accurate than that of a bee colony. Wax pots are built together in heaps and used as needed.

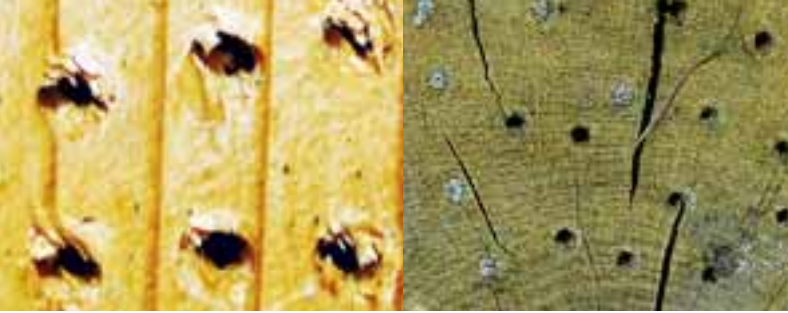


solitary bees. Wild bees are especially useful for plants that are less noticed by honeybees. This also includes many rare plant species threatened with extinction. However, wild bees are also finding it increasingly difficult to survive. The reasons for this are, on the one hand, changes in climate and, as a consequence, vegetation. Directly connected with human activity are the elimination of nesting possibilities by building on and sealing the landscape. Nesting sites are also destroyed by the removal of dead trees.

Frequent mowing or even burning down of roadsides and waysides, meadow, and garden land leads to a reduction of the food supply as well as the one-sided design of green spaces with grasses and conifers, large-area monocultures and poisoning with pesticides.

For about half of all wild bee species, a vegetation-free sandy area is sufficient to build their small tube-like nest.





Not like that: The drill holes are frayed and lead to wing injuries. Marginal: It is clearly visible that holes with cracks through them are not accepted.

Artificial nesting aids for wild bees

Man-made living holes in a suspended wooden block are helpful. Holes are drilled with sharp drills of various diameters. The wood must not be drilled through completely. The holes should be drilled in the longitudinal and not in the front side of the wood. The wood shavings must be knocked out of the holes and any fibres at the entrance must be sanded away. Housing holes with a diameter of two to six millimetres are preferred, and some species prefer up to 10 millimetres. Ash, lime, or fruit trees are particularly suitable because their wood hardly swells at high humidity. Otherwise, the brood inside would be crushed. There should also be at least two centimetres between the holes to prevent the wood from cracking too much. To prevent shrinkage cracks from running through the later brood tubes, drilling can also be postponed, until the wood has dried slowly in an airy place for at least one year. A rain-protected, sunny place avoids the growth of fungi that can destroy the brood. Under no circumstances should the wood be



impregnated. Because wood preservatives do not distinguish between pests and beneficial insects – they kill everything.

Since wild bees need clay to close their nest tubes, which they hardly find anymore, a freely accessible small pile in the garden or a clay-filled flowerpot will help. Hollow plant stems are also welcome, preferably in their original

*Probably the best known wild bee is the ground bumble bee (*Bombus terrestris*).*

Hollow-strand interlocking tiles, which are occasionally used for roofing, are a simple solution which, however, only helps species that often exist.



location. However, if they occur during the necessary rejuvenating pruning, as is occasionally necessary with blackberries, for example, bundles can also be hung up in the dry. The bundles should not turn in the wind. This makes the bees' approach more difficult. Such thin bundles, hung horizontally and vertically, make the façade of a summer house look much more rustic. And, if empty snail shells are lying around in front of your feet during gardening, just put them in a protected place, because they will be colonised as well. It is best to distribute the nesting aids, for example on the summer house, on fence posts or on trees with loose crowns. Otherwise, parasites and enemies have an easy time. About half of all wild bee species dig their breeding grounds in open, i.e. largely vegetation-free soil. This is particularly noticeable between cobblestones when small “volcanoes” are formed there. If you leave the bees to their innate building talent, they clear the turrets by themselves. Sweeping away cleanly, on the other

hand, disturbs them, prolongs their work, and causes the pavement to subside. Doing nothing is the best decision here.

Now all that remains is to wait and see. Solitary bees collect pollen, which they carry home stuck to their legs like honeybees. There, they stomp it into the selected tube, lay an egg on it and close the cell with clay. They continue to put the pollen into the cell, then an egg is laid on top of it and the cell is closed again until the tube is full and the line nest, as the expert says, is ready. Some bees, such as the leaf-cutter bees, add nesting material before the nest is completed. Especially in sandy soil this stabilises the side walls or the nest entrance. Larvae hatch from the eggs, which feed on pollen and then pupate. Usually the finished bees do not hatch out until the following year, in reverse order of egg deposition.



Close-meshed grids directly in front of the nesting aids help to prevent birds from robbing the brood. Otherwise, plant stems in particular are often looted.

Cooperation instead of competition

It is sometimes claimed that honeybees are in competition with wild bees. This is false. Honeybees and plants have adapted to each other over the course of evolution, and this was before humans came to take care of them. More than 10,000 years ago, when temperatures in Europe began to rise again after the last ice age, forests with thermophilic flora such as hazel, oak and beech were expanding from the Mediterranean towards the north to Scandinavia. With them came the honeybees.

It is thanks to beekeepers that there are still honeybees today. The reasons have already been mentioned: Without this profession, honeybees would be even worse off than wild bees. In a cultivated landscape, honeybees hardly find suitable, sufficiently large nesting holes. Added to this are the temporary lack of food and parasites introduced in the course of globalisation.

The fact that honeybees and wild bees do not naturally compete can be explained biologically:

In contrast to all other bee species, honeybees are characterised by an all-year-round social lifestyle. They overwinter as a colony. However, since they spend the winter not sleeping but resting, and even breed at times, they have to produce at least 20 degrees Celsius inside the winter residence, for the brood even 35 degrees. For this, the honeybees need sufficient fuel, namely honey. To build up sufficient supplies, they prefer to use mass gatherings of special plants. Where bee colonies with an individual annual requirement of 50 kilograms of pollen and 70 kilograms of honey still produce a surplus, food for individually living wild bees with a requirement of one to ten grams of pollen for raising offspring cannot be too scarce. Honeybees operate in a highly economic way according to the following strategy: individual bees fly out and search for nectar and pollen. If they find little, they pollinate the flowers they find so that these can produce seeds and reproduce. Then they fly back home.

Bees are often confused – for example with the German wasp (*Vespula germanica*; left in the picture) or with the hornet (*Vespa crabro*) – actually bigger and louder, which brushes its front legs in the picture on the right.



Only when they find plenty of food do they communicate this to the beehive. In this way, they recruit more workers to make effective use of the temporary food supply. For this purpose, they also travel several kilometres.

Due to the large number of bees in a colony alone, they do not eat the food of bees living individually (solitarily). Instead, there are highly competitive species among the wild bees, such as the great or garden woolly bee (*Anthidium manicatum*), which successfully defend their feeding grounds, for example a shrub, vehemently against other flower visitors, including honeybees.

An example may illustrate how positive effects honeybee husbandry can have on wild bees. At the site of the Hohen Neuendorf Bee Institute, beekeeping with several dozen colonies has been demonstrably practised since the 1920s. In addition, Hohen Neuendorf has a strong beekeeping association with numerous part-time beekeepers, which also ensures a high density of honeybees in the surrounding area.

In a survey carried out at the beginning of the 1990s, 83 of the 550 wild bee species found on the two hectares of the institute's premises in Germany were identified. Among these were two species which were considered to be extinct in the region. Seven of them are considered to be exceedingly rare and 16 others rare. This is probably due to the good beekeeping practice of avoiding overstocking with bee colonies and supporting the development of a wide range of food sources. Food and nesting facilities are the key to the survival of the bee fauna native to Brandenburg. However, many seed mixtures offered for wild bees are visually attractive but of little use, especially if they contain double flowering varieties and foreign species. It is therefore essential to use suitable seeds recommended by nature-loving experts.



Honeybee

Useful messengers of love

In Brandenburg beekeepers harvested on average 30 to 50 kilograms per colony over the years. However, weather extremes have a particular impact on beekeeping. In the drought year 2019, for example, only about 20 kilograms per colony could be harvested. This meant that even the long-term average of 1300 tonnes of honey, according to the state's animal husbandry report, could not be achieved. Added to this is beeswax, which is extracted in quantities of less than one kilogram per colony and year.

Furthermore, a bee colony offers products which are not harvested by every beekeeper, but which are extremely interesting, especially for medical purposes. These are pollen and beebread, propolis (putty resin), royal jelly, bee venom and hive air. However, the latter is not extracted in the strict sense, but is used directly on the hive for respiratory treatments. However, the main achievement of the bees is pollination with pollen from other flowers of the

same species to produce seeds and fruits without inbreeding by self-pollination. For this, the plants need a “messenger of love”. The pollination and the resulting fertilisation of their female germ cells with the male pollen of other conspecifics leads to high yield security, high quality fruit and simultaneous flowering and even ripening in insect-flowered crops. Insect-flowering plants are easily recognised by the fact that they develop striking petals of various colours to attract the flying pollinators. These include fruit trees, rape, dandelion, clover, and most garden flowers. In contrast, the flowers of windflowers, which include hazelnut, birch, poplars, and grasses including all types of cereals as well as the Mark Brandenburg pine, are very unobtrusive, at least in terms of colour. The value produced by the pollination of cultivated plants by the honeybee alone is considerably higher than that of honey. For this reason, fruit-growing farms in particular, but also some arable farms, pay a pollination premium for the use of bee colonies during the flowering

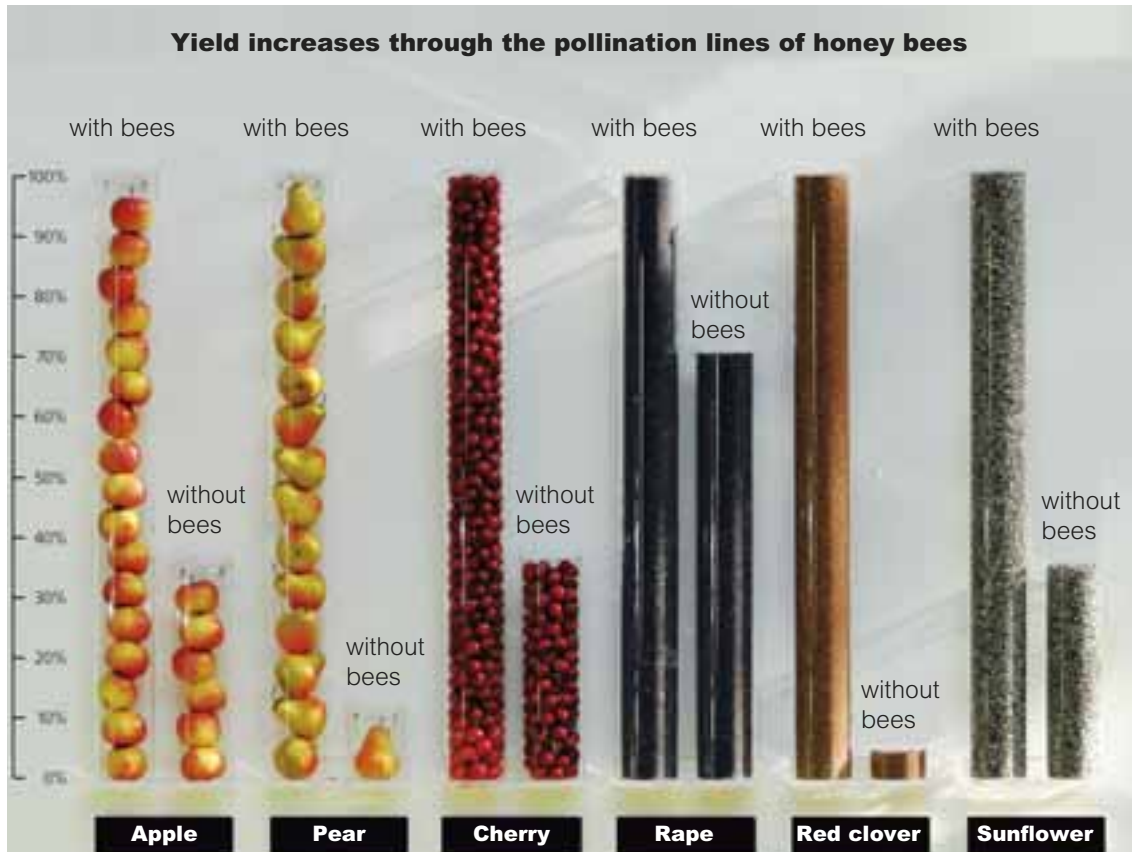
Insect bloomers, like the pear here, have conspicuous petals, sticky pollen and nectar as a reward compared to wind bloomers.

period. However, the plants react very differently to the pollination activity of honeybees. Some are good self-pollinators. They can cope well with a little wind alone. One of these is rape, which is also widespread in Brandenburg. Others depend on the honeybee as a strict foreign pollinator. This applies to red clover, for example. But not only between the different plant species, there are also considerable differences from variety to variety. The nectar from which the bees prepare honey has a water content of about 70 percent, honey on the other hand only a maximum of 20 percent. Taking into account the consumption of nectar for the collection flight, the bees have to collect three times the amount of nectar to produce one kilogram of honey, i.e. 3000 grams. However, since the bee can only transport half of its body weight of 0.1 grams additionally, namely 0.05 grams, 60,000 trips are required for the above-mentioned quantity. But, since plants do not offer nectar for free, but rather want to encourage bees to carry

pollen from flower to flower to pollinate, each flower releases only a tiny drop of nectar. Thus, a bee has to visit about a hundred flowers in order to fill her honey belly. For one kilogram of honey that is six million flowers.

However, if a colony of bees produces 100 kilograms of honey in the course of a summer, of which it consumes about 70 kilograms itself, it is easy to see that it visits 600 million flowers annually. However, only the months March to August are available for this, i.e. half a year. This does not include the cold days, which are particularly frequent in March and April, and the rainy days which occur throughout the year. Finally, the number of flying days is limited to a hundred. This means that the bees of a single colony fly to over six million flowers every day. But that is only the average. The peak performance of bee colonies is 30 million flower visits on a single day. The honeybee pollinates flowers within a radius of up to three kilometres around its hive. In rare cases it can be ten kilometres or more.





Using bees as a yield factor

Brandenburg's agriculture, and in particular horticulture, benefits from the pollination performance of honeybees, especially when they are placed close to agricultural land. However, some beekeepers now avoid agricultural land: On the one hand, they only provide food for a short time, and on the other hand, chemical

pesticides have repeatedly caused beekeepers' displeasure. Due to the considerable decline in beekeeping in Brandenburg after 1990, many beekeepers are no longer dependent on the use of agricultural land to harvest honey. Whether rapeseed or sunflower, apple, or cherry, many cultivated plants show the typical characteristics of an insect blossom. With bright petals and



Hawthorn



Barberry



Blackberry



Column cactus



Spindle tree



Mountain ash



Cornelian cherry



Cornell



The pollination influences the quality: here, there was no sufficient pollination. Not all germ cells formed seeds. The apple grew crooked.



The yield of cultivated crops is mainly generated by bees. Rape especially benefits from them.

intensive nectar production, the flowers attract insects. Even if the pollen can partly be spread by wind or the stigma can even be self-pollinated with the flower's own pollen, both new and old studies show that insect-flowering plants, which in agriculture and fruit growing including all dicotyledonous species, benefit from insect pollination. What is striking is that even though the yields of many crop species have increased considerably in recent decades, both through breeding and optimised agrotechnical and chemical measures, nothing has changed in fertilisation biology. The influence on the fruit and seed formation of different crops, which was already observed decades ago, is still confirmed today, only at a significantly higher yield level. This is a win-win situation for bees and farmers: the additional yield caused by bees does not require any additional effort on the part of the farmer, apart from the additional work involved in recovering the larger harvest. But for the

beekeepers to settle there with their colonies, it is important to think about the later use of colonies already during sowing. At least one bee colony should be used per hectare of insect-pollinated crop, but no more than four. More is only advisable for medium to heavy soils and sufficient moisture. On sandy soils, such as those typical of the "Märkische Streusandbüchse", a honey harvest would often no longer be possible with this density of bees. The bee colonies are to be distributed in groups on or between the areas in such a way that the bees have to fly over radii of only a few hundred metres. Flat splintered areas that are no longer used for agriculture, and the hem area around windbreak hedges are particularly suitable for the installation. Here in particular, however, a width of at least three metres is required, as beekeepers usually travel by car, van, or off-road vehicle with trailer. Larger unevenness of the ground and loamy, heavily moistened soils without firm turf can become a problem for beekeepers. On the other hand, orchards often



Important bee pasture plants

Agricultural crops	Catch crops	Trees	Shrubs
Rape	Phacelia	Willow species	Willow species
White/red Clover	Winter Vetch	Fruit trees	Hazelnut
White Melilot	Summer Vetch	Maple species	Raspberry
Lucerne	Espardette	Lime species	Blackberry species
Sunflower	Serradella	Robinia	Black alder buckthorn
Silphy	Persian Clover	Horse Chestnut	Wild rose species
Topinambur	Incarnate Clover	Chestnut	Fenugreek
Buckweat	Mallow	Mountain Ash	Blackthorn
Asparagus	Oil Radish	Bee tree	Dogwood species

offer good installation possibilities in the working aisles between and next to the crops.

A distance of several dozen metres from field paths or wide, dense hedges shield the bee-hives from disturbances. Farmers should visit their areas with the beekeepers before setting up the colonies.

Since the flight radius is optimally less than one kilometre and can effectively only be extended to a few kilometres, the food supply in the field is often no longer ensured by large-scale

monoculture and the removal of field shrubs and field margins. This can be counteracted with windbreak hedges including a border biotope, crop rotation of different crops, weed and pest control based on damage thresholds, flowering areas, biogas production based on different plant species, intercropping, and the horticultural design of farmland, yard, and storage areas. Last but not least: an appropriate pollination premium also attracts beekeepers.

No harvest is here to be expected: When the many rapeseed glitter beetles have finished eating, there is nothing more to pollinate.



Plant and bee protection

Cultivated plants and honeybees enter into a close relationship every spring and summer. In order for this relationship to remain fruitful, it is important that farmers and garden owners use plant protection products not only sparingly, but above all in a way that is suitable for bees. The flowering of many traditional plants such as rape and fruit crops is also the time when many harmful organisms are active. If possible, chemical plant protection measures should be avoided during the flowering of the crops. Absolutely necessary applications should take place outside the daily bee flight. If the use of plant protection products during the flowering of crops is unavoidable, for example against peak drought and blossom rot in stone fruit, against scab in pome fruit or against the Sclerotinia fungus in rape, the regulations on bee protection must be strictly observed. These regulations apply without restriction also to plant protection products used in the home and allotment garden sector.

Plant protection products classified as dangerous for bees (B1) must never be applied to flowering plants, even at night. Furthermore, it must be ensured that flowering weeds in the plant stand and flowering plants or plants flown on by bees at field margins, hedges and other adjacent areas are not affected by such plant protection products. The principles of good plant protection practice, such as avoiding drift and observing wind speed and direction when applying plant protection products, must be observed. Some insecticides which are classified as non-bee-dangerous (B4) may have negative effects on other flower visitors who are more sensitive than the honeybee. Their application during the flowering period should therefore be avoided if possible, or only be carried out in the evening hours. Special caution is required with tank mixes. Tank mixes of several insecticides, even if they are individually classified as non-bee-dangerous (B4), cannot be regarded as non-bee-dangerous because of their cumulative effect. Tank mixes with certain fungicides can also increase the danger to bees.

The authorisation of plant protection products for non-professional users and for use in the home and allotment gardens

Especially seeds treated with insecticides must not be allowed to drift away. The use of appropriate sowing techniques must be observed. The sowing of maize seed treated with certain plant protection agents from the neonicotinoid group is still prohibited. In addition to maize, a similar ban now applies to other crops such as rape, including spring rape. According to the Bee Protection Ordinance, plant protection products classified as dangerous to bees may not be applied to areas flown on by bees, regardless of whether they are currently in flower or not.

What does this mean in practice? In the case of flowering crops, the situation is clear. But even when the first pre-flowering plants appear, when undergrowth or second growth are flowering, bee-dangerous products must not be used. In the case of severe aphid infestation, crops that are not really of interest to bees, such as cereals or potatoes, are often flown on. Puddles can also be a problem if they are used by bees for water supply.

How do you determine whether areas are



NB 661: *agent is dangerous to bees* **B1**

NB 662: *agent is dangerous to bees, except when applied after the daily bee flight in the treated area until 23.00* **B2**

NB 663: *due to the uses of the plant protection product specified in the authorisation, bees are not endangered* **B3**. *If the product is used in deviation from the application instructions (application purpose, application time, concentration, application rate, tank mixing with other pesticides (also with tank residues), it may be dangerous to bees.*

NB 664: *agent is classified as non-hazardous to bees up to the highest application rate or concentration specified in the authorisation* **B4**. *If the agent is used in deviation from the application instructions (in particular with regard to quantity, concentration, tank mixture with other plant protective agents also with tank residues), it may become dangerous to bees.*

NB 6643: *If the agent is mixed with fungicides, the application may only be carried out in the evening after the daily bee flight until* **23 hrs.**

Bee-dangerous pesticides should not get into stocks flown on by insects. Second growth and pre-flowering should not be overlooked.





With a share of 75 percent, bees ensure the highest percentage of pollination in horticulture.

being flown to? If insect-flowering plants such as fruit, rape, sunflower, buckwheat, and various legumes are in flower, it can be assumed that they are being flown on. The same applies to heavy aphids, flowering undergrowth (e.g. lion's tooth, dead-nettle) and second growth.

It is possible to observe the population, but this is not easy. A strong flight is already given if a single bee can be observed on several square

metres. Bees can visit many flowers in a short time. Most plants bloom for several weeks. On the other hand, the flight of the bees is not constant. Depending on plant species and weather conditions, it fluctuates during the day and is uneven over the area. The Landesamt für Ländliche Entwicklung, Landwirtschaft und Flurordnung (LELF) offers analyses in plant protection. In addition, the LELF presents comprehensive information and a collection of



<https://mluk.brandenburg.de>

Sie sind hier: ▶ [Start](#) ▶ [Landwirtschaft](#) ▶ [Tier](#)

Tierzucht und

▶ [Bienenwanderung](#)

links on its website. Even if there is no poisoning, the spray film alone can affect the flight ability of the bees in such a way that they cannot return to their hive. Otherwise they carry the sprayed broth into the hive, which can have an adverse effect on the bee products and their marketability. It is therefore also advisable to spray non bee-hazardous substances in the evening or early morning, at least on areas known to be occupied by bee colonies. Often the effect is better outside the midday sun. Droplet nozzles are recommended for fungicide treatment for rape, as they allow the fungicides to reach the place where they are supposed to act: on the stem.



Early coordination with beekeepers on the planned plant protection measures is in the interest of both parties. This can be done in connection with the determination of migration sites. If necessary, it is better if beekeepers do not migrate until several days after the start of flowering. This is because, in contrast to other species, beehives cannot be closed for a long period of time. Resident beekeepers within a radius of a few kilometres around the areas to be treated cannot move around with their permanent beehives. Their locations can be obtained from the local or regional beekeeping association.

In the interest of good cooperation, it makes sense to present the plant protection strategies of the coming season to the beekeepers' associations in winter. This will result in higher and better yields for the farmer and healthier and more productive bees for the beekeeper.

On the left: The Brandenburg Ministry of Agriculture and Environment informs on its homepage about the topics of beekeeping and plant protection.

In order to stay healthy and productive, bees need flowering plants from April to August.

*For several years,
Malte-Sören Voigts
has planted flower
strips on his land
around Kremmen.*

Farmer loves bee and bee loves farmer

Brandenburg is asparagus country. Some even speak of a real asparagus economy miracle here. After all, commercial asparagus cultivation tended towards zero at the time of the re-unification. In 2019, a remarkable 20,200 tonnes on 3,700 hectares could be harvested again. A further 800 hectares are not yet in production. Asparagus is a permanent crop and has very good bee pasture properties. The plants bloom from May to September. During the season, individual crops are gradually removed from the harvest. On 24 June, the day of St. John's Day, the motto is: cherries red – asparagus dead. This of course is not true, because the plants live on. They are now allowed to grow out, form flowers and carry out photosynthesis, which is vital for the plant, but ultimately for all beings. Asparagus donates valuable pollen over a long period of time, especially in times when otherwise few flowering plants are available in Brandenburg. In addition, the large asparagus farms in





Brandenburg also grow other fruits, mostly strawberries and blueberries, to extend the season. Malte-Sören Voigts is managing director of Spargelhof Kremmen GmbH & Co. KG. Voigts, born in 1977, comes from a farming family in Lower Saxony, which has been based in Holthusen in the Lüneburg Heath for generations. So, it was only logical that he studied agricultural economics in Göttingen. However, he did not return to his home state, but came to Kremmen as production manager for arable farming in 2007. Since 2010, he is managing director in Oberhavel. Malte Voigts sees himself as a farmer by conviction, which is already evident from the fact that he advises his children to go into agriculture. The father of a family wants to produce sustainably, regionally, and environmentally friendly. His commitment is now also recognised by others, which he is proud of. "We have been awarded the title of 'bee-friendly farmer' by the initiative 'Echt grün – Eure Landwirte' 2019. This is an initiative of farmers who have set themselves the goal of "creating a better social understanding

of modern and animal-friendly agriculture". Their nationwide uniform bee seal is awarded according to points.

The minimum is five points, which one receives if at least two measures from a catalogue on bee protection are implemented in a binding manner. This is how Voigts likes to show visitors the flowering strips on his fields. The flower strips, planted with flower mixtures, had been planted by Voigts a long time before there was even a special subsidy for this in the state. They are a richly set table for many insects, but also attract small game and birds.

Voigts proclaims "bees love farmers", but the other way round would be correct. A total of 43 beehives are on his land. In addition, there are cabinet-like structures with drilled wooden blocks. They are populated by wild bees, many of which are on the Red List. The encapsulated holes show that the wild bee tower is well accepted. Battens sprayed with signal colours should help the wild bees to find their one-room housing more easily.

The wild bees nesting aids were quickly colonised. With their excellent pollination performance, they also contribute to a good harvest.

Honey and wild bees are also on the move on his pale white-flowering blueberry plantation between Staffelde and Flatow on this cloudy May day. The insects have already been working hard here over the past weeks. The first firm, green, small berries appear on the fruit stands. In July they will be spherical, dark blue and ready for harvest. This area alone is eight and a half hectares in size. If you squat down on the level of the bushes, there is a lot of traffic above you like on the nearby motorway, a “highway” for insects in the literal sense of the word. The chirping and fluttering above the bushes are evidence that birds have also discovered the diversity of insects. Here, the “bee food” provides for agricultural birds, whose existence in other agriculturally used cultural landscapes is often threatened.

Roland Bläsche looks after the wooden bee boxes, which are set up at the head of the blueberry rows. He is an employee at the Spargelhof Kremmen. The former forester, who is responsible for the 23 hectares of blueberry



plantations, has now acquired the necessary know-how for beekeeping and at the end of the season will provide the first farm honey, which will then be sold in the farm shop. With the bees and wild bees, it should be possible to have a good harvest and to replace the Dutch bumblebees used up to now. They are more expensive than the local pollinators anyway. Soon, Malte Voigts hopes, “we will only use our own insects”. Regional pollination, and on top of that a regional honey is created, that is the goal. In winter, the bees and wild bees move into sheltered rooms or three refrigerators on the farm before being sent by Bläsche and Voigts back to working the fields in the next spring.



In winter, the wild bee colonies move to a refrigerator on the farm.

Actually, these are all good conditions for a harmonious liaison between farmers and conservationists. If it were not for the occasional relationship problems which the farmer himself openly addresses. The reason is the large foil fields, which the local asparagus growers do not do without for a variety of reasons. Despite the diversity in cultivation and production, asparagus in Kremmen is the crop on which the company depends. The foils lead to discussions every year. Despite and precisely because of this conflict, Voigts continues to work on building bridges to bring agriculture and biodiversity ever more into harmony on his farm.



After the first trials, farmers have acquired beekeeping know-how by themselves.

He maintains contact with nature conservationists in the region, helps out with NABU, for example, and, together with other local actors such as the Kremmener Landschaftsförderverein Oberes Rhinluch (Kremmener Landscape Support Association Upper Rhinluch), accompanies sustainable environmental protection projects. The company is not only committed to insects. The farmer and his employees create larch windows in cereal fields, put up perches for birds of prey, plant hedges and trees and lay out piles of field stones which serve as a habitat for many smaller animals.

Passion for baked goods and bees:
Master baker
Karl-Dieter Plentz



Sowing, harvesting, enjoying

The two-metre man Voigts has entered into cooperation with another “tall guy” from the immediate vicinity, the master baker Karl-Dieter Plentz from Schwante. For the professional baker Christian, who, according to his own motto “baking and praying”, the preservation of creation with all that creeps and flees is a matter of the heart.

“Sowing, Harvesting, Enjoying” is the official name of the campaign, which was thought of by Plentz and Voigts who run two medium-sized companies. Karl-Dietmar Plentz is the fifth master baker in the family business founded in Oranienburg in 1877. The bakery and pastry shop Plentz, which operates a number of branches around the Schwante headquarters in the northwest of Berlin, has specifically included honey products in its range. Plentz took the liberty of presenting his newly created honey bread in the Brandenburghalle at the Green Week 2020, a wholemeal rye bread in a honeycomb form as well as delicious honey-walnut muffins and honey-spelt rolls. In the “Sowing, Harvesting, Enjoying” campaign, 25,000 packages were distributed to trade fair visitors at the International Green Week 2020.





However, the campaign for bees and honey is not limited to the Green Week. Sustainability and regionalism are to a certain extent a family programme for Plentz: the honey used by the baker comes from the Albe family beekeeping company from Bad Belzig in Fläming, into which daughter Emelie has married.

Both at the asparagus farm in Kremmen and directly around the old oak tree at the wood-burning oven of the Plentz bakery in Schwante, small bee meadows were created a few months after their trade fair appearance.

Under the hashtag #OHVblühtauf the newly

created bee pastures are continuously documented on Instagram and Facebook. First of all, they have decided to get people in their immediate vicinity interested in bee conservation. They were able to enlist the help of Ludger Weskamp, the District Administrator of Oberhavel, for the initial sowing in April 2020. However, the aim is to create more areas with natural flowering plants for insects and especially for bees throughout the country and to give them back their habitats.

*Walnut and
honey muffins
from Velten*



As a large direct marketer, Spargelhof Kremmen also offers regional honey and honey wine.

Bee country Kremmen

The store of a grocery discounter on the outskirts of Kremmen has been empty for some time now. The former market could soon become the bee country of Marco Skala of beekeeping supplies 'beekeepers'. Customers should not only be able to buy honey products or even tap the sweet mass themselves, but should also be able to

The bee country is to move into this empty supermarket on the outskirts of Kremmen

obtain comprehensive information about beekeeping. In addition to the specialist beekeeper's shop, a display beekeeping, a glass honey extractor, and a café with an adjoining themed playground are to move in. All this was of course not possible in the old industrial area in the Rhehaniastrasse in Berlin-Spandau, where beekeepers could be found until now. In Kremmen, Skala meets fellow bee enthusiasts. "It's great that the initiators of 'Sowing, Harvesting and Enjoying' are creating flowering meadows with publicity and hopefully bring in a good harvest. Ultimately it was a coincidence, but a good one, to advertise beekeeping here in connection with the nearby, much-visited asparagus farm. "We are planning events such as a honey market, want to establish a bee trail via the asparagus farm to the Scheunenviertel", Skala is quoted in the regional newspaper about their plans.

A rare speciality

Bees love asparagus! But who knows asparagus honey? Beekeeping wise possible, you have to like it and ask for it specifically.

Some of Brandenburg's beekeepers offer it, for





example in the area around the asparagus stronghold of Beelitz. Honey can absorb up to 70 percent of asparagus pollen if it comes from regions where asparagus is grown, according to analyses by the State Institute for Apiculture in Hohen Neuendorf e.V. The flowers are also rich in nectar. Due to its high fructose content, this unusual variety of honey remains liquid for a long time. It then crystallises roughly. The typical colour changes from golden-yellow to apricot-orange.

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Bee protection in the allotment garden

The people of Brandenburg are known as the people with the proverbial “green thumb”. Almost every family cultivates its own little patch of green here. All in all, the flowering plants in allotment and home gardens are an enormous food supply. According to the provisions of the Plant Protection Act, only plant protection products that are approved for non-professional users without proof of expertise may be used in the home and allotment garden. They are marked with the note, “Application by non-professional users permitted”. This also applies to plant protection products which, according to the previous regulation, are labelled with the statement “Use in the home and allotment garden sector permitted”. The Federal Office for Consumer Protection and Food Safety (BVL) carries out a special examination of this as part of the authorisation procedure. This takes into account the properties of the product, the type and size of the packaging, the dosing device, and other criteria. Diversity of plants, insect hotels and bird houses and the absence of chemical plant protection products help the beneficial organisms in the garden.





If a problem arises, one should not spare the effort and consult a gardening consultant via the local allotment garden association, and not only rely on what package inserts, internet forums or sellers of plant protection products have to tell them by remote diagnosis. Currently, 62,300 gardeners in Brandenburg, including many Berliners, are organised in 1,251 associations, which are divided into 32 district and regional associations, and use a total of 3,100 hectares of allotment garden area. In addition, there are

tens of thousands of house and allotment gardens, and an infinite number of windowsills, balconies, and terraces. It is not only in your own garden that uniform greenery leads to yawning boredom. The urban green spaces, the roadside greenery, as waysides and avenues are called in official German, also gain from flowering, native species. In most cases, the costs are lower than the expenses for the employees of the Parks Departments, who have to keep the municipal greenery short with their mowers.

Homebuilt: Insect hotel in the house garden



Hazelnut



Winter aconite



Willow



Horse chestnut



Cornel



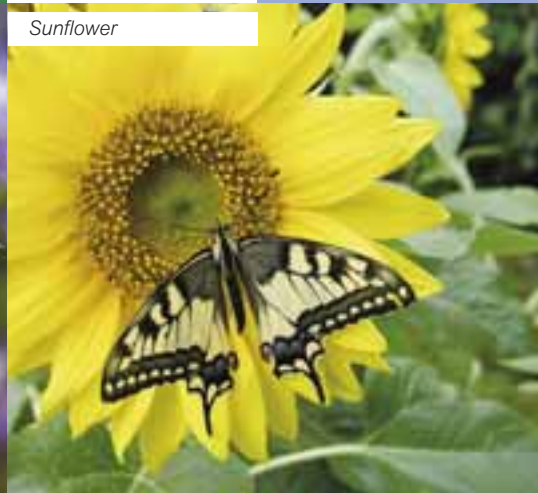
Robinia



French Rose



Phacelia



Sunflower



Crocus



Dandelion



White Clover



Thistle



White Mellilot



Sun Bride



Autumn Sedum



Ivy



Many wild plants benefit from honeybees, for example the blackthorn: The illustrations show a branch pollinated and unpollinated by honeybees.



The bells never ring sweeter – Honey Church in Neu Hartmannsdorf

On the south-eastern outskirts of Berlin, in the district of Spreehagen, lies the 740-soul community of Hartmannsdorf. Its outwardly inconspicuous village church in the Neu Hartmannsdorf district houses a unique interior, an altar and an altar wall made of pure beeswax. Already in a first document about Hartmannsdorf from the year 1510, besides fishermen and farmers, Zeidlers are mentioned. These are the forerunners of today's beekeepers. The Zeidlers still looked after their bee colonies in the woods in specially prepared tree hollows high above the ground. This is where the bees' original housings were located, as far as possible out of the reach of brown bears and other honey-eating contemporaries. Only later did resourceful settlers come up with the idea of taking the colonies of bees down from the high tree hollows and placing them in the garden behind the house.

Former community educator Marianne Stein explains how the wax altar in Neu Hartmannsdorf came about. "When the church, built in 1858, had become dilapidated after massive damage during the Second World War, the Protestant parish of Spreehagen decided to renovate it in 1988. This was completed in 1993. Since the original altar had been replaced by a dark black table with an equally dark wooden cross, the Berlin artist Brigitte Trennhaus created a friendly, inviting design. She was inspired by signs of local beekeepers selling honey as well as the glow of blooming dandelion meadows around the tranquil place, which can be seen from afar. To preserve the old wood from the dilapidated roof truss was melted down in the wax altar. But apparently, this wood sank to the bottom of the altar during the production process, drew moisture from the stone floor over the years and finally destroyed the work of art."

*The church of hope in
Neu-Hartmannsdorf houses
a special altar.*

**"Honigkirche"
Church of Hope**
Neu Hartmannsdorf
Chausseestraße 20
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OT Neuhartmannsdorf

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services and concerts
we recommend
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or
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or
Christa Sommerfeld
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So, in 2012, the complete renewal of the altar was due. And this time, it should last longer: The Brandenburg Beekeepers' Association e.V. called for wax donations. Members of the congregation took part in watering their altar for a fortnight: beeswax donated by beekeepers from Brandenburg and from far away was melted in front of the church. Now it was important to carry the hot wax into the church in buckets to cast the 800 kilogram altar into the mould made for it on site. Layer after layer had to be applied. Only if they cooled down each layer slowly one by one, cracks could be avoided. For this purpose, a wire mesh was inserted into the foundation just like in newly built houses. According to an old custom, a box with documents and coins was also placed inside for posterity. Then it was only a matter of waiting until the altar had cooled down completely and the formwork could be removed.

“On the second Advent of 2012, the new

altar was put into use with a festive service, after we had to say goodbye to its predecessor, without any anticipation, during the Communion service on Maundy Thursday of the same year,” Marianne Stein remembers vividly. The fragrant, velvety altar is hexagonally shaped like the cell of a honeycomb and reaches 1.35 metres in diameter from corner to corner at a height of 97 centimetres. The wall behind the altar is clad with beeswax, which was applied in up to 80 thin layers on plasterboards. In this way, another 200 kilograms of beeswax were applied to the altar wall, which is eleven metres high and twelve metres wide. The characteristic scent of the wax fills the room, and its soft golden yellow colour radiates calmness. The obligatory wooden cross is formed by the letters of the word light, positioned vertically and horizontally.

*Light – a pious wish
in beeswax.*

*Unique in the Church of Hope:
altar wall and altar are made of
pure beeswax.*





Rock drawing in the
"Spider Cave"



Beehives as the hometown of the populations spread initially in less wooded areas west of the Elbe and Saale rivers.



*Old High German:
Zidal-: The determiner
Zeidel goes back to
the Germanic* tīpla;
Indo-European for
bright, shiny, shimmer,
shine, so that the
honey is named after
its bright shine.*

Beekeeping – passion with tradition

Honeybees have been around much longer than humans: While the latter first migrated around the world 160,000 years ago, the first bees were buzzing 90 million years earlier. As hunters and gatherers, humans recognised the taste as well as the energising effect of honey, as a rock carving in the "Spider Cave" (Cueva de la Arana) near Bicorb, near Valencia in Spain, proves. The brood also represented a valuable source of protein. So, it was not unusual for people to stalk the bees and rob or exploit their nests, hence the term "prey" for dwelling. In Africa, the cradle of mankind, the honey cuckoo or honey indicator helped to find cave-dwelling bees. Prehistoric man and large predators such as the honey badger were able to break open the caves and let the honey indicator participate in the prey.

The oldest written evidence of honey extraction on the territory of today's Brandenburg are documents of Emperor Otto I. from the year 965. It is not known whether the honey was

taken from the bee colonies living in tree hollows at that time, while destroying their nests, or whether forest beekeeping already existed.

The freely grown, flowering mixed forests and their clearings offered the bees food from spring to late summer. To protect trees, in which bee colonies were located, from wind breakage, they were cropped, i.e. freed from their crowns. The people who cared for the hive trees or beehives, i.e. the trees used as housings together with their inhabitants, developed a high culture of beekeeping, called forest beekeeping or Zeidlery*.

Strictly concerned that the bees were doing well, in order to earn a living with them, they built caves in suitable trees at a sufficient distance from each other, following the example of nature. Without a large, dry cave at a height safe from bears, bee colonies could not survive safely.

The resulting large opening was fitted with a perfectly fitting timbered flap, the opposite side



Otto I. (912-973)



A flight hole acts like a seismograph: a beekeeper can observe exactly how his colony is doing.



Originally, the honey harvest was counted to forestry activities.

with a flight hole facing southeast. The hives could be managed from the back after the Zeidler had climbed the tree. They preferred pine, spruce, and fir trees at a height of at least three metres because of their straight, knotless growth, which left little chance for bears and martens.

The Zeidlers gained great respect in society. Honey was long the only sweetener that not only provided a livelihood for the gingerbread bakers, but also made fruit edible, and medical tinctures by soaking it in honey or making jams and marmalades with the same long shelf life. In castles and cathedrals, guilders used honey to improve the adhesion of their primer made from glue water and vinegar. Beeswax also provided light in churches and ruling houses, while the common people were content with tallow (tallow is a solid fat deposit on the intestines of cattle, sheep, and goats). The Zeidlers were given the right to bear arms to stop poachers and make the trade routes safer from robbers. In return they were given an arm

chest and had to perform military service for the sovereign if necessary. The socially highly respected status of the Zeidlers was also given its own jurisdiction. Only those who passed the required examination could be admitted to this guild. The robbery of bee colonies was punished with high penalties up to the cutting off of hands.

On 27 June 1775, King Frederick II (1712-1786) issued a decree on the punishment for deliberately damaging bee colonies: six years' imprisonment and a Karrenstrafe (punishment to work for the community), "The prisoners were chained to a cart and had to carry out heavy transport work in building and road construction. Climbing the tress in the forests was arduous. It was also not unusual for hive trees to fall over. However, these were too valuable to be left lying on the forest ground, which would have meant the imminent death of the bee colonies inside. The bee-

As an economically important asset, people also hoped to protect their bees from predation, disease, and evil spirits. St. Ambrose became the patron saint of beekeepers.





von Gottes Gnaden, König von Preussen,
Marggraf zu Brandenburg; des Heil. Röm. Reichs Erz-
Kämmerer und Churfürst; Souverainer und Oberster Herzog von
Schlesien; Souverainer Prinz von Oranien, Neuchâtel und Va-
lengin, wie auch der Grafschaft Hain; in Geldern, zu Maasburg,
Gleve, Jülich, Berge, Stettin, Pommern, der Cosiden und
Wenden, zu Meissen und Grossen Herzog; Burggraf zu Nürn-
berg; Fürst zu Halberstadt, Minden, Camin, Wenden, Schwertin,
Nagelburg, Ostfriesland und Meurs; Graf zu Hohenollern, Ruppin,
der Mark, Ravensberg, Hohenstein, Tellenburg, Schwerin, Lützen,
Bühren und Leetdam; Herr zu Ravensstein, der Lande Rostock, Starg-
ard, Lauenburg, Bülow, Arlay und Breda, &c. &c.

EDICT

die,
auf die Vergiftung

und

vorsehliche

Beschädigung derer Bienen,
gesetzte Strafe

betreffend.



De dato Berlin, den 27. Juni 1775.

Erwollt bey Georg Jacob Zehn, Königl. Hofbuchdr.

Under Brandenburg's King Friedrich II, anyone who deliberately damaged or poisoned bee colonies was punished with six years' imprisonment in a fortress and duty for the community without regard to the person concerned.

bearing part of the tree was unceremoniously cut out and placed at the Zeidler's house. Thus, the forest beekeeping (Zeidlerei) became the domestic beekeeping. This process of transition from forest beekeeping to domestic beekeeping in the late Middle Ages was also promoted by the increasing demand for wood. The Zeidlerei was finally found to be a disturbance with more intensive forest use. The strongest and straightest trees were not only best suited for bees, but also as building material. The wooden blocks as hives, called "Klotzbeuten (log hives)" in the technical jargon, are finally the forerunners of the later

wooden bee boxes. In 1845, Johann Dzierzon (1811-1906), a priest and beekeeper born in the Silesian bee village of Lowkowitz, revolutionised beekeeping with a wooden upper beam for the combs. From now on it was

For centuries, there has been extensive specialist literature on beekeeping in the German-speaking world.

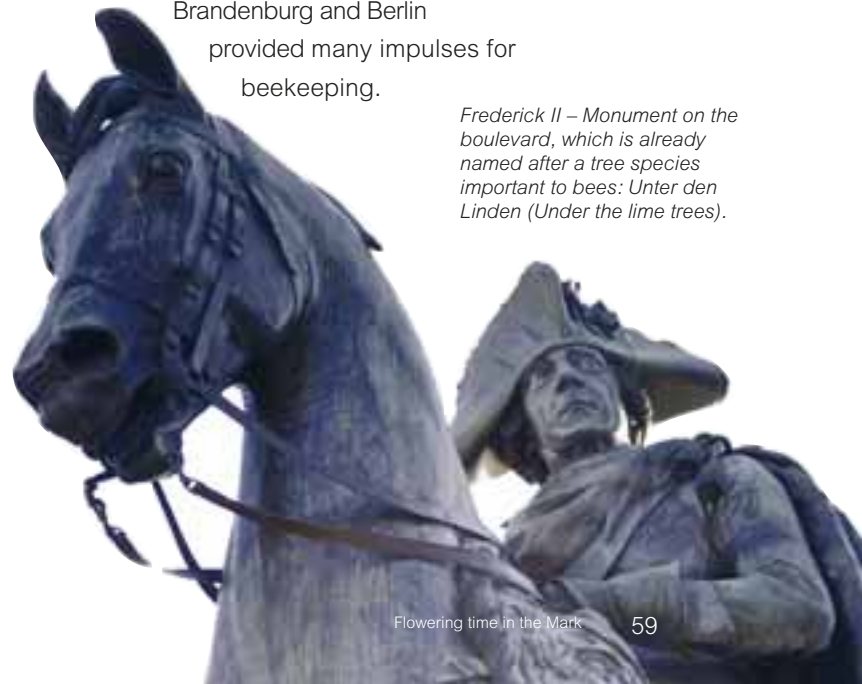


possible to disassemble the honeycomb at any time without damaging it and to look into the straw hives, which were a special form of the hives. However, they only became widespread in the originally forest-poor areas of the lowlands west of the Elbe and Saale rivers. The first German-language book about bees and their keeping was published in 1568, also by a Silesian, the master furrier and beekeeper Nicol Jacob (1505-1576). Christian Konrad Sprengel (1750-1816), a theologian, linguist and teacher, who was born in Brandenburg and later worked as a principal in Berlin-Spandau, described in his book “Das entdeckte Geheimnis der Natur im Bau und in der Befruchtung der Blumen (The discovered secret of nature in the construction and fertilisation of flowers)” for the first time the pollination of flowers by bees in 1793. Sprengel had to quit his job in the same year due to many changes in the teaching structure, including the abolition of morning devotions in favour of natural history lessons.

Only the English physician and natural scientist Charles Darwin (1809-1882) confirmed in his main work “On the emergence of species through natural breeding choice” Sprengel's findings on pollination. Also, later on

Brandenburg and Berlin provided many impulses for beekeeping.

Frederick II – Monument on the boulevard, which is already named after a tree species important to bees: Unter den Linden (Under the lime trees).





The travelling wagon became a beehive on wheels. With it the pollinating insects could be easily brought to good food sources.

Beekeepers under the hammer, compass, and garland

In order to keep the development of beekeeping in the GDR as unhindered as possible despite material bottlenecks, beehives were subjected to standardisation along with many other technical devices and vehicles, and the back handling hive was thus stipulated for a long time. In 1952, beekeepers agreed on a standard, the "TGL-Prey 52" with the honeycomb dimensions (German standard dimensions) of 370 x 223 millimetres, which had already been

standardised in 1880. However, there were also variants with dimensions of 330 by 250 and 338 by 200 millimetres. What was available and had proven itself was standardised. Nevertheless, the few manufacturers of beekeeping products often experienced supply bottlenecks. Until the 1980s, beekeepers were only able to obtain new hives on the basis of advance orders and allocation. Sixty percent of beekeepers in the new federal states still use the standard hive today. A big advantage of this back handling hive was that it was stackable and made good use of the



*Norm Prey 52:
In GDR times the
colourful flight
fronts were typical.*

available floor space. Placed in beehive carts, at any time, the agricultural vehicles could transport a large number of colonies to where they were needed without any loading effort. Late in the evening, when all the bees were at home, it was quickly possible to couple two carts, each with 32 or more colonies. Equipped with a centrifugal chamber, a propane cooker, and mattresses, they were moved up to several hundred kilometres and visited by beekeeper families at weekends. Because if the hives were not firmly bolted together or the overloaded tyres gave up, the journey was soon over and so was the night. Nobody knew about mobile phones then; landline phones were rare. New, industrially manufactured beehive carts were rather the exception than the rule. Often the carriages were built with a lot of love and expertise, but just as often from used material, from small single-axle vehicles to two-axle vehicles with multiple tyres, sometimes holding up to 60 colonies. Since the

honey was extracted locally, it only needed to be transported home or directly to the purchase site. After the honey had been extracted, it was not unusual for the bee-keepers from next door to get together in the evenings with their colleagues, who often became friends. At GDR times, beekeeping was geared towards leisure activities and was often run as a side-line business. There were only a few full-time businesses. Privileged enterprises had not been completely abolished due to the associated private ownership, but they were tolerated at least. The GDR needed in particular individual animal husbandry, i.e. private

*In his book published
in 1919, Ludwig
Armbruster was the first
to apply the laws of
heredity, discovered by
Gregor Mendel, to the
western honeybee.*





The Klotzbeuten (log hives) led to the cleanly carpentered back handling hive. Equipped with windows, they allow the beekeeper to check the inside at any time.

initiative, to ensure a better supply for the population. Beekeepers were not independent in the GDR, but were united in the VKSK, in an association with allotment gardeners, settlers and small animal breeders.

In addition, between the late 1960s and early 1970s, a large beekeeping operation with 500 to 2,000 colonies was set up in each of the 15 districts of the former GDR to ensure better pollination. Thus, in Flemsdorf near Angermünde in today's district of Uckermark, a large beekeeping operation was established for the former district of Frankfurt (Oder), another one on the outskirts of the city of Brandenburg an der Havel for the district of Potsdam. These facilities took over the practical vocational training and performance testing of the bees bred in Hohen Neuendorf. Within the framework of the dual vocational training system, the agricultural vocational school was established in Criewen-Flemsdorf in 1969, along with other tasks, as a central vocational school for beekeeping for the theoretical vocational training of beekeepers from the entire GDR. The "Lehr- und Versuchsanstalt für Bienenkunde Tälermühle" in Thuringia, which was initially entrusted with this



task, was closed due to the lack of political discipline of its long-time director, Dr. Hans Oschmann (1915-1999), which was noted by SED party officials. Oschmann had maintained contacts with West German colleagues, contrary to the party's politically prescribed course. But even in Flemsdorf, the professional training of beekeepers could not be established in the long term. With the change in the organisational allocation of beekeeping from animal breeding to plant breeding, the shift of the training to a plant cultivation-oriented training location was inevitable. Therefore, the agricultural engineering school Neugattersleben took over in 1981, today Saxony-Anhalt, the adult qualification as a skilled

beekeeper worker as well as the further training as a master beekeeper. After the early death of Harald Borchardt (1927-1988), the only teacher of beekeeping in Flemsdorf, the vocational school for horticulture in Werder (Havel), took over the central theoretical training. Every year, 20 to 30 apprentices ensured that the beekeeper classes were well-filled. The development in the number of colonies is extremely interesting. While the number of bee colonies in the old federal republic fell continuously from 1950 to 1989 from just under two million to half a million, in the GDR, it remained at about the same level of 500,000 colonies, only to fall to around one fifth after 1990.

Domestic honey production was supported in the GDR. In the 1980s, for example, a beekeeper received 14 GDR marks for one kilo. The 500-gram jar in the shop cost 4.95 GDR Marks. The concept worked. From 1948 to 1988 the honey harvest rose from 2 500 to 10 000 tonnes.

The honey bear became a design icon of the food trade in GDR times. It is still in use today.



As mentioned before, food self-sufficiency was a high priority for the GDR. This required the pollination by bees. Those responsible for this obviously understood how to use this interest in the beekeepers' interest. Again and again, at the suggestion of the Hohen Neuendorf Bee Institute, above all Prof. Dr. Günter Pritsch, guidelines were passed which were beneficial to beekeeping. For example, the migratory order in which the support of beekeepers in relocating bee colonies in line with their needs was laid down, as was the remuneration for pollination services. Honey was bought up by the state, which corresponded to a sales guarantee. The purchase price was revised upwards several times in the course of agricultural price reforms, while the retail price for beekeeping equipment was kept low. From 1984, for example, the honey purchase price of 14 Marks per kilogram was set against the price of 85 Marks for a back handling hive, which corresponds to 6 kg of honey. In addition, pollination

premiums of five marks per bee colony in rape seed, and up to 120 marks per bee colony in apple blossom were paid. According to the GDR Statistical Yearbook, the gross monthly income at that time averaged 1,200 Marks, so that beekeeping could become a lucrative side-line business.

The Monetary Union on 1 July 1990, which marked the end of the GDR mark and the introduction of the German mark in eastern Germany, swept eastern products off the shelves. As a result, a number of companies in the food industry were either wound up by the Treuhand (Trust company) or bought up by competitors, most of them from West Germany. Many traditional brands in the food trade, some of them from times before the founding of the GDR, disappeared from the market. With the reorientation of the food retail trade, many Western products were available on the one hand, but on the other hand the sources of supply for agricultural raw materials changed. Honey was now also available as a cheap imported product. In addition, agricultural and horticultural production collapsed. In Brandenburg in particular, a serious decline in



Honey labels from the GDR trade

this branch of production was recorded after the end of the Havelland fruit-growing area and the subsequent clearing of orchards.

Around 100 local groups are united under the umbrella of the Landesverband Brandenburger Imker e.V. (Brandenburg Beekeepers' Association), the largest association of beekeepers in the state.



Zusammen schaffen wir blühende Landschaften



Willkommen auf der Webseite des Landesverbandes Brandenburger Imker e.V.

Start into a new era

The period after the political change in autumn 1989 also raised new questions and problems for beekeepers. Above all, the purchase of honey, which had been secured by the state until then, collapsed completely and with it the financial basis of beekeeping.

Thus, after the founding of the Berlin (East) Beekeepers' Association on 7 April 1990, which soon merged with the Berlin (West) Beekeepers' Association, the Brandenburg State Association of Beekeepers was founded under the chairmanship of Dieter Paschke (1928-2000), teacher of beekeeping at the Central Vocational School for Beekeeping in Werder on 28 April 1990. Thus, the association is older than the state of Brandenburg, which was re-founded on 3 October of the same year and comprises the former districts of Cottbus, Frankfurt (Oder) and Potsdam, but also small parts of the districts of Schwerin and Neubrandenburg.

The migration of the bee colonies had to be reorganised as well as the monitoring of their health. The biggest challenge, however, was marketing the honey at an acceptable price. Due to the lack of state buy-ups, this could only be



With the opening of the wall and the cheap honey from abroad, many beekeepers lost their jobs, and without the necessary care also the end for many bee colonies.

managed by cooperatives or through direct marketing, following the Western model. However, since the latter had previously been completely undesirable, the prerequisites for this first had to be created. Dieter Paschke and his committed comrades-in-arms succeeded in obtaining funding from the Brandenburg Ministry of Agriculture.

This help for self-help helped some beekeepers to overcome the one or other hurdle into the market economy. Because the stainless steel technology now available and necessary for the future not only shone with its polished surface, but also with corresponding prices. Many gave up or expected more from the regional association than that was able to provide on a voluntary basis.

But passionate beekeepers remain loyal to their bees. Under the new conditions, they looked for new ways and made use of the diverse training opportunities offered by the Regional Beekeepers' Association, which did not shy away from using the experience of established associations in the West. With the admission of the East German regional beekeepers' associations to the German Beekeepers'

The beekeepers' association also uses events such as the Brandenburg Agricultural Exhibition BraLa in Paaren/Glien as a platform for direct marketing.

Association in October 1990, the use of the Imkerbund glass as a trademark for the highest quality of domestic origin

also became possible for the Brandenburg beekeepers. But this was only a milestone, the goal was far from being achieved. Now, the beekeepers had to be intensively trained so that only the best products were delivered to the customers. At the time, the association saw this as an opportunity to survive successfully on the market in the long term. After all, 80 percent of the honey consumed in Germany was and is imported from other EU countries and from overseas. Almost everything that is on offer in honey products in the food retail trade comes from abroad.

In the post-reunification period, it soon became clear that honey marketing as the basis for profitable beekeeping had to be structured differently. The need was there, because the East Germans had relatively quickly returned to their regional products, as long as these had survived the bloodletting after economic and monetary union.





Since the Brandenburg beekeepers joined the German Beekeepers' Association (Deutscher Imkerbund e.V.), they have been allowed to use the trademark of regional quality "Genuine German Honey" which has been successful since 1925.

But for the retail chains, most beekeepers were and still are too small as suppliers. That is why the Brandenburg Beekeepers' Association presented itself at the largest Brandenburg Agricultural Exhibition (BraLa) from the very beginning, which has been held annually in the Havelland region of Paar/Glien since 1991, to familiarise visitors with local agriculture and its products. What began with a small information stand at the former cheese dairy, is now continued



For three decades now, the Brandenburg Ministry of Agriculture has been organising a State hall at the Green Week in Berlin, under which honey products are also presented.

as the "Bee" competence centre. Visitors can find out about types of honey, which plants support bees, or how to become a beekeeper, whether as a hobby or as a profession. Brandenburg's beekeepers use the major events in the state for the direct marketing of their honey products. They are among the hosts of the Brandenburg Country Party, which takes place every year on the second weekend in June. They show their flag at the largest folk festival in the country, the Werderaner Baublüte, or offer their products to visitors to the Choriner Musiksommer on the way to the monastery. As a result of the enormous commitment of its long-standing chairman Rainer Gabriel, who unfortunately passed away in the meantime, the



Landesverband Brandenburgischer Imker e.V.
 (beekeepers association) also presents itself
 at the annual International Green Week in Berlin
 in January, the largest consumer fair for
 agricultural products in the world.

*The Groß Schauener
 beekeeper and
 chairman for public
 relations of the regional
 beekeeper's ass.
 Holger Ackermann, in the
 Zeidler costume*



Learning from bees – Experience community

If you keep bees you are not alone. After all, honeybees have a radius of action of about three kilometres around their dwelling, which they can extend to over ten kilometres if necessary. In this respect, the bee colonies of a region are at least potentially in contact with each other, which not only brings advantages. After all, pathogens and pests can also be exchanged in this way, and raids can be committed. Because as harmonious as a bee colony is, different laws apply between colonies. This makes it all the more important that their keepers are networked as well as possible. It is no coincidence that beekeepers have been joining together since ages, to harmonise

beekeeping, to exchange ideas, to learn from each other and finally to pass on their knowledge and skills to the next generation. Sustainable, successful beekeeping requires good conditions. To maintain or even improve these conditions, individuals in the community can take a much more effective approach, especially when it comes to initiating support programmes and developing large-scale activities, whether for beekeeping investments, improving marketing conditions, flowering area programmes, tree and avenue protection, pollinator-friendly biomass production, beekeeping research, education and advice, and plant protection that protects beneficial organisms. While the bee-keepers' association and the regional association operate at federal



and state level, the local or regional beekeepers' association works where the beekeepers keep their bees. After all, it is at the local level that the greatest influence can be exerted on those bodies and companies that often unconsciously decide on the bees' food resources: environmental agencies and committees, agricultural enterprises. In addition, coordination with farmers on plant protection measures is easier if there are only some contacts on both sides. The direct contact between beekeepers and especially between the board and its members enables faster information about current news. The general media offer little beekeeping information. Beekeepers' journals have a lead time of months until they reach the letterbox.

Up-to-date information on subsidies for new beekeepers, poisoning damage, optimal weather conditions for pest control is often distributed on the same day via the beekeeper associations. In addition, beekeepers benefit from the associations' group insurance scheme by taking out a low-cost insurance policy. This applies to both the liability insurance and the legal protection insurance for livestock owners. Even the handling of insured losses is relatively simple, because the insurer is faced with a relatively large number of insured persons who exchange information with each other, and assess the quality of the insurer, i.e. exert a certain amount of pressure. Anyone marketing honey needs suitable containers, including labels with all the legally required information.

After the sweet cherry, pear and apple wait for pollination.

He needs advertising. However, only for members of the beekeeper associations who are members of the national associations of the German Beekeepers' Association (D.I.B.), the use of the D.I.B. glass including the associated advertising material is possible. This glass stands for the particularly high quality requirements which the German Beekeepers' Association has laid down in its trademark statutes. The brand Echter Deutscher Honig (Real German Honey) has a uniform appearance, and stands up to the foreign competition, which largely dominates the honey market. The D.I.B. also makes sure that all information required by laws and regulations is included on the D.I.B. honey jar warranty. This means more legal security for the individual in comparison with the official food control. The development of advertising materials by the D.I.B. guarantees a uniform appearance of advertising and product. Based on uniform quality criteria and appearance of the honey, participation in quality competitions is possible. These offer a good opportunity for public relations work in the respective region. In addition, the certificates are used for advertising

in the company's own sales, in particular for marketing ex house or via a farm shop. Finally, the beekeepers' association offers the community. You get to know new people there. This often leads to intensive friendships that last a lifetime. But how do you find a club? The appendix contains addresses of beekeeper associations in the region. The local associations are also listed on their websites. In many cases the local beekeeper associations can also be found in the association lists of the towns and municipalities. Here a look at the homepage of the city or municipal administration is helpful. Some associations also maintain their own internet presence. It is also worth taking a careful look at announcements for small animal shows, autumn festivals and weekly markets: here you will often find a contact person from the sweet guild. Do not be afraid to enter a new world: beekeepers are usually friendly people. Once the first contact has been made, the associations make it possible for them to attend their events as guests, before one makes a final decision.



Fascination bee colony

For more than half a century, Lothar Lucke has been taking care of bees and his beekeeping association. As soon as the fruit blossoms begin to bloom, the hobby beekeeper from Werder brings most of his 25 colonies to the orchards for which the traditional horticultural stronghold in the Potsdam-Mittelmark district is famous. Afterwards he takes his colonies on a hike to the bright yellow rape fields in the surrounding area. Lucke is one of the most experienced and committed beekeepers in the state, certainly one reason why the independent insurance broker did not evade the demand to become 1st chairman of the Regional Association of Brandenburg beekeepers after the unexpected death of the long-standing chairman Reiner Gabriel in 2016. He is now carrying out this honorary office in addition to his other activities

in the Beekeepers' Association of Werder, or in the Lebens(t)raum (habitat – life's dream) Potsdam-Mittelmark. The latter is the name for a network project of the tourism associations Havelland and Fläming. Lucke and his honeys have also been to the Brandenburghalle at the International Green Week in Berlin to answer visitors' questions.

Twelve questions to Lothar Lucke, 1st Chairman of the Brandenburg Beekeepers' Association.

How did you actually take up beekeeping?

Lucke Actually quite profanely: a colleague of my father's had a so-called two-axle bee cart with about 40 bee colonies. These bee wagons were not rare in GDR times. The colleague raved about the additional income from this small "factory". From this motivation I started as a new

Brandenburg's "top" beekeeper is Lothar Lucke from Werder. As chairman of the Brandenburg state board of beekeepers, he is particularly committed to the interests of hobby beekeepers.



beekeeper with three bee colonies in 1968. Like many who started, I was taken by the “fascination of beehives”, which has never left me since.

Starting from Bavaria, initiatives have come together in many German states which are committed to insect protection and thus to more bee protection. In Brandenburg two popular initiatives were even launched in 2019. Both initiatives, which were quite competing, were able to persuade many people to sign up. Are you saying: finally, because the topic has reached the middle of society or should more be done?

Lucke Bees have been in the public eye for a long time now as sympathizers for nature conservation, and pollination of wild and cultivated plants. But it is a fact that the extinction of wild bees and insect protection in general are now also perceived as overly complex issues because they can affect every individual. It is right that this is being discussed and that it is not just a matter of words.

Allotment gardeners are an important player, and their regional association is one of the

largest leisure organisations in the country. Is there any cooperation?

Lucke At the level of the umbrella organisations there is no significant cooperation with the allotment gardeners so far. But quite a few beekeepers are also members of the regional association of garden friends. They have their bee colonies in their gardens which also belong there. I know from conversations that some garden neighbours do not always have the necessary understanding for this. As beekeepers, we advertise, for example, that mowing is not done accurately everywhere. In my opinion, small flowering areas or islands of flowering are not only beautiful, but much more beautiful than short lawns. All in all, the many home gardens and allotments in the country are also important as a habitat and food source for insects.

The key to pollution-free honeys lies primarily in the hands of farmers. In May 2019, the Märkische Allgemeine Zeitung wrote that the alliance between farmers and beekeepers was indeed in place, “but more than fragile”. How do you see this? How, in your view,



has the relationship between organised beekeepers and the farmers developed?

Lucke The alliance is not fragile. There are often good contacts. There is also constructive cooperation at local and association level. It is true that the key to pollution-free honeys made from agricultural produce lies in the hands of farmers, who should be in good contact with local beekeepers, and vice versa. There are indeed similarities: Like beekeepers, farmers want to produce healthy food. The difference is that we are almost all on the move as a side-line, but most farmers have to make a living from it as their main occupation. They often have to gear their activities to large quantities at the lowest prices. As consumers, we have to realise that with less agricultural chemicals, on average less is harvested. Harvesting is then, as we all want it to be, more residue-free, but cannot be so cheap. This market principle is not in line with what most of us expect in nature conservation and, in relation to beekeeping, in insect protection. The relationship between organised beekeepers and the agricultural profession is therefore not always free of conflicts of interest,

but it is clear that pesticides containing glyphosate have long been problematic because residues remain in the soil for a long time, and also because sprayed flowering plants continue to be flown on by bees one or two days after the application of such products. It is overdue and right that there should finally be an end to this.

As everywhere in Germany, the vast majority of beekeepers in Brandenburg have chosen Carnica. It actually comes from Carinthia and has only been native to Central Europe for 150 years. Why don't our beekeepers keep, as some experts demand, the dark bee described as native, which should be best adapted to the conditions in our region? Would this be possible and sensible at all?

Lucke With the Carnica we have a very efficient, adaptable, and gentle bee breed. At the time of its naturalisation in the German-speaking countries, the Carnica was superior to the then widespread Dark Bee in its essential characteristics. Breeding selection and thus influencing the genetic make-up of the honeybee as the third most important farm



animal began much later than with other animals. Of course, this has to do with the mating behaviour in the air, which is probably unique and uncontrollable for a farm animal. Nevertheless, I see the revitalisation of the dark bee, which in principle no longer exists in our country, from populations that are still partly found in Scandinavia, as positive. Because this is also completely in the sense of the widest possible gene pool in bees, which we certainly need for possible requirements in the future. But you should protect yourself from exaggerations. Even the dark bee is not a miracle bee. Right now, the conditions for beekeeping in our region are changing. While some scientists are still arguing about the effect of a tenth of a degree temperature increase, our bees are reacting sensitively to climate change, which is essentially man-made. The ancestors of the dark bee had not experienced climate changes like these. They could therefore not react genetically and pass this on with their genetic material. It is clear that all species of useful bees must adapt to the current situation.

One problem that many associations with an agricultural background have in the country is the lack of younger people. The association is now making a recognizable effort to get children and young people interested in beekeeping. Is it worth the effort or would it not be easier to recruit early retirees and part-time workers to fill the beekeepers' ranks?

Lucke The efforts to show children and young people a fascinating part of our environment are always worthwhile. Be it that we show them a completely different world in addition to the omnipresent Internet world and offer them a real, meaningful, and manageable leisure activity. Or whether it is that the young people in their later life, often after professional or private turbulences, turn to beekeeping permanently. Then it pays off that they want to experience or deepen what they have already heard and seen in the past.

With our offers for trial and beginner courses we reach many age and occupational groups anyway. The courses are always well attended. We have succeeded in reversing the downward



trend in our membership figures. As a national association, we currently have 101 beekeeper associations and thus represent almost exactly 3,000 beekeepers with 27,000 colonies!

What would I have to do if I had, other than good intentions, no experience, and no equipment? Do I have to join a club right away? Isn't it possible to learn beekeeping on the Internet or from a textbook?

Lucke Of course there is a lot of literature and too many who think they have to put something on the internet. But my suggestion is that you attend a “live” course, held by a practitioner you know in your area, or through our national association. You can get tips from our office on what we think is recommendable as literature for beginners.

However, you should look at a local community as soon as possible. Depending on the season and outfit, the situation is different. Then, depending on the situation, different supporting works are necessary or useful. This kind of challenge is, by the way, one of the things that makes up the “fascination bee colony” for me. In some of our associations there are groups of

beginners who are supervised by an experienced beekeeper and who meet regularly at another place of a new beekeeper to do the necessary work. A club membership is not mandatory, but absolutely recommendable. One is in a circle of like-minded people, usually finds friends with whom one can talk shop. In addition, the very inexpensive club membership gives you unbeatable insurance protection and you do not have to worry about it by yourself. This also has an epidemic-hygienic background. So, everything speaks for a local beekeeper association. By the way: For those who cannot even imagine this, there is our Internet association!

How much money would I have to invest initially? Could I also become a hobby beekeeper in the city?

Lucke We calculate 500 euros as an initial investment. We are grateful to the state of Brandenburg for a subsidy for new beekeepers, processed and handed out through our association. Of course, you can also become a hobby beekeeper in the city. How this works and what you should observe is also the subject of our beginner courses.



But some younger people are afraid that they will take on a permanent task with bees, that they will then have no time for the family, or not even be able to go on holiday? What do you tell them?

Lucke A colony of bees knows what to do and provides itself with food whenever there is something blooming within a radius of three kilometres. It is not dependent on daily care like dogs and cats, and does not need a paddock, but a suitable location for the beehive. You can take a holiday for almost the whole winter if there is one here again. Even in summer two weeks are possible. But true, a bee colony is a permanent task. Just to put it up and then not to care about it would be irresponsible.

Unfortunately, there can be pests in the wax and in the bee colony besides possible lack of food.

Honey from the beekeeper is often a little more expensive than the honeys you can buy in the food retail trade. What do you think are the arguments for buying domestic honey?

Lucke Honeys in the food retail trade come from cheap imported honeys, if not declared

otherwise. They are indeed tested, but not everything can be traced. Honey from domestic beekeepers always contains domestic pollen. This makes them valuable for our health and immune system. Besides, when buying a local honey, the contribution that a local beekeeper makes to the preservation of regional biodiversity with his bee colonies and their pollination performance is appreciated.

Is it a correct observation that in recent years more and more professional beekeepers have been gaining foothold in Brandenburg? What is the ratio of professional to hobby beekeepers?

Lucke Yes, the observation is correct. With a professional beekeeper, similar to a farmer, the main focus must be on making a profit. This has led to divergences in the past, but as always in life, it depends on the people involved. When professional beekeepers with large numbers of colonies migrate from far away and set up their bees where natural habitats are perhaps limited, or even local beekeepers have established a flowering area with local farmers and justify this by saying that

=) Aufgrund ihrer Form
werden die

nature belongs to us all, this is not an argument with validity. In addition to constructive cooperation between professional and hobby beekeepers, more far-reaching regulations are needed here than in the past, in the sense of coordinating such bee colony movements.

Do you see that hobby beekeeping in Brandenburg has a future?

Lucke Absolutely! I am again thinking of the “fascination bee colonies”. For beekeepers it is clear that we have to rethink and change the way we live and work today in many respects. The meaningfulness of beekeeping has far more to do with bees than just honey. It stands for the growing understanding that we cannot always just take from nature, but must also give something back.

Beekeepers regularly check whether their colonies have been successful and how the workers are doing.



*Honey harvest:
First the bees must
be separated from
the honeycombs.*

From the honeycomb into the glass

In former times, beekeepers worked in complete isolation in their beehive surrounded by myths, far from the hustle and bustle of the city. Today, many bee lovers like to share their hobby with honey fans, for example in the Oranienburg Castle Park. It has already been said there several times: “Show extraction is the order of the day”. The harvest of the newest honey is imminent. Numerous onlookers gather at the apiary to look over the master beekeeper's shoulder and finally to get one of the glasses with the golden yellow delicacy.

“You just have to communicate properly with bees,” says Jens Radtke from the State Institute for Apiculture in Hohen-Neuendorf. “And a few stings are not that bad. After all, bee venom is healthy, it promotes blood circulation. Anyone who fights them wildly or smells like a bear is treated as such by the bees. The first beekeeper's duty is to stay calm, otherwise the bee will sting, sting, sting”. Daring but with a sure grip Radtke opens the first bee box. Close above the bees he lets his hand circle as if he wanted to test how his bees are feeling today. He only wants to take away the fear of the many spectators, but not their respect.



Slowly he pulls one honeycomb after the other out of the box. “First I have to send the bees away so that they know who is the boss here. In no time, the bees are back in the box at the stroke of a feather”. He hands the bee-free combs to the baffled audience. So, he does not have to carry the honey-heavy combs to the spinning area alone. Once there, the first thing to do is to lift the serving lids off the honey cells. “The most important thing is that the honeycombs remain intact, otherwise everything will stick. He skilfully places the uncovered honeycombs in the honey extractor, which he traditionally operates with muscle power. In this way, the golden yellow mass can be separated neatly from the honeycombs. A good 200 revolutions per minute make the honey splash against the glass kettle wall.



“The fact that today you no longer have to suck the honey out of the honeycomb but can spread it neatly on bread is thanks to an invention made in 1865. At that time, the Austrian Major Franz Edler von Hruschka (1813-1888) presented the first honey extractor at the travelling meeting of the beekeepers of German tongue, as it was called at the time. It was actually invented by his son. He was supposed to carry the honeycombs home in a basket. But just as children are, he did not carry the valuable treasure thoughtfully along the path, but jumped cheerfully and let the basket rotate. “And then the honey was out,” resounds the audience, which now laughs out loudly. “Certainly, there was a slap in the face at first, but then Dad thought about the adversity of his son and enlightenment came to him.”

Meanwhile, the mouths of the observers of the strange hustle and bustle are beginning to water. “Hmmm, the honey tastes great, not as artificial as from the supermarket. It’s much more aromatic,” a young lady tells her friend. “The variety of flowering, gentle processing and short distances from the bee colony to the consumer are also noticeable in the taste”, the expert adds. “But this is not the only reason why it makes sense to buy regionally produced honey. The better the local beekeepers can sell their honey, the more bees they will keep and the safer the pollination of cultivated and wild plants will be in the future. In this way, yields can be stabilised in a purely organic way, and native plants can multiply. Birds and small mammals find sufficient food.”

The honeycombs are then uncovered. The honey runs golden yellow into the sieve and is then filled into jars.



A large variety of flowers helps to produce a multi-flower honey, depending on the season as spring or summer flower.

Sweet Gold

Known to many only as a spread, honey was often used medicinally in earlier times. Even today, it is impossible to imagine naturopathy without it. It is even finding its way back into conventional medicine, and has been able to regain ground in the treatment of wounds, which was long disputed by antibiotics.

Honey is a natural product that bees produce from nectar (flower juice) and pollen of different plant origin and enrich it with the body's own enzymes (biocatalysts). The more intensively the bees process the water-rich nectar in their hive, and the more gently the beekeeper extracts, processes, and stores the honey, the higher the

proportion of positively active substances. More than 180 substances have been identified. Although the main components of honey are sugar, they are not to be confused with the usual household sugar, sucrose. Honey contains mainly the simple sugars glucose and fructose. While the latter gives many fruits their sweet taste, dextrose is a popular source of energy, which is often purchased in pharmacies by sportsmen and intellectuals. Both monosaccharides cause the sponging out of wounds and skin impurities, while the enzyme glucose oxidase is responsible for the germicidal effect against various pathogens. In addition, honey contains, among other things,



Ingredients

- 40 percent fruit sugar (fructose)
- 35 percent glucose
- 18 percent water
- 5 percent multiple sugars
- 2 percent Vitamins, Minerals, Amino acids, enzymes, and flavourings

vitamins B1, B2, B6 and C as well as the minerals iron, potassium, magnesium, and zinc. It is no coincidence that honey has a firm place in many cosmetics. A prominent example is the Egyptian ruler Cleopatra (69 – 30 B.C.E.). She is said to have bathed in milk, and then cared for her delicate skin with a honey mask. A litre of milk in the bath water and a few tablespoons of honey are certainly a good start. Others like to rub honey into their skin before going into the sauna.

Treat honey gently

However, some enzymes and vitamins are sensitive to light and excessive heat. Therefore, honey should be stored in a dark place and not

heated unnecessarily. Due to the heat sensitivity of various ingredients, honey is added at the end of the cooking process if possible.

It is only stirred into the sauce when this is ready. Poultry or other roasts are only coated with honey towards the end of the cooking process, especially as this makes the surface become particularly crispy.

What about honey in hot milk or hot tea? Serenity is required, because here too, if honey is added to the drinks only when they are ready to drink, it is hardly damaged. The latter is always a product of temperature and time. The shorter a high temperature acts on the honey, the less its ingredients are damaged.

If individual plant species appear in the flight range of the bees especially often, this can lead to pure honey with the typical aroma of the respective plant. In Brandenburg, depending on location or weather conditions, honeys are produced from fruit, rape, robinia, cornflower, lime, sunflower and heather.



Their problematic invasive potential has led to Robinias being criticised in the wild. On the other hand, they are appreciated as a park tree and as a treat for bees.

Some knowledge regarding varieties

If the bees have many different plants at their disposal at the same time, they will produce a multi-flower honey which is called spring flowering or summer flowering, depending on the season. Multi-flower honey reflects the diversity of a region. Like a good wine, it tastes

a little different every year. If specific plants are present in clear excess, as in the case of varietal honey, this will also be reflected in the results. When one plant species clearly predominates, and if the honey has the corresponding characteristics in smell and taste, and in its chemical-physical properties as



well as in its microscopic image, the plant species concerned can be highlighted in the designation. Pure honeys are more expensive than multi-flower honeys because of the higher beekeeping effort and laboratory tests.

Typical variety honeys in Berlin und Brandenburg

In Brandenburg, the yellowish, delicate fruit-blossom honey is just as typical for the fruit-growing regions as the sweet, larded rape honey from the rape fields, which shine yellow from the end of April to mid-May. Robinia forests

Many former military training areas in Brandenburg are now protected heaths. Especially in late summer they offer a large food reservoir for bees.



Sunflower honey is one of the particularly creamy, aromatic honeys. Many beekeepers swear by this variety.

provide the clear, sweet Robinia honey, which is sometimes also available as acacia honey. Where in summer the cornflower transforms fields into a sea of blue flowers, cornflower honey is an interesting option. Elsewhere, the linden avenues that criss-cross Berlin and Brandenburg offer a rich basis for the menthol-spicy linden honey. In rainy summers, the declining sunflower cultivation produces sweet golden-yellow sunflower honey. The dark, almost black, strongly scented buckwheat honey can be extracted from many buckwheat fields in the sands of the Mark Brandenburg. Not quite as dark, but rather reddish to brownish in colour, is the malty-spicy heather honey from the heath landscapes, which are bathed in a delicate violet from August to September.

If the honey contains little water, the liquid phase contracts so strongly, especially at cool temperatures, that the fine dextrose crystals become visible on the glass wall. When left in the kitchen cupboard at room temperature for a few days or even slightly warmed, the liquid phase expands again, and the white surface disappears, at least on the glass wall. A light



Solid or liquid honey?

The origin of the nectar of various plants influences not only its composition but also its later consistency. First of all, every honey is obtained in liquid form, but the dextrose contained in the honey crystallises. Depending on its natural content in honey, this process takes only a few days or several months. Thus, for forest honey, there can hardly be any liquid honey from autumn onwards. However, the beekeeper ensures that the honey forms extremely fine crystals through proper mechanical processing, i.e., stirring at a cool ambient temperature, which leads to optimal spread ability.

Such a fine creamy honey does not spill off the bread so easily. If the honey is left to its own, it often crystallises roughly and solidly. Here, the honey is not worse. But it is difficult to spread. Occasionally, it also forms on the upper areas and on the glass wall white areas. This “flower formation” indicates an extraordinarily dry, i.e., waterless honey and is a physical phenomenon: While only the dextrose crystallises in the honey, the fructose, the water, and the substances dissolved in it form the liquid phase in between to make the honey spreadable.

Direct marketing at markets and fairs is an important distribution channel for regional honey products in Brandenburg.

white layer can also be formed on the honey surface by rising air bubbles that have entered the honey during extraction and processing. Crystallised honey is usually easy to spread at room temperature. In order not to endanger its ingredients and thus its quality, it should not be liquefied. Just as an ingredient for cooking, baking and roasting or for cosmetic purposes, it can be useful to liquefy the closed honey jar in a water bath beforehand.

Honey does not belong to the easily perishable food. Under optimal conditions, it can be stored for several years without loss of quality, similar to wine. As long as honey does not ferment, which is easily recognisable by its highly vinegar-like smell and taste, it retains its marketability well beyond the stated best before date. This date should not be confused with an expiry date. Larger quantities should be stored in a cool and dark place, for example in the cellar. The jar intended for immediate consumption, on the other hand, is best stored in the kitchen cupboard. Otherwise it becomes too solid and loses both spread ability and aroma.



Which honey is the best?

It is well known that taste is a matter of debate. The only thing that helps here is to try it. But taste is not everything that makes quality. It is important that the honey remains natural. This is achieved by gentle processing, storage, and short transport routes from the producer to the consumer. Consumers receive honey from the region directly from the beekeeper or from small traders, weekly markets, bakers, and pharmacies, thus promoting local beekeeping. Due to its small harvest quantities, honey is one of the best studied foodstuffs. Regular inspections are carried out by the veterinary and food control authorities. In addition, there are voluntary analyses by beekeepers or controls by



the German Beekeepers' Association These analyses repeatedly show that domestic beekeepers offer high-quality honey, which, however, can rarely be listed in supermarkets due to the comparatively small quantities involved. The German Beekeepers' Association in particular controls the honey of its members very strictly. In its trademark statutes, it has laid down much higher quality requirements than those generally applicable to honey on the market and otherwise only achieved by selected and premium products.

Quality has its price. Therefore, the beekeepers also accept lower harvests. Local beekeepers

have also no problem to declare their product clearly and unmistakably as „Deutscher Honig (German honey)“ or even as „Echter Deutscher Honig (Genuine German honey)“. Some beekeepers can also be certified as organic farms. In most cases, this changes little for the beekeepers, since from the outset, attention is paid to the production of honey that is as natural as possible.

Genuine German honey is characterised, among other things, by its particularly high degree of ripeness. And this can be measured with the refractomete.





*Deutsches Biosiegel:
German Bio Seal:
Only where organic
is in it may it be
labelled organic.*

**Lusatian
bees love
organic food**

Nature has left behind a treasure in the Niederlausitzer Heidelandschaft Nature Park, right on the border with Saxony. But this is far from self-evident here. For decades, lignite was mined in the region. Mining the coal turned everything upside down. Entire villages disappeared. More than 40 mines were registered by the mining authorities. Nevertheless, large parts of the maltreated landscape are now protected as a national natural landscape in the legal form of a nature park. Even though not all wounds have healed by a long way, species-rich habitats have reappeared since the end of coal mining. Some of the open-cast mining pits are now flooded and attract tourists in summer. Purple heather blossoms and flowering fruit trees create blossoming landscapes. Orchard meadows, a paradise for old varieties of fruit, but also refuges for many rare animals and plants are the trademarks of the Niederlausitzer Heidelandschaft. This is where Christian Wolf settled with his organic apiary in 2012, so to



speak on the lower right of the border of the Niederlausitzer Heidelandschaft nature park. He runs his beekeeping with great passion in Lauchhammer. “Bees have always fascinated me.” But the final impetus came at the end of his studies of geography with an introductory course for beekeepers. He has remained a geographer. He teaches at the Protestant Highschool in Cottbus. Beekeeping is only a side-line of his family business. “We believe that ecological and above all rural agriculture is the only right way to work in a resource-saving, animal-friendly and sustainable way.” Christian Wolf is a member of the Bioland Cultivation Association and, in addition to beekeeping, also manages about ten hectares of arable land, twelve hectares of grassland and ten hectares of orchard meadows. Bioland is the largest organic farming association in Germany. Its subdivision, Bioland Ost e.V. with Berlin, Brandenburg, Mecklenburg-Western Pomerania, Saxony-Anhalt, Saxony, and Thuringia, includes over 300 farmers, gardeners and also beekeepers such as Wolf. Today, 400 beekeepers from Germany and South Tyrol work in the Bioland umbrella organisation.



Organic beekeeping places particular emphasis on natural and environmentally friendly husbandry conditions. “As an organic beekeeping company, we can guarantee that our honey has less or no pesticide residues”, Christian Wolf explains his decision. “Our wax is also significantly less contaminated. In contrast to conventional beekeepers, we are only allowed to use organic acids when combating the varroa mite. The use of chemotherapeutic drugs is prohibited. In order to control this, certified organic beekeepers like us must have samples of honey and wax tested for residues in the laboratory. Criteria for recognition as organic beekeeping are:

- linseed oil treated wooden boxes,
- natural remedies for disease control,
- promotion of natural honeycomb construction,
- gathering of pollen and nectar on mainly organic land,
- own honey or organic sugar for wintering,
- ecological wax/own wax cycle,
- not cutting the wings of the queen,
- gentle treatment and further processing of the honey.



Applies in all Member States: the Established EU organic logo

In case of a completely new start with certified Bioland bee populations, the conversion period is omitted. The beekeeping is then an organic operation from the very beginning and can market honey under the Bioland label immediately after the first successfully passed inspection.

Those who want to convert from conventional beekeeping to organic honey, on the other hand, must wait one to two years (depending on the farming association) for the conversion period. However, since the certification and the regular controls result in additional costs for the beekeeper, a conversion is worthwhile from a business management point of view from about 30 colonies upwards according to the recommendation of the Bavarian State Institute for Viticulture and Horticulture. Wolf has 50 beehives. In the high times, between April and August, numerous bees swarm through his garden and across his orchard meadow. “Then there's a good buzz



Single flowering varieties are favourable for bees. Filled flowering varieties are useless for them, as this comparison of dahlias shows.

Naturpark
Niederlausitzer
Heidellandschaft



at the beehives,” says Christian Wolf”. His beehives are preferably located on ecologically certified areas in the Nature Park and in Lauchhammer. In the Bioland guidelines, which basically apply similarly to all other organic associations, it says, “If the location of the hives is an agricultural field, it must be organically managed. The location must be chosen in such a way that no significant impairment of bee products by agricultural or non-agricultural sources of pollution is to be expected within a radius of 3 km around the beehive. Plant crops in which pesticides have been sprayed into the flower may not be used for pollen collection. Industrial centres or the vicinity of roads with heavy traffic (e.g. motorways) should also be avoided.” There is occasional criticism of the three-kilometre limit, as bees can fly further in their search for food. But if there are enough flowers within the three-kilometre radius, the honey comes primarily from this environment. According to Bioland’s guidelines, “The number of bee colonies must be limited in such a way

that each colony is sufficiently supplied with pollen, nectar, and water. The locations of the colonies are recorded in a migration plan over the year. The migration plan must contain exact information about time, place, outfit, and number of colonies. The colonies may only be set up, also for wintering, in the Bioland care area and in neighbouring border regions. Exceptions must be separately approved by the association and only in individual cases. Regular quality controls are mandatory anyway to ensure the organic quality of the honeys. The Lower Lusatian region offers areas for an organic beekeeper such as Wolf, despite the intensive agriculture which is also present. This saves his bees from having to go through a costly travel. The many orchard meadows in the Hohenleipisch area as well as the robinias and lime trees make it possible to produce different types of honey. Wolf owes the buckwheat honey harvest to the nearby areas of the organic farm Ogrosen. However, as so often in the state, there are too few bees and too few beekeepers in Lauchhammer.

The teacher Christian Wolf produces organic honey according to the guidelines of the Bioland Association in a side-line business with his 50 beehives.

Although his bees are already demanding a lot from him, Wolf takes the time to introduce children in a bee school in cooperation with NABU Senftenberg to the fascinating world of beekeeping. The beekeeper also wants to create the first interest in order to take away the fear of one or the other of entering beekeeping.

It is often the case that interest is passed on within families or relatives. Today, this is not enough. Newcomers are also welcome in Lauchhammer. The beekeepers' association is the best place to ensure that the bees are expertly cared for, and that good quality honey is produced. Those who dedicate themselves to beekeeping need time and commitment. A beekeeper can contribute a lot to the well-being of these sensitive animals. But also, a lot can be done wrong. Then you risk not only the health of the bees and the quality of the honey, but also your own investments in beekeeping.

After all, the Lauchhammer Beekeepers' Association has already succeeded in increasing the number of its members in the last two years. There are currently 21. In the



State the trend is upwards after years of a decline in membership, although the tentative recovery of the Brandenburg beekeeping sector is by no means sufficient to compensate for the slump after the fall of the Wall.

Furthermore, it can be observed that many beekeepers only look after a few colonies. The sustainable concept of beekeeper Wolf includes thinking in regional cycles. His honey products are not only ecological, but are also marketed directly and regionally. Like many beekeepers, he sells the honey jars directly from the farm and in the Naturparkhaus Bad Liebenwerda, in regional organic shops and reform houses, but also online via his website.

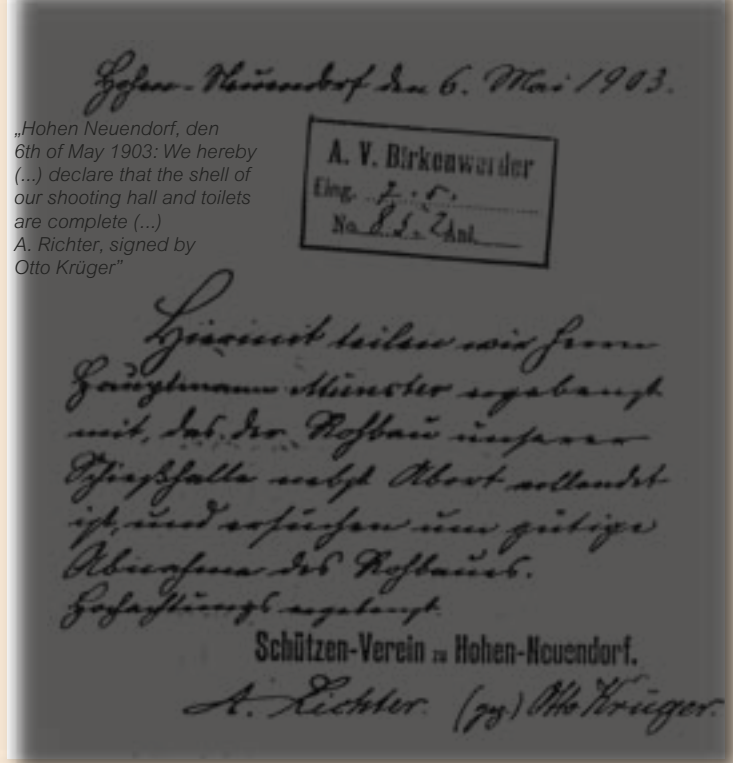
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With the construction of its shooting range, the Hohen Neuendorfer Shooting Club laid the foundation for the structural use of the existing farmland.

In the beehive

The history of the Landesinstitut für Bienenkunde (LIB) goes back to 1918, when a research centre for bee biology and bee breeding was established at the Kaiser-Wilhelm-Institut for Biology in Berlin-Dahlem. In 1923, the Bee Institute was founded at the Agricultural University in Berlin-Dahlem under Prof. Dr. Ludwig Armbruster (1886-1973), who, on the basis of Mendel's laws, was intensively involved in the hereditary processes of the honeybee. Thus, he raised the Research Centre for Bee Biology and Bee Breeding at the Kaiser Wilhelm Institute of Biology, which had existed since 1919, to a new level. Armbruster soon discovered that it is not the external appearance that determines the value of a bee, but its characteristics and performance. Therefore, he did not fit into the race ideology of the rulers of the time and had to leave in 1934. After the end of the Second World War, when the Agricultural College and the Bee Institute were no longer



accessible for East German beekeepers, due to the division of Berlin, Jan Gerriets (1889-1963) initiated the founding of the Bee Institute in Hohen Neuendorf in 1952. Gerriets, Professor of Small Animal Breeding, had already accompanied the founding of several bee institutes in the state of Prussia in the pre-war period. At that time, it was still the Department of Apiculture and Silk Production of the Institute for Small Animal Breeding at the Humboldt University Berlin. Dr. Grete Meyerhoff (1913-2002) became head of the department, later Professor of Apiculture.



Already in 1905, the restaurant was attached to the shooting range. (Postcard around 1910)

This institute became the central beekeeping research institution of the GDR.

There, essential work was carried out for the research of the pollination performance of bees in different agricultural crops, the maintenance of healthy bee colonies, and the standardisation of hives and equipment. The leadership of the GDR was committed to the self-sufficiency of the population with food. Bees had to make a substantial contribution to this, mainly in the form of pollination. The honey produced was bought up to transform it mainly into hard deutschmarks. The complicated ownership

structure on the allocated Hoher Neuendorf property, the former Schützenhaus (Shooting Clubhouse), caused considerable problems. In addition to the use of the villa with its goat shed, only wooden bee houses were allowed to be built on the premises. It was not until 1970, when it was founded as the VEB Research Centre for Beekeeping, that massive buildings were erected. Until 1973, the new institute was subordinated to the Association of Volkseigener Betriebe (VVB) Animal Breeding, from 1974 to the VVB Seed and Planting Material of the GDR. After 1990, the entire research landscape of the



The Schützenhaus from the north-west perspective

The renovated former restaurant Schützenhaus, main building of the bee institute founded in 1952, has been shining in new splendour since 2002.



former GDR was put to the test. In 1992, on recommendation of the Science Council of the Federal Republic of Germany, the Research Centre was re-established as a multi-state institution in the legal form of a registered non-profit association. The State Institute for Bee Research Hohen Neuendorf e.V. (LIB) has since been a non-university institution, supported by Brandenburg, Saxony-Anhalt, Saxony, Thuringia, and Berlin. Non-university refers to legal autonomy and here, however, only to funding. Of course, the links to the universities in the capital region are particularly close and mutually beneficial.

The five founding states are still jointly responsible for the Institute today, because none of them alone can or want to finance such a research institution. The multi-state funding has

made it possible to establish a research institution for practice-oriented bee research in Hohen Neuendorf which is unique in eastern Germany. As the home state, Brandenburg was particularly involved in this. Since the re-foundation of the state, the institute has been assigned to the agriculture department. In 1995, the institute's property was acquired from a private source with the support of the ministry. The proximity to the country is also helpful in obtaining third-party funding. In 2019 alone, the budget of the Brandenburg Ministry of Agriculture and Environment provided the Institute with 413,000 euros for its infrastructure, and 402,000 euros for specialist projects. Renovation of the buildings began in time for the 50th anniversary of the institute in 2002. Until 2020, 5,185,906 euros from the European



*Prof. Dr. Pritsch, 2020,
Director of
the Institute from
1990 to 1995*

Regional Development Fund (ERDF) were used for the conversion of the main and ancillary buildings. The money secured the renovation of the main building, the beekeeping facility and workshop, the rearing building, and the construction of a new technology depot. Laboratories could be equipped with modern technology, mainly thanks to grants from the Federal Ministry of Agriculture. In the funding period from 2009 to 2020, 1,018,739 euros from the ERDF were available for the procurement of high-quality scientific equipment and custom-made products. In beekeeping, honey extraction was automated. The institute's own IT technology is once again state-of-the-art. All these were building blocks for the Institute to make a name for itself with its main topics on the breeding and behaviour of honeybees, molecular microbiology and bee diseases, honey analyses and pollination studies, and thus also to get the chance to implement large, international research projects.



*It was thanks to close
connections to Great Britain
that patent attorney Richard Linde
kept his bees in Dadant
magazines from the 1920s on the
site of the present Bee Institute,
which put him far ahead of
other German beekeepers.*

Smart Bees: Clever bees help against pests

His profession and vocation were virtually predestined. As the director of the institute, Prof. Kaspar Bienefeld's name is, so to speak, part of the programme. Because he travels a lot, appears in the press, radio, and television, gives lectures, publishes, and receives visitors, he has to live with the fact that this connection is alluded to again and again. He has been researching in Hohen Neuendorf since 1992. The friendly man omits all allusions, because what is much more important to him is what he wants to achieve professionally in order to take up the cudgels for the smallest, but not least important species of farm animal. Hundreds of thousands of beekeepers in Europe keep bees. Although their number has been increasing again recently in Germany, the extinction of entire bee breeds has reached extinction-threatening proportions for the entire continent. The bee breeds have adapted to climate, vegetation, parasites, and pathogens through natural selection. As with many farm animal species, the biodiversity of bees is also threatened.

In 1983, the breeding centre was built especially for the breeding of queens from the best colonies



Beekeepers obviously choose the type of bee that produces the most honey. Carnica is the “star” among beekeepers and is now spread throughout Europe. On the one hand, the Asian varroa mite (*Varroa destructor*), with which the local honeybee (*Apis cerana*) copes well, has been causing high losses among European bee colonies (*Apis mellifera*) for many years. On the other hand, there is a systematic displacement of many European bee breeds by two breeds that have been bred for some time for performance, quiet behaviour, and disease resistance. Both causes dramatically reduce the genetic diversity of honeybees in Europe and endanger sustainable, regionally adapted beekeeping.

A response to a dangerous development for honeybees

„You know, we have a climate change and in a few decades we may well have breeds that can cope with hotter and drier climates. In other words, it would be negative to displace this subspecies now, and no longer have these genetic resources. We definitely want to have the option of being able to fall back on them if

conditions change,” Prof. Bienefeld explains. The EU Commission must and wants to act and, therefore, supported research in this area. In 2014, the States Institute took the lead in a large Europe-wide joint project called Smart Bees to study the European honeybee population. The project firstly determined the genetic diversity, still detectable today, in European honeybees, ultimately with the aim of improving breeding lines. Funded by the European Commission with €6 million, the research project has involved four years of collaboration between geneticists, molecular biologists, parasitologists, virologists, immunologists, communication scientists, mathematicians, and bee specialists from 11 countries. It was the first time that such diverse disciplines had worked together and in coordination on bee mortality. The task was complex, but the multidisciplinary approach opened up great opportunities to improve the health and genetic diversity of bees in Europe in a sustainable way. Samples from more than 2 200 colonies of all ten bee subspecies represented on the continent were analysed. “These were then examined morphologically.

The bees were marked with platelets on the back for behavioural examinations.



The bees differ in appearance, but we also did molecular genetic analyses to see if these are still the pure breeds.”

Ways to control the varroa mite

Genetic diversity is also proving to be the key in combating what is currently the biggest plague for beekeeping, the varroa mite. As part of the Smart Bees project, the scientists also agreed to study the dangerous triangle of bee-mite viruses and to explore the mechanisms that turn harmless viruses into deadly pathogens when interacting with the varroa mite. To find out which genes play a role in the defence against brood parasites, individual brood cells first had to be infected with varroa mites under laboratory conditions in the LIB. The scientists were interested to find out which bee recognizes the infected cell and how it clears the parasitized brood, thus preventing the parasite from multiplying in the cell. The more animals show this behaviour, the more likely the bee population has a chance to survive. But why don't all bees know about the parasite? Molecular genetics research provided the answer.

In 60 experiments, a total of 115,000 bees were placed on bees infected with varroa mites. Each individual bee was given a small plate on its back. Then it was time to start filming: breeding expert Fred Zautke started the video recordings. His job was to observe the bees during the removal of infested brood and to register their start number. Once the mite has laid its eggs in one of the capped brood cells, this is opened and removed by individual bees after about three days. Now the mite has to start again and when the honeycomb is opened again, its reproduction cycle is disturbed and interrupted. The DNA of this bee cleaning team was later analysed by a Danish project partner. This made it possible to identify the gene sections responsible for the behaviour. It soon became clear that it must have something to do with the sense of smell. “That is, bees that are resistant, that show the property are bees that can smell better. They are better able to recognise whether a pupa is infested with this parasite or not. And our analyses have clearly shown that it is not the parasite itself that is detected, but the damage that this parasite causes to the pupae,” says Bienefeld.



The beekeeping building, which was renovated between 2003 and 2006, offers the best working conditions.

Over time, it has become increasingly possible to identify and understand important factors in the interaction between the bee, the parasite and the viruses transmitted by it. Thus, in the part of the project that was worked on by the Department of Molecular Microbiology and Bee Diseases, it was shown that one of the viruses transmitted by the varroa mite, the wing deformation virus, infects not only bees but also mites. However, the virus variant that develops in infected mites is more dangerous for bees than the variant that is found only in bees. “The project has not only produced valuable new findings that will have a lasting positive influence on beekeeping in Europe”, the professor summarised after the end of the project in January 2019. “Smart



*Smart Bees: Apiary for work on *Apis cerana* in Kathmandu, Nepal.*

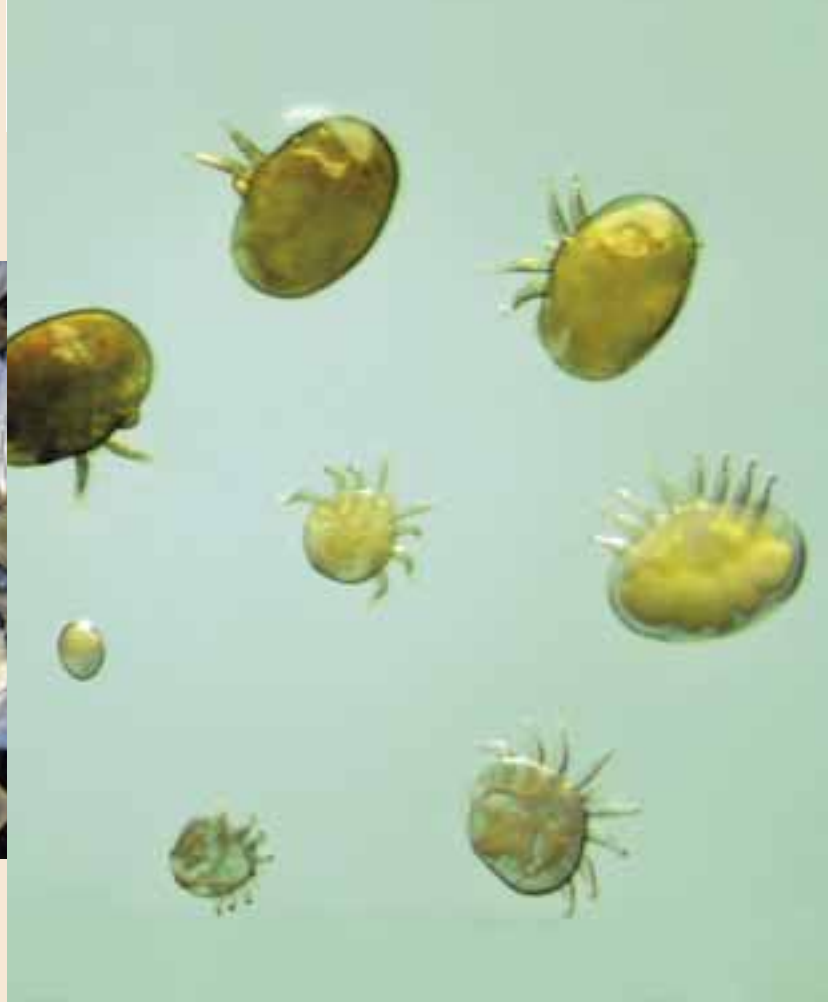
Bees is also a good example of the synergy effects that a large European research cooperation can produce”.



One of the main areas of research is bee health, including the control of the varroa mite. One such parasite (brown) sits on the bee. The sucking out by the varroa mite and Infections caused by virus transmission lead to severe diseases of the bees, for example wing deformations.



The female Varroa lays eggs from which a male (centre) or new females develop over several stages of development.



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Networker of knowledge

Prof. Bienefeld, at the start of the Smart Bees project on 1 November 2014, you could proudly point out that you had secured the leadership in the most ambitious joint project in European bee research to date for the relatively small country institute in Hohen Neuendorf. Seen from the outside, too, this looks like a great coup. Now it is part of the normal business of every research institution that is able to

successfully acquire third-party funded projects. Nevertheless: The competition is fierce, especially in Brussels. Before you were given money for your 90-page project application, what did you think were the reasons for convincing the Commission? How did it come about and how long did the preparations take?

Bienefeld The EU tender text was published on 10 July 2013. EU calls are generally formulated in a very general and broad manner,

Welcome to www.beebreed.eu, an online database and website of the [Institute for Bee Research, Hohen Neuendorf, Germany](#). In the menu option "Breeding Values", you can retrieve the breeding values of queens without registration. You will find general information about breeding value estimation as well as specifics of our coding system. Under "Breeding and Performance Data", registered breeders can record the studbook data of their queens. For this, you will need access authorisation, which only the chairman of your association can grant. Attention ! Not all functions are accessible to everyone. The administrative functions are available only to the chairman of your association. [For suggestions and comments use our contact form, please.](#) Thank you very much!



Bee images © Fred Zautke and LIB, with the support of Malgorzata Biełkowska, Fani Hatijna, Egoitz Galarza, Borce Pavlov, Thomas Galea, Maria Bouga, Raffaele Dall'Olio and Adriano Siceanu.

leaving room for leeway as to which priorities are to be set. However, this call included the demand to look for solutions to ensure the preservation of the different bee breeds in Europe, and to increase resistance to the parasite *Varroa destructor*. Both topics interest me very much and we were already working on them at LIB. The EU funding

offered the great opportunity to make considerable progress with significantly improved financial possibilities and specialists from various research areas from all over Europe. Normally, EU projects are coordinated by universities or large national research institutions, each of which has its own department for the recruitment of EU projects.

So, I did not think there was much chance of this being possible. But the small prospect of success with such a project was worth the effort. The deadline was 5 February 2013 at 17:00. In the six months before that, even on weekends, I hardly worked on anything else. After careful consideration of the concept, I started looking for European partners and found qualified colleagues from eleven European countries. The success of the proposal, and the success of the project is largely due to the committed cooperation of the entire Smart Bees team, which met several times during the preparation phase and discussed the project in countless telephone conferences. In June 2013, I was informed that our project design had prevailed against strong international competition. The reviewers praised the innovative overall concept, which was expected to produce scientifically interesting results as well as a direct benefit for beekeeping in Europe. The project should have actually started in November 2013, but there was a complaint from an unsuccessful competitor, resulting in all applications again being reviewed by another panel of experts. Again,

our project application was the winner, so that we were able to start on November 1st, 2014, unfortunately one year later than planned.

How is the work in such a large international network? Do you travel all over Europe all the time? Can you do research yourself as a coordinator? Do you also have the say when, for example, you have to remind others to keep to deadlines, or perhaps even settle controversial opinions?

Bienefeld I travelled a lot during this time, but most of the arrangements were made over the phone or by e-mail. The EU corresponds only with the coordinator. He bears the overall responsibility. He can reject reports from partners as inadequate, and stop funding if they fail to fulfil their obligations. As in most other large projects, problems can be minimised if the project is well self-organised. There were various working groups with clearly defined tasks, working on a sub-area alone or in cooperation with other working groups. In addition, the working groups were grouped into larger groups, for example genetics, bee pathology, knowledge transfer, for which there were responsible partners. Most problems did

not arise from controversial opinions, but from time delays in one working area, the results of which were the basis for the work of another group. The entire team, including the staff employed by the partners and the doctoral students, met every six months to discuss results and existing problems. These personal contacts were helpful. As coordinator, I sometimes had to bring together conflicting interests or opinions, but that was not often the case. Of course, there was time for my own research work. Two parts of Smart Bees, “Search for resistance genes against Varroa” and “Development of breeding programmes for endangered bee breeds” were carried out in my working group.

Did you only speak in English? Did friendships develop beyond the professional cooperation or were these only alliances of convenience?

Bienefeld All communication, reports and minutes were in English. Since molecular biologists, mathematicians, bee pathologists, geneticists, communication scientists with specific technical terms worked together, understanding was initially difficult. Such a



project is of course a marriage of convenience, but for success it is important that people understand each other.

I knew some of them very well before the project. It was a great advantage that the interest in bees united us all. A sense of togetherness developed, and most of us are still in contact with each other today

Beekeepers and bee researchers had observed increasing bee losses, especially the total loss of entire colonies in winter, without being able to understand why, for quite some time. To this day, you and others refer to the varroa mite as the biggest plague currently affecting beekeepers. How did it come about that this mite species has risen to such an exposed position as the worst parasite for beekeepers?

On the left a healthy bee, on the right a crippled bee due to infection with the wing deformation virus (DWW)



Bienefeld The varroa mite, which initially only lived in the colonies of the Asian honeybee, came to Europe in the 1970s. This parasite now encountered a host, the European honeybee, which had no resistance mechanisms to varroa, which then led to major losses. In addition, in recent years, it has been shown that varroa not only transmits viruses, but that these originally rather harmless bee viruses become much more dangerous when transmitted by varroa. One of the reasons for this is that the saliva of the varroa mite affects the bees' immune system, making bees more susceptible to viruses. This is what a working group from Great Britain found out in the context of the Smart Bees project.

In principle, at a time when insect issues have reached a broad public, for projects that contribute to genetic and thus biodiversity, these are well invested research funds. But let us take a purely economic view. What are the arguments against our beekeepers switching to varro-resistant Asian bee breeds? In the age of globalisation, the transfer of animal and plant species is increasing anyway. Other

farm animals which are kept in Germany are not Europeans either, because they are not of European origin.

Bienefeld That would not be a good idea. Firstly, the Asian honeybee is not so adapted to the local climate, secondly it has problems with diseases that are not so important for our bees, and thirdly, it is clearly inferior to the European honeybee in terms of honey yield. We are observing exactly the opposite phenomenon. In the Smart Bees project, we also looked at the Asian honeybee. In Nepal, we compared the resistance properties of both bee species, and we conducted a survey on the condition of the Asian honeybee throughout Asia. The result was that 55 percent of the bee colonies there have already been replaced by European honeybees. In some countries, the native species is almost extinct, a very threatening situation. The Asian honeybee has many advantages in addition to

*Hatching queen
of the breed Apis
mellifera carnica*



its disadvantages. Asia urgently needs a big project that supports the conservation and improvement of the native bee species.

Some beekeepers think that genetic research on the honeybee is certainly all well and good, but above all it is expensive.

Against varroa mites and other bee diseases, there are already proven methods such as the treatment of the beehives with formic or oxalic acid? What do you tell them?

Bienefeld There are not so many beekeepers who share this opinion. If such questions are addressed, I will answer:

1. formic and oxalic acid also harm bees.
2. despite these drugs, a lot of bees will die in some years because these acids are less effective in certain weather conditions.
3. medicines also cost money and time to use, and this every year. Breeding is sustainable.

A key objective was to make progress in describing the genetic diversity of European honeybee breeds. To what extent has this been achieved? Are there any new findings for you?

Bienefeld Indeed, this was a central goal of Smart Bees. Even before the project, it was known that exports to other and not only European countries were displacing many indigenous bee breeds, but also others, see Asia. The diversity of European bees is a richness that provides the basis for adapting to future stressors such as climate change or the introduction of new diseases. The first aim of the project was to identify the remaining diversity. The good news is that all of them are still there, at least in remnants. In addition, they can now be easily and cheaply identified using a DNA chip, so that beekeepers who want to work with their local subspecies can be sure of the origin of their bees. However, the richness of honeybee diversity can only be preserved if beekeepers are willing to keep the locally adapted bees. To this end, Smart Bees has established a network of interested parties in

Preparation of a pupa's skin from queen cells for later DNA extraction and analysis on the SNP chip.



over ten countries. These have been intensively trained in modern breeding methods. Extensive information material was created, translated, and adapted to local conditions. For the first time, breeders of all European subspecies are now able to use the central breeding database beebreed.eu, to efficiently plan their breeding activities. The participating breeders recently founded the “International Honeybee Breeding Network” to carry these successes into the future after the end of Smart Bees.

For the Smart Bees project, you have chosen to analyse the Carnica bee breed in particular in your search for varroa resistance. It is said to have been native to Central Europe for only 150 years. Why didn't you go for the dark bee, the European “original bee” so to speak, as some experts demand? Would that have been possible and sensible at all?

Bienefeld We did not analyse any breed “in particular”. In the LIB, we observed resistance mechanisms, especially the hygiene behaviour towards varroa parasitic brood, of different bee breeds, and analysed them with a partner from Denmark. The aim was to find genetic markers

for varroa resistance that are applicable to all European bee breeds, and thus significantly improve the selection possibilities in general. The results are currently being validated with additional bees. A DNA chip for the detection of varroa resistance is soon on the Market.

With the “smart” bees, have we now obtained the key to effective control of the varroa mite? Will there eventually be varroa-resistant European bees?

Bienefeld Yes, but it would have been presumptuous to promise a varroa-resistant bee after completion of the Smart Bees project. However, important things were researched that will make the path to this goal easier and faster. ***As always in science, externally funded projects have a beginning and an end. As coordinator, you made the project results available to the scientific community. Does that mean you have to be quiet now or will you continue to research these issues in a very concrete way? Are there plans for a follow-up project?***

Bienefeld We are of course continuing to work on varroa resistance and combining the results from Smart Bees with another very large

*Fluorescence
microscope projects
drone sperm and
bee embryos.*

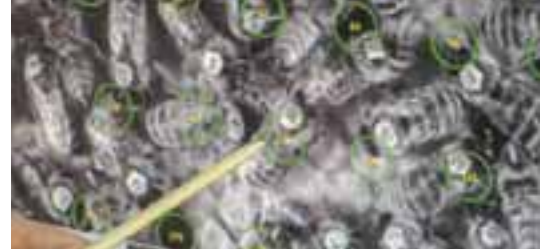
genomic selection project funded by the German Federal Ministry of Agriculture. Within the Smart Bees project, we have recognised how threatened and how important the preservation of genetic diversity in the honeybee is. Therefore, we have applied for the following two projects, and received approval from the Federal Ministry of Agriculture. Thanks to a new technique developed in our company, bee sperm can now be deep-frozen and made available for future generations. At present, we collect drones from different colonies of the Carnica and Mellifera breeds, whose sperm is then stored as a national reserve in the German Cryobank for endangered breeds of farm animals in Mariensee (Lower Saxony). In a second project, we are testing and optimising methods that make it possible to control the mating in the honeybee, which usually takes place uncontrollably during the mating flight of the sexual animals, and thus keep adapted bee breeds pure.



Treasury of nature – Gene bank for honeybees

The institute pursues more than two dozen research projects simultaneously. With the establishment of a gene bank for bee DNA, the Hohen Neuendorf researchers are once again breaking new ground. In August 2019, the researchers were commissioned to secure a first gene pool by the end of 2021, which will be derived from honeybees from Germany and neighbouring countries – a treasure for the preservation of biodiversity in the present, and an emergency reserve for beekeeping in the future. Genetic diversity is always an important prerequisite for the survival of a species in changing times. The wider the gene spectrum, the greater the probability that at least some representatives of this species will be able to adapt to climate, or environmental changes as

Infrared video recordings for the identifying of (marked) hygienic bees.



climate change progresses. “This is a kind of insurance against the consequences of future changes,” confirms Prof. Bienefeld. The first question to be addressed is, what needs to be considered in order to build up a gene bank for honeybees in which the DNA remains vital. The funding comes from the Federal Ministry of Agriculture. “We will take care of the technology, the collection of samples and the contractual matters,” Bienefeld announces. The genetic material will be prepared in liquid nitrogen at minus 196 degrees Celsius for frozen storage. The scientists use experience with freeze storage that was already gathered in previous projects. In the first stage until 2021, samples from around 300 colonies are to be taken in Germany and abroad, and cryopreserved. Molecular genetics and morphological tests will be used to investigate how unique a bee colony is. Those that can be assigned to a rare subspecies on the basis of their characteristics, will be preserved for the future. Specifically, DNA samples, sperm samples, and complete individuals are frozen. These are stored in the “Deutsche Genbank landwirtschaftlicher Nutztiere zur Erhaltung der

genetischen Vielfalt bei Nutztieren” (German Gene Bank of Farm Animals for the Conservation of Genetic Diversity in Farm Animals) in Mariensee, which was founded in 2016 by the federal and state governments, and belongs to the Friedrich-Löffler-Institute. As the dark honeybee, once indigenous to Germany, is almost extinct, samples of this species should also be taken, e.g., in Norway and Austria and, if necessary, preserved. But this gene bank is not a substitute for the protection of the remaining bee species. Because DNA alone does not make flowers pollinated or beehives saved. But the genes could help to breed more resistant honeybee varieties by using genetic analysis. “With the establishment of this living reserve, we want to create a permanent basis for the storage of further honeybee genetics centrally in the German Gene Bank of Farm Animals at the Friedrich-Loeffler-Institute”, says Bienefeld: “This could serve as a model for similar initiatives worldwide, since some bee breeds which adapted to extreme climatic conditions, are already highly endangered by imports in many countries.”

The Diagnostic Colour Atlas of Bee Pathology is the first of its kind. It provides the essential basics necessary for understanding the functional anatomy of the honeybee and the pathogenesis of bee diseases.

Atlas of bee diseases

The scientific interest of the Department of Molecular Microbiology and Bee Diseases at LIB is focused on bee diseases. Besides the development of molecular methods for the diagnosis of infectious diseases of honey bees, the research of the department under the direction of Prof. Dr. Elke Genersch focuses on three bee pathogens: the RNA virus Deformed Wing Virus (DWV), the Gram-positive bacterium *Paenibacillus larvae* and the microsporidia *Nosema apis* and *Nosema ceranae*, which belong to the fungi. All three pathogens are economically important as they cause considerable losses in the western honeybee *Apis mellifera*, which is after all the third to fourth most important farm animal in Germany. DWV leads, especially when transmitted by the mite *Varroa destructor*, to the death of infected pupae or to the hatching of crippled, life-insecure bees. *P. larvae* causes the notifiable animal disease American foulbrood (AFB), which can kill not only individual larvae but also entire populations. *Nosema apis* and *Nosema ceranae* infest grown bees as intestinal parasites, and lead to diarrhoea and



PD Dr. Heike Aupperle (Laboklin Kissingen), Prof. Dr. Elke Genersch (LIB/Freie University of Berlin), Dr. rer. Lena Poppinga (Humboldt-University in Berlin): Diagnostic Colour Atlas of Bee Pathology with illustrations from Maren Lellbach, Paperback, 182 Pages, Laboklin GmbH Kissingen 2016 ISBN 978-3-00-052781-4

weakening of infested colonies. The aim of the research is always to develop new strategies for disease control, and minimise colony losses during the season and in winter through a better understanding of infections in honeybees. The Diagnostic Colour Atlas of Bee Pathology, which was mainly developed in Hohen Neuendorf, provides in German and English the essential basics necessary for understanding the functional anatomy of the honeybee, and the pathogenesis of bee

*Prof. Dr. Elke
Genersch,
deputy director
of the institute
in the LIB*



diseases. As one of the authors, the deputy director of the institute, Prof. Elke Genersch, was able to contribute experience and results from more than a decade of research on bee diseases at LIB. She is the head of the Department of Molecular Microbiology / Bee Diseases at the Institute. The atlas contains images of healthy, infected, and diseased bees (larvae, pupae, adult bees) and bee parasites. For the normal findings, healthy bees, mainly from the colonies of the LIB, were used. For the presentation of bee diseases, controlled infection experiments were carried out in the laboratory.

The atlas, completed after four years of work in June 2016, is the first of its kind. With its more

than 350 colour illustrations, it has become a reference work for the diagnosis of bee diseases for pathologists, scientists, and students, but also for interested beekeepers.

Use of new methods for honey analysis

In contrast to many other foodstuffs, honey is a natural product with a multitude of ingredients. Its composition and quality are decisively determined by the nectar input from an infinite variety of plants in various combinations. However, external factors such as weather influences, soil quality, and beekeeping measures must also be taken into account. The investigation of honey quality has been a research priority at the LIB for many years.



Special emphasis has been placed not only on methods to offer regionally based beekeepers in particular a cost-effective honey analysis, but also on the investigation of honey ingredients. In addition, the pollen pattern of a honey can be used to show which plants the bee visited for its production. The honeys of a region provide a mirror image of the bee pasture, and thus important information for the supply of the bees. For the beekeepers, this is important support to improve the quality of their honey, or to find new ways of marketing it.

Infrared spectroscopy is an analytical method that enables substances of any consistency to be reliably examined, and is used in many areas of food control, among others. In the Honey Analysis Department of the LIB, infrared spectroscopy (IR) was successfully applied to honey for the first time in Germany in 2002, and established as a routine method there. With this method, important constituents are measured more environmentally friendly and faster, yet just as reliably as with conventional methods. In sugar analysis alone, the measuring time of a sample is reduced from 40 minutes to about 2 minutes. With IR, several analysis parameters

can also be determined simultaneously. Whereas previously measurements were made with diluted samples, the use of an undiluted drop of honey is sufficient for the IR spectrometer with attenuated total reflection (FTIR-ATR). This makes it possible to also determine honey constituents in lower concentrations and the water content. The device must first be calibrated for the examination of the different quality parameters of honey, so that a measurement of the honey contents is possible at all. The diversity of honey must be taken into account, as its composition varies greatly depending on many components such as outfit and weather conditions, unlike other foods. One aim is to translate the advantages of this modern technological process into practical quality testing of honey, so that beekeepers can also benefit from it. In another project, the examination of beeswax for adulteration using FTIR-ATR was also established.

Training and further education/service

Education and training have always been an integral part of the Institute's work. At the end of 2007, a separate working area was set up for

this purpose to encourage and support the beekeepers' own initiative. Focal points are the development and testing of teaching materials, the training and further education of multipliers, training activities, and the creation of consultation opportunities.

LIB scientists are also firmly integrated into university education: Prof. Dr. Bienefeld in the Life Sciences Faculty of the Humboldt University of Berlin, and Prof. Dr. Genersch in the Department of Veterinary Medicine at the Free University of Berlin. At LIB, Bachelor's, Master's, and doctoral theses can be supervised. Internships and training positions are gladly taken up by pupils, students, and graduates.

Via publications in the beekeepers' press, lectures and extensive training and consulting activities, the knowledge acquired at LIB is made available not only to beekeepers in the LIB-promoted countries, but also to the interested public. This includes, among other things, breeding value estimation for the whole of Germany, disease diagnosis in bees, honey and wax quality analyses, performance testing of bee colonies, artificial insemination of queens.

Of particular interest to beekeepers is the sale of queens that are valuable for breeding. Day nursery children and school classes are frequent guests at the LIB. The institute's bee school offers excursions and teaching units. The WebPage www.honigbiene.de also offers an informative overview of the current scientific projects and services of the Institute for laymen. Especially for the subject of breeding value estimation, the page www.beebreed.eu was launched. If you want to get a first-hand impression of the work at the institute, you should mark down the open day in your calendar. Every year on the first Sunday in September, from 10 a.m. to 4 p.m., staff members invite visitors to Friedrich-Engels-Strasse 32 in Hohen Neuendorf, to share their expert knowledge on bee research with visitors, and to show the otherwise closed laboratories. This is also a good opportunity to taste honey, watch bees behind glass, or craft beeswax candles.



Bee research in the bee town

With so much attention, which Hohen Neuendorf owes to bee research, even the local politicians do not want to stand back. On 28 March 2019, the town councillors decided, much to the delight of the institute staff, that Hohen Neuendorf should be called “Bienenstadt (bee town)”. Although the town has 27,000 inhabitants, 65 million bees and 1300 colonies in the town area make up the majority. In addition to the State Institute for Apiculture, there are beekeeper working groups at four schools, the largest beekeeper association in Brandenburg, initiatives for bee-friendly urban greening, the decision to avoid the use of insecticides on agricultural land, and to create flower strips. For some time now, towns in Brandenburg have also been able to market themselves better by adding a name supplement. This helps tourism, but also strengthens regional identity. The prerequisite is always that the Brandenburg Ministry of the Interior, as the highest local supervisory authority, agrees to it. Professor Bienefeld had already suggested adding the name in 2013. After all, with Neustadt (Dosse) in Brandenburg there is officially a “city of horses”.

The Hohen Neuendorf town sign is still the old one. The approval of the Brandenburg Ministry of the Interior is pending. But what is not already, can still come true.

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Who will marry my queen?

There are hardly any other honeybees than the Carnica breed in Germany. But not all Carnica bees are the same. In detail, they also show different characteristics, which can be helpful for keeping them or not. Beekeepers have basically three possibilities as wedding mediators: Firstly, one could simply take the chance that drone and queen mate wildly. Then it can happen that good characteristics of a colony are lost. Beekeepers, therefore, participate in breeding programmes just like other agricultural livestock farmers. It is important that approved (performance-tested) queens take over the sceptre, and ensure the preservation of the species and that the colonies are hard-working, healthy, as varro-resistant and peaceful as possible. This leads to variants two and three: Either beekeepers use a mating station, or they rely on artificial insemination. For artificial insemination, frozen or fresh semen from bees can be used for breeding. This is important and good for the preservation of the genetic diversity of bee breeds.

However, Hans Jörg Breuninger, since 2018 chairman for beekeeping in the Brandenburgischer Imker e.V. association, prefers, like most hobby beekeepers in the state, to use specimens for mating. Breuninger, a fisherman by profession, has been breeding queens in Jänschwalde for many years, and is master of about 100 colonies: "If a drone manages to mate with a queen at a height of about 25 metres, this is also an expression of the vitality of the queen from which the drone descends". It must be ensured that only bees of a defined origin and race meet around the places of mating. The use of these sites can also be understood as a commitment to bees from regional breeding.

The Brandenburg Beekeeping Act (BbgBienG) of 8 January 1996 is designed to ensure the pure re-mating of bees. This is the basis for the Ordinance on the Recognition of Beekeeping Stations (BienBelV) of 29 January 1998, which was issued by the state.



Six stations, supervised by experienced beekeepers, exist throughout the state.

(<https://www.imker-brandenburgs.de/zucht.html>)

Within a radius (protected area) of ten kilometres around the stations, only colonies of bees of defined origin may be kept from 15 May to 15 August. The beekeepers make sure that this requirement of the beekeeping law is observed out of self-interest. Violations can be punished as administrative offences and cost up to 10,000 euros.

Little Red Riding Hood and the drone

Hans Jörg Breuninger and Maik Happatz are in charge of the “Little Red Riding Hood” mating station near Tauer in the Spree-Neisse district. The basis for this is breeding colonies, which are tested for colony characteristics according to the guidelines of the German Beekeepers' Association. This takes place several times a year in a similar manner: “When I work on a colony, I document, for example, whether the colony has replacement cells for queens in

order to assess swarm inertia. Moreover, when I work on a colony, I can already tell whether a bee might fly at me or even sting me, so that I can assess its gentleness. And in addition, I weigh out the honey in order to document the yield,” says Breuninger. Honeycomb consistency is also part of the performance test. Here, the bees should remain sitting on the combs when the beekeeper removes them from the hive. The beekeepers document these observations, and summarise them at the end of the test with grades from 1 to 5 for each individual characteristic and for each tested colony. The grades are sent to the breeding database www.beebreed.eu of the Landesinstitut für Bienenkunde Hohen Neuendorf e.V. (LIB). Every spring, LIB calculates values from all the registered scores for the test year with several thousand breeding colonies from all over Germany and other European *Carnica* breeding associations, with the help of which the breeders can see how their colonies perform in the tested traits in comparison to all others in the test year.

Hans Jörg Breuninger and Maik Hoppatz manage the occupancy office in the southeast of Brandenburg, in the Spree-Neisse district. A lot of experience and enthusiasm for beekeeping are necessary to be able to work as service providers for other beekeepers.



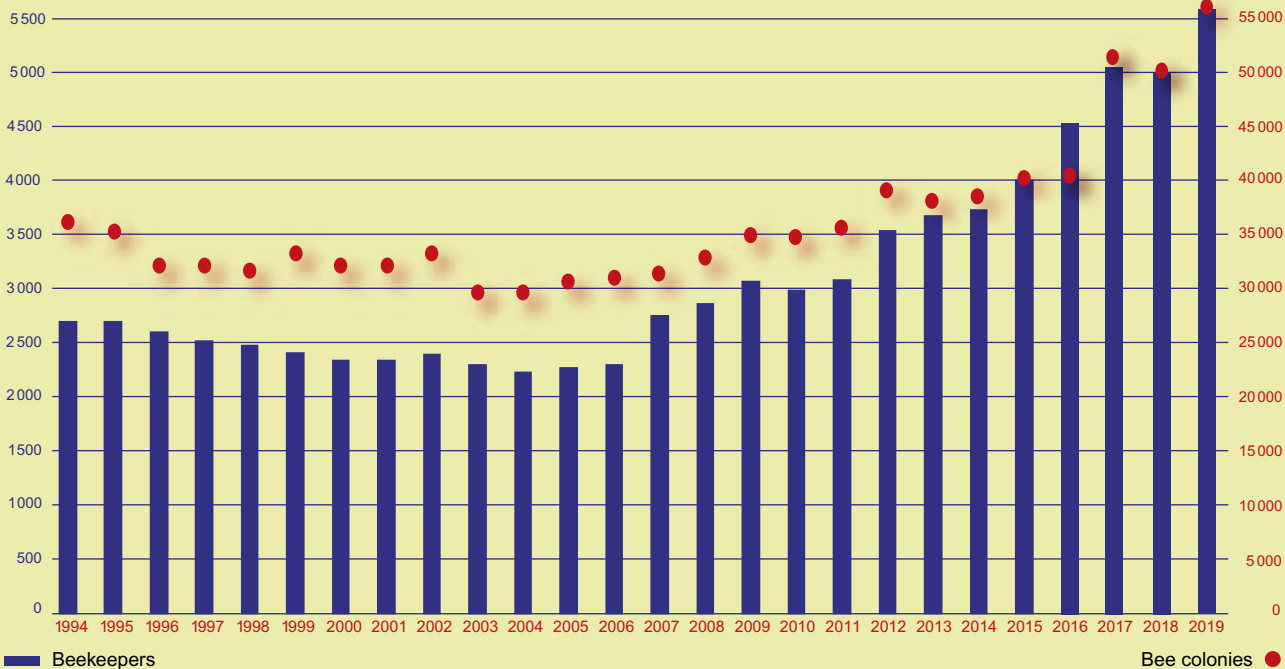
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Since the performance evaluations of the ancestors of the test colonies are also included in this breeding value estimation, the breeding values also reflect the genetic, hereditary differentiation between the tested colonies of the same year. The breeding colonies with the best results will be selected. They form the basis from which the offspring, i.e., subsequent breeding queens and drone colonies for the mating stations, are drawn.

The demand for new queens is particularly high after winters with large losses of colonies. At the

mating stations, the un-copulated rulers, the queens, are already expected by the drones. But, wedding papers are also needed here. Before the head of a mating station can take drones there, these must pass a test. Qualified experts take a close look at the characteristics of pure-bred Carnica drones, even the hair length and colour. If the drones are suitable for the station according to their descent and their characteristics, the colony gets a certificate. Beekeepers who bring young queens for copulation to the mating station must make sure that there are no drones in the small accompanying colony. Every beekeeper who does not come from within a radius of ten kilometres of the site must also present a health certificate regarding American foulbrood from the original colony of the queen. Only now does nature take over. In order for the young queens to meet the drones at the so-called drone collection points, sunshine, and temperatures of around 25 degrees Celsius are required. This can take days and weeks until the weather is right. On their wedding flights, the young queen is inseminated by about 10 to 20 drones. The seeds are received in the seminal vesicle and



After beekeeping collapsed to 20 per cent in Brandenburg at the beginning of the 1990s, there has been a clear upward trend again since 2007.

last until the end of the queen's life. After successful mating, she moves back into the mating box and starts to lay eggs. The mated queens are then collected by their beekeeper.

However, many beekeepers come to the place of mating in between to talk shop with like-minded people.

A bee observation box can be set up in the classroom just as easily as an aquarium.



Bee observation box for school

In GDR times, working groups of young beekeepers helped to recruit young beekeepers. Unfortunately, in the 30 years since the end of the Wall, almost none of these groups, most of which were active in rural schools, have survived in Brandenburg. For the active beekeepers and for many experts, this is one of the reasons for the ageing of the beekeeping profession which has been observed for years.

It is therefore all the more important that beekeepers today mainly approach day-care centres and schools to promote bees and honey.

Children want to discover the world and approach new things with curiosity and a lack of prejudice. What could be more fascinating than little crawling animals? This is also the case with bees, especially when they can be observed in large numbers behind glass in a few centimetres distance. Every beekeeper who has children visiting can easily observe the fascination of a bee showcase. Cannot done be more with this fascination? After all, practical

learning is still the best school. A bee showcase brings life to the biology room of the school. It can be installed like an aquarium in the classroom. It is filled by the beekeeper with bees, brood, and supplies. Flying out is made possible through a temporary opening in the window. The breeding of the queen is exciting, as is the collection of pollen and all the processes inside. The bee showcase thus builds a bridge from the classroom to nature. In direct experience, the pupils discover connections in the environment. They become sensitive to the diversity of plants and animals, and contribute to their protection in the best possible way. A beekeeper or beekeeper's association will fill an existing bee showcase with one or two honeycombs for six to eight weeks from about mid-May, or make it available to the local school. The clou: in contrast to the usual occupation of showcases, one third of the showcase is occupied with brood, and one third as food supply including bees but without queen bees. This makes the whole thing very inexpensive, requires no supervision and at the latest at the beginning



of the school holidays, the beekeeper usually gets the display case back together with the young queen.

It is advantageous if there is also some drone brood on the brood comb and a piece of comb is cut out, which can be rebuilt by the bees. A window is chosen as the place of installation, where the bees can fly in and out undisturbed. For the few weeks of spring, the window sash or windowpane can be replaced by a plexiglass pane. A hole is first drilled in this pane, through which a transparent plastic tube with an inner diameter of at least 20 millimetres can be inserted as a channel connection between the display case and the window. If it is not possible to replace the window sash, a window sash can also be fixed in a slightly open position, and the resulting opening can be closed with three suitably cut wedges, of which the vertical one receives the hole for the passage channel. If the room is located on a higher floor, it is advisable to clearly mark the entrance hole. Southern exposure should be avoided if the window area is not shaded. If necessary, a darkening foil or a sheet of

paper, which can also provide information about bees.

can help to prevent the display case from heating up too much. It should be ensured that the flying in and out can be easily observed. To be able to bring the bees easily back to the beekeeper's apiary without any losses, it should be possible to take out the observation box in any case. Of course, for all of this we need the caretakers of the school!

In order not to irritate the bees again and again, it is best if the teachers make sure that the observation box is opened in the morning and closed again at the end of school. The bees get used to it quickly and can be observed by the pupils during every break: Entry and exit, life in the beehive, development of the brood, the food supply, and of course the young queen. Their hatching, excursion and oviposition are exciting events for every observer. Different warmth zones can be felt with the bare hand. A stethoscope reveals previously unheard sounds. The bee showcase thus becomes a bee observation box.

If they are already present, these fascinating

The bees can get out through a channel at any time and thus maintain their rhythm of life. They fly out unhindered and can be easily observed this way.



Those who learn at an early age to handle animals properly will show them tolerance and respect.

creatures can be included in the classroom in many ways. The children can observe and record what happens in the box. What, how and why leads to exploratory learning: How can we test the hypotheses? Moreover, the observations soon go beyond the observation box. Connections with the weather are recognised, and the plant environment is examined more closely. Perhaps for some flowering plants, fly gauze or lady's stockings are being used to prevent bees from flying to them, in order to test their influence on fruit stands.

With a little imagination and the recommended literature in the appendix, different learning stations for different class levels can be set up with little effort. Perhaps the observation box will awaken the desire for more: then the return of the colony to the beekeeper's apiary can be combined with a visit by the observers.



Role reversal – Königs Wusterhausen's Bee World

Actually, Britta Herter had nothing to do with bees. Because she is actually a biology teacher at the Staatliche Gesamtschule Königs Wusterhausen. She also heads the regional group of the Schutzgemeinschaft Deutscher Wald (SDW) (German Forest Conservation Society) and its youth group, the Waldies. When the forest youth group was founded in 1993, she was looking for a suitable home and found one just behind her school. An arboretum, i.e. a woodland teaching garden, was created here on 3,000 square metres. The project began with a cheque handed over on 26 November 1993, signed by Jacques Rocher, the son of the cosmetics entrepreneur Yves Rocher, who has been particularly committed to tree protection for many years through his foundation "Plant for the Planet". The Waldies planted a red beech tree for the opening on 27 April 1994. Today there are around 200 species of trees and shrubs, a pond with sprinkler system, a hedgehog enclosure, an aviary, a garden ark, a barefoot path and much more. Since 2000, Britta

Herters Waldies also have looked after three bee colonies in the arboretum, which the late Kurt Kohl, a beekeeper, made available to the children. Groups of children now came here on project days and could experience the bees at work. So, the idea was buzzing in the air, literally, to turn the project days with bees into a world of bee experience. "On the one hand, bees are considered to be a useful source of honey for us humans, they are role models and bearers of sympathy. They enable us to convey the values of our virtues and stand for good cooperation in a society. However, the aspect of preserving the diversity of species on our planet is also important. The appreciation of the bee as a key creature is increasingly being lost in the population", Britta Herter explains her voluntary commitment to bees. This was also the motivation for her to continue and not to be discouraged despite years of preparatory work.

Train the sense of smell: Scent organ



Bee legs and antennae only become really visible under the microscope.

As with the creation of the arboretum, the work on the plain was the first step. And although everyone was always in favour, and the German Forest Conservation Society supported Britta Herter, in the end, as is so often the case in voluntary work, the task was to become active, contacting possible sponsors at the state organisations, the forestry, the beekeepers' association or even in the city. Little by little, the project took shape: Contact persons became allies. Money for equipment and expansion measures could be raised. It proved helpful that the nearby Haus des Waldes Gräbendorf, one of the large forest-educational institutions of the Landesbetrieb Forst Brandenburg, was recognised as a centre for the Voluntary Ecological Year (FÖJ) by the German Forest Conservation Society, regional association Dubrow. "The care of the bee colonies is added in the summer months," writes Annelie, who as a volunteer helped out in the arboretum in 2012/2013, in her experience report. "As an Öki, however, you are not alone in caring for them; Mrs. Britta Herter, your supervisor and head of the arboretum as well as a beekeeper are always there to help you. The bee experience



world, which was created with love and the help of many former FÖJers, is very well visited in summer. The bee experience wagon has been available since 2012. This is a converted former construction wagon, which no longer looks like its past. With its colourful painting, it reminds of the house of Pippi Longstocking. On 4 May 2013, the 20th anniversary of the founding of the Waldies, the bee experience world was officially inaugurated in the presence of the then Minister of the Environment, Anita Tack, and the District Administrator of Dahme-Spreewald, Stephan Loge. "This forest-educational institution enables pupils to identify themselves as particularly social beings through role reversal with bees, and thus to gain a deeper understanding of each other and a sense of sustainability," was said in the opening ceremony. This is the only one of its kind in the state of Brandenburg so far, and Britta Herter's pupils are to engage in such a role reversal. Both in a specially equipped classroom, and in the 3,000 square metre outdoor world, the bees can be experienced and understood with all their senses: Not only sight and hearing are addressed, but also smell, taste and touch. It usually begins in the



classroom. The children sit at honeycomb-shaped tables. The room is filled with models and teaching material about the bee. Much of it is made to order. The walls are laid out like honeycombs and show the brood in all stages. Food plants supplement the intestines. Large-format models of bees and flowers as well as microscopically small preparations of beehives and antennas, including tactile hairs, strengthen the urge for research. Dubrow Naturschutzmanagement GmbH has developed a special scent organ, a sound box, a quiz wall, and a pedal generator, with which you have to generate electricity yourself in order to access further information. There are educational games and materials in the cupboards with which the children can make bee objects. A total of seven stations are to be completed. Because this is the best way to understand the life of a bee.:

Station 1: I become a worker bee

The children crawl through the honeycomb tunnels. Next, the human bee-actors pass through or rather crawl through the narrow cells in their development phase. In the crawling tunnel, the miraculous transformation from egg to pupa and bee is simulated.

Station 2: Smelling and hearing like a bee

Children can recognise a bee, mosquito, wasp, hornet or even a swarm of bees by the sound box. They can identify typical nectar plants on the scent wall.

Station 3: Cleaning, feeding, building

The children clean the honeycombs, feed each other with honey, as the nurse bees do with the larvae, and then build a honeycomb wall.

Station 4: Bee puzzle

Only those who have listened and participated well can put together the puzzle with beekeeping tasks.

The dynamo bicycle makes the bee Summi talk.



Large-format bee and flower models are available to the children in the learning room.

Station 5: Flying like a bee

At the cable car, the participants learn to fly with wings, feelers, and colourful cups on their legs, they are allowed to whiz over the terrain and collect coloured balls from large replicas of flowers, imitating pollen. But please only in one colour at a time: honeybees stay with one type of flower, meaning they fly to the flowers of the same plant species over and over again until these stop flowering. This behaviour is important for plants that cannot be pollinated at all, or only with difficulty without the help of insects. The children learn that pollination leads to fertilisation, and thus to seeds and fruits.

Station 6: The importance of the bee

On the dynamo bicycle the children learn about a bee named Summi and how important it is for pollination of food plants.



Station 7: Beekeeping practice

Somewhat offside, colourful beehives catch the eye. They are located right next to the wooden house, which has a strong smell of wax and honey. Here the pupils have the opportunity to watch beekeepers and observe bees from close up. Nobody needs to be afraid: sufficient protective clothing for the children is on site. Regional beekeepers, such as Britta Hofmann from the Königs Wusterhausen Beekeepers' Association, support Britta Herter at the bee experience days. After all, in addition to environmental education, the aim is to get young people interested in beekeeping. The association is the best place to learn how to handle the insects and the equipment. In GDR times, there were still many more schools and youth facilities with beekeeping associations in the region. Today, cooperation like the one in Königs Wusterhausen are the exception just like young people in beekeeper associations. So, if you feel like it, you can put on your beekeeper's clothing here every week and check whether the eight bee colonies have been diligent. After all, the school bees are supposed to produce



something. In good years, the sweet harvest makes up to 120 kilograms of honey. But often, as in the dry years 2018 and 2019, it is much, much less.

In the open bee boxes, it is usually lively, time for the topic “Living in a social state”. Britta Herter sees the bee as a role model. “They live together in good harmony. We humans like that.” The bees have a strict order. Every insect fulfils a task. One is dependent on the other, and only together can they live and survive.

While the bees rest in winter, the colony grows in spring as soon as it is green, and blossoms are outside. More and more brood are raised, which, behind closed cell lids, transform from an almost completely harmless larva into a flying insect. For this purpose, honeycombs with a regular hexagonal pattern are built, the cells which differ in size, depending on whether workers or drones are to develop. And suddenly, particularly striking wax cells are built onto the honeycombs. They look like thimbles. This is where queens are raised, Britta Herter explains to the excited students. Does the colony of bees want to take off? What to do? The teacher has found a solution for this as well.



As time goes by, she becomes more and more a beekeeper, just like many teachers before her. Children make up the majority of the visitor, but the bee experience world is basically a learning and experience place for all generations. The programme and the possibilities on site are suitable for all ages. How about a team day or a birthday with friends or family in the World of Experience? Groups of visitors are welcome, but should contact in advance if possible.

Britta Herter seems to have a soft spot for spiny animals: She is also happy to tell you about her hedgehog rescue centre.

In 2019, the Waldies carried out several wild bee rescue campaigns. They collected signatures for a large-scale campaign from various associations. At a booth in Königs Wusterhausener Bahnhofstraße, she and her Waldies distributed seed bombs to the people. „We had collected the seeds ourselves.

Eye-catcher in the outdoor area is the bee cart.



Together with the children, we made small insect hotels out of tins that looked like bees

and seeded wildflower meadows. Many people liked that,” says Mrs Herter cheerfully.

Bee experience in the Arboretum

Königs Wusterhausen at the Staatlichen Gesamtschule Erich-Weinert-Straße 9 15711 Königs Wusterhausen

Opening hours

of the Arboretum:
Monday to Friday
from 8 am to 16 pm

Meeting place of the Waldies:
Tuesday 14.30 to 16 hrs
Visitors to the Arboretum
and to the meetings
of the Youth World Group
are very welcome,
please make sure before you
arrive to contact the Waldies:

Project leader Britta Herter
T +49 173 6578149
E infos@waldieskwh.de
Project website of the Waldies
Königs Wusterhausen:
www.waldieskwh.de

Work in the arboretum:
voluntary ecological year (FÖJ) for young people
up to 27 years old:
Märkischer Wald e.V.
FÖJ project

Weg zum Hölzernen See 1
15754 Heidesee
OT Gräbendorf

T +49 33763 666 18
www.maerkischerwald.de/foej-brandenburg

Federal Voluntary Service

An assignment in the field of environmental and forest pedagogy is possible without age restriction in the Federal Voluntary Service:

Ökologischen Bundesfreiwilligendienst Internationale Jugend-

gemeinschaftsdienste (IJGD), Landesverband Brandenburg e.V.
Bereich ÖBFD
Stephensonstraße 24-26
14482 Potsdam

T +49 331 20153-220
E oebfd.brandenburg@ijgd.de

Beekeeper Holger Ackermann at the Fortuna Portal, which closes the inner courtyard of the Brandenburg State Parliament.

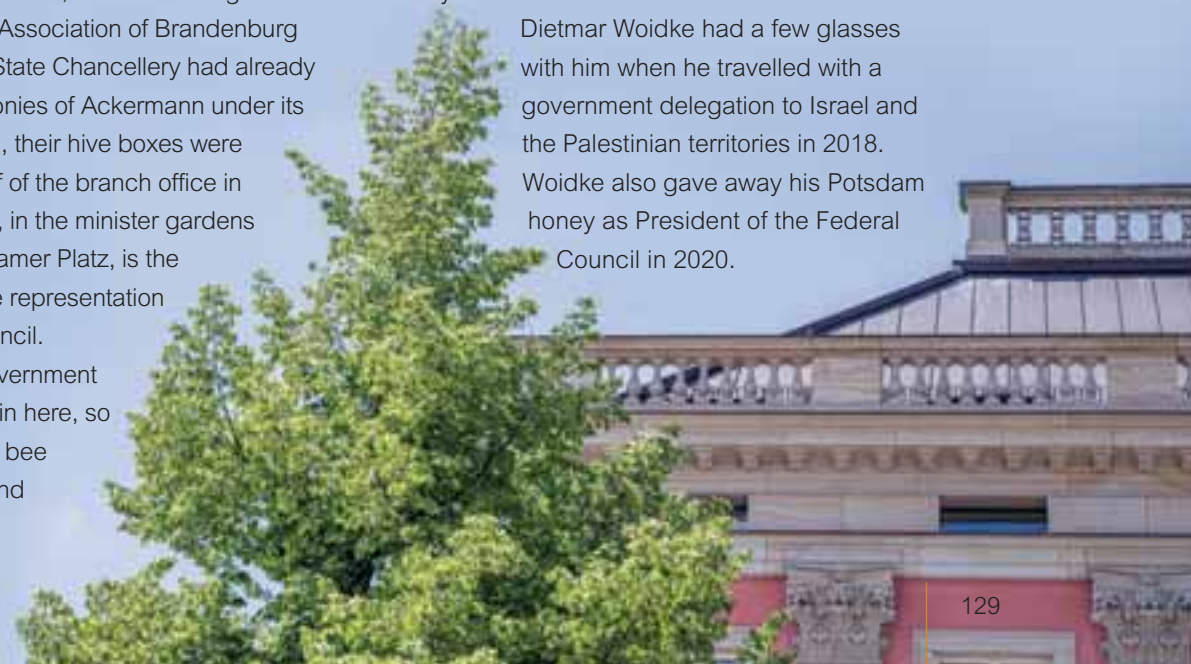


Bees of the Mark in the public service

City beekeeping is in fashion: In the large metropolises of the world, high-quality honey has been successfully collected on roofs, terraces, in parks and gardens for several years. After all, many cities offer a rich variety of flowers in their parks or on private balconies. In the meantime, the trend has arrived in Potsdam, the capital of Brandenburg. Since 2017, there is humming behind the Brandenburg State Chancellery. A meadow, chestnut trees and lime trees offer a good collecting basis for the two colonies with about 40,000 state bees, each from Holger Ackermann of the Association of Brandenburg Beekeepers. The State Chancellery had already taken two bee colonies of Ackermann under its care in 2015. Then, their hive boxes were located on the roof of the branch office in Berlin-Mitte. There, in the minister gardens right next to Potsdamer Platz, is the Brandenburg state representation at the Federal Council. Brandenburg's government bees had a free rein here, so to speak: no other bee colony hums far and

wide in the district, and because the Brandenburg's bees were the first, the small animals became big media stars. Since then, 125-gram jars with the red eagle from the state coat of arms have been available. The jars are not for sale: only special guests receive honey from the state as a gift. In 2016, for example, athletes from Brandenburg who travelled to the Olympic Games in Rio had the honey in their luggage. The state honey was a must at the reception of the three athletes at the German Embassy in London on the "Day of German Unity" on 3 October 2017. Minister President

Dietmar Woidke had a few glasses with him when he travelled with a government delegation to Israel and the Palestinian territories in 2018. Woidke also gave away his Potsdam honey as President of the Federal Council in 2020.



Regional products are in demand, but they are not self-selling: The bees on the roof of the Brandenburg State Representation in Berlin and on the premises of the Potsdam State Chancellery are to be understood as an invitation to consciously look for the origin of the honey when shopping. On the other hand, bees are ambassadors for an intact environment, and especially for more protection for insects. Influences from the immediate environment can be easily seen from the honey. In years of drought, honey yields decline noticeably. In cold and humid years, it is possible that honeys have a too high water content of over 18 percent. Honeys containing too much water can ferment easily. At the beginning of October 2017, the two Brandenburg bee colonies fell victim to the devastating autumn storm “Xavier” on the roof of the State Representation in Berlin. The two colonies on the grounds of the Potsdam State Chancellery had survived the storm, but only until the winter of 2017 to 2018. “Due to unsteady temperatures in winter and spring, whole colonies froze to death,” says their caretaker Ackermann, “This is what happens

when the bees do not have enough honey in stock. They need it as fuel to maintain the required nest temperature of 37 degrees. Only then can their brood survive.”

In the meantime, Ackermann has climbed onto the roof of the Potsdam government several times, which is basically an advantage because it makes the journey from his home town of Groß Schauen worthwhile for him: since May 2020, he has been caring for bees on the Fortuna Portal, which closes off the courtyard of the Potsdam State Parliament. Since 2 June, bees from him have been on the roof of the main building of the Brandenburg Ministry of Agriculture and Environment on Henning-von-Tresckow-Strasse. 50,000 new employees have been on the move as “environmental bees” since then. But will bees find enough food on a largely sealed former barracks site? The beekeeper reassures. A first learning effect for bystanders is to look at the surroundings of the grey ministry block with the eyes of a bee when the colony is handed over to Minister Axel Vogel. And look, even on the official site and between the car parks, flowering plants can be found that have so far received little attention. This is how environmental education

Environmental bees arrive in Potsdam: Axel Vogel, Minister of Agriculture and Environment, assists beekeeper Holger Ackermann with the censer.

succeeds on living objects. Urban beekeepers observe time and again that city residents very quickly show solidarity, and identify with “their” bees. When the bee colony is handed over, the minister may give the experienced beekeeper a hand. The dazzling white beekeeper's protective clothing, which also makes its debut on this day, is actually unnecessary. In spite of the annoyance caused by a guttering burner, which is used when opening the beehive box in order to have as few insects as possible on the combs, the colony behaves in a gentle manner, just like Carnica bees are. If you want, you can carefully touch the woolly looking insect balls that remain on the frames. But since the beekeeper has reported shortly before, that he gets stung a few times a month, nobody wants to try. In the coming months, the beekeeper will be making his way from Storkow to check on the bee colony again and again. Because the animals remain his property. They have to be looked after and in a manner that is in keeping with animal welfare standards, as is usual in livestock farming. Although there will be honey from the roof of the Ministry of the Environment at the end of the season, the proceeds do not cover the effort



Brandenburg “state honey” as a present for special guests.





Since 2014, the Brandenburg state parliament has had its seat in the reconstructed building, which is modelled on the venerable city palace on the outside.

Ackermann is making here. His Potsdam colonies are part of his voluntary commitment as chairman for public relations in the regional association. "Bees are always a good opportunity to talk about the work of beekeepers. Especially city children know honeybees only from television or the web. Often, they only learn about them in school and then it is teaching and not necessarily fun. At home, they usually cannot ask questions: Even their parents' knowledge of how honey gets into the jar is declining. Urban honeys are not certified as organic honey, which is a pity for the host, Axel Vogel, Minister of Agriculture, and the Environment, but of course he understands that his ministry is responsible for ensuring that organic honeys are produced in accordance with organic standards in Brandenburg. Bio (organic) may only appear on it when organic products are included in

accordance with the recognised standards of the European Union. Organic honeys are also subject to particularly high requirements, both with regard to the location of the apiaries, and the conditions under which they are kept. These are regulated in the EU Organic Regulation and the EU Organic Implementing Regulation. Within a radius of three kilometres, the bee pasture for the production of organic honey must consist mainly of plants from organic farming or wild plants. For this reason, the standards for urban beekeeping are more oriented towards species-appropriate husbandry, with beekeepers orienting themselves on what is and what is not permitted in organic beekeeping. However, there are still people who swear by city honey in particular because less pesticides are used here, and there is a great variety of pollinator plants. Regional honey can help hay fever allergy sufferers to desensitise themselves, because even small amounts can train the immune system, for honey from your own living environment contains exactly the pollen you are allergic to.



Breeding tutoring for nature – Buckfast honey from the vending machine

Germany is mainly Carnica country. But there are also beekeepers who swear by other bee breeds. Relatively small is the group that is enthusiastic about the dark bee. Larger is the community of the Buckfast beekeepers. Despite its English name, the Buckfast bee has a German “father”, Brother Adam (1898-1996). He came from the small town of Mittelbiberach

in Upper Swabia and his actual name was Karl Kehrlé. When he was 12 years old, at the instigation of his mother, he joined Buckfast Abbey in Buckfastleigh in the English county of Devon, and chose the name Adam after his consecration as a Benedictine monk. From 1915, he worked there in the monastery beekeeping, which he headed as of 1919. Because the tracheal mite disease Acarapiose, which was then rampaging in England killing many of his colonies, Brother Adam decided to

*Jürgen Brauße
with his wife Jutta
in the in-house
laboratory.*

breed a more robust, peaceful, and industrious bee himself. Beginning in the 1920s, he travelled all over Europe, Asia, and Africa to crossbreed some breeds into his population. Jürgen Brauße with his wife Jutta in the in-house laboratory.

One in particular stood out. It was always a cross between an Italian bee (*Ligustica*) and the resident English bee or *Ligustica* colonies. Furthermore, he integrated further breeds into his beekeeping. He named the resulting breed Buckfast in honour of his home monastery. Thanks to its genetic breadth it is considered to be very resistant to disease. It is also their swarm inertia and their high honey output, which is why this bee breed is especially appreciated by professional beekeepers. The Landesverband der Buckfastimker Berlin-Brandenburg e.V. is a member of the Vereinigung der Gemeinschaft der europäischen Buckfastimker e.V. The largest umbrella organisation of buckfast beekeepers came together to further develop their native lines. Apart from the breeding goals of combination breeding, which were already important to Brother Adam, today, as with the

Carnica, the focus is on the selection of varroa tolerant breeding strains. Buckfast beekeepers from Saxony, Saxony-Anhalt, Thuringia, and Mecklenburg-Western Pomerania also participate in the association's projects. Mating stations are important for beekeeping and therefore also for Buckfast breeding. But, beyond that there is always the possibility to help artificially. With Jürgen Brauße from Blankensee in the district of Teltow-Fläming, there is an internationally recognised breeder in Brandenburg who has been able to draw on experience with artificial insemination of queen bees since 1976. In 2005, when a new pool was established in the regional association of Brandenburg Buckfast beekeepers e.V., he was there. In 2007, Jürgen Brauße was able to use the homogeneous sperm mixture developed at the end of the GDR for the first time. The sperm supply comes from drones from tested drone colonies of different origins. For breeding, sperm is mixed from many drones whose genetic characteristics have been previously examined and classified as suitable for breeding. From mature drones, sperm can be obtained relatively easily by

*Semen collection:
This requires a lot of
experience, a good
eye and sure in-
stinct.*

hand, without the use of any aids. This is done by rolling and pressing the chest and abdomen of the drones. But then the problems start, above all the inseminator has to know which drone sperm is mature and suitable for mating with the queens. One difficulty, for example, is to recognise semi-ripe sperm and mucus. Even inconspicuous deposits within the tip of the insemination cannula make further sucking up difficult, as this can later lead to the queens' fallopian tubes becoming blocked.

For the so-called sperm mixing technique, in which the sperm portions of the individual drones are mixed, a dilution of the thick liquid sperm is unavoidable.

Jürgen Brauße uses a special method. The sperm is collected in a large-volume container syringe and gently stirred in a special device, the mixing bladder (containing 3000 µl) with a 10 percent addition of a special thinner. The insemination of the fixed queens takes place under CO₂ anaesthesia and requires the greatest precision, also with regard to the hygienic conditions at the workplace. Beginners have their difficulties with all this. Brauße offers the equipment and the



techniques of artificial insemination. “The sperm mixing technique has been developed by us to such an extent that it can be used by any skilled inseminator”, he advertises, because the larger the pool of beekeepers involved, the better breeding results can be expected for the Buckfast bee or other breeds. Jürgen Brauße has artificially inseminated many thousands of queens during his time as a breeder, and is therefore one of the most successful inseminators in the community of European Buckfast beekeepers. The queens to be inseminated are each delivered by the beekeepers in a so-called mating unit with bees. A queen must be placed in its unit in such a way that it can be removed

*Honey vending
machine*



without the bees flying away, but can be optimally cared for by the bees in the unit. If semen is delivered from the insemination station, it is usually already ready to use and so the first fumigation can be started immediately and then the insemination. The queen is returned to her unit under general anaesthesia and the beekeeper can immediately take the units home again.

The breeding season is high season for every beekeeper. Even Brauße has little time then. For this reason, in 2005 he commissioned a night express service provider for the first time to transport beehives who live far away from his insemination station to and from the station. This service provider works nationwide and ensures that the mating units with their inseminated queens are back with the beekeepers within 36 hours.

Blankensee is an old fishing village in the Mark Brandenburg, thirty kilometres from Berlin in the Nuthe-Nieplitz Nature Park. In 1902, the writer Hermann Sudermann acquired the manor house and lived there until his death in 1928. Brauße is also involved in the network project Offene Höfe (open farms) im Fläming. His farm

shop is located directly at the entrance to Sudermann Park in Blankensee. The assortment includes various types of honey, pollen, wax, candles, propolis, Apilarnil and cosmetics. From a honey vending machine, you can buy beekeeping products around the clock. Even fresh eggs are available in the vending machine and are transported by a lift to the serving hatch without breaking.

If you want to go to bed with the bees, this is the right place: Brauße's wife Jutta is responsible for renting the holiday rooms on the beekeeping farm.

**Besamungsstation des
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**Simone Helbig,
Beekeeper from Liebenwalde**

***Ms Helbig, how did you get the
idea of keeping bees?***

Due to my strenuous day at work in an engineering office, I was looking for a hobby that is close to nature and gives me the opportunity to relax from a stressful day. Television programmes and literature have awakened my interest in beekeeping. I became aware that I can make a contribution to nature with the bees. In addition, there is a beekeeper in my circle of acquaintances, who always talks passionately about his experiences with bees. And finally, our 1,000 square metre, rural property offered enough space to place the bees right behind the house.

How did you proceed?

First of all, I tried to take part in an introductory course on beekeeping at the State Institute for Apiculture in Hohen Neuendorf, or the adult education centre. Unfortunately, there were no free dates. The following year, right after I had received the programme from the county adult education centre Oranienburg in my letterbox, I registered for the course “Beekeeping – Fascination and Passion”. Almost at the same time, I had read in the newspaper that a beekeeping association in my area was looking for interested people. I also contacted them and got a confirmation. So, I attended the course at the adult education centre, and the practical course “Beekeeping on trial”.



Simone Helbig critically observes the work of her bees. Little by little she moves her bees from the boxes borrowed from the beekeeper's godfather into new ones. The knowledge and skills acquired in courses enables her, in addition to protective clothing, to deal calmly with her bee colonies.

What unexpected problems arose?

I had not expected that there would be no uniform way of leading nations. I found that in discussions with three beekeepers there are four different opinions and practices to find the right approach. It is therefore very difficult for new beekeepers to find the right approach. I could not find any competent advice in the specialised trade. A further problem was the low supply of flowers at my place of residence. Many gardens only contain lawns and conifers.

How were you able to solve the problems?

A reliable help for solving my problems was the consultation with the course instructor at the adult education centre. Specialist literature such as Werner Gekeler's book "Honigbienenhaltung" (Honeybee husbandry) and the training folder of the German bee journal "Grundwissen für Imker" (Basic knowledge for beekeepers) were a great help

for my self-study. Not to forget the weekly, free information letter of the bee institutes Bienen@Imkereii. In order to compensate for the lack of flowers, my husband and I started to redesign our garden, with new plantings of bee-friendly perennials, shrubs, and fruit trees. We have also spiced up our remaining lawn with the low white clove.

How do you feel about your decision to keep bees today?

My decision was the right one. I learned that beekeeping can be more fun than work. My hobby gives me a lot of fun, peace, and balance. I feel extremely fortunate that my husband has supported me in my project from the very beginning. Even our neighbours are watching our bees at their garden pond with excitement, and are astonished about the many fruits on their trees. And by the way, our home has become much more colourful due to the new blossoms.

How do you see your beekeeper future?

The bees inspire me again and again. But beekeeping should remain a hobby and not



degenerate into work. With about five colonies, there is enough honey for my family and our circle of friends.

What would you recommend to someone who is also interested in beekeeping?

In any case, you should study the theoretical basics of beekeeping beforehand and take part in a course that gives an insight into the bee year. In this way you know what to expect and can avoid some beginner's mistakes, for example, mistakes that cost money unnecessarily. You should look for an experienced beekeeper whom you can contact when you have questions in the first and second year. Because different opinions of different advisors are unsettling. I also find the exchange with other beekeepers exciting. That is why I am still in contact with like-minded people from the adult education centre.



In urban areas, landscaped green spaces are not only a feast for the eyes. They offer a diverse range of food for bees.

Already in early spring the crocuses are spreading.

Lavender and other kitchen herbs are scenting the terrace

Literature for Newcomers

All in German language

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Verlag Neumann

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www.berlinerhonig.de
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