

The Home Forum.

# The ABCs of bees

THESE INSECTS AREN'T NATIVE TO AMERICA, BUT THEY'VE ADAPTED WELL – EVEN TO LIFE IN THE CITY



GOING 'COMB': The clumps of yellow on the bees' legs are their full pollen 'baskets.' Flower nectar is carried in the bees' special 'honey stomachs.' (Bees have two stomachs.)

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HIS JOB IS SWEET: Beekeeper Robert MacKimmie holds a frame from a beehive on private land in the Cow Hollow section of San Francisco. The city's mild climate means blooms are available all year. At right is a closeup of one of the manmade hive's removable frames.

**A**S BEEKEEPER Robert MacKimmie opens their hive, the deep hum of 40,000 bees fills the air. Where have I heard this sound before? Oh, yes – in horror movies.

Mr. MacKimmie checks honey stores, pollen supplies, and the bee "nursery." Dozens of bees crawl across his bare arms and hands, but they don't sting. The buzz chorus may sound creepy, but honeybees are sweet.

"Yellow jackets give honeybees a bad name," MacKimmie says. "Bees are really very gentle." He cares for about 750,000 bees like these – while living in a one-room apartment in San Francisco!

Most beekeepers live in the countryside and keep their beehives in orchards or on farms. This hive is in a small backyard, close to streetlamps, parked cars, and sidewalks. San Francisco may not seem like a bee haven, but its mild weather means blooms all year.

He has 15 such hives. He keeps them in the backyards of bee-lovers. "Some people just enjoy watching bees, and others are gardeners," he says. "One woman had an apple tree and got just three apples from it. After we put in the beehive, she had an apple bonanza!"

Bees help flowering plants. As they travel from flower to flower, bees carry pollen from plant to plant, fertilizing the seeds. Bees pollinate one-third of our food.

Before opening a hive, MacKimmie dons a net-covered helmet. "I don't get stung that often," he says, "but I never want to get stung around my eyes."

Next, he puts dry pine needles into his bee smoker and lights them. The smoker looks like an old coffee pot. "When the bees smell smoke," he says, "they rush into the hive and gather honey. When the bees are full of honey, they can't sting."

He lifts off the top of the hive. Rows of rectangular frames hang inside the box. He lifts out a frame full of honeycomb. He urges me to try some, which I do very carefully – bees are crawling on my bare hand, on the frame, and over my net-covered helmet. I hope they don't mistake me for Winnie-the-Pooh.

The honey is thick, sweet, and warm. "The bees keep the hive at 95 degrees," explains MacKimmie. "They need warmth to incubate the baby bees."

### You can taste the Golden Gate

Each of MacKimmie's hives produces 100 to 200 pounds of honey every year. He sells more than a ton of "City Bees" honey annually. Each neighborhood has a slightly different climate and different plants, so each neighborhood's honey has its own flavor. The beehive we're looking at is in Cow Hollow, not far from the Golden Gate Bridge. In the 1860s, this was a pasture. Now bees "graze" on Cow Hollow's flowers, giving the honey a lovely floral taste.

Bees make honey by gathering sweet, sticky nectar from flowers. They mix the nectar with a chemical they make in their bodies. The bees store the mix in a honeycomb cell. After the mix dries a bit, the cell is capped with honeycomb wax. Bees make wax from glands in their abdomens.

MacKimmie harvests honey in the summer and fall. He puts honey-filled frames into his spinner at home. The honey spinner works like a salad spinner, drawing honey out of the frames. The honey is poured into jars, labeled, and sold.

Most people buy MacKimmie's honey because they love the flavor. "Store-bought honey is heated and filtered, which takes out the pollen and minerals," says MacKimmie. "It is refined sugar water," in his opinion. The heating and filtering are to make the honey look better.

### Rummaging in the bees' pantry

Do the bees miss the harvested honey? "Bees make honey to eat during the winter when they are less active," MacKimmie says. "A healthy hive can make two or three times as much honey as they need. I make sure my bees have plenty to eat."

Man-made beehives are designed to make honey harvesting easy. The hive is a stack of wooden boxes. The bees enter the hive through a gap at the very bottom of the stack. The top box has a lid, and the bottom box has a floor, but the boxes in between don't have tops or bottoms. Each box is hung with frames. Inside the beehive, the bees move freely from box to box and frame to frame – except the queen bee.

MacKimmie removes the honey-filled upper boxes. Underneath one is a metal grid called a "queen excluder." Bees like to store extra honey at the top of their hive, and the small worker bees can easily pass through. But the queen is too big. By keeping the queen in the lower boxes, the beekeeper makes sure that only pure honey – and no bee eggs – are in the upper boxes.

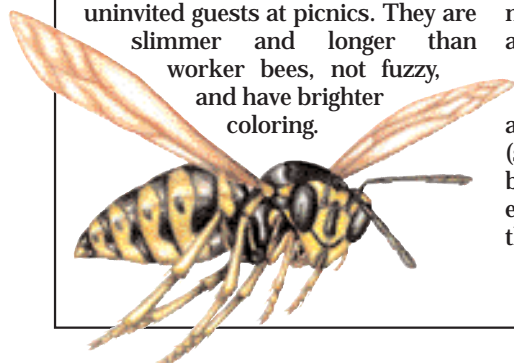
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## What's the buzz?

**Honeybees** (see facing page) are gentle. They're interested only in flowers, so they rarely sting. They are not native to North America – settlers brought them in the 1600s. (Native bees do not make honey.) Honeybees have a fuzzy body and orange-and-black stripes.

**Yellow jackets** (below) are responsible for most “bee” stings. They are meat-eating wasps and are often uninvited guests at picnics. They are slimmer and longer than worker bees, not fuzzy, and have brighter coloring.



**Bumblebees** (above) collect nectar from flowers. They make nests and live in small groups. They are large, round, and furry. Like honeybees, they are usually gentle. They are slow and rather clumsy.

**If a honeybee, yellow jacket, or bumblebee lands on you,** stay calm and quiet. It will probably fly off in a moment. Swatting and jumping around may scare it into stinging. Some people have success gently blowing on the insect to shoo it away. You might try brushing it away (slowly and gently). But it's usually best just to wait. If you are stung, scientists say it's a good idea to pull out the stinger quickly.

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MacKimmie takes off the excluder and lifts out a frame. This is the bee “nursery.” The hundreds of worker bees on the frame don't fly away. They are so intent on their bee tasks they don't seem to notice us.

A developing bee passes through three stages: egg, larva, and pupa. MacKimmie points out bee larvae: They look like tiny white slugs, each curled up in its own honeycomb cell. The cluster of brood cells is ringed by other cells filled with pollen and honey. “It takes one cell of honey and one cell of pollen to raise a bee,” he says.

Worker bees feed the larvae pollen and honey. Each larva gets larger and larger until it almost fills up its cell. Worker bees cap the cell when the baby bee reaches the final pupa (cocoon) stage. From egg to bee takes about 21 days.

MacKimmie spots a baby bee just coming out of its cell. The baby bee pushes off the wax cap. Two little antennae pop out and wave around. A tiny round head emerges. Two worker bees march over the struggling newborn. Finally, she slides out. Her wings are still wet. “It's easier to be born if someone isn't walking on your head,” says MacKimmie, laughing. “In a beehive, it's every woman for herself.”

If you see a honeybee, it is probably a “she.” The thousands of worker bees in a hive are all female. They spend their first three weeks in the hive, storing honey and pollen, building cells, feeding larvae, and cleaning the hive. They also tend the drones (male bees) and the queen. Workers spend another three weeks collecting nectar and pollen. To make one pound of honey, bees fly about 24,000 miles and visit 3 million to 9 million flowers!

### Bees ‘talk’ by dancing

When a bee finds a good food source, she returns to the hive and gives other bees directions using a special “dance language.” She runs in a circle on a vertical honeycomb. The top of her circle represents where the sun is. The bee cuts across her circle at the same angle each time she goes around. That angle represents where the food is in relation to the sun. A bee leaving the hive looks for the sun, then flies off at that same angle.

MacKimmie pulls out another frame. This one is covered by larger, darker bees – the male drones. A hive may have as many as 800 drones during the summer, but the worker bees kick them out of the hive in the fall, when the queen isn't laying many eggs. The drones' only job is to mate with the queen. They don't even feed themselves – that's the duty of worker bees. “The drones usually gather around the pollen cells,” says MacKimmie. “Like a bunch of guys hanging out at the gym.”

### Duties of her majesty

MacKimmie pulls out another frame. There she is – her majesty! The queen bee is larger than worker bees or drones. She has a speck of yellow painted on her back. We watch the queen race from cell to cell, sticking her head in, and pulling it out again. “She uses her head to measure the cell. That tells her what kind of egg should be laid in it,” MacKimmie says. “Worker bee cells are smaller than drone cells. She lays exactly the right egg for each cell.”

Worker bees live 40 or 50 days, and drones not much longer, but a queen bee can live up to five years. She doesn't lounge around, though. She spends her entire life laying eggs – up to 2,000 a day!

MacKimmie finishes his beekeeping duties and restacks his bee boxes. “Look at all the worker bees,” he says. Bees are sitting on the hive with their hind ends in the air, vigorously flapping their wings.

“They have scent glands on their rear ends,” explains MacKimmie. “Every queen has a unique smell, and all her worker bees have that scent. They are fanning and blowing the smell, telling everyone that this is their hive.”

Even if you don't understand bee-dance language, and even if you can't smell bee messages, it's easy to imagine they are saying: “Home sweet home!”

Pamela S. Turner

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