

Wildlife
stories
of the year

Plight of the **bumblebee**



As the die-off of pollinators threatens our food supply, one scientist has found a solution down in the dump

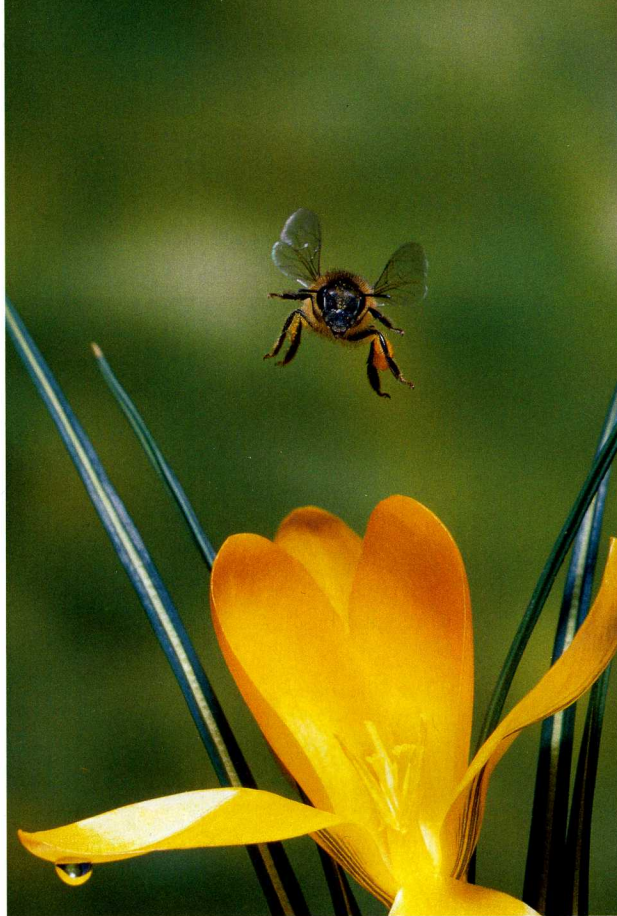
BY CANDACE SAVAGE

IT'S A PLEASANT AFTERNOON in July, and a group of us — a city councillor, a landscape architect and a handful of university types — are scuffing up a dirt track in a decommissioned municipal landfill on the outskirts of Guelph, Ont. Under our feet lies a four-decade accumulation of household trash capped with soil and clay to create a rising landscape of small hills and gentle valleys. Were it not for the frequent intrusion of leachate-monitoring stations and methane-gas wells, tightly enclosed by fences and locks, we might forget that we are walking over a midden of spent and wasted things, a graveyard for years of gotta-have-it dreams.

Yet the members of the hiking party are lighthearted, inspired not by what this place is but by what it could become. In their eyes, this wasteland is crying out to be transformed into flower-rich habitat for bees, butterflies, beetles and other flower-friendly bugs. Already, they can envision a sign at the entrance welcoming visitors to “Pollinator Park,” the world’s first sanctuary for the insects that feed us.

The prime mover behind this unusual project is just ahead on the path, bending to inspect some small flying thing on a tangle of Queen Anne’s lace. With his unruly eyebrows and oversized specs, Peter Kevan has the air of an eccentric professor — just the kind of character you might expect to hatch such a wild-eyed plan — and, truth to tell, he is an associate professor of environmental biology at the University of Guelph. But for all his casually dishevelled appearance, he is also respected in Canada and abroad as an expert on pollination and one of the world’s leading proponents of pollinator conservation.

For the better part of 40 years, beginning at about the same time the first load of trash was being tipped into this



dump, Kevan has been spreading the message that pollination — and the busy, buzzing workforce of bees, flies, beetles, butterflies and other pollinating animals that make it happen — is critically important both to us and to the health of the planet. If we persist in trashing the Earth, he warns, we put this vital process at risk.

See those tiny black bees surfing over the flowers beside the path? What if our very lives depend on insects like them?

BEFORE THE EXPEDITION to the landfill, I had been introduced to Kevan through his published work, which features learned analyses of subjects such as the importance of pollinators to agriculture and their potential role as bioindicators in assessing ecosystems. For pure enjoyment, however, none of these technical articles can compete with a speech Kevan gave at a meeting of the Entomological Society of Canada in Edmonton, in which he reminds his colleagues that pollination is not only important — it is also sexy.

Flowers, with their bright colours and alluring perfumes, are instruments of seduction that signal a plant’s readiness for sex. And “how do plants copulate?” a teasing Kevan asks. They rely on pollinators — “our ‘little wonders,’” he calls them — to turn the trick for them.

“Yes,” he says, “insects are plants’ winged penises.” In their search for rewards of nectar and pollen, pollinators transfer pollen grains from the male stamens of one plant and to the

Bring on the bees! An expert in pollinators, biologist Peter Kevan (OPPOSITE) has persuaded the city of Guelph, Ont., to transform a municipal landfill into the world’s first sanctuary for flies, beetles and bees, such as *Apis mellifera*, approaching a crocus (ABOVE).

female stigma of the next. Suddenly pregnant with possibility, the fertilized flower sets seed and swells with juice, thereby achieving the climax of fruitfulness. The whole process is deliciously lewd.

But even in this mood of ribald celebration, Kevan can't keep a note of warning from inflecting his tone. As he sees it, the need to conserve these diligent little sex workers is urgent. A decline in the abundance or diversity of pollinators, he cautions, would decrease the supply of food for birds and other wildlife. Worse yet, a shortage of fruit and seed could easily translate into a long-term dieback of flowering plants, because they could no longer produce enough seedlings to perpetuate themselves. Like a kingdom lost for want of a horseshoe nail, whole ecosystems could collapse for want of pollinating insects.

If this grim scenario were to unfold, the 6.8 billion people on Earth would also be caught in the crunch. Except for cereal crops, which are pollinated by the wind, we rely on insect pollinators for the complete A to Z of fruits, vegetables, seeds and nuts. Together, these foods make up the healthiest third of our diet. Even our supplies of milk, cheese and beef are dependent on the specialized bees that pollinate alfalfa crops for cattle feed.

The humming intercourse between insects and flowers is "one of nature's major and critical mutualisms," concludes Kevan. What would become of us and the beauty of the living Earth without the tireless efforts of nature's "little wonders?"

"HONEYBEES VANISH, Leaving Keepers in Peril," *The New York Times* reported on Feb. 27, 2007.

"Apriarists buzzing about soaring rate of honeybee deaths," *The Globe and Mail* later confirmed.

We all remember the headlines and the anxiety they provoked. Everyone's favourite pollinators — the only pollinating insects that many of us know much about — were in trouble.

The problem first surfaced in Florida in the fall of 2006, when a commercial beekeeper made a routine check of his hives and discovered that box after box was empty or, at best, occupied by only the queen and a few attendants. The rest of the bees had disappeared without a trace, not even leaving their dead bodies.

Soon, stories of this vanishing, called Colony Collapse Disorder, or CCD, were coming in from other parts of the United States, together with reports of unusually high winter die-offs from severe weather and other causes. As many as 875,000 honeybee colonies, or about 32 percent of America's managed bee population, were lost that fall and winter. Despite higher-than-usual winter losses in parts of Canada, there have been no reports here of CCD.

For months after the news first broke, the public mind was abuzz. And it wasn't just the bees we were worried about: we were afraid for ourselves. Many people were surprised to discover that honeybees are the primary pollinators of more than 90 crops, mainly fruits and



Although honeybees (ABOVE and OPPOSITE) are not native to North America, they have become the most important pollinator of commercial fruit and vegetable crops, with an economic

value that runs to billions of dollars. Honeybee populations have recently declined sharply in parts of North America and western Europe, for a suite of reasons that remain elusive.

BOTH: PAUL HARTLEY; MAP: STEVEN FICK/CANADIAN GEOGRAPHIC

The more land we plow or plunder, the fewer wild corners are left to sustain pollinating insects.



vegetables, with a commercial value that runs into the billions of dollars. Amenable to being housed in boxes and packed onto flatbed trucks, these willing workers are routinely transported across the United States — from almond orchards in California to orange groves in Florida and cranberry heaths in Maine — as an itinerant pollination brigade. Beset by introduced parasites and diseases, including two newly identified microorganisms that may be implicated in the outbreak of CCD, they are a vulnerable link in the human food chain.

The loss of honeybees is “an absolute catastrophe,” says Kevan, but he fears it is only the visible tip of a much larger problem. He is even more worried about the 200,000 other kinds of pollinating insects, including more than 17,000 species of wild bees, that help keep the world fruitful and flowering. The value of these other pollinators was first brought home to him some 30 years ago by another catastrophic loss, this one in the blueberry fields of New Brunswick. The berry plants were not producing, and Kevan, then a young government entomologist, was given the task of figuring out what had happened. It turned out that an insecticide sprayed on the surrounding forests to combat spruce budworm had drifted across the fields and wiped out the wild bees, a synergistic assemblage of some 70 species. Without these buzzing clouds of insects, the plants could not set fruit, and blueberry lovers were out of luck.

Happily, the sting of litigation by blueberry producers eventually helped to inspire a change in forestry practices and the adoption of more pollinator-friendly methods. It took the bees several years to recover, but Kevan was marked for life. “What on Earth do we think we are doing,” he remembers asking himself, “by poisoning these crucial relationships?”

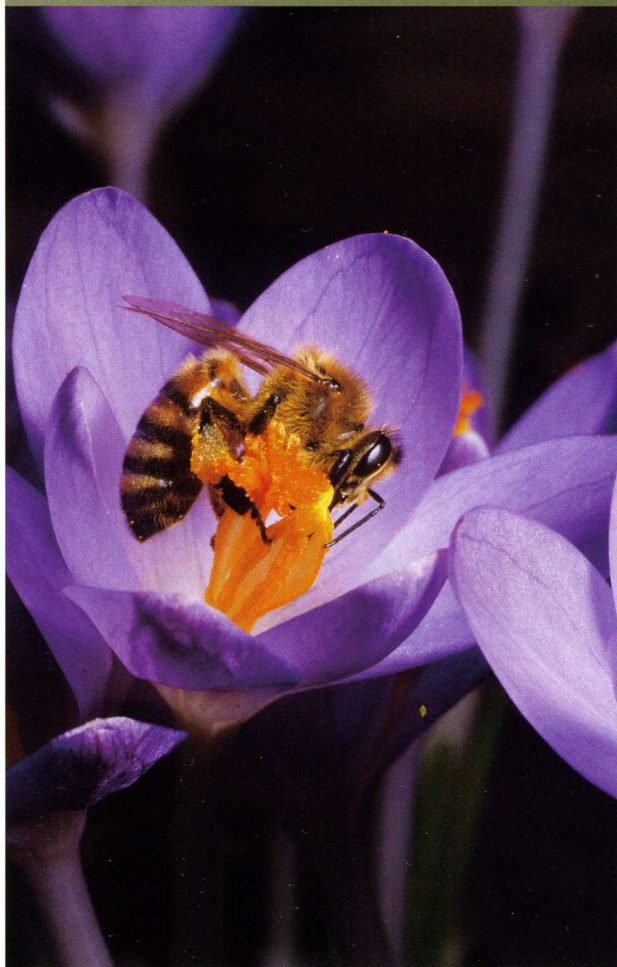
Wildlife
stories
of the year

Be a bee-friendly gardener

Providing food and shelter for flower-feeding insects can offer multiple satisfactions to gardeners:

- Make plantings more natural and complex so that your yard develops an ecological balance. When a garden is home to “good” insects that keep the “bad” ones in check, resorting to lethal chemicals is seldom necessary.
- Plan your flower beds to provide a steady succession of blooms, since pollinators need food throughout the growing season. This offers sustenance of one sort or another for both insects and humans.
- Introduce heritage varieties or, even better, native plants that are adapted to cater to native pollinators, rather than going for the latest creations of the plant breeders, which are often eye-catching pompoms devoid of bee-and-butterfly-friendly nectar or pollen.
- Reserve an untouched corner here and there where pollinators can take refuge. This will bring a new kind of unruly beauty to the garden.

C.S.





DAVID TRATTI ES. OPPOSITO: EDUARDO RIBOLLA/C.E. FOTO STOCK/FIRST LIGHT

Where better to start doing something about the pollinator problem than in an old garbage dump, that everyday manifestation of wastefulness?

IF THE DREAM OF CREATING a sanctuary for pollinators was born in the blueberry fields of New Brunswick decades ago, it has never seemed more urgent than it does now. What was once an obscure worry in the minds of specialists like Kevan has recently emerged as a pressing global concern. In the past four to five years alone, long-term studies in western Europe have documented alarming losses of wild bees. In Belgium and France, for example, almost half of the 330 native bee species are described as either declining or rare. In Britain, 3 of 25 bumblebee species are considered extinct and another 7 are known to have suffered significant reductions in numbers. Meanwhile, researchers in the Netherlands and Great Britain have recently documented a contraction of the range of wildflowers that are pollinated by bees, together with widespread declines in bee diversity. "I had expected losses," says Kevan, "but these findings were even worse than I had feared."

In North America, by contrast, the situation remains unclear. Disappointingly little is known about the populations or ecology of our native pollinators, according to a 2007 status report by the National Research Council of the United States. The report does, however, point to "suggestive evidence of [the] decline, extirpation or extinction" of dozens of species.

Kevan (OPPOSITE, with part of his extensive specimen collection) is an expert on the relationship between native vegetation and insects. "Three-quarters of all flowering plants depend on pollinators for fertilization," he says.

Be a bee-watcher

Want to improve the prospects of pollinators and have a little fun? Then consider becoming a "citizen scientist." One of the main reasons researchers have been able to track the decline of pollinators in western Europe is that amateur observers have been making detailed records of their sightings over many decades.

Now Canadians have an opportunity to become amateur insect-watchers, thanks to a program called Pollination Canada. Several years in the making, the content for the web-based protocol (www.seeds.ca/proj/poll) was developed by consultant and pollinator-enthusiast Jim Dyer of Cambridge, Ont., and launched last spring by Seeds of Diversity Canada, a Canadian charitable organization dedicated to the conservation of public-domain non-hybrid plants of Canadian significance.

"Pollinator observation is not like birdwatching," says Michael Harder, a volunteer with Toronto's Community Stewardship Program, which helped pilot the program. "But it does require the same degree of patience and faith that an interesting discovery will be made."

C.S.



Wildlife stories of the year



This decommissioned dump in Guelph, Ont., will become the world's first pollinator sanctuary.

In the months since the report was released, some of those fears have been confirmed, and the facts may again be worse than expected. By replicating a survey of bumblebees conducted in and around Guelph 30 years ago, York University grad student Sheila Colla compared then and now. Of the 14 species counted in the original study, four are now significantly less abundant than they were and three, including the fuzzy orange and brown *Bombus affinis* that was once quite common, are missing in action. After surveying the entire historic range of *B. affinis*, from Ontario to Georgia, with essentially no success, Colla believes the species is endangered, at best.

The prime suspects in the decline of wild pollinators in Europe and North America include the widespread deployment of pesticides — both insecticides, which kill bees outright, and herbicides, which deprive them of flowering plants for food — and the disruption of undisturbed places where they take refuge. Unlike honeybees, with their man-made hives, most wild bees nest and overwinter in humble shelters, often inside hollow plant stems or in little tunnels in the ground. The more land we plow, pave or plunder to meet our wants and needs, the fewer wild corners are left to sustain pollinating insects.

BACK AT THE LANDFILL, the members of our hiking party have reached the summit of “Trash Mountain” and are looking down on the scruffy fields below, an area of about 20 hectares alongside the site where kiddies will, in a couple of years, come to play soccer.

In my mind's eye, I conjure up the darting forms and bright voices of the children. That much I can believe. But my imagination falters when I try to envisage the unkempt slopes of the landfill as an oasis of life, riotous with floral colours, perfumed with floral scents and loud with the hum

of insects. “Hey, guys,” I want to shout at my companions, “this place is a dump. Can't you think of a better place to promote conservation?”

When a smiling Kevan enthuses about the project — “Maybe I have on rose-coloured glasses, but I can just see this taking off!” — I look at my feet and mumble something noncommittal.

It is only weeks later, after I've returned home and immersed myself in the literature about pollinator declines, that I see the light. If pollinators are in trouble and the cause of that trouble is us, where better to start doing something about it than in an old garbage dump, that everyday manifestation of wastefulness?

Fortunately, Guelph's City Council easily grasped this point, and it has been quick to give Pollinator Park the go-ahead and about 45 hectares of the landfill site to plan and develop. Work on the adjoining sports fields is scheduled to begin next year, with the pollinator habitat to follow once funding has been secured.

So let there be gardens around the leachate-monitoring stations, benches beside the gas wells and the heady buzz of pollinating insects everywhere. Let people visit Pollinator Park for pleasure and to learn what they can do around their homes and gardens to conserve pollinators. Sure, the park is an audacious idea, but it is all the better for that. It's about time that somebody put a bee in our bonnets.

Saskatoon-based writer Candace Savage is the author of more than two dozen books, including Bees: Nature's Little Wonders, published this fall by Greystone Books.



To comment, please e-mail editor@canadiangeographic.ca.
Visit www.canadiangeographic.ca.