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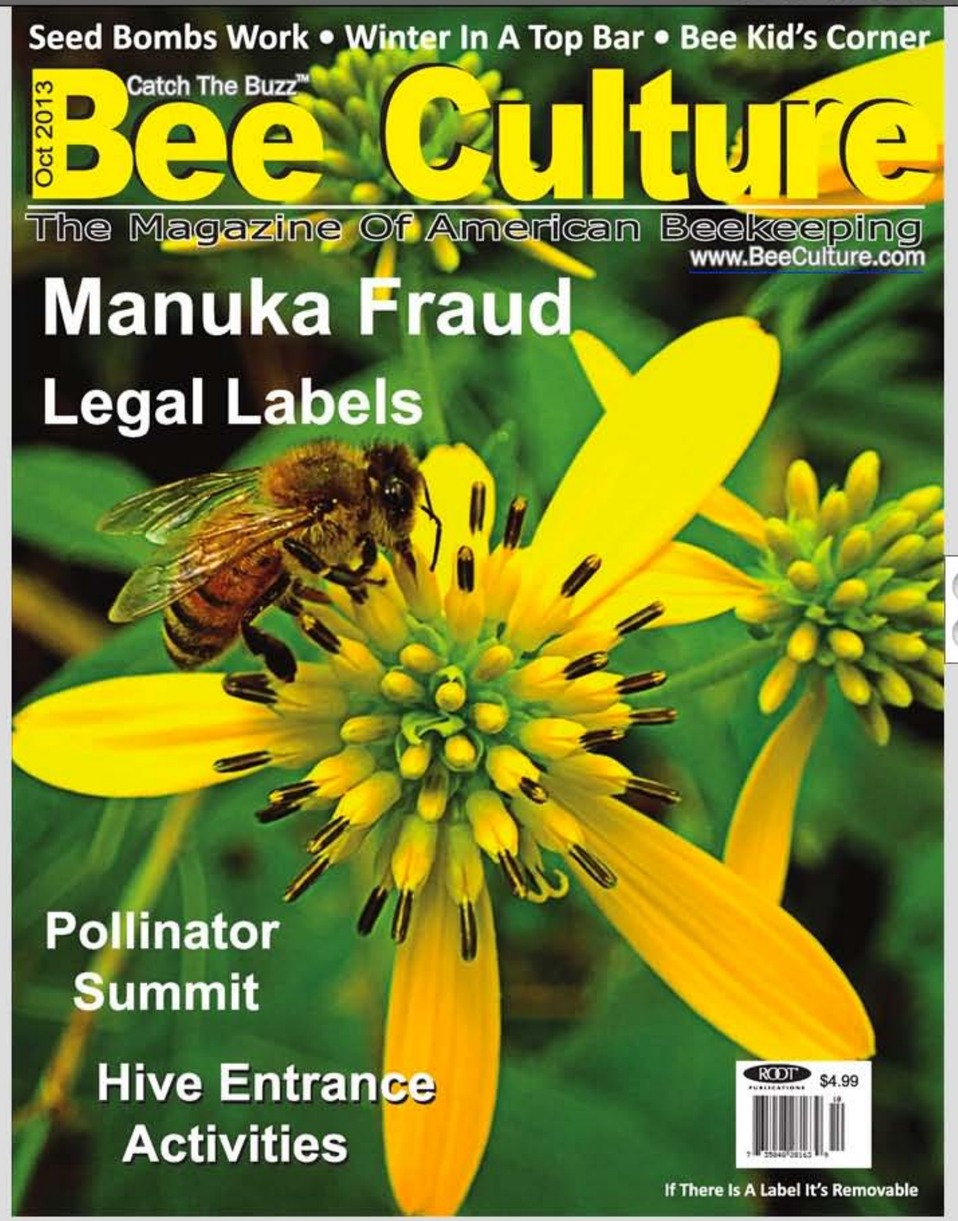


DOWNTOWN

Is There Enough Food In The City For Your Bees?

"Does urban apiculture do more harm than good?" That's the sensationalized question that hit the mainstream press, distorting the conclusions of a recent article by Dr. Francis Ratnieks and Dr. Karin Alton in the UK journal, *The Biologist*. Their study asked whether the massive and still-growing popularity of London beekeeping has outstripped the feeding capacity of the city's greenspace.

Because you all might be holding your breath (spoiler alert) I'm going to cut to the chase and tell you, "No, at least not yet," but you are *not* off the hook.

Let's underscore the very special nature of that specific London case: in that city, the number of registered hives has doubled from 1,677 to 3,745 since 2007, and Angela Woods, secretary of the London Bee Keepers Association (www.lbka.org.uk), notes that "our membership has grown 575% in six years." She points out that London's green coverage amounts to only 25%. This study was meant to get in front of a developing problem in a unique urban habitat. And good for them!

But many urban beekeepers in the U.S. who have fought to keep their hives alive over the past year anxiously whispered, "What about my bees?"

What is *your* answer?

Perhaps the best response the urban beekeeping community can give today is, "If you are in North America, your bees probably have adequate forage, but not necessarily. Not guaranteed." The solution for not knowing is relatively simple: finding out. And there is reason to be optimistic that you – and your friends and neighbors – can make valuable contributions to bee forage and, therefore, honey bee health. In building up urban green spaces and pollinator resources, we will also find ourselves working alongside allies in organizations that have approached sustainability in the city from this angle for a long time.

All urban neighborhoods are not created equal. The truth, across this continent, is that people of less economic means are also people of less green space, in part based on age and in part based on overall economic clout. The average age of urban beekeepers in the US, for example, skews far younger than the age of beekeepers overall (a 2010 MAAREC study by Elizabeth Burdick and Dewey Caron places the latter around 57 years). Urbanite beekeepers are more likely to be younger people who cannot afford to rent, own, or manage as much space as their older rural or suburban counterparts.

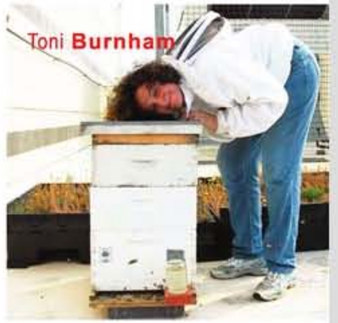
In the U.S.' densest cities, like New York, almost *all* beekeepers have no yards or gardens to call their own, and they cut deals with building owners for roof access, or community gardens for a share there. Younger beekeepers also tend to clump into more affordable areas, making competition for shared space that much more intense.

Then take into account city areas with concentrations of economically disadvantaged populations, including under-supported park and recreational infrastructure, and you can see that some of the most likely people to want and benefit from beehives may not exercise much influence over the forage areas necessary to support them.

So you can see why the assertion, "Your bees may be starving!" could hit a raw nerve among beekeepers who are trying very hard to create sustainable urban habitats. But take comfort.

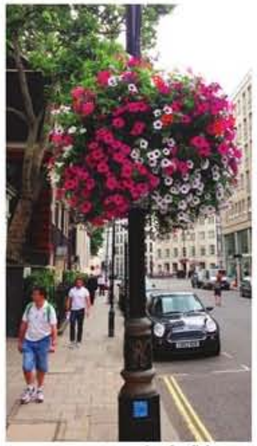
There's no rule of thumb for how many acres of forage it takes to support each beehive: it depends on the plants that grow around you. Dr. Gordon Wardell, Bee Biologist at Paramount Farming Company in Bakersfield, CA, and honey bee nutrition expert, puts it this way: "Let's say the average flight range for a bee is two miles, that means they have 8,658 acres to forage. So the question becomes 'What is in a two-mile radius from your colony at any particular time?'"

James Fischer of The Honeybee Conservancy (www.thehoneybeeconservancy.org) in New York notes that "two miles" may be optimistic in ur-



Are City Bees Starving Bees?

Berkley Square.



London lightposts.

ban foraging conditions, which can be severely impacted by wind velocities and turbulence around skyscrapers, and so on. "We are working with patches of lavender in the dearth periods to see just how far hives in certain unproductive sites can forage, and – we may be forced to admit that some green roofs are 'solitary/bumble bee only' sites, or sites where honeybees cannot be expected to make much of a harvestable crop . . . But most sites are very productive, as NYC has a good dispersion of parks, and most streets are tree-lined on both sides."

UK scientists Dr. Karin Alton and Dr. Francis Ratnieks, concentrating on the case of London, posit about 2.5 acres or so of borage, or up to 20 acres of lavender, as a likely proxy of about how much pollen and nectar a mature hive in their climate will consume in a year. That's a daunting chunk of land, but a justifiable measure of planted space to use, because British urban street trees are not, in the main, pollinator-friendly. That city's trees are nearly a monoculture of the London Plane *(Platanus × acerifolia)*, which is devoid of bee-friendly nectar and pollen.

But North American urban forests are more plentiful and much more diverse. Tree forage is a mainstay of urban apiculture from coast to coast, and city governments are investing in tree canopy renewal. How many acres of borage in England are equivalent to a city block of Black Locust on the East Coast? This is not a conversion that you can find on Google, but one you can make an estimate of for the space around you. (see sidebar)

But let's back up now to the average number of acres – 8,658 – that your bees might forage: how likely is it that they can find the equivalent of that amount of plant forage (from two to 20 acres) and variety (from both ground level plantings and trees) for the number of hives sharing that space? According to a 2010 compilation of data on urban tree coverage by Fiona Watt and Bram Gunther of the NYC Department of Parks, the average tree canopy in American cities covers 27% of the land (Atlanta comes in first at 36.7%). If you live in an average neighborhood in an average U.S. city, your bees can perhaps forage over 2,000 acres of trees, though some of them – like London's plane trees – are not pollinator-friendly, and urban wind tunnels can limit access.

There are simply no parallels to the London case in any North American city, however. Londoners look after 10 hives per km². James Fischer estimates about 400 hives in the 834 km² of NYC (which has an estimated tree coverage of 24%). Here in DC we host about 200 hives (tree coverage of 37.2%, 177 km²). Most of the hives in either DC or New York would have to be located in roughly the same overlapping forage area to exhaust just the tree resources available to them, not taking into account gardens, window boxes, green roofs, and so on. But remember, sources do not flower continually and you need to know your local bloom times to know when food might run short.

All beekeeping is local, and all city bees will do better in proportion to the level of education and information their keepers have (and use) about the slice of urban heaven that they inhabit. The London Bee Keepers Association has already been including forage information (and emphasizes the responsibility of the beekeeper to assure its adequacy) along with basic and continuing beekeeping education throughout their huge boom in membership. And it works when beekeepers take the relationship between bees and green spaces seriously.

The British Beekeepers Association supports this strongly: "One thing that everyone in the urban environment can strive to do is to improve that environment for bees by planting bee-friendly flowers be it in pots and window boxes through to garden or park-scale planting. For those who wish to get more directly involved then joining a local beekeeper's association and learning the necessary skills is the way forward."

Scientists here also point out it is relatively easy to make a big contribution via pollinator planting. Dr. Wardell has seen a small amount of additional plant life go a long way:

"This year I became aware of how just a little bit of natural forage can really benefit an apiary even when [hives] are receiving supplemental feeding . . . I had one set of splits here at my lab where I planted a small plot (0.5 acre) with wild flowers just to see what did well after almond bloom. The other spot [where] I put the [second set of] splits was pretty barren. Even though my little wild flower plot supplied relatively little pollen to each of the 50 splits at the lab, that little bit made a huge difference in how the colonies built up even with all the supplemental feeding they got. The isolated yard didn't build as well and queen acceptance was higher in the colonies that had just a little bit of natural pollen.

I don't encourage people to try to plant acres and acres of flowers for their bees, just a little bit can make a huge difference. Some wild flower seeds in a fence row or a backyard bee garden can be a huge boost to a colony. "

Dr. Wardell also has a suggestion for any beekeeper, because we all really need to understand the forage around where we put our apiaries. It's a lot of fun to find out how local forage works! Hive scales are more and more within the reach of the average beekeeper, both in price and the technical chops it takes to monitor one. Place a hive scale and use it to monitor a healthy, queen-right colony over a couple of years. Get a feel for what comes in, day after day. Perhaps report what you find to HoneyBeeNet, *honeybeenet.gsfc.nasa.gov*

You might discover a positive feedback loop. Says Dr. Wardell, "I put a half dozen colonies in my backyard. The yields were good but continued to grow year to year as the bees pollinated the flowers they preferred. White and yellow sweet clover got thicker and thicker. Moving bees to an area will improve the preferred forage and honey potential will grow. So there is a dynamic that benefits both parties, the flowers and the bees (actually three parties – I harvested the honey)."

Most of us got into urban beekeeping as a search for just such a beneficial relationship with green space: we want our city habitats to function better as a result of our bees being there. You have to understand your bees and what they need for that to happen, of course. The idea that just buying and slapping down beehives anywhere is somehow good for all concerned is the kind of logic used by people who hoard cats: if you really care, you make sure you can tend to them. If you don't, it's a tragic, toxic mess.

The London Beekeeping Association has an approach that we can afford to emulate in advance of such density problems. Instead of encouraging business groups, public agencies, the media and others who wish to promote the health of bees to buy and place hives willy-nilly, they are suggesting the improvement of urban grasslands as wildlife habitat and the reduction of mowing. Other possibilities include support for gardening organizations – often starved for funds in hard economic times – that in turn undertake pollinator friendly plantings. Right now, your city has organizations working on tree planting, lawn reduction, runoff prevention, green roof promotion, carbon sequestration – it just goes on an on – who'd love to think they were helping out the bees as well. It might be worth attending a few of their meetings and sharing the opportunity.

In many cities, it is also legal to garden on vacant lots if no barriers to access are present. In even more places than that, "guerrilla gardeners" create and throw seed bombs over fences to encourage the growth of food for both people and wildlife on disused property. Pollinator plant seed bombs are fun and easy to make: consider including plants that are good for natives and bumble bees as well as honey bees!

If you manage a colony or two (or more!) of honey bees, you have chosen the place where they will make their home. Even if that is a relatively large North American city, they are likely to find lots to eat, most of the time. But there are large variations from neighborhood to neighborhood, and certainly from season to season, and if you are going to intervene when they need you, you need to learn about the forage they have available before starvation becomes a possibility.

Most of us are into city beekeeping because it is our way of ensuring sustainability and green-ness in an increasingly urban future. It is a source of hope, wonder, and connection in places where people might forget that they are still on a living planet. Even in the city, pollination is that perennial conversation between the world of animals and the world of plants, in the air and in the soil around us. Though we beekeepers really like to mess with the animal half of that equation, the relationship ends without attention to the plants, as well. It's a worthy business to have beekeepers raise their hands to ask if a balance is being maintained, and to accept the responsibility to make that happen. We're lucky on this side of the ocean that we still have room to grow, and can thank our colleagues on the other side of the pond for helping us keep that critical balance in mind. BC

With contributions from Dr. Gordon Wardell (Paramount Farming Company, James Fischer (The Honeybee Conservancy), and Angela Woods (London Beekeepers Association.)

Estimating the Contribution of Urban Trees
(Math by James Fischer, errors by Toni Burnham)

How can you assess the contribution of your local tree cover to honey bee forage? James Fischer of the Honeybee Conservancy (www.thehoneybeeconservancy.org) offers that using the surface area and volume of a sphere is one way to estimate the equivalent acreage of blooms provided by a tree, and contributed the handy chart below:
Area=$4\pi^2$ • Volume=$4/3\pi^3$ • Bloom density=2 inches from each other in all directions

Tree Foliage Radius (feet)	5	10	15	20	25	30
Surface Area (sq ft)	314.16	1256.64	2827.43	5026.55	7853.98	11309.73
Volume (cubic feet)	523.60	4188.79	14137.17	33510.32	65449.85	113097.34
Surface Equivalent acres	0.01	0.03	0.06	0.12	0.18	0.26
Volume Equivalent acres	0.07	0.58	1.95	4.62	9.02	15.58

In the chart above, assume either that a tree provides blooms only on its surface, or inside its volume, as well. You can also pick a bloom density within the tree, in this example conservatively normalized to no blooms that are closer than 2 inches from each other. What results is impressive "equivalent acreage" from tree blossoms. A single tree with a 30-foot diameter ball of foliage (15 foot radius) with blooms inside as well as on the surface offers the equivalent of nearly 2 acres of blooms.
So, how many trees are on your block? When do they bloom? How many hives do you suppose are nearby?

Seed Bombs Work

An Urban Bomb Worth Throwing

Toni **Burnham**

Supplies needed.

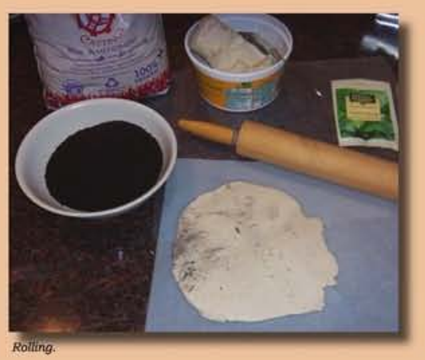
Most of us see honey bees working vacant lots. Well, we can improve bee nutrition and expand their foraging there with some well-placed seed bombs. And no one gets hurt!

What is a seed bomb? It's a lot like a human-made fruit: there are seeds in the middle, surrounded by food for the young plants, encased in a protective shell.

A wiser, more experienced beekeeper once told me, "It's easier to plant a tree than to get permission to cut one down," so let's give it a try.

Warnings:

- Be careful where you throw! Don't hit people, windows, or vulnerable stuff.
- Don't interfere with conservation areas or existing gardens.
- Don't plant invasive species.



Rolling.

Ingredients:

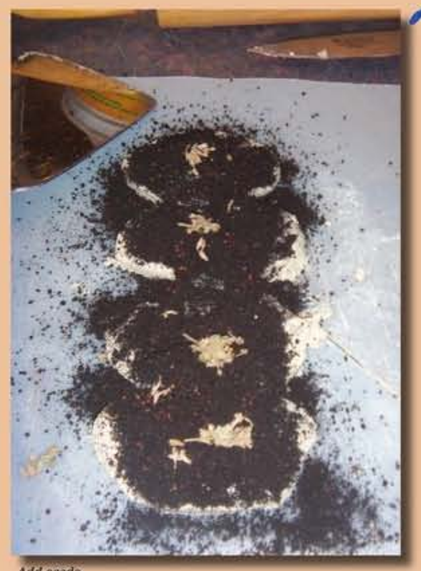
- **Clay:** either naturally-occurring or store bought (the non-toxic kid-kind works);
- **Pollinator-friendly seeds:** consult local planting guides or buy a pre-mixed pack. Consider some native bee forage.
- **Compost or worm castings:** give your seeds a good start by choosing solid nutrients.
- **Water:** just a bit, to hold things together only.
- **Gloves:** if you worry about getting messy.

Cut to size, sprinkle compost.

Directions:

Work on a smooth, cleanable surface. Roll out a thin (less than 1/3" thick) disk of clay, shoot for an oval 2½" by 2".

Spread/pile your compost or worm poo on the clay, as much as you can get to stay.



Add seeds.

Add seeds. If they are tiny, you could get a whole teaspoon in there, if they are large, maybe only three or four. Some bombers recommend adding some chili powder to discourage animal munching.

Some drops of water: less is more here. You are just looking to get stuff to stick together with a smidge of moisture, not to water your seeds.

Roll bomb in compost.

Roll into a ball, making sure that all the seeds and as much of the compost stay inside as you can.

Place some more compost in a bowl, and roll your seed ball around in it, mashing as much as you can in. Some folks repeat this several times.

Ready to go!

You can get six of these in a biggish pocket. If you are seed bombing this Fall, think about early Spring forage for bees! BC