



SWEET STUFF

NIBA NEWSLETTER – SEPTEMBER 2025

PRESIDENT'S MESSAGE

Tom Allen



Science News

from research organizations

Scientists found the missing nutrients bees need — Colonies grew 15-fold

Date: August 23, 2025

Source: University of Oxford

Summary: Scientists have developed a breakthrough food supplement that could help save honeybees from devastating declines. By engineering yeast to produce six essential sterols found in pollen, researchers provided bees with a nutritionally complete diet that boosted reproduction up to 15-fold. Unlike commercial substitutes that lack key nutrients, this supplement mimics natural pollen's sterol profile, giving bees the equivalent of a balanced diet.



Worker bees feeding in the lab, Oxford Bee Lab. Credit: Caroline Wood

A new study led by the University of Oxford in collaboration with Royal Botanic Gardens Kew, University of Greenwich, and the Technical University of Denmark could provide a cost-effective and sustainable solution to help tackle the devastating decline in honeybees. An engineered food supplement, designed to provide essential compounds

found in plant pollen, was found to significantly enhance colony reproduction. The results were published on August 20 in the journal *Nature*.

The challenge: addressing a critical nutrient deficiency

Climate change and agricultural intensification have increasingly deprived honeybees of the floral diversity they need to thrive. Pollen, the major component of their diet, contains specific lipids called sterols necessary for their development. Increasingly, beekeepers are feeding artificial pollen substitutes to their bees due to insufficient natural pollen. However, these commercial supplements -- made of protein flour, sugars, and oils -- lack the right sterol compounds, making them nutritionally incomplete.

In the new study, the research team succeeded in engineering the yeast *Yarrowia lipolytica* to produce a precise mixture of six key sterols that bees need. This was then incorporated into diets fed to bee colonies during three-month feeding trials. These took place in enclosed glasshouses to ensure the bees only fed on the treatment diets.

Key findings:

- By the end of the study period, colonies fed with the sterol-enriched yeast had reared up to 15 times more larvae to the viable pupal stage, compared with colonies fed control diets.
- Colonies fed with the enriched diet were more likely to continue rearing brood up to the end of the three-month period, whereas colonies on sterol-deficient diets ceased brood production after 90 days.
- Notably, the sterol profile of larvae in colonies fed the engineered yeast matched that found in naturally foraged colonies, suggesting that bees selectively transfer only the most biologically important sterols to their young.

Senior author Professor Geraldine Wright (Department of Biology, University of Oxford), said: "Our study demonstrates how we can harness synthetic biology to solve real-world ecological challenges. Most of the pollen sterols used by bees are not available naturally in quantities that could be harvested on a commercial scale, making it otherwise impossible to create a nutritionally complete feed that is a substitute for pollen."

Lead author Dr Elynor Moore (Department of Biology, University of Oxford at the time of the study, now Delft University of Technology) added: "For bees, the difference between the sterol-enriched diet and conventional bee feeds would be comparable to the difference for humans between

eating balanced, nutritionally complete meals and eating meals missing essential nutrients like essential fatty acids. Using precision fermentation, we are now able to provide bees with a tailor-made feed that is nutritionally complete at the molecular level."

From pollen to precision nutrition: Identifying and producing key bee sterols

Before this work, it was unclear which of the diverse sterols in pollen were critical for bee health. To answer this, the researchers chemically assessed the sterol composition of tissue samples harvested from pupae and adult bees. This required some extraordinarily delicate work; for instance, dissecting individual nurse bees to separate the guts. The analysis identified six sterol compounds that consistently made up the majority in bee tissues: 24-methylenecholesterol, campesterol, isofucosterol, β -sitosterol, cholesterol, and desmosterol.

Using CRISPR-Cas9 gene editing, the researchers then engineered the yeast *Yarrowia lipolytica* to produce these sterols in a sustainable and affordable way. *Y. lipolytica* was selected since this yeast has a high lipid content, has been demonstrated as food-safe, and is already used to supplement aquaculture feeds. To produce the sterol-enriched supplement, engineered yeast biomass was cultured in bioreactors, harvested, then dried into a powder.

Co-author Professor Irina Borodina (The NNF Center for Biosustainability, Technical University of Denmark) said: "We chose oleaginous yeast *Yarrowia lipolytica* as the cell factory because it is excellent at making compounds derived from acetyl-CoA, such as lipids and sterols, and because this yeast is safe and easy to scale up. It is used industrially to produce enzymes, omega-3 fatty acids, steviol glycosides as calorie-free sweeteners, pheromones for pest control, and other products."

Benefits for agriculture and biodiversity

Pollinators like honeybees contribute to the production of over 70% of leading global crops. Severe declines -- caused by a combination of nutrient deficiencies, climate change, mite infestations, viral diseases, and pesticide exposure -- poses a significant threat to food security and biodiversity. For instance, over the past decade, annual commercial honey bee colony losses in the U.S have typically ranged between 40 and 50%, and could reach 60 to 70% in 2025. This new engineered supplement offers a practical means to enhance colony resilience without further depleting natural floral resources. Since the yeast biomass also contains beneficial proteins and lipids, it could potentially be expanded into a comprehensive bee feed.

Co-author Professor Phil Stevenson (RBG Kew and Natural Resources Institute, University of Greenwich) added: "Honey bees are critically important pollinators for the production of crops such as almonds, apples, and cherries and so are present in some crop locations in very large numbers, which can put pressure on limited wildflowers. Our engineered supplement could therefore benefit wild bee species by reducing competition for limited pollen supplies."

Danielle Downey (Executive Director of honeybee research nonprofit Project Apis m., not affiliated with the study) said: "We rely on honey bees to pollinate one in three bites of our food, yet bees

face many stressors. Good nutrition is one way to improve their resilience to these threats, and in landscapes with dwindling natural forage for bees, a more complete diet supplement could be a game changer. This breakthrough discovery of key phytonutrients that, when included in feed supplements, allow sustained honey bee brood rearing has immense potential to improve outcomes for colony survival, and in turn the beekeeping businesses we rely on for our food production."

Next steps and future applications

Whilst these initial results are promising, further large-scale field trials are needed to assess long-term impacts on colony health and pollination efficacy. Potentially, the supplement could be available to farmers within two years.

This new technology could also be used to develop dietary supplements for other pollinators or farmed insects, opening new avenues for sustainable agriculture.

Story Source:

Materials provided by **University of Oxford**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Elynor Moore, Raquel T. de Sousa, Stella Felsinger, Jonathan A. Arnesen, Jane D. Dyekjær, Dudley I. Farman, Rui F. S. Gonçalves, Philip C. Stevenson, Irina Borodina, Geraldine A. Wright. **Engineered yeast provides rare but essential pollen sterols for honeybees.** *Nature*, 2025; DOI: [10.1038/s41586-025-09431-y](https://doi.org/10.1038/s41586-025-09431-y)



Autumn Fear

Scared stiff

Thoughts from Larry Kregel



“All we have to fear is fear itself.” Said by Franklin Delano Roosevelt as he took office in the heart of the Great Depression. Rather insightful.

Would the country be so filled with fear of the future they would not willingly act in their own best interest? Roosevelt proceeded to point out that doing nothing is not the answer to a scary situation. Doing something is magnitudes better than yielding to inaction. He did something – the New Deal, Social Security, the Civil Conservation Corps, banking reform – he did something.¹

Could this be like beekeepers in the autumn of the year facing a winter with boxes full of bees depending on them? Sure could. The bees in your hive could be dead before the dandelions bloom. Winter is tough. Especially the nubee may be scared stiff. Inaction is a possible choice, but a poor one.

I have written in the Sweet Stuff before saying there are many ways to keep bees. There is not just a single proper one. That is quite true of preparing for an impending winter. Insulate or not? Treat for varroa or not? When and with what? Combining weak colonies? Is a windbreak important? Bring them in to the cellar for the winter? (100 years ago, that was popular.) Did I miss some things. Certainly. Many.

Advice is easily found. Check the Northern Illinois Beekeeping Facebook Page. Often a request for help is followed by a dozen or more responses. Vetting these comments is difficult. The only requirement to post on Facebook is a keyboard. It is best to be cautious.

YouTube? Attempting to follow all – often contradictory – advice found in blogs on YouTube is a formula for disaster. Please don't. Be selective.

Seldom will I tell my protégées what to do. I prefer to share what I do or would do in a specific situation allowing them to evaluate my actions. Am I now going to share my sure-fire method of keeping my bees alive until April? No.

What I am going to do is encourage you, the reader, to do something. Do something. Winter is coming and will not wait. Choose a course of action and run with it.

Success in beekeeping is a summation of three factors. Education, experience, and common sense. Those reading this hopefully acquired a basic education in the ways of the bees as they began their time in the apiary. If not, now is the time. Go get it. Your bees will thank you. ²

We are all on the route to gaining greater beekeeping experience. Both you and I will have more experience under our bee veils next year than we had this year. Each year we invest our time and get valuable experience in return. Perfection is not possible, but experience moves us along a path of improvement.

When with the bees, don't underestimate your common sense. You and your bees are depending on you. Many are the unique situations a keeper encounters while with the bees. Most often common sense wins the day.

All you have to fear is fear itself.

Thanks FDR.

1. FDR was a hero of nature leading the development of access to the beauties of our national parks, but I have no reason to believe his ever kept bees.
2. NIBA has a mentoring beeyard in the Student Garden at McHenry County College. Many mentoring sessions were organized during the recent season. There is another opportunity Saturday, September 6, at 10:00 am when honey supers will be harvested. Hive maintenance will be on an as-needed basis. All vintages of beekeepers are invited. The harvested honey will be sold to support the beeyard and the many other activities of the Association.



Chores of the Month – September 2025

Like the bees we study, we accomplish more together.

John Leibinger

What's happening in the hive?

What a difference a year makes in the Weather! It feels like Fall is coming early. The temperatures that we are experiencing now are about like the temperatures that we experienced in the last week of September last year. September last year was warm....like half the days in the mid to upper 80s, so don't expect your colonies to be acting quite the same as last year.

You will observe that the colony population will start to decline noticeably this month. There will, however, still be significant brood rearing going on as the nurse bees work to raise the 'winter bees' (diutinus bees) that will carry the colony through the winter. Though they appear the same on the outside, winter bees are physiologically different from the worker bees raised in spring and summer. They have more fat bodies which produce the vitellogenin that is crucial to their long lives. These bees are very important bees for the survival of the colony, so do all you can to assist them through their wintery journey. That means leaving or providing them with sufficient stores to overwinter, providing them protection against robbing, providing protection against mouse infiltration, providing protection against wind infiltration in the hive, and helping prevent disease by controlling the ever present Varroa mite.

You are likely observing the Fall 'Ousting of the Drones'. Don't confuse this with robbing. A small group of workers will be ganging up on a drone, dragging him to the edge of the bottom board and dumping his lazy, freeloaded carcass over the abyss (drama added for the smiles of our ever increasing female beekeeper population).

You may notice a significant change in the odor (not a pleasant change) of your hives (second or third week of Sept, historically) This is very common, and is a result of goldenrod nectar foraging. You are likely to see foragers bringing in copious amounts of pollen. Great food for the winter bees being raised. Life is good in the beehive!

You may well be seeing robbing occur. With the cooling weather, a strong Fall nectar flow might not materialize. As the month progresses, food sources will become more lean and opportunistic robbing may occur. Weak hives are most susceptible, so consider combining a weak hive with a stronger one to help the combined colony make it through winter. If successful, you can split the hive in early Spring to increase your colony count. A robbing event can not only kill a colony, but can destroy drawn out comb which is, arguably, the most valuable resource you have in the hive.

Expect to find your bees have developed some 'attitude' as we get into the month. Reduced resources not only lead to robbing behaviors but also defensive behaviors. Dress accordingly.

For All Beekeepers, it is time to:

Finalize your annual harvest if you haven't already. Let the bees collect and store some natural fall food after your harvest by returning a wet super to the hive. If you have sufficient stores already you can return wet supers to the hives to allow the bees to clean them up. Place the wet super above the inner cover and below the outer cover.* Some beekeepers recommend putting an empty super between the inner cover and the wet super to add additional space. Either way works. This has a twofold benefit. First, the bees can pull the remaining honey from the wet super and store it in the boxes below. Second, it gets the super frames cleaned and dried and in most cases repaired and ready for winter storage. You may be surprised at what a nice job they do.

Alternately, you can store your supers wet (directly from the extractor). Pros: Bees are quick to utilize these supers the following year. Cons: Can be messy to store. Must take steps to mitigate problems from pests.

*Beware the possibility of promoting robbing when doing this. Seal off any outside entrance from the inner cover. Don't use a ventilated inner cover when doing this.

A tip from member Carl Christiansen: If you have supers with frames that are partially filled, consider placing them under the brood boxes. The bees will remove the honey/nectar from that lower super and bring it up into the upper box(es).

Bottle and label your harvest. Sell some, give some to friends and family, prepare some Holiday gifts, **donate some to your favorite bee club** for fund raising.

Monitor Varroa Mite levels and take action if needed (See Honey Bee Health Coalition link in General Info section for guidance on treatment. Also see links for references to mite checking procedures).

It is very important to get the mite loads under control now. Actually, it is a bit late, but better a bit late than never. The brood that will be raised as winter bees are in process. Help them out. Pay attention to labeling instructions when using treatments and be mindful of temperature ranges for various types of treatments.

There is a relatively new varroa mite treatment that came to market last year. It is Varroxsan and is manufactured by Vita Bee. It is an oxalic acid extended release (OAE) product that comes in cardboard(ish) strips saturated in a glycerin/oxalic acid solution. Application is 1 strip for every 2.5 frames of bees. It is relatively safe and easy to apply. It has a two year shelf life. It is a 42-56 day treatment. Testing has shown a 95-97% efficacy. Varroxsan is generally used to keep mites in check rather than being utilized as a knock down treatment, so if you have a significant problem, other treatments may serve you better, but it is getting a bit late in the season. Take note and prepare better next year. A benefit I envision for this time of year is protection throughout the robbing season. This product will NOT prevent or reduce robbing but it does offer another benefit of protection. This time of year bees are looking for resources and if your bees have an opportunity to rob a weak, varroa infested hive within their foraging range they will enthusiastically take it. Mites from those weak hives will want to latch on to your bees for the chance to leave a dying host colony to go to a stronger host colony. It's a matter of their survival. Won't those phoretic mites be in for a surprise when they enter your 'hive in treatment' to find out they have just been given a free ride to MITE HELL. Since this treatment can last 42- 56 days that will take your colony protection into mid to late October, by which time robbing activity has generally ceased.

Your specific approach will be influenced by your colonies' condition, your personal goals and philosophy, but, if you have a mite problem, doing nothing is not an acceptable answer if you want your colonies to survive and thrive and come out of winter as healthy bees raring to go for 2026. Controlling varroa is a great step towards sustainable beekeeping.

Be very aware of robbing. It happens quickly and can be devastating. Reduce entrance openings to the smallest size on your entrance reducers, or alternately, install robbing screens. There are many types of robbing screens, some very simple and some a bit more 'inventive'. Check the internet for robbing screens and you will get an abundance of ideas. You will have to use your judgement on the direction you take. Be aware that robbing is not just honey bee to honey bee, but oftentimes involves wasps, hornets, and yellow jackets. If you are inclined to use a yellow jacket trap, do not place it immediately adjacent or on top of your hives as it may tend to draw more yellow jackets to your hives and cause greater problems.

Add mouse guards (probably late in the month). Nights will start to cool off soon and mice will be looking for warm, dry spaces to make fall and winter nests. Don't let that be your hives.

Check your hives for honey stores. Consider moving existing full frames of honey to outer edges and partially filled towards the center to allow bees easier access to filling them. Do not break up/ separate the brood nest to accomplish this.

Start feeding and don't stop until they stop taking it.** Use a 2:1 sugar to water syrup mix. Check your feeders often enough to keep them filled. Avoid using Boardman type feeders this time of year to reduce inducing robbing.

** If they still seem to be consuming by late October (yes, I know I am forward projecting) you may want to stop. They will need time to reduce the moisture content of the syrup before winter sets in.

General Info

Download the forms to register your bees with the Illinois Department of Agriculture.

<https://www2.illinois.gov/sites/agr/Insects/Bees/Documents/beekeep.pdf> (Ctrl+Click link)

[The Honeybee Health Coalition Varroa Decision Tool](#) (Ctrl+Click link)

[Hive Inspection Checklist](#) (Ctrl+Click link)

Sugar Roll Method: [varroa mite monitoring - The Sand Hill](#) (Ctrl+Click link)

Alcohol Wash Method: [Alcohol Wash for Mite Control - YouTube](#) (Ctrl+Click link)

Formulas for making 2:1 syrup for fall feeding:

Sugar (lb)	1	2	4	8	16	32
Water	1cup	1 pint	1 quart	1/2/gal	1 gal	2 gal

Note 1: Do not boil sugar syrup (its OK to boil the water prior to adding sugar but not after). Boiling can lead to the creation of HMF (Hydroxymethylfurfural) which is toxic to honeybees.

Note 2: Some people are concerned about using sugar from beets. There is no difference in the sugar (sucrose) from beets vs cane sugar (sucrose). Sucrose is sucrose. Genetic modification (GM) in beets modify the proteins in the plants, not the sucrose.
Note 3: Use white table sugar (sucrose) only. Do not use brown sugar or molasses. Do not use organic sugar.

ROBBING SCREENS



MOUSE DAMAGE



MOUSE GUARDS



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www.nibainfo.org – The Northern Illinois Beekeepers Association website. A wealth of information is available. Contact board members via email, download the membership form, access copies of the newsletter. Terri is asking for your pictures, stories, etc. to have them highlighted on the web page!
reevestherese@att.net

This is YOUR newsletter. Please feel free to contribute. Or let us know if you have any topics you'd like to see covered. spinkawa@gmail.com

Honey Extractor

Did you know that your membership in NIBA includes the opportunity to rent one of the clubs 3 honey extractors?

Two of the extractors are manual, a 4 frame a 3 frame. The third is motorized and is capable of extracting both sides of 9 frames at a time.

Rental fee for either of the manual extractor is \$10.00 for 3 days with a \$10.00 security deposit. The electric (motorized) 9 frame extractor costs \$25.00 to rent for 2 days with a \$75.00 security deposit. Deposits will be returned if equipment is returned on time, clean, and undamaged.

The extractors come with most equipment needed to make the uncapping and extraction experiences go smoothly, except of course, the honey frames and buckets.

To reserve a date contact Al Fullerton by phone or text at 815-382-7139 or email adfhone@gmail.com, if you don't get a timely response, just phone. Pick it up in Cary Illinois.

The queen marking color for 2025 is Blue

