

# THE BUZZ

## THE NEWSLETTER OF THE INVERNESS-SHIRE BEEKEEPERS' ASSOCIATION



Honeybees everywhere are almost ready to emerge after a very cold winter!!!

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# Flowers can hear Buzzing Bees – and it makes their Nectar Sweeter!!!

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PUBLISHED JANUARY 15, 2019

EVEN ON THE quietest days, the world is full of sounds: birds chirping, wind rustling through trees, and insects humming about their business. The ears of both predator and prey are attuned to one another's presence.

Sound is so elemental to life and survival that it prompted Tel Aviv University researcher Lilach Hadany to ask: What if it wasn't just animals that could sense sound—what if plants could, too? The first experiments to test this hypothesis, published recently on the pre-print server bioRxiv, suggest that in at least one case, plants can hear, and it confers a real evolutionary advantage.

Hadany's team looked at evening primroses (*Oenothera drummondii*) and found that within minutes of sensing vibrations from pollinators' wings, the plants temporarily increased the concentration of sugar in their flowers' nectar. In effect, the flowers themselves served as ears, picking up the specific frequencies of bees' wings while tuning out irrelevant sounds like wind.

## The sweetest sound

As an evolutionary theoretician, Hadany says her question was prompted by the realization that sounds are a ubiquitous natural resource—one that plants would be wasting if they didn't take advantage of it as animals do. If plants had a way of hearing and responding to sound, she figured, it could help them survive and pass on their genetic legacy.

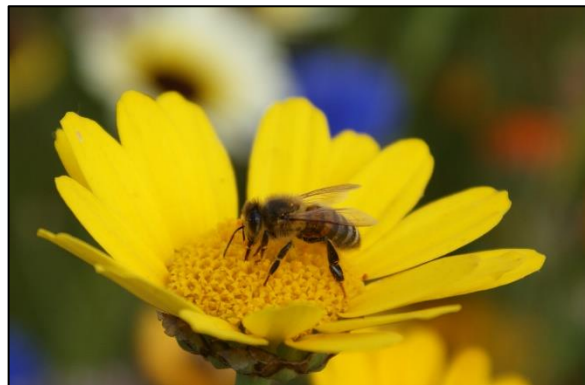
Since pollination is key to plant reproduction, her team started by investigating flowers. Evening primrose, which grows wild on the beaches and in parks around Tel Aviv, emerged as a good candidate, since it has a long bloom time and produces measurable quantities of nectar.

To test the primroses in the lab, Hadany's team exposed plants to five sound treatments: silence, recordings of a honeybee from four inches away, and computer-generated sounds in low, intermediate, and high frequencies. Plants given the silent treatment—placed under vibration-blocking glass jars—had no significant increase in nectar sugar concentration. The same went for plants exposed to high-



frequency (158 to 160 kilohertz) and intermediate-frequency (34 to 35 kilohertz) sounds.

But for plants exposed to playbacks of bee sounds (0.2 to 0.5 kilohertz) and similarly low-frequency sounds (0.05 to 1 kilohertz), the final analysis revealed an unmistakable response. Within three minutes of exposure to these recordings, sugar concentration in the plants increased from between 12 and 17 percent to 20 percent.



A sweeter treat for pollinators, their theory goes, may draw in more insects, potentially increasing the chances of successful cross-pollination. Indeed, in field observations, researchers found that pollinators were more than nine times more common around plants another pollinator had visited within the previous six minutes.

“We were quite surprised when we found out that it actually worked,” Hadany says. “But after repeating it in other situations, in different seasons, and with plants grown both indoors and outdoors, we feel very confident in the result.”

### Flowers for ears

As the team thought about how sound works, via the transmission and interpretation of vibrations, the role of the flowers became even more intriguing. Though blossoms vary widely in shape and size, a good many are concave or bowl-shaped. This makes them perfect for receiving and amplifying sound waves, much like a satellite dish.

To test the vibrational effects of each sound frequency test group, Hadany and her co-author Marine Veits, then a graduate student in Hadany’s lab, put the evening primrose flowers under a machine called a laser vibrometer, which measures minute movements. The team then compared the flowers’ vibrations with those from each of the sound treatments.



“This specific flower is bowl-shaped, so acoustically speaking, it makes sense that this kind of structure would vibrate and increase the vibration within itself,” Veits says.

And indeed, it did, at least for the pollinators’ frequencies. Hadany says it was exciting to see the vibrations of the flower match up with the wavelengths of the bee recording. “You immediately see that it works,” she says.

To confirm that the flower was the responsible structure, the team also ran tests on flowers that had one or more petals removed. Those flowers failed to resonate with either of the low-frequency sounds.

## What else plants can hear?

Hadany acknowledges that there are many, many questions remaining about this newfound ability of plants to respond to sound. Are some “ears” better for certain frequencies than others? And why does the evening primrose make its nectar so much sweeter when bees are known to be able to detect changes in sugar concentration as small as 1 to 3 percent?

Also, could this ability confer other advantages beyond nectar production and pollination? Hadany posits that perhaps plants alert one another to the sound of herbivores mowing down their neighbors. Or maybe they can generate sounds that attract the animals involved in dispersing that plant’s seeds.



“We have to take into account that flowers have evolved with pollinators for a very long time,” Hadany says. “They are living entities, and they, too, need to survive in the world. It’s important for them to be able to sense their environment—especially if they cannot go anywhere.”

This single study has cracked open an entirely new field of scientific research, which Hadany calls phytoacoustics.

Veits wants to know more about the underlying mechanisms behind the phenomenon the research team observed. For instance, what molecular or mechanical processes are driving the vibration and nectar response? She also hopes the work will affirm the idea that it doesn’t always take a traditional sense organ to perceive the world.

“Some people may think, how can [plants] hear or smell?” Veits says. “I’d like people to understand that hearing is not only for ears.”

Richard Karban, an expert in interactions between plants and their pests at the University of California Davis, has questions of his own, in particular, about the evolutionary advantages of plants’ responses to sound.

“It may be possible that plants are able to chemically sense their neighbors, and to evaluate whether or not other plants around them are fertilized,” he says. “There’s no evidence that things like that are going on, but [this study] has done the first step.”

Ref. <https://www.nationalgeographic.com/science/2019/01/flowers-can-hear-bees-and-make-their-nectar-sweeter/?fbclid=IwAR39vPAj310B9g0MmQu5IYCjeMDrf3RBxeZLKQv-jaqJGol7B5rMzqR19BE>

# Buzzing Bee Games

## Fred and Jean Millwood

Many thanks to Fred and Jean Millwood who provided the puzzle for this edition of the Buzz. Find the answers on the next page!!

Visual Mind-Bending Puzzles

|                      |                               |                      |                                |   |
|----------------------|-------------------------------|----------------------|--------------------------------|---|
| STONE<br>2           | MAN<br>BOARD<br>2             | NOON T<br>3          | STAANCE<br>4                   | PAR<br>2<br>5   |
| HOROBOD<br>6         | KNEE<br>LIGHTS<br>LIGHTS<br>7 | XQQQME<br>8          | <u>READ</u><br>9               | AGED<br><u>AGED</u><br>AGED<br>10                         |
| GO IT, IT, IT.<br>11 | O<br>MD<br>BSC<br>PHD<br>12   | SHOW<br>13           | BSGE, SBGE<br>GEGS, ESGG<br>14 | ROADS<br>R<br>A<br>D<br>S<br>15                           |
| MCE, MCE, MCE<br>16  | MILONELION<br>17              | FACED<br>FACED<br>18 | CCCCCC<br>19                   | WORDS<br>FUNNY WORDS<br>FUNNY WORDS<br>WORDS<br>20        |
| SECRET<br>21         | PINEAPPLE<br>CAKE<br>22       | BLOCUSE<br>23        | CHIMADENA<br>24                | GROUND<br>FEET, FEET,<br>FEET, FEET,<br>FEET, FEET,<br>25 |

# Buzzing Bee Answers

## Visual Mind-Bending Puzzles Answers

1. Corner Stone
2. Man-over-board
3. Afternoon tea
4. For-instance
5. 2 under par
6. Robin Hood
7. Neon Lights
8. Excuse Me
9. Read between the lines
10. Middle-age
11. Go-4-it
12. O-Level
13. Side-show
14. Scrambled Eggs
15. Cross Roads
16. 4 Blind Mice
17. 1 in a million
18. 2-faced
19. 7 seas
20. Too funny for words
21. Top Secret
22. Upside Down Pineapple Cake
23. See-through Blouse
24. Made in China
25. 6 feet under Ground



## What to do in...

### February

- The bees will consume about 24lb (11Kg) of stores in February – so check they have enough by hefting hive (don't open the hive)
- Undertake varroa count and plan treatment as necessary
- Read and plan the next 6 months, especially Feeding, Swarm Control and Varroa Management
- Order equipment and bees as required

### March

- Take BBKA exams
- Observe hive entrance for flying bees bringing in pollen
- This is the month when colonies often die of starvation. Weigh hives and feed bees if necessary
- When weather warmed up:
- Remove mouseguards when the weather has warmed up and the bees are no longer in a cosy cluster
- Start new seasons Hive Record Cards

### April

- Easter Weekend: Plant Bee-Friendly Flowers
- Spring feeding
- Change brood box and floors for clean ones (if you have spares that you disinfected)
- Inspect every 7-9 days for disease, swarming intentions, status of Queen, brood pattern and stores (9 days is the time it takes the bees to create and cap a Queen cell and decide to swarm). Temperature must be above 15C
- Practice good apiary hygiene
- Undertake varroa counts
- If bees show intention to swarm then create artificial swarm
- Super-up (when bees cover 7 of the 10 frames, add a super)
- Remove supers for extraction as required – essential if your bees are bringing in oil seed rape
- Unite weak colonies where necessary
- Make sure there is enough space for the bees
- This inspection is a good time to find and mark the Queen before hive gets too busy

### May

- Start of May – Set up Swarm Traps / Bait Hives
- Inspect as above
- Add super, preferably one that needs drawing out. Thinking: they will produce wax and this might reduce their intention to swarm

Ref: <http://www.talkingwithbees.com/beekeeping-how-to-guides/beekeeping-calendar>

## Notice Board.

### SBA MODULE 1 TRAINING PROGRAM 2019

#### **Completed your Basic Bee-master Certificate? Want to Learn More?**

If so the SBA Module 1 Training Program will allow you to develop your skills and expand on your existing knowledge of beekeeping.

If you are interested, please contact:

**David Brown - [david@bearradh.co.uk](mailto:david@bearradh.co.uk)**

**Home No. 01463 234466**

**Mob No. 07725 170 585**

### MONTHLY STRIM TEAM VOLUNTEERS WANTED

#### **Charlie and Des need your help!!!**

Beginning in SUMMER 2019 - they are looking for volunteers to join their monthly maintenance team at the Knocknagael apiary.

#### **TASK WILL INCLUDE:**

- Strimming grass
- Clearing around existing planting
  - Fencing repairs
- Planting new shrubs and bee-friendly plants

**If you are interested, please contact:**

**CHARLIE MOIR - [charliemoir@btinternet.com](mailto:charliemoir@btinternet.com)**

**Tel No. 01463 741618**

**Mob No. 07733362577**



AT THE MOMENT OUR PRICES FOR JARS, AMBROSIA AND FONDANT ARE AS FOLLOWS:

| Item                                      | Price           |
|---|-----------------|
| Ambrosia (12kg, non-refundable container) | £15.00          |
| Fondant (2.5kg pack)                      | £4.00           |
| Fondant (full box – 5x 2.5kg packs)       | £20.00          |
| Jars (72 x 1lb jars with lids)            | £30.00          |
| Jars (96 x ½lb jars with lids)            | £35.00          |
| Spare lids (for both sizes of jars)       | £2.00 per dozen |

### GARDENFEST 2019 VOLUNTEERS

**Gardenfest 2018 was a huge success but next year we need your help**

HELP US TO SPREAD THE BEEKEEPING WORD, AND MAYBE EVEN SELL SOME HONEY AT THE SAME TIME!!!

**For more details please contact;**

**REBECCA HIGGINS - chrreb@icloud.com**

**TEL NO. 01463 861413**

Please visit our website <https://inverness-shirebeekeepers.org/>

for more exciting information and resources such as:

- The beekeepers blog
- Beekeepers library catalogue
  - Help with swarms
- Details of upcoming events and meetings
  - Helpful beekeeping hints and tips
  - Backdated issues of the Buzz

Don't forget to visit the exclusive **MEMBERS SECTION** for extra goodies!!!

### EASY FUNDRAISING SUPPORT

The Inverness-Shire Beekeepers Association needs your help!!!

If you would like to help the association financially,

PLEASE VISIT: <https://www.easyfundraising.org.uk/support-a-good-cause/step-1/?char=208763>

YOUR SUPPORT WILL GO TOWARDS:

- **NEW TRAINING EQUIPMENT – USED TO TRAIN THE NEXT GENERATION OF BEEKEEPERS**
- **APIARY IMPROVMENTS AND REPAIRS – ENSURES ALL OUR FACILITIES ARE SAFE AND PLEASURABLE PLACES**
- **CLUB ADVERTISMENT – SPREADING THE BEEKEEPING WORD**

### YOU CAN PUT AN ADVERT IN THE BUZZ!!!

Anyone wishing to advertise the sale of bees or beekeeping equipment can advertise in the Buzz.

The Buzz is distributed to every member of the Inverness Beekeeping Association.

If you are interested in filling this space with your advert contact Jed Russell via:

[jed.k.russell@googlemail.com](mailto:jed.k.russell@googlemail.com)

## The Back Page.

| Scottish Beekeepers Association Calendar |   |
|--|---|
| Date                                     | Speaker   |
| <b>2019</b>                              |   |
| March 12<br>Tuesday                      | AGM<br><i>Free Church Hall, Smithton, 7.30pm</i>  |
| April 16<br>Tuesday                      | Alan Riach<br><i>Beekeeping through the ages</i><br><i>Free Church Hall, Smithton, 7.30pm</i>                       |
| May 7<br>Tuesday                         | Toni Clark<br><i>Pollination project and Wild 25</i><br><i>A site visit to the Inverness Botanic Gardens 7.30pm</i> |

| Contact Details            |                    |  |                               |
|----------------------------|--------------------|--|-------------------------------|
| President                  | David Brown        | <a href="mailto:david@bearthadh.co.uk">david@bearthadh.co.uk</a>               | 01463 234466<br>07725 170 585 |
| Acting Chairman            | Charlie Moir       | <a href="mailto:charliemoir@btinternet.com">charliemoir@btinternet.com</a>     | 07733362577<br>01463 741618   |
| Secretary                  | Sue Mullins        | <a href="mailto:sasabac@btinternet.com">sasabac@btinternet.com</a>             | 01463 741056                  |
| Secretary                  | Helen MacLeod      | <a href="mailto:macleodhelen@gmail.com">macleodhelen@gmail.com</a>             | 01463 238074                  |
| Treasurer                  | Annelise McDougall | <a href="mailto:nairnside@aol.com">nairnside@aol.com</a>                       | 01463 793030                  |
| Membership                 | Annelise McDougall | <a href="mailto:nairnside@aol.com">nairnside@aol.com</a>                       | 01463 793030                  |
| Education                  | Moira Carstairs    | <a href="mailto:Moira.carstairs@gmail.com">Moira.carstairs@gmail.com</a>       | 01463 783834<br>07787 500 480 |
| Apiary Manager             | Des Kelly          | <a href="mailto:kellydes@aol.com">kellydes@aol.com</a>                         | 01463 237661                  |
| Equipment/<br>Ambrosia etc | Des Kelly          | <a href="mailto:kellydes@aol.com">kellydes@aol.com</a>                         | 01463 237661                  |
| Website                    | Mark Paton         | <a href="mailto:mpaton88@outlook.com">mpaton88@outlook.com</a>                 | 07477 665 605                 |
| Librarian                  | Rebecca Higgins    | <a href="mailto:chrreb@icloud.com">chrreb@icloud.com</a>                       | 01463 861413                  |
| Newsletter                 | Jed Russell        | <a href="mailto:Jed.k.russell@googlemail.com">Jed.k.russell@googlemail.com</a> | 07786 818741                  |
| Committee                  | Margaret Lashley   | <a href="mailto:inchrory@hotmail.com">inchrory@hotmail.com</a>                 | 01463 782207<br>07752 459 800 |
| Committee                  | Ken Morley         | <a href="mailto:ken@downingford.co.uk">ken@downingford.co.uk</a>               | 01463 243891<br>07884 260 736 |
| Committee                  | Neil Stewart       | <a href="mailto:Neil.st@btinternet.com">Neil.st@btinternet.com</a>             | 01667 462727<br>07899 878 010 |

|           |             |  |              |
|-----------|-------------|--|--------------|
|           |             |  |              |
| Committee | Susan Kling | <a href="mailto:susan@kvnet.co.uk">susan@kvnet.co.uk</a> | 01463 792914 |