TABLED AT HEARING
Application: Canterbury Landscape Supplies
Date: 7/3/2018

My name is Janet Madeley and I live at 71 No. 10 Road, Eyreton.

I am speaking to my written submission, in opposition to the applications from Canterbury Landscape Supplies Limited for consents to discharge contaminants to air, and into & onto land.

I am concerned on effects to the environment and the potential for future issues due to the fact these applications are to cover a period of 35 years.

It is possible that similar to these comments may have also been received in other submissions.

First - with regards to discharge of contaminants to air.

To summarise from my written submissions -
I have found when there has been odour from this site in Diversion Road it is a sulphureous, rotten-egg type smell which is very objectionable.
Concerns I have are :

- health consequences for people with asthma, sinus or lung conditions who may find their conditions aggravated due to dust and smell reactions.
- Increased number of people residing in the area now means more people affected by the smell.
- Enjoyment of outdoors is impossible when this smell is present. Planning of outdoor events is a risky situation, with no certainty that the smell will not be present.

- Consequences for bees. (and this is one of the main reasons I wished to speak today). I have received information from Apiculture New Zealand which organisation supports all aspects of the bee-keeping industry in New Zealand. A copy of their email is attached with my documents regarding this presentation. The information was reported from the Chair of their Science and Research Focus Group. I quote: Bees have the ability to detect odours as well as the best tracking dog. It is likely that offensive odours in the environment would disrupt and repel them in much the same way as any other organism with a high degree of sensitivity to smell. Also attached are 2 extracts from research in United States. The first is from Science Daily and by Liam Jackson concerning bees' ability to forage and that this decreases as air pollution increases due to odour confusing the bees. The second extract is regarding the strong sense of smell which honey bees have, and comments that honey bees use odour recognition for finding food. This is by James Kloeppel.

There are bee hives all round the countryside, although I do not know exactly how close to the Diversion Road property where Canterbury Landscape Supplies have set up their business. My understanding is that bees would generally fly up to 3 kilometres from their hive, however may fly up to 5 kilometres. It is important to consider the potential consequences for bees, of any discharge to air in the environment, if this is an objectionable odour. Bees have an important role in plant pollination and for honey production and beeswax. Many farm crops are very dependent on bee pollination at certain stages of growth eg clovers, Chinese greens, radishes. The work of bees provide both environmental and economic benefits.

While this odour is not present all the time, I feel considerable lack of confidence that it would never occur again. It appears to me that the very nature of the business - outdoors, exposed to elements of rain and wind, and the materials listed in the consent applications, as being used and also those which may be used, all have the potential of creating the same objectionable smell again in the future.

With regards to discharge of contaminants into and onto land - the composting materials are exposed to the open air. At times of rain, there is concern for leaching into soil. The rows sit on a bed of sawdust. I have doubts that this would stop the leach of contaminants into the soil over the long term, especially when there are heavy rains of which there have been a number of occasions in recent years.

The close proximity to Waimakariri River and even closer to the Eyre River diversion poses risk of contamination into the river and into the underground water flow path. The location on Diversion Road is in the Waimakariri River red zone where there are already issues regarding water quality, without taking in account effects from this composting business operating for next 35 years (if consent granted).

Other concerns I mentioned in my written submission related to roading and effects on road surfaces with increased truck movements, and fire risk. However it may be that these are not necessarily issues for this hearing, but perhaps for the Waimakariri District Council to be concerned with.

Thank you.

Janet Madeley

-------- Forwarded Message --------
Subject: Fw: Bee behavior question
Date: Wed, 25 Oct 2017 04:01:43 +0000 (UTC)
From: Sarah Madeley <sjmadeley@yahoo.co.nz>
Reply-To:sjmadeley@yahoo.co.nz <sjmadeley@yahoo.co.nz>
To: Janet Madeley <janetmadeley@xtra.co.nz>
Sent from Yahoo Mail on Android

----- Forwarded message -----
From: "Info @ ApiNZ" <info@apinz.org.nz>
To: "sjmadeley@yahoo.co.nz" <sjmadeley@yahoo.co.nz>
Cc:
Sent: Wed, 25 Oct 2017 at 17:00
Subject: RE: Bee behavior question

Hi Sarah,

Thanks for your email. I've just spoken with the Chair of our Science and Research Focus Group and he's given the answer below:

Bees have the ability to detect odors as well as the best tracking dog; it is likely that offensive odors in the environment would disrupt and repel them much the same as any other organism with a high degree of sensitivity to smell.

If you're interested, here are a few links on some recent research on the ability of bees to detect odours:

https://news.illinois.edu/blog/view/6367/206824

https://www.researchgate.net/profile/Jerry_Bromenshenk

I hope this helps. Let me know if you need further advice.

Kind regards,

Hannah Amante | Communications Coordinator | Apiculture New Zealand Inc | P: +64 4 471 6254 | www.apinz.org.nz

apiculture_horizontal_logo

ScienceDaily®
Your source for the latest research news

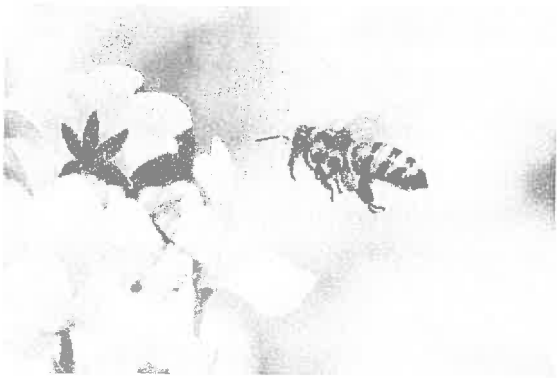
Bees' ability to forage decreases as air pollution increases

Date: July 6, 2016

Source: Penn State

Summary: Air pollutants interact with and break down plant-emitted scent molecules, which insect pollinators use to locate needed food, according to a team of researchers. The pollution-modified plant odors can confuse bees and, as a result, bees' foraging time increases and pollination efficiency decreases. This happens because the chemical interactions decrease both the scent molecules' life spans and the distances they travel.

FULL STORY



Bee and flower (stock image).

Credit: © sumikophoto / Fotolia

Air pollutants interact with and break down plant-emitted scent molecules, which insect pollinators use to locate needed food, according to a team of researchers led by Penn State. The pollution-modified plant odors can confuse bees and, as a result, bees' foraging time increases and pollination efficiency decreases. This happens because the chemical interactions decrease both the scent molecules' life spans and the distances they travel.

While foraging for food, insects detect floral scent molecules in the air. Wind currents can carry these molecules up to thousands of feet from their original source to where bees have their hives.

"Many insects have nests that are up to 3,000 feet away from their food source, which means that scents need to travel long distances before insects can detect them," said Jose D. Fuentes, professor of meteorology and atmospheric science, Penn State. "Each insect has a detection threshold for certain kinds of scents and they find food by moving from areas of low concentrations of scents to areas of high concentrations."

Plant-emitted hydrocarbons break down through chemical interactions with certain air pollutants such as ozone. This breakdown process results in the creation of more air pollutants, including hydroxyl and nitrate radicals, which further increase the breakdown rate of plant odors.

The researchers sought to understand how these chemical interactions, which start with the presence of air pollutants, would impact bees' ability to find food. They first estimated the changes in concentrations of flower scents as a result of air turbulence and chemical interactions using a computer simulation, which allowed them to track the concentration and movement of multiple plumes of scents from different flower beds over time. Then, the researchers ran 90,000 simulations representing various bees' foraging and movement patterns amid differing scent levels modified by air pollution and diluted by wind speeds.

The team reported in the current issue of *Atmospheric Environment* that, as air pollution increases, hydrocarbons' lifetime and travel distance decreases. For example, at 60 parts per billion ozone levels, which the U.S. Environmental Protection Agency considers a 'moderate' level, the researchers found that enough chemical changes took place to thoroughly confuse bees and hinder their ability to identify the plumes of floral scents they needed to locate food.

The scent molecule alpha-pinene, which survives nearly 40 hours in an ozone-free environment, survived fewer than 10 hours when ozone rose to 60 parts per billion and only 1 hour when ozone was at 120 parts per billion. Another molecule, beta-myrcene, which travels more than 3,000 feet in an ozone-free, windy environment, traveled an average of 1,500 feet when ozone was 60 parts per billion and, when ozone rose to 120 parts per billion, most traveled fewer than 1,000 feet.

The changes in air chemistry impacted the number of bees able to detect food sources in a given time frame. In an ozone-free environment, it took 10 minutes for 20 percent of foragers to find the scent molecule beta-caryophyllene. When ozone rose to only 20 parts per billion, it took 180 minutes for the same amount of bees to find the scent. The team found similar results for the six different scent molecules they analyzed.

"We found that when we confused the bees' environment by modifying the gases present in the atmosphere, they spent more time foraging and would bring back less food, which would affect their colonies," said Fuentes. "It's similar to being asked to get a cup of coffee at the nearest cafeteria while you are blindfolded. It will be hard to locate the coffee shop without using visual cues. The same could happen to insect pollinators while foraging for food in polluted air masses."

Because the concentration of scents changes drastically in air polluted environments, this could impact important interactions between plants and insects.

"There are two types of pollinators, generalists and specialists," said Fuentes. "Generalists can detect a mixture of scents, while specialists can only detect one type of scent. This means that as certain scents decrease their travel distance and life span, specialists and generalists may both have trouble finding food."

Declines in the pollination of wild plants may lead to increases in the population of plants that do not rely on pollinators, and pollinator declines would lead to decreases in crop yields, Fuentes noted.

These findings highlight that air pollution is one of many factors influencing the decline of the bee population.

According to the U.S. Department of Agriculture, managed honeybee populations in the U.S. have declined between 25 and 45 percent per year since 2010, including a 44 percent decline from 2015 to 2016.

"Honeybees and other pollinators are in trouble almost everywhere, and they pay us a lot of services through their pollination," said Fuentes. "The more we can understand about what factors are affecting their decline in numbers, the more equipped we will be to intervene if needed."

Story Source:

Materials provided by **Penn State**. Original written by Liam Jackson. *Note: Content may be edited for style and length.*

Journal Reference:

1. Jose D. Fuentes, Marcelo Chamecki, T'ai Roulston, Bicheng Chen, Kenneth R. Pratt. **Air pollutants degrade floral scents and increase insect foraging times.** *Atmospheric Environment*, 2016; DOI: 10.1016/j.atmosenv.2016.07.002

Cite This Page:

MLA APA Chicago

Penn State. "Bees' ability to forage decreases as air pollution increases." ScienceDaily. ScienceDaily, 6 July 2016. <www.sciencedaily.com/releases/2016/07/160706131924.htm>.

RELATED STORIES

'Bee' Informed: Public Interest Exceeds Understanding in Bee Conservation
Sep. 5, 2017 — Many people have heard bee populations are declining due to such threats as colony collapse disorder, pesticides and habitat loss. And many understand bees are critical to plant pollination. Yet, ... **read more »**


Bumble Bees Make a Beeline for Larger Flowers

June 29, 2017 — Bumble bees create foraging routes by using their experience to select nectar-rich, high-rewarding flowers. A study now suggests that bees actually forage more efficiently when flower sizes are large ... **read more »**


Managed Bees Spread and Intensify Diseases in Wild Bees

Nov. 5, 2015 — Wild pollinators are in decline across many parts of the world. To combat this, managed honey bees and bumblebees are frequently shipped in to provide valuable pollination services to crops. But does ... **read more »**


Foul Exhaust Fumes Derail Dinner for Hungry Moths

June 26, 2014 — In new research on how pollinators find flowers when background odors are strong, researchers have found that both natural plant odors and human sources of pollution can conceal the scent of ... **read more »**

Honey bee chemoreceptors found for smell and taste

OCT 25, 2006 9:00 AM BY JAMES E. KLOEPPEL | 217-333-1085

blog posts

CHAMPAIGN, Ill. - Honey bees have a much better sense of smell than fruit flies or mosquitoes, but a much worse sense of taste, according to researchers at the University of Illinois at Urbana-Champaign.

Hugh Robertson, professor of entomology and an affiliate of the university's Institute for Genomic Biology, has studied the honey bee's chemoreceptors for smell and taste.

Photo by L. Brian Stauffer

"The recently completed honey bee genome reveals a remarkable expansion of the insect odorant receptor family compared with those found in fruit flies or mosquitoes," said Hugh M. Robertson, a professor of entomology and an affiliate of the university's Institute for Genomic Biology. "The bee genome also reveals far fewer gustatory receptors - those used for the sense of taste - than we had anticipated."

In work funded by the National Institutes of Health and reported in the Oct. 26 issue of the journal Genome Research, Robertson and postdoctoral research associate Kevin W. Wanner identified the family of honey bee chemoreceptors that deals with smell and taste.

Honey bees (Apis mellifera) have 170 odorant receptors, the researchers found, compared with 62 in fruit flies (Drosophila melanogaster) and 79 in mosquitoes (Anopheles gambiae).

The enhanced number of odorant receptors underlies the honey bee's remarkable olfactory abilities, including perception of pheromones, kin recognition signals, and social communication within the hive.

Honey bees also use odor recognition for finding food. "Foraging worker bees might encounter a bewildering number of flowers to choose from, but they can discriminate between them using subtle olfactory cues," Robertson said. "A large number of odorant receptors allows the bees to find food and communicate its location to other bees."

In striking contrast, the researchers found only 10 gustatory receptors in A. mellifera, compared with 68 in D. melanogaster and 76 in A. gambiae.

The low number of gustatory receptors for the sense of taste was unexpected, Robertson said, but can be explained.

"Honey bees have a beneficial, non-antagonistic relationship with plants, so plants don't have to defend themselves with toxins," Robertson said.

"And in the nurturing environment of the hive, bee larvae are provisioned by adults with food that is pretty much free of toxins. Since the bees don't have to detect toxins, they don't need many gustatory receptors."

While honey bees don't need many taste buds, they do require an excellent sense of smell to detect chemical signals, such as pheromones, that control bee behavior inside and outside the hive.

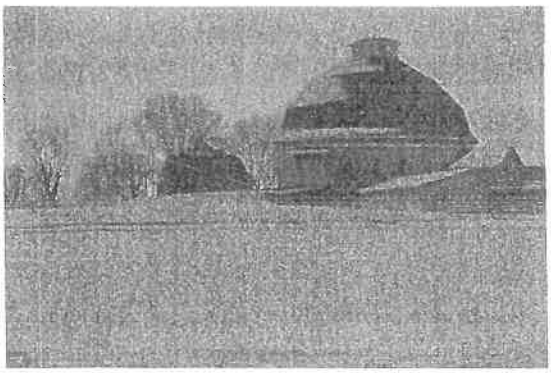
For example, the sole task of male drone bees is to mate with virgin queen bees, and the male's antennae are specifically designed for the detection of queen pheromone.

"We have identified several honey bee odorant receptors that are abundantly expressed in male antennae," Robertson said. "This moves us an important step closer to understanding the molecular details of how bees, and insects in general, smell."

Editor's note: To reach Hugh Robertson, call 217-333-0489; e-mail: hughrobe@uiuc.edu.

additional blog information

Read Next



Illinois soil temperatures warmer than normal this winter

Krannert Art Museum publishes catalogue of Swahili art in conjunction with exhibition