OP-233 [Beekeeping Technology and Quality]

An AI chatbot as a dependable and trustworthy beekeeping advisor: present-day reality or still wishful thinking?

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Recent development in widely accessible and ready-to-use AI chatbots from various companies has provided exciting new tools for information gathering, as the complexity level of the AI-generated answers is high and the interaction mode allows follow-up questions. Especially in countries with no or few beekeeping advisors, such chatbots could provide beekeepers with advice tailored to their needs and regional conditions. However, the quality of such AI-generated answers is greatly debated, and it is questionable whether they could adequately replace advice from human experts. Thus, the COLOSS core group B-RAP tested a well-known chatbot (ChatGPT; several versions) by asking two practically relevant beekeeping questions and rated the ChatGPT-given answers for correctness and usability. The rating committee (=author list) comprised beekeeping researchers, beekeeping advisors and veterinarians, most with practical beekeeping experience. Each question defined an acute problem in beekeeping for a specific geographical location and asked how to address the problem (American foulbrood in Norway, and problems with the queen excluder in Germany). All rated chatbot answers gave a broad overview of possible solutions to the presented problem, similar to the quality found in general beekeeping books. However, ChatGPT's answers consistently contained misleading information. Answers were either entirely incorrect or lacked crucially important details. Following the misleading advice would result in visibly negative results, such as (1) decreasing the probability of colony survival, (2) leading to the spread of notifiable diseases (including conflict with local law), or (3) decreasing honey quality. Furthermore, a considerable amount of information was useless for the given case, containing general advice for how to increase bee health or suggesting preventive measures of no use in the given acute situations. The results show impressively that the use of chatbots of their current quality must be critically questioned for beekeeping advice, especially when used by inexperienced beekeepers and in legally-relevant situations (e.g. notifiable diseases). To fulfil their desired potential as easy-to-access dependable advisory tools, serious improvements are necessary. For example, chatbots need to be trained with high-quality information sources that are also sensitive to the local context of beekeeping techniques and legal requirements.

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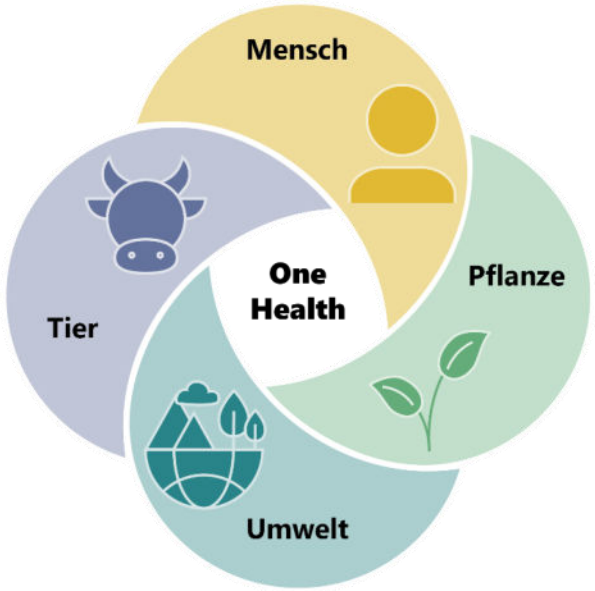

Linde Morawetz

COLOSS CG B-RAP; AGES – Dept. for Bee Protection and Apiculture

Your experience with Chatbots

Your answer is 'Yes'? Please raise your hand!

Did you every ask a Chatbot questions about beekeeping?

Did you find any major mistakes in the Chatbot's answer(s)?

Would you suggest to a (fellow) beekeeper to use a Chatbot in case of beekeeping problems?

AI-Discussion during B-RAP workshop

Olomouc (Czech Republic), February 2024

A panel of honeybee researchers, beekeeping advisors and veterinarians

Linde Morawetz, Lotta Fabricius Kristiansen, Jan Brus , Robert Chlebo, Bjørn Dahle, Jiří Danihlík, Ana Diéguez-Antón, Johann Fischer, Kristina Gratzer, Alison Gray, Ewa Mazur, Hannes Oberreiter, Georg Schaunitzer, Dirk Louis P. Schorkopf and Robert Brodschneider

Putting AI to the test

Rating procedure

1. Deciding together for a question
   - Has to be a question, which a beekeeper may ask
   - No detailed promting (‘realistic scenario’)
2. Asking ChatGPT3.5 the selected question
3. Rating ChatGPT’s answers into four different categories
   - **C – correct and valuable information**
   - **U – correct, but useless information**
   - **M – correct, but important details are missing**
   - **I – incorrect information**
4. Providing detailed comments about rating

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Question: What are the symptoms of American Foulbrood?

ChatGPT3.5 Output	Experts' rating	Experts' comments
American foulbrood (AFB) is a highly contagious and destructive bacterial disease that affects honeybee larvae. Some Symptoms of American foulbrood include:	C	
Discolored Larvae: Infected larvae may appear darkened or discolored, often turning from pearly white to brown or black as they decay.	C	
Ropy or Sticky Texture: Infected larvae may exhibit a "ropy" or sticky texture. When a toothpick is inserted into the decaying larvae, it often stretches out in a characteristic manner due to its stickiness.	C	
Foul Odor: A distinctive foul odor resembling that of rotting meat or sour, fermenting odor may be present around the affected hive.	C	better: in the affected hive
Sunken Cappings: The cappings of infected brood cells may appear sunken or punctured, often indicating the larvae within have died and decomposed.	C	addition: cappings appear most and darkened
Spotty Brood Pattern: Infected colonies typically exhibit a spotty brood pattern, with irregular or patchy distribution of healthy and infected brood cells.	M	spotty brood pattern only seen in severely infected colonies, single standalone capped cells are missing as symptom
Weak or Dying Colonies: Colonies affected by AFB may weaken over time, with reduced population numbers, decreased foraging activity, and ultimately, colony death if left untreated.	U	
Presence of Scale: In advanced stages, the remains of infected larvae may dry out and form hard, scale-like structures at the bottom of brood cells.	M	Scales are not removable (differentiation to scales of European foulbrood and Sacbrood)
If you suspect American foulbrood in your honeybee colonies, it's crucial to consult with a qualified beekeeping expert or apiarist for accurate diagnosis and appropriate treatment options. AFB is a serious threat to bee colonies and can spread rapidly if not managed effectively.	C	

Rating ChatGPT's answers

Question: What are the symptoms of American Foulbrood?

ChatGPT Answer Paragraph Nr	Experts' rating
1	Correct
2	Correct
3	Correct
4	Correct
5	Correct
6	Missing information
7	Useless
8	Missing information
9	Correct

Question: What measures should be implemented in a beekeeping operation in Norway affected by American foulbrood?

ChatGPT Answer Paragraph Nr	Experts' rating
1	Correct
2	Incorrect
3	Useless
4	Useless
5	Missing information
6	Incorrect
7	Incorrect
8	Useless
9	Useless
10	Useless + Incorrect
11	Missing information
12	Correct

Examples for ChatGPT answers

...and our ratings!

Question: What measures should be implemented in a beekeeping operation in Norway affected by American foulbrood?

In some cases, antibiotics may be used to treat AFB-infected hives.

ChatGPT3.5

Examples for ChatGPT answers

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Question: What measures should be implemented in a beekeeping operation in Norway affected by American foulbrood?

Incorrect

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ChatGPT3.5

Provide education and training for beekeepers on AFB prevention, detection, and management.

Examples for ChatGPT answers

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Useless

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Provide education and training for beekeepers on AFB prevention, detection, and management.

Promptly and safely destroy any equipment or comb, that shows signs of AFB.

Examples for ChatGPT answers

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ChatGPT3.5

Incorrect

In some cases, antibiotics may be used to treat AFB-infected hives.

Useless

Provide education and training for beekeepers on AFB prevention, detection, and management.

Missing Info

Promptly and safely destroy any equipment or comb, that shows signs of AFB.

At the moment, ChatGPT...

- ...is a good teacher for standard beekeeping knowledge.
  - E.g. for information at beginner's level
  - No harm done, if there is 'information clutter'

- ...should be avoided, when colony health is in acute danger
  - Risk of ill-advised or confused beekeepers
  - Risk of colony death and legal problems
  - Risk of spreading diseases to other colonies/apiaries

Our advise: Be careful and think for yourself

Our vision of an AI beekeeping advisor

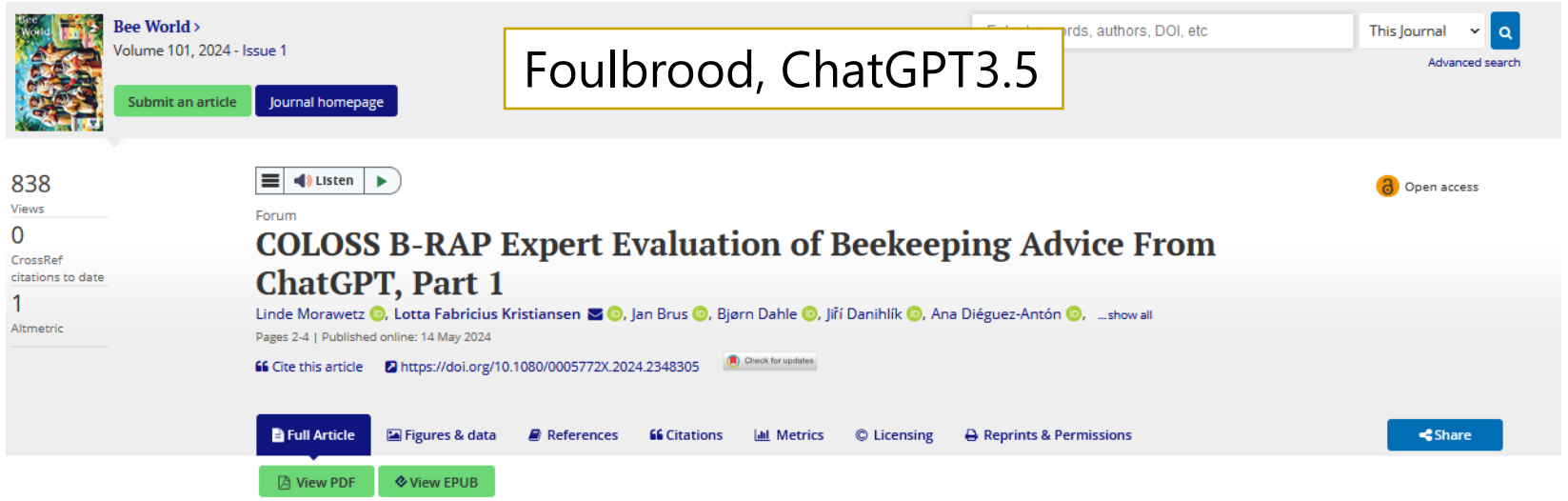
- ...gives answers adapted to region and season.
- ...focuses on the important aspects of the problem.
- ...uses only scientifically sound and high quality sources.
- ...adapts answer to beekeeper's skill and needs.
- ...asks necessary follow-up questions.

- .... anything missing?

AI-generated image created with Bing Image (nov 2024) by L Fabricius Kristiansen

More details in…

Foulbrood, ChatGPT3.5



Queen excluder, various versions of ChatGPT

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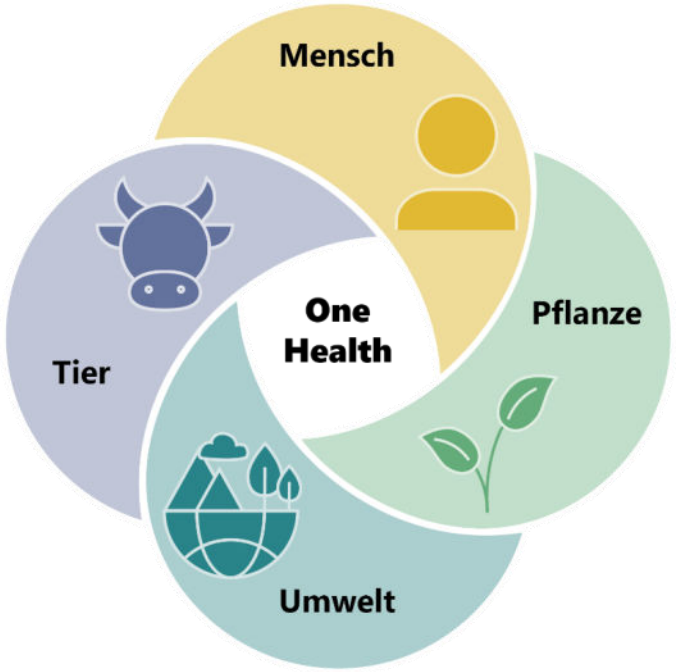

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