



Bat die-off linked to increased insecticide use and infant mortality

Description

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A little brown bat (*Myotis lucifugus*) with white-nose syndrome, which has ravaged bat populations across the US

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The diminution of bat populations in the United States as a consequence of the proliferation of a fungal ailment has resulted in decreased incomes for farmers and an additional 1300 fatalities in infants under the age of one, a recent study has revealed.

In regions afflicted by the bat disease, farmers augmented their utilization of insecticides by 31 percent to offset the decrease in insect predation by bats, as discovered by [Eyal Frank](#) at the University of Chicago in Illinois. Frank estimates that between 2006 and 2017, farmers in impacted areas incurred a \$27 billion loss due to reduced crop sales and elevated insecticide expenses.

Additionally, in the affected regions, there was an 8 percent surge in the number of infant mortalities before the age of one, which Frank attributes to the heightened use of insecticides. "Insecticides are inherently toxic," he remarks. "Even when employed at prescribed levels, there seems to be a health toll."

White-nose syndrome, which was first observed in 2006 in hibernating bats with a white fungal growth on their muzzles in a cave in New York state, has been propagating throughout North America, resulting in the demise of myriad bats.

Upon learning about white-nose syndrome, Frank recognized it as an opportunity to directly evaluate the advantages that bats confer upon farmers. "This serves as a rather exemplary approximation for an ideal experiment where populations are arbitrarily manipulated," he explicates.

Through the utilization of data from agricultural censuses, Frank compared counties where white-nose syndrome had been identified with those where it had not yet manifested until 2017 – ceasing at that point due to the periodic release of census data.

In the stricken counties, insecticide usage surged annually subsequent to the detection of the disease, while remaining relatively stable in unaffected areas.

It is noteworthy that white-nose syndrome impacts solely 11 of the approximately 50 bat species in the U.S. and has exterminated around 70 percent of those species, on average, in afflicted regions, underscoring that the overall value of bats to farmers in the U.S. considerably surpasses the figures Frank has tabulated.

Subsequently, Frank delved into data regarding infant mortality, excluding fatalities stemming from accidents and homicides. The 8 percent escalation in afflicted counties would have culminated in an additional 1300 infant deaths by 2017, according to his calculations.

Frank posits that his findings transcend mere correlation, illustrating that the die-off of bats precipitates both heightened insecticide utilization and increased infant mortality. He contends that the most compelling aspect is the parallel trajectory observed in counties upon the arrival of the disease, irrespective of the year of its onset.

Nonetheless, the precise mechanism through which heightened insecticide utilization translates into increased infant mortality remains nebulous. "I am unable to provide insights into the direct exposure

mechanism; my findings only suggest that the notion of exposure via food is untenable," states Frank.

Therefore, inhalation of insecticides or consumption of contaminated water sources emerges as the most plausible routes of exposure.

"Frank persuasively demonstrates that in counties affected by white-nose syndrome, there is a surge in insecticide utilization compared to unaffected counties," asserts [Roel Vermeulen](#) at Utrecht University in the Netherlands.

Vermeulen, however, posits that the financial repercussions could engender heightened stress in agricultural communities, which might also contribute to escalated infant mortality. "Hence, it remains debatable whether the observed effects on infant mortality can be solely ascribed to heightened insecticide use," he contends.

"This study underscores the capacity of bats to safeguard human lives simply by fulfilling their natural role of consuming insects," remarks [Jennifer Raynor](#) at the University of Wisconsin-Madison.

Raynor further emphasizes the importance of diverse wildlife for human health and well-being, underscoring that technological advancements cannot invariably supplant these benefits post their loss.

Vermeulen believes the study advocates for a broader perspective on human health, asserting the necessity to transition from a human-centric health impact evaluation, solely considering the direct impacts of pollution on human health, to a planetary health impact assessment.

Topics:

Vocabulary List:

1. **Diminution** /dɪmə'nu:ʃən/ (noun): The reduction or lessening of something.
2. **Proliferation** /prə'lifə'reiʃən/ (noun): Rapid increase in numbers.
3. **Augmented** /ɔ:g'məntɪd/ (verb): Made greater in size or value.
4. **Inherent** /ɪn'hərənt/ (adjective): Existing as a permanent essential or characteristic attribute.
5. **Nebulous** /'neb.jʊ.ləs/ (adjective): In the form of a cloud or haze; unclear vague or ill-defined.
6. **Escalation** /'eskə'leɪʃən/ (noun): An increase in the intensity or seriousness of something.

Comprehension Questions

Multiple Choice

1. What has caused the diminution of bat populations in the United States?

- Option: Proliferation of a fungal ailment
- Option: Over-hunting by humans
- Option: Climate change
- Option: Habitat loss

2. Who discovered that farmers in impacted areas incurred a \$27 billion loss due to reduced crop sales and elevated insecticide expenses?

- Option: Eyal Frank
- Option: Roel Vermeulen
- Option: Jennifer Raynor
- Option: Unknown researcher

3. How much did farmers increase their utilization of insecticides in regions afflicted by the bat disease to offset the decrease in insect predation by bats?

- Option: 31%
- Option: 15%
- Option: 50%
- Option: 10%

4. In which year was white-nose syndrome first observed in hibernating bats with a white fungal growth on their muzzles?

- Option: 2006
- Option: 2010
- Option: 2015
- Option: 2000

5. What did Frank recognize white-nose syndrome as an opportunity for?

- Option: Evaluating the advantages that bats confer upon farmers
- Option: Researching new insecticides
- Option: Developing a cure for white-nose syndrome
- Option: Creating artificial bat habitats

6. What mechanism does Frank suggest as the most plausible route of exposure to heightened insecticide utilization?

- Option: Inhalation of insecticides or consumption of contaminated water sources
- Option: Direct exposure via food

Option: Physical touch with contaminated surfaces

Option: Ingestion of contaminated soil

Answer

Multiple Choice: 1. Proliferation of a fungal ailment 2. Eyal Frank 3. 31% 4. 2006 5. Evaluating the advantages that bats confer upon farmers 6. Inhalation of insecticides or consumption of contaminated water sources

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What term is used to describe the outer limit of knowledge or achievement in a particular area?

- Option: A) Boundary
- Option: B) Challenge
- Option: C) Frontier
- Option: D) Venture

2. What does the word "peril" generally mean?

- Option: A) Safety
- Option: B) Comfort
- Option: C) Threat
- Option: D) Joy

3. Which of the following best defines the term "designation"?

- Option: A) Removal
- Option: B) Appointment
- Option: C) Rejection
- Option: D) Isolation

4. What are "anomalies" in a system or process?

- Option: A) Errors
- Option: B) Improvements
- Option: C) Regularities
- Option: D) Anomalies

5. What term refers to the ability to be maintained at a certain rate or level?

- Option: A) Growth
- Option: B) Sustainability

Option: C) Depletion

Option: D) Expansion

6. What does "collaboration" entail in a working environment?

Option: A) Competition

Option: B) Isolation

Option: C) Cooperation

Option: D) Disturbance

7. Which term describes the process of increasing the population density in urban areas?

Option: A) Ruralization

Option: B) Urbanization

Option: C) Migration

Option: D) Suburbanization

8. What does "augmentation" usually involve?

Option: A) Reduction

Option: B) Growth

Option: C) Maintenance

Option: D) Stability

9. What is typically associated with the term "opposition"?

Option: A) Support

Option: B) Agreement

Option: C) Resistance

Option: D) Authorization

10. What relates to the organic processes or functions in living organisms?

Option: A) Biological

Option: B) Chemical

Option: C) Physical

Option: D) Physiological

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. The project needs to be assessed for its _____ before proceeding with further

investments.

12. The factory will be expanded to increase its production _____.

13. The authorities _____ the illegal drugs hidden in the container.
14. Access to the sensitive information was blocked for _____ users.
15. The recent policy changes have led to a _____ in customer satisfaction.
16. The dangers of the job are _____ and cannot be eliminated completely.
17. The lost data was of critical importance and its _____ poses a significant challenge.
18. The forecast predicts heavy _____ in the region over the next few days.
19. The repeated delays caused a sense of _____ among the passengers waiting for their flight.
20. The new software includes improved security _____ to prevent unauthorized access.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

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| 21. Astronauts often perform activities outside their spacecraft during missions. |
| 22. Understanding the historical of events is crucial for accurate analysis. |
| 23. Adequate is essential for the smooth functioning of any modern society. |
| 24. Constructive can help individuals and organizations improve their performance. |
| 25. Law enforcement agencies are working to apprehend the of the crime. |
| 26. The global economy is made up of markets and industries. |
| 27. The team their capabilities by leveraging new technologies. |
| 28. The risks associated with the project are in its nature. |
| 29. The concept was still and required further clarification. |
| 30. Customs officials the smuggled goods at the border. |

Answer

Multiple Choice: 1. C) Frontier 2. C) Threat 3. B) Appointment 4. A) Errors 5. B) Sustainability 6. C) Cooperation 7. B) Urbanization 8. B) Growth 9. C) Resistance 10. D) Physiological

Gap-Fill: 11. viability 12. capacity 13. seized 14. unauthorized 15. diminution 16. inherent 17. irretrievability 18. precipitation 19. frustration 20. mechanisms

Matching sentence: 1. Extravehicular 2. Significance 3. Infrastructure 4. Criticism 5. Perpetrators 6. Interconnected 7. Augmented 8. Inherent 9. Nebulous 10. Seized

CATEGORY

1. Sci/Tech - LEVEL6

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