



# Research Discovers: Cicadas Expel Urine in Streams, not Droplets – An Unusual Phenomenon Explained

## Description

The intriguing physiological characteristics of cicadas have recently been the focus of a [novel research study](#) published in the eminent Proceedings of the National Academy of Sciences. Albeit minute in size, cicadas are renowned for their prodigious appetite and frequent urination habits, distinguishing them from the majority of their insect counterparts. Characteristically, this class of insects opts for energy-saving droplets of urine rather than potent jets. Adult cicadas have even been observed using their anal jets as defensive tactics against intruders, a fact that's bound to haunt us as we approach the anticipated 'double brood' cicada season this spring.

While the scientific realm has ardently inspected the fluid dynamics of ingesting in insects, the case is quite contrary when it comes to scrutinizing their waste elimination process. This is according to Saad Bhamla, an esteemed member of Georgia Tech's faculty, who ironically, points out that even the eminent Leonardo da Vinci was captivated by the behaviour of jets and the part played by fluid cohesion in the formation of droplets. Bhamla maintains that the elimination of waste is crucial to the regulation of any creature's ecological and metabolic activities. Predictably, his research ventures have been dedicated to bridging this knowledge gap and challenging the old-fashioned, mammal-centered paradigms that presumably govern waste elimination in various species.

Previously, Bhamla's team engaged in a comprehensive exploration of urination in the glassy-winged sharpshooters. These exotically named insects indulge in copious ingestion of water by piercing the xylem of plants (a specialised tissue transporting water from roots to stems and leaves) and feeding on the sap. The resulting frequency of urination is extraordinary, with sharpshooters expelling up to 300 times their body weight in urine daily. Defying conventional rules, they create droplets of urine at their anus and propel these away from their bodies at phenomenal speeds, achieving accelerations faster than a Lamborghini.

This exceptional strategy, termed 'superpropulsion', was discovered to be a remarkable energy conservation mechanism. The investigators associated the sharpshooter's activity with a diver launching from a high-dive board. Their theoretical models indicate that this method consumes up to four to eight times less energy than continuously producing a urine stream. From an ecological standpoint, this impressive distance also reduces the risk of predators discovering them through chemical detection.

Notably, the sharpshooter isn't a solitary example of insects adopting unique excretion strategies; the animal kingdom is replete with similar examples. Resilient 'frass-shooters', 'butt-flickers', and 'turd-hurlers' - such as skipper larvae with anal plate latches that expel solid pellets by increasing their blood pressure, and certain noctuid moths that kick pellets away using their thoracic legs - counter their predators with these dramatic actions. Nevertheless, the exclusive study of the glassy-winged sharpshooter marked the first-ever observation of superpropulsion in a living organism.

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## Vocabulary List:

1. **Physiological** // (adjective): Relating to the normal functions of living organisms.
2. **Intriguing** // (adjective): Arousing curiosity or interest.
3. **Prodigious** // (adjective): Remarkably great in extent size or degree.
4. **Anticipated** // (adjective): Regarded as about to happen or exist.
5. **Ecological** // (adjective): Related to the relationships between living organisms and their physical environment.
6. **Metabolic** // (adjective): Relating to metabolism the chemical processes within living organisms.

## Vocabulary quizzes

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

1. What term refers to the origin or beginning of something?

Option: Quintessential

Option: Genesis

Option: Prodigious

Option: Antediluvian



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2. Which word means the quality of being powerfully and mysteriously attractive?
- Option: Quintessential
  - Option: Metabolic
  - Option: Devastated
  - Option: Allure
3. Which term describes actions that are wicked or criminal?
- Option: Promulgated
  - Option: Nefarious
  - Option: Infusion
  - Option: Surreptitious
4. Which word means extremely large or great?
- Option: Physiological
  - Option: Colossal
  - Option: Quintessential
  - Option: Ecological
5. What term is related to the branch of biology that deals with the relations of organisms to one another and to their physical surroundings?
- Option: Anticipated
  - Option: Ensare
  - Option: Covertly
  - Option: Ecological
6. What type of software is specifically designed to disrupt damage or gain unauthorized access to a computer system?
- Option: Anticipates
  - Option: Colossal
  - Option: Quintessential
  - Option: Malware
7. Which term refers to the normal functions of living organisms and their parts?
- Option: Quintessential
  - Option: Physiological
  - Option: Malware
  - Option: Prodigious
8. Which word means kept secret especially because it would not be approved of?
- Option: Quintessential
  - Option: Surreptitious
  - Option: Malware



Option: Devastated

9. Which term means to promote or make widely known?

Option: Promulgated

Option: Antediluvian

Option: Genesis

Option: Allure

10. What term means destroyed or ruined?

Option: Devastated

Option: Scrutinize

Option: Revered

Option: Quintessential

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

11. \_\_\_\_\_ farming emphasizes sustainable practices and natural methods.

12. The \_\_\_\_\_ of new technology into the company's operations improved efficiency.

13. Fans \_\_\_\_\_ the release of the new album from their favorite band.

14. The little black dress is considered the \_\_\_\_\_ of style and elegance.

15. The message was so \_\_\_\_\_ that it took hours to decipher its meaning.

16. There was something \_\_\_\_\_ about the old house that made people uneasy.

17. The doctor explained the patient's \_\_\_\_\_ rate and how it affected their weight loss.

18. The young artist showed \_\_\_\_\_ talent beyond her years.

19. The cunning villain plotted to \_\_\_\_\_ the hero in a trap.

20. The spies operated \_\_\_\_\_ to gather intelligence without being detected.

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

21. The detective needed to carefully examine the evidence to solve the case.

22. The ancient monument was deeply respected and honored by the locals.



23. The photograph perfectly captures the essence of the joyful moment.
24. The actor made his first appearance on the stage in the famous play.
25. The national flag is symbolic and representative of the country.
26. The mystery novel had a plot full of twists and turns that kept readers engaged.
27. The magician performed an extraordinary trick that amazed the audience.
28. The highly awaited movie generated excitement among fans before its release.
29. The explorer discovered ancient artifacts from a civilization that existed before the great flood.
30. Users should be cautious of malicious software that can harm their computers.

## Answer

**Multiple Choice:** 1. Genesis 2. Allure 3. Nefarious 4. Colossal 5. Ecological 6. Malware 7. Physiological  
8. Surreptitious 9. Promulgated 10. Devastated

**Gap-Fill:** 11. Organic 12. Infusion 13. Anticipated 14. Quintessential 15. Cryptic 16. Peculiar 17. Metabolic  
18. Prodigious 19. Ensnare 20. Covertly

**Matching sentence:** 1. scrutinize 2. revered 3. encapsulates 4. debut 5. emblematic 6. intriguing 7. prodigious  
8. anticipated 9. antediluvian 10. malware

## CATEGORY

1. Sci/Tech - LEVEL5

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