

## 1. 3[A] – Honey Bees and CCD

2. Honeybees are best own for their honey, but their most important role is actually  
 3. in the pollination of more than 90 types of agricultural crops. It is estimated that  
 4. honeybees contribute to the production of a staggering \$14.6 billion worth of  
 5. crops annually in the United States alone. In fact, many professional beekeepers  
 6. make most of their income by renting their hives to orchards and farms during  
 7. pollination season. Since 2005, however, a mysterious syndrome called colony  
 8. collapse disorder (CCD) has had a profound effect on North American honeybee  
 9. colonies. CCD devastates previously flourishing colonies, leaving just the queen  
 10. and a few young as all the adult worker bees fly away from the hive and die. The  
 11. bees that remain are typically found to be weakened by disease, suggesting their  
 12. immune systems have been compromised. CCD has already reduced the number  
 13. of honeybee colonies in the United States by as much as 40 percent. Should the  
 14. colonies be affected even more severely, crop yields would be hit hard as the

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24. A team lead by University of Montana researcher Jerry Bromenshenk, however, believes it has finally put the mystery to rest. Using a technique known as mass spectrometry, in which samples of materials can be separated into their molecular components, the team analyzed honeybees from hives that had fallen victim to CCD in different locations across North America. In all the affected bees, they found proteins belonging to two particular pathogens: *Nosema ceranae*, a single-celled fungus, and invertebrate iridescent virus (IIV), a virus never before found in North America. When honeybees from hives in Australia—where CCD has yet to occur—and from CCD-free hives in the state of Montana were analyzed, neither *Nosema ceranae* proteins nor IIV proteins were discovered. Subsequent laboratory tests showed that each pathogen in isolation is not deadly but that a combination of the two results in certain death for most honeybees. The way the two pathogens interact to trigger CCD is still unknown.

25. “They’re cofactors, that’s all we can say at the moment,” admits Bromenshenk.

Further Questions & Sample Answers



26.4) What is mass spectrometry?

27. *Mass spectrometry is a technique in which samples of materials can be separated into their molecular components.*

29.5) What are the two pathogens that Bromenshenk believes are responsible for CCD?

31. *He believes that Nosema ceranae, a single-celled fungus, and invertebrate iridescent virus (IIV),*

32. *a virus never before found in North America, are responsible.*

34. Bromenshenk's findings have been questioned, however.

35. Dr. James Frazier, an entomologist and Penn State University, believes Bromenshenk has been too quick to discount the role of pesticides.

36. Frazier says research in Europe has proven that contamination by certain pesticides makes hives susceptible to CCD.

37. He also notes that Bromenshenk runs a company that develops equipment for

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45. *The company that funded Bromenshenk has been implicated in honeybee deaths in Europe*

46. *and wants to create evidence that they are not to blame for CCD.*

47. \*Choose the correct answer from these choices.

48. (32) What does the author of the passage say about the future implications of CCD?

49.1. If CCD continued to spread, honey could cease to be the primary source of income for beekeepers as most consumers could no longer afford it.

50.2. Disease carried by infected honeybees will contaminate orchards and farms, affecting the quality of produce and causing massive food shortages.

51.3. A further reduction in the number of honeybees available for crop pollination would have a major impact on the food supply.

52.4. Even if CCD were to vanish, the fact that it has already reduced the number of honeybee colonies by 40 percent means many crop yields will fail to recover.

53. **(33)** Which statement best summarizes the findings of Bromenshenk's team?

54. 1. Although the mass death of honeybees involves many factors, colonies are more vulnerable to CCD where cell-phone radiation is strong.

55. 2. Two different pathogens that individually are not fatal for honeybees somehow cause CCD when both are present in honeybees.

56. 3. CCD causes honeybees to lose the ability to breakdown and absorb proteins from their food, which is what weakens and eventually kills them.

57. 4. Honeybees taken from supposedly CCD-free Australian hives were suffering from a similar syndrome, albeit a nondeadly one.

58. **(32)** James Frazier is critical of the study led by Bromenshenk in part because

59. 1. it focused on the effects of agricultural chemicals on honeybees while ignoring other possible causes of CCD suggested by European research.

60. 2. the effects of recent changes in laws governing the importation and use of foreign pesticides in North America were not taken into account.

61. 3. Bromenshenk has ties to companies that stand to gain an advantage if CCD

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70. *Mass spectrometry is a technique in which samples of materials can be separated into their molecular components.*

71. **5)** What are the two pathogens that Bromenshenk believes are responsible for CCD?

72. *He believes that Nosema cernae, a single-celled fungus, and invertebrate iridescent virus (IIV), a virus never before found in North America, are responsible.*

73. **6)** What does Dr. Frazier feel Bromenshenk has been too quick to dismiss?

74. *He feels that Bromenshenk has been too quick to dismiss the role of pesticides.*

75. **7)** What does Bromenshenk's company develop?

76. *He develops equipment for detecting disease-causing pathogens in bees.*

77. **8)** Why would Dr. Frazier feel that the funding Bromenshenk received from a pesticide company be a conflict of interest?

78. *The company that funded Bromenshenk has been implicated in honeybee deaths in Europe and wants to create evidence that they are not to blame for CCD.*



79. Honeybees are best own for their honey, but their most important role is actually in the <sup>授粉 (じゅふん)</sup> pollination of more than 90 types of <sup>農作物 (のうさくもつ)</sup> agricultural crops.
80. It is estimated that honeybees contribute to the production of a <sup>驚 (おどろ) くほどの</sup> staggering \$14.6 billion worth of crops <sup>年間 (ねんかん) で</sup> annually in the United States alone.
81. In fact, many professional <sup>養蜂家 (ようほうか)</sup> beekeepers make most of their income by <sup>貸 (か) すこと</sup> renting their <sup>みつばちの巣箱 (すばこ)</sup> hives to <sup>果樹園 (かじゅえん)</sup> orchards and farms during pollination season.
82. Since 2005, however, a mysterious <sup>症候群 (しょうこうぐん)</sup> syndrome called <sup>蜂群崩壊症候群 (ほうぐんほうかいしょうこうぐん)</sup> colony collapse disorder (CCD) has had a <sup>重大 (じゅうだい) な</sup> profound effect on North American honeybee colonies. CCD <sup>荒 (あ) らす</sup> devastates <sup>これまで</sup> previously <sup>繁茂 (はんも) している</sup> flourishing colonies,

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*The most important role of honeybees is the pollination of more than 90 types of agricultural crops.*

88.2) How much do honeybees contribute to the production of crops?

89. <sup>みつばちは、</sup> <sup>農作物 (のうさくもつ) の生産 (せいさん) に</sup> <sup>いくらか</sup> <sup>くらい</sup> <sup>貢献 (こうけん) していますか。</sup>

*Honeybees contribute to the production of \$14.6 billion worth of crops annually.*

90.3) What does CCD do to a bee colony? CCD <sup>は</sup> <sup>はちの群れ (むれ) に</sup> <sup>対 (たい) して</sup> <sup>どんな</sup> <sup>こと</sup> <sup>を</sup> <sup>し</sup> <sup>ま</sup> <sup>す</sup> <sup>か。</sup>

91. *It devastates a previously flourishing colony, leaving just the queen and a few young.*

92. A <sup>無数 (むすう) の</sup> myriad of factors, including <sup>農薬 (のうやく)</sup> pesticides, climate change, and even <sup>携帯電話 (けいたいでんわ)</sup> cell-phone <sup>放射線 (ほうしゃせん)</sup> radiation have been investigated <sup>調査 (ちょうさ) された</sup> in attempts to determine <sup>～するために</sup> the cause of CCD.

93. A team lead by <sup>モンタナ大学 (だいがく)</sup> University of Montana <sup>研究員 (けんきゅういん)</sup> researcher Jerry Bromenshenk, however, believes it has finally <sup>(put~to rest で) ~を解決 (かいけつ) する</sup> put the mystery to rest.

94. Using a technique known as mass spectrometry, in which samples of materials can be separated into their molecular components, the team analyzed honeybees from hives that had fallen victim to CCD in different locations across North America.

分子成分 (ぶんしせいぶん)

分析 (ぶんせき) した

~の犠牲 (ぎせい) になった

95. In all the affected bees, they found proteins belonging to two particular pathogens : Nosema ceranae, a single-celled fungus, and invertebrate iridescent virus (IIV), a virus never before found in North America.

たんぱく質 (しつ)

病原体 (びょうげんたい)

ノゼマ原虫 (げんちゅう)

単細胞 (たんさいぼう) の 菌 (きん)

無脊椎動物虹色 (むせきついでうぶつにじいろ) ウイルス

96. When honeybees from hives in Australia—where CCD has yet to occur—and from CCD-free hives in the state of Montana were analyzed, neither Nosema ceranae proteins nor IIV proteins were discovered.

CCDにかかっていない

その後 (ご) の

研究所 (けんきゅうしょ)

単独 (たんどく) で

97. Subsequent laboratory tests showed that each pathogen in isolation is not deadly but that a combination of the two results in certain death for most

組 (く) み合 (あ) わせ

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*responsible.*

102. Bromenshenk's findings have been questioned, however.
- 疑 (うたが) われている
103. Dr. James Frazier, an entomologist and Penn State University, believes Bromenshenk has been too quick to discount the role of pesticides. Frazier says research in Europe has proven that contamination by certain pesticides makes hives susceptible to CCD.
- 昆虫学者 (こんちゅうがくしゃ)
- 無視 (むし) する
- 証明 (しょうめい) した
- 汚染 (おせん)
- 影響 (えいきょう) を受 (う) けやすい
104. He also notes that Bromenshenk runs a company that develops equipment for detecting disease-causing pathogens in bees, and as such would benefit if CCD were blamed on a biological contagion rather than agricultural chemicals.
- 見 (み) つける 病気 (びょうき) を引 (ひ) き起 (お) こす
- ~のせいにされる
- 生物学的 (せいぶつがくてき) な 伝染病 (でんせんびょう)
- 農薬 (のうやく)



105. Moreover, Bromenshenk is accused of having a conflict of interest on another front, as he received substantial funding for research from a pesticide company implicated in honeybee deaths in Europe.
106. Until widely accepted conclusions can be made about CCD, Frazier emphasizes the necessity of continued research into all potential causes.

Further Questions & Sample Answers



107. 6) What does Dr. Frazier feel Bromenshenk has been too quick to dismiss?

108. フレーザー博士は、ブロメンシェンク氏が早々と無視したのは何だと考えていますか。

*He feels that Bromenshenk has been too quick to dismiss the role of pesticides.*

109. 7) What does Bromenshenk's company develop?

110. ブロメンシェンク氏の会社が開発しているのは何ですか。

*He develops equipment for detecting disease-causing pathogens in bees.*

111. 8) Why would Dr. Frazier feel that the funding Bromenshenk received from a

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118. 4. Even if CCD were to vanish, the fact that it has already reduced the number of honeybee colonies by 40 percent means many crop yields will fail to recover.
119. (33) Which statement best summarizes the findings of Bromenshenk's team?
120. ブロメンシェンクのチームの発見を要約した以下の文のうち最も正しいものはどれですか。
121. 1. Although the mass death of honeybees involves many factors, colonies are more vulnerable to CCD where cell-phone radiation is strong.
122. 2. Two different pathogens that individually are not fatal for honeybees somehow cause CCD when both are present in honeybees.
123. 3. CCD causes honeybees to lose the ability to breakdown and absorb proteins from their food, which is what weakens and eventually kills them.



- 124.4. Honeybees taken from supposedly CCD-free Australian hives were suffering from a similar syndrome, albeit a nondeadly one.
125. (32) James Frazier is critical of the study led by Bromenshenk in part because
126. ジェームス・フレイザーはブロメンシェンクが筆頭研究者である研究に批判的です。その理由の一つは・・・
- 127.1. it focused on the effects of agricultural chemicals on honeybees while ignoring other possible causes of CCD suggested by European research.
- 128.2. the effects of recent changes in laws governing the importation and use of foreign pesticides in North America were not taken into account.
- 129.3. Bromenshenk has ties to companies that stand to gain an advantage if CCD is found to be the result of natural rather than man-made factors.
- 130.4. the equipment developed by Bromenshenk to measure levels of

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- 139.5) What are the two pathogens that Bromenshenk believes are responsible for CCD?
140. He believes that *Nosema ceranae*, a single-celled fungus, and *invertebrate iridescent virus (IIV)*, a virus never before found in North America, are responsible.
- 141.6) What does Dr. Frazier feel Bromenshenk has been too quick to dismiss?
142. He feels that Bromenshenk has been too quick to dismiss the role of pesticides.
- 143.7) What does Bromenshenk's company develop?
144. He develops equipment for detecting disease-causing pathogens in bees.
- 145.8) Why would Dr. Frazier feel that the funding Bromenshenk received from a pesticide company be a conflict of interest?
146. The company that funded Bromenshenk has been implicated in honeybee deaths in Europe and wants to create evidence that they are not to blame for CCD.