NATURAL SCIENCE (SAT)

This passage is adapted from US Environmental Protection Agency, "Colony Collapse Disorder."

Colony collapse disorder (CCD) occurs when the majority of the worker bees in a colony disappear, leaving behind a queen, plentiful food, and a few nurse bees to care for the remaining immature bees and queen. Hives cannot sustain themselves without worker bees, so the colonies eventually perish. Once thought to pose a major long-term threat to bees, CCD has declined substantially over the past few years. The overall indicator of bee health is the number of beehives that fail over the winter months. This number has averaged about 28.7 percent since 2006-2007 but dropped to 23.1 percent in the winter of 2014-2015. While the total losses remain somewhat high, the number of losses attributed to CCD dropped from roughly 60 percent in 2008 to 31.1 percent in 2013. However, CCD is still a concern.

CCD may not be a new phenomenon, as agricultural records from more than a century ago noted occasional bee "disappearances" and "dwindling colonies" in some years. Of course, it is uncertain whether the colonies had the same combination of associated factors. CCD first came to national attention during the winter of 2006-2007, when certain beekeepers reported losses of 30 to 90 percent of their hives. Up to 50 percent of these colonies demonstrated symptoms inconsistent with known causes of honeybee death. The colonies experienced a sudden loss of the worker bee population with very few dead bees found nearby. The queen and brood (young) remained, and the colonies appeared to have relatively abundant honey and pollen reserves.

CCD is not the only cause of mass bee death. Beekill incidents can be caused by diseases and pests, which can wipe out the colony and leave behind many dead bees. Additionally, acute pesticide poisoning can result from overexposure to harmful pesticides, resulting in large numbers of dead bees outside the hive entrance. The popular media has reported several incidents of acute poisoning of honeybees in recent years, and these incidents are sometimes mistakenly associated with CCD. However, the results of these incidents are quite different from CCD.

Researchers have different theories about the cause of CCD. Scientists are focused on factors such as:

- Increased losses due to invasive varroa mites, a pest of honeybees;
- New and emerging diseases, such as Israeli acute paralysis virus and the parasite Nosema;
- Pesticide poisoning through exposure to substances applied to crops or those used for in-hive insect or mite control;
- Stress experienced by bees due to management practices such as transportation to multiple locations across the country for pollination services;
- Changes to the habitat where bees forage; and
- Inadequate food supplies and poor nutrition.

The U.S. Department of Agriculture (USDA) leads the federal government's response to CCD. In 2007, USDA established the CCD Steering Committee, which includes representatives from other government agencies, such as the Environmental Protective Agency (EPA), and members of academia. The Steering Committee developed a Colony Collapse Disorder Action Plan with four main components:

- Survey and collect data to determine the extent of CCD and the current status of honeybee colony production and health;

- Analyze bee samples to determine the prevalence of various pests and pathogens, bee immunity and stress levels, and exposure to pesticides;
- Conduct research on new and reemerging pathogens, bee pests, environmental and nutritional stresses, and pesticides; and
- Undertake mitigating and preventative measures to improve bee health and habitats, and to counter mortality factors.

Source: Environmental Protection Agency. "Colony Collapse Disorder." EPA.gov. Sept 1, 2015. http://www2.epa.gov/pollinator-protection/colony-collapse-disorder

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1. The main purpose of the passage is to
   A) emphasize the disastrous consequences associated with massive honeybee losses.
   B) describe mysterious circumstances that have had a serious impact on bee populations.
   C) identify the cause of the decline in bee populations in the modern world.
   D) question governmental responses to a challenging ecological problem involving bees.

2. Based on the passage, the class of bee that is most immediately affected by Colony Collapse Disorder is the
   A) queen bee.
   B) nurse bee.
   C) young bee.
   D) worker bee.

3. As used in line 5, "immature" most nearly means
   A) childish.
   B) crude.
   C) inexperienced.
   D) young.

4. The passage indicates that
   A) CCD has never been thought to pose a long-term threat to bees.
   B) the number of beehives that failed during the winter of 2014-2015 was 23.1 percent.
   C) the number of losses attributed to CCD rose from approximately 31.1 percent in 2008 to 60 percent in 2013.
   D) the overall indicator of bee health is the number of beehives that fail during the summer months.

5. Which choice provides the best evidence for the answer to the previous question?
   A) Lines 8-11 ("Once thought . . . years")
   B) Lines 11-13 ("The overall . . . months")
   C) Lines 13-16 ("This number . . . 2014-2015")
   D) Lines 16-19 ("While the . . . in 2013")

6. As used in line 33, "inconsistent" most nearly means
   A) clashing.
   B) fluctuating.
   C) irreconcilable.
   D) uncertain.

7. According to the passage, which of the following choices is a sign that a bee colony may have died out due to overexposure to pesticides?
   A) A lack of pollen or honey within the colony
   B) An unexplained disappearance of the worker bees
   C) The continued presence of the queen bee within the hive
   D) Large numbers of dead bees near the colony

8. Which choice provides the best evidence for the answer to the previous question?

A) Lines 34-36 (“The colonies . . . nearby”)
B) Lines 36-39 (“The queen . . . reserves”)
C) Lines 44-47 (“Additionally, acute . . . entrance”)
D) Lines 52-53 (“However, the . . . CCD”)

9. The author most likely included the information about pesticides in lines 44-53 in order to

A) offer evidence to suggest that pesticides cause more beekill incidents per year than does CCD.
B) support the claim that colony collapse disorder is a real condition.
C) prove that research often contradicts reports offered by the media.
D) establish that the characteristics of CCD are distinct from those of other beekill incidents.

10. The author includes a list of factors being considered by researchers (lines 57-74) in order to

A) offer possible explanations for the occurrence of CCD.
B) describe the reasons why CCD is difficult to detect.
C) question conclusions drawn by researchers studying CCD.
D) dispute a counterclaim suggested by CCD scientists.