Questions 39-47 are based on the following passage.

This passage is adapted from Ed Yong, "Gut Bacteria Allows Insect Pest to Foil Farmers." ©2013 by National Geographic Society.

Here is a lesson that we're going to be taught again and again in the coming years: Most animals are not just animals. They're also collections of microbes. If you really want to understand animals, you'll also have to understand the world of microbes inside them. In other words, zoology is ecology.

Consider the western corn rootworm—a beetle that's a serious pest of corn in the United States. The adults have strong preferences for laying eggs in corn fields, so that their underground larvae hatch into a feast of corn roots. This life cycle depends on a continuous year-on-year supply of corn. Farmers can use this dependency against the rootworm, by planting soybean and corn in alternate years. These rotations mean that rootworms lay eggs into corn fields but their larvae hatch among soybean, and die.

But the rootworms have adapted to this strategy by reducing their strong instincts for laying eggs in corn. These rotation-resistant females might lay among soybean fields, so their larvae hatch into a crop of corn.

There are almost certainly genetic differences that separate the rotation-resistant rootworms from their normal peers, but what are they? Researchers at the University of Illinois have been studying the problem since 2000 and, despite generating a vast mountain of data, have failed to find the genes in question. "The western corn rootworm has been an enigma for a long time," says Manfredo Seufferheld. "This insect has the ability to adapt to practically all control methods deployed against it, including crop rotation. After many years of research about the mechanisms of rotation resistance, results were mostly inconclusive."

So, Seufferheld looked elsewhere. Rather than focusing on the rootworm's own genes, he studied the genes of the bacteria in its gut . . . and found some answers. The rotation-resistant varieties have very different gut bacteria from the normal ones. And when the team killed these microbes with antibiotics, they severely reduced the beetle's ability to cope with rotation.

"The bad guy in the story—the western corn rootworm—was actually part of a multi-species conspiracy," says Joe Spencer, who was part of the study.

The team, including graduate student Chia-Ching Chu, found that a third of the rootworms' gut bacteria comprise species that are unique to either the resistant or normal varieties. These two factions also differ in the relative numbers of the bacteria that they share.

These different microbes give the resistant beetles an edge when eating soybeans. The rootworms digest the protein in their meals using enzymes called cysteine proteases, and soybeans defend themselves with substances that can block these enzymes. But Chu found that the more the beetles' bacteria differed from the normal set, the higher the levels of cysteine proteases in their guts. By avoiding indigestion, these beetles were better at surviving among soybeans, and more likely to lay their eggs there.

The team proved that the bacteria were responsible by killing them with antibiotics. Sure enough, this drastically lowered the cysteine protease activity in the guts of the rotation-resistant beetles and wrecked their ability to thrive among soybeans.

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Over the course of the passage, the main focus shifts from a

A) statement about the challenge posed by a particular insect to an indication of why that challenge was easy to overcome.

B) summary of a once-unexplained natural phenomenon to a biography of the scientists who researched that phenomenon.

C) description of a problem affecting agriculture to an explanation of how scientists identified the cause of that problem.

D) discussion about a scientific field to an anecdote showing how research is done in that field.

CONTINUE