Nematodes – What Exactly Are They?

URBANA, ILL.

Nematodes have been a popular agronomic topic this winter, but many individuals are still confused about them. What are nematodes?

Nematodes are microscopic worm-like creatures, but they are not close or even distant cousins to earthworms. Instead, they are a water-filled sack that consists of many cells and little specialized tissues. They may or may not be plant parasitic, and their physiology is one method by which their feeding habits can be distinguished.

Plant parasitic nematodes have the following physiologic structures. First, the plant parasitic nematode has a needle-like projection referred to as the stylet. The stylet is hollow and is used by the nematode to puncture plant cells. It is pushed outward through a pair of lips that may have sensors capable of detecting plant chemicals, thus allowing the nematode to hone in on plant prey. Under the microscope, the stylet can be seen rapidly puncturing cells and retracting through movement by muscular knobs (flanges) within its body. Most of the muscular activity of the nematode is controlled by a thin nerve cord. Digestion of food begins outside the body, with the partially dissolved material ingested thereafter. Enzymes within the salivary gland are injected into the punctured cell of a plant when the median bulb, a muscular structure along the digestive tract, contracts. (The structure almost resembles the squeegee used to clean the nostrils of infants.) As enzymes are injected, the cellular contents are dissolved, the bulb returns to normal size, and the partially dissolved cellular material is moved into the hollow stylet. This food then rushes into the intestine and is absorbed into the nematode's body to keep it alive and to form new tissue. Not all nematodes that have a stylet are plant parasitic, but all plant parasitic nematodes have a stylet.

Nematodes are laid as eggs either within the soil or within plant tissue. In the egg stage, the nematode passes through one juvenile stage and sheds its thin skin. After hatching as the second stage juvenile, the stage which typically infects plant material, the nematode sheds its skin again and repeats the process another two times until adulthood. A nematode may take about a month to develop to maturity, and one female nematode may lay dozens of eggs allowing the population to build to astonishing numbers.

As with any integrated pest management problem, correct diagnosis is the first step in truly solving the problem. Nematodes present a unique challenge for homeowners and producers. Since they are small, they cannot be easily seen and many other problems may mimic nematode symptoms. If one believes that they may possibly have nematodes, U of I Extension can help diagnose the problem. A laboratory on the U of I campus can test soil samples for nematodes. For information about diagnostic assistance, call the Mason County Extension Office at 309-543-3308 or Fulton County at 309-547-3711. Δ

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