ALFALFA MICRO-ENEMY: STEM NEMATODES IN WESTERN ALFALFA PRODUCTION
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At least 35-40% of all U.S.-grown alfalfa hay is produced in the Western U.S., which is also where most alfalfa seed production acres are planted. Western alfalfa hay is used for feeding dairy and beef livestock throughout the region and to supply active hay and seed export markets. Within this very important alfalfa-growing region lurks a micro-enemy which threatens alfalfa productivity. It is known as the alfalfa stem nematode (ASN) and is a nearly microscopic roundworm that lives in the soil and in plants or plant debris. Stem nematodes are plant parasites that can reduce crop yield and quality by feeding on crowns, stems, and leaves of alfalfa plants. They are reproductively favored by wet weather in late winter or early spring and with temperatures ranging from 59 to 70⁰F. A complete life cycle, from egg to reproducing adult, can occur in 19-23 days with a single ASN female producing 200-500 eggs. While ASN can parasitize and persist on several host plant species, they can only reproduce in alfalfa and sainfoin. To make matters worse, ASN can easily persist for years in plant debris or dry soils.

Symptoms are easily recognized in the early spring during cool, wet weather. Damage is most often seen in flood-irrigated fields with the greatest damage observed near the headwater ends of infected fields. A characteristic of infested fields: patches of stunted plants likely following water movement patterns. Stunted plants have short internodes, and leaves are often twisted, crinkled, or deformed, eventually turning yellow or white. Infected stems are brittle and crown health is poor, often resulting in slow spring green-up. Plants eventually die when severely infected. In fields with high levels of ASN, newly seeded alfalfa can have reduced plant establishment and plants with poor vigor, resulting in poor yield and short stand life.

Stem nematodes have hollow, needle-shaped stylets used to puncture plant tissue for feeding. After hatching, juvenile nematodes can persist on hay or plant debris, seeds, or in the crowns of plants. These juvenile nematodes become active when soil moisture and temperatures are favorable. When active, they enter alfalfa plants by colonizing seedlings during germination or by swimming on live plant surfaces and entering through plant stomata. The nematodes move within the plant’s internal open spaces between cells and secrete enzymes and hormones as they feed. The hormones stunt and swell plant tissue. As plants become heavily infected and begin to die, nematodes escape to the soil or other plant debris to wait for the next opportunity to continue their life cycle.

When growers suspect nematodes are causing damage in fields, it is important to confirm their existence by taking samples of alfalfa stems and leaves from plants showing distinct symptoms. Determining if nematodes are present can be done quickly and accurately with the aid of a microscope. If confirmation and identification are needed, send samples to a laboratory capable of diagnosing nematodes. Ultimately, the decision to plow down an alfalfa stand is determined by the level of yield reduction and not nematode counts.

Managing alfalfa stem nematode in production fields involves several strategies. One of the first is to plant high-quality, certified alfalfa seed to reduce the risk of planting nematode-infected seed. Choose approved varieties with high levels of genetic resistant (certified by the Association of Official Seed Certifying Agencies (AOSCA). Chemical nematicides have not been found to be effective and are often expensive to use in alfalfa. Rotating out of alfalfa to other non-host crops (small grains, corn, sorghum) for two or more years will reduce stem nematode populations in a field. To prevent nematode spread or reintroduction into a clean alfalfa field, plan to harvest clean fields first when the topsoil is dry. Do not cut the alfalfa when the top 2-3 inches of soil surface is wet, as nematodes will exit plants and return to the soil once they sense plants are dying. Cleaning equipment before moving from field to field will also help avoid spread. When irrigating, don’t use tail waters from fields that may be contaminated with ASN. Finally, avoid spreading manure from cattle fed nematode-infected hay.

References