

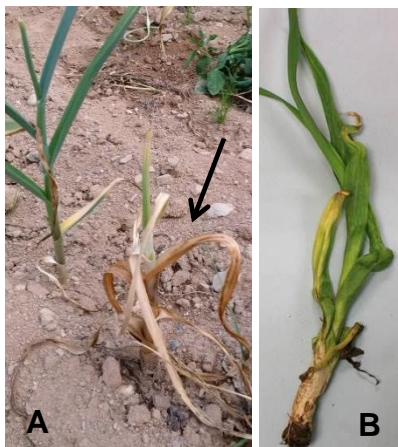


## Stem and Bulb nematode in New Brunswick garlic fields

The stem and bulb nematode, *Ditylenchus dipsaci*, attacks garlic, onion and other alliums. The nematode is a plant parasite that damages plants and is very difficult to manage (control) once it is established in fields. The stem and bulb nematode can be introduced into a field on infected garlic seed, plant debris, soil or in water. Once present on a farm, the nematode can survive many years in plant debris, soil and on weed hosts. A small population of nematodes can reproduce rapidly throughout the growing season, resulting in significant yield loss.

Infected garlic or onion seedlings become swollen, leaves appear twisted and malformed, young roots and bulbs rot, severely infected plants turn yellow and die (Fig 1 and 2). Plants that do not die have deformed bulbs, short leaves and senesce prematurely. Severely infected garlic bulbs are soft, discoloured, deformed and missing portions of the root system (Fig 2A and B). A slight infection in the field may pass unnoticed, but the nematode can multiply in storage if the bulbs are not kept at low temperatures. Nematode infected bulbs can be easily infected by secondary pathogens in the field. They can also be infected by postharvest pathogens in storage.

The stem and bulb nematode has been reported in various garlic/onion production regions in Canada. The New Brunswick Department of Agriculture, Aquaculture and Fisheries (NBDAAF) Plant Diagnostic Laboratory received and identified stem and bulb nematode on garlic grown in New Brunswick in the past few years. It is recommended that garlic and other *Allium* crop growers send soil samples prior to planting garlic to a diagnostic laboratory for nematode identification and count.



**Figure 1.** (A) Stunted growth, leaf yellowing and early defoliation of garlic plant (right) and (B) twisted and malformed garlic leaves infected with stem and bulb nematode.



**Figure 2 A and B.** Garlic bulbs damaged by the stem and bulb nematode. Severely infected garlic bulbs are soft, discoloured and deformed, with a portion of the roots absent.

The extent of the distribution of stem and bulb nematodes in New Brunswick is not known. In 2017, the NBDAAF in collaboration with the Atlantic Canada Organic Regional Network (ACORN) conducted a survey to determine the distribution of *Ditylenchus dipsaci* in New Brunswick garlic fields. Results of the survey showed the presence of stem and bulb nematodes in garlic and soil samples collected from garlic fields. The results of this survey will provide a starting point for the development of various approaches to help the growers to manage this nematode.

The NBDAAF recommends the following best management practices as a strategy to manage stem and bulb nematode. A single strategy will not help reduce stem and bulb nematode population. Best result can be achieved by integrating all of the following possible management practices.

- 1) Plant clean, nematode free garlic seed. Avoid using garlic for seed from an infested field.
- 2) Rotate to non-*Allium* (non-susceptible) crops for 3 to 4 years. Avoiding legumes in the rotation may help to manage the nematode. Remove weeds and volunteers during rotation.
- 3) Plant cover crop such as mustard, rapeseed, oilseed radish and sorghum-Sudan grass before planting garlic. This can help suppress nematodes.
- 4) Completely remove cull bulbs and crop residues from the field if soil tests confirm the presence of nematodes.
- 5) Implement proper sanitation to prevent spread of the stem and bulb nematode from infested to non-infested fields. Carefully clean all tools and equipment on site before moving them to another location.

## References

Diseases and pests of vegetable crops in Canada. 1994. The Canadian Phytopathological Society and the Entomological society of Canada.

OMAFRA. 2015. Watch out for stem and bulb nematode symptoms in garlic.

<http://www.omafra.gov.on.ca/english/crops/hort/news/hortmatt/2015/14hrt15a2.htm>

Stem and bulb nematode in garlic.

<http://www.extension.umn.edu/garden/yard-garden/vegetables/stem-and-bulb-nematode-in-garlic/>