

Manitoba Survey and Molecular Quantification of Soybean Cyst Nematode

Soybean cyst nematode was confirmed in Manitoba for the first time in 2019 in four out of 106 fields and four out of 18 municipalities sampled across all surveys (2012–2019). Cyst populations found in these four fields were extremely low and consistent with recent establishment of the pest.

SOYBEAN CYST NEMATODE (SCN, *Heterodera glycines*) is a microscopic roundworm that parasitizes soybean roots. Different types of nematodes can commonly be found in Manitoba, but not all are harmful to crops. SCN is a harmful type of nematode and one of the most damaging pests to soybean crops in North America.

Infestation of SCN can impact growth and yield by removing plant energy and nutrients, disrupting nutrient and water uptake, impeding root growth and opening plants to infection by soil-borne pathogens. Preventative action, early detection and timely management are key in avoiding significant yield loss from SCN. Once above-ground symptoms are noticed, up to 30% yield loss can already be expected.

This project is a continuation of the SCN survey initiated in 2012 to assess Manitoba fields for this pest. This second leg of the study was also launched to develop rapid, accurate molecular methods for quantifying any SCN found in the soil. The conventional quantification method is laborious and time-consuming, involving crushing cysts and counting eggs under a microscope. The availability of a molecular test would also benefit any region dealing with SCN.

In 2017, 30 soybean fields near the U.S. border with histories of soybean and dry bean production were sampled in October after harvest. Soil samples were collected from different risk areas of each field. Cysts were recovered from 12 of the 30 fields, of which seven had intact cysts containing eggs. However, only four of the seven fields had cysts that looked like they could be SCN. SCN was confirmed by visual

and molecular DNA methods in these four fields.

This means four out of 106 fields and four out of 18 municipalities tested positive for SCN over the survey's entire history (2012–2019). Rural municipalities where SCN has been detected are Norfolk-Treherne, Rhineland, Emerson-Franklin and Montcalm (Figure 1).

No above-ground symptoms of SCN (e.g., stunting, chlorosis) were observed in these four fields. Cyst populations were also extremely low and consistent with the recent establishment of the pest, at one to 14 cysts per 5 lbs of soil. This is compared to populations of 3,000–4,000 cysts per 5 lbs of soil in Ontario and the U.S. Midwest where SCN has been present for many decades.

In July 2019, 20 fields in Ontario with a range of SCN levels and soil types were sampled to initiate work on the molecular quantification of SCN. Cysts were extracted from the soil samples and eggs were counted using the conventional method. DNA has been extracted from

soils containing different numbers of eggs using extraction kits. Extracted DNA has been quantified for different soil types and SCN risk levels (none, low, moderate, high or very high) are now being developed. This research is ongoing.

Given the large gap between regions with positive identification, SCN may be present in fields not sampled during this survey. It is also possible that SCN may have established itself in additional fields since this survey was carried out due to its movement with soil. Routine surveillance and testing are recommended in Manitoba fields.

Once established, SCN can remain in the soil for many years. At this early stage of infestation, farmers can manage this pest before it causes significant soybean yield reductions. Populations of SCN can be minimized by rotating to non-host crops, growing resistant soybean varieties, controlling host weed species and cleaning machinery between field visits. Visit manitobapulse.ca or thescncoalition.com for more information on testing and management of SCN. ▀

Figure 1. Rural municipalities in Manitoba surveyed for soybean cyst nematode.

