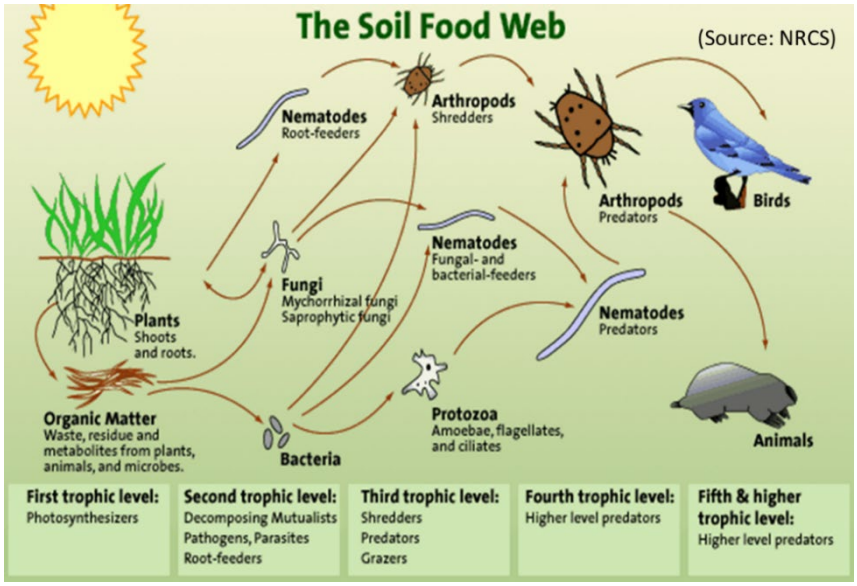
How do herbivore nematodes affect the food chain and beneficial nematodes improve soil health?

Nematodes, the most abundant metazoan on the planet, inhabit across all terrestrial and aquatic systems. They include harmful (herbivores) and beneficial (bacterivores, fungivores, predators and omnivores) trophic groups with fast- to slow-reproducing life histories. Herbivore nematodes cause crop quality and yield loss by either partially- (ectoparasites) or fully-embedded (endoparasites) in plant tissues and sucking host cell contents. They disrupt water and nutrient uptake and the photosynthesis process in one of three ways: destructive (host cells killed, e.g. root-lesion, *Pratylenchus*), adaptive (cells modified e.g. cyst, *Heterodera*) and neoplastic (cells modified and undergo new growth, e.g. root-knot, *Meloidogyne*) feeding behaviors.

Beneficial nematodes are central players in the soil food web (SFW), nutrient cycling and an important indicator of soil health conditions. In simple terms, nutrient cycling results from predator-prey interactions and the defecation and death of microorganisms and macroorganisms operating across 5 trophic levels of the SFW (see NRCS Figure). By feeding on or being food for other organisms, nematodes contribute to nutrient cycling in SFW levels 2, 3, and 4.



An open access NRCS illustration of how the Soil Food Web (**SFW**) generates a nutrient-rich soup of predator-prey and pooping at 5 trophic levels, in 3 of which beneficial nematodes play a role.

Quantifying how a combination of beneficial nematodes population dynamics, life stages and functions change across the SFW indicates the nutrient cycling and soil health conditions.