

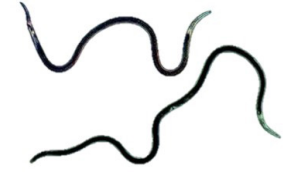
# Cover Crops for Sting Nematode Management in Florida

Wael Elwakil<sup>1</sup> and Johan Desaeger<sup>2</sup>

<sup>1</sup>Extension Agent, Fruit and Vegetable Production, UF/IFAS Extension, Hillsborough County, Seffner, FL 33584;

<sup>2</sup>Associate Professor of Entomology and Nematology, UF/IFAS, Gulf Coast Research and Education Center, Wimauma, FL 33598

**Sting Nematode** (*Belonolaimus longicaudatus* Rau): is native to the southeastern US and is considered one of the primary destructive nematodes to a variety of economically important crops in Florida including strawberry, potato, citrus, peanut, many vegetables, and turfgrass.



## Symptoms:

Sting nematode feeding on the roots kills the root meristems stopping further growth. This results in a stubby looking root system that provides no support for the shoots and is incapable of delivering water and nutrients. Depending on the population levels in the soil, transplants may not survive establishment stages. Plants can appear stunted and stressed and can be easily pulled from the soil due to the lack of support from the damaged root system. Distribution in the field is usually observed in irregular-shaped patchy areas of stressed and stunted plants (Fig 1).



**Figure 1:** Sting nematode damage in strawberry field. Stunted and stressed plants can be noticed in a patchy pattern. Credit J. Desaeger, UF/IFAS

## Conventional Nematode Management:

Traditionally, nematode management is done through soil fumigation. There are many fumigants and fumigant mixtures on the market as well as several non-fumigant products that are applied through chemigation or drench. Some of the most commonly used fumigant mixtures used are 1,3-Dichloropropene and Chloropicrin due to the wider range of control that extends to pathogens, insects, and weeds.

## Cover Crops for Nematode Management:

Cover crops can be used as an effective tool in nematode management and in organic production they are one of the few options that growers have. Cover crop plants/species provide nematode management benefits by different mechanisms. Some are non-host plants for the nematodes stopping further population increase in the soil. Some are used as “Trap Crops” where the nematodes are attracted to them instead of the crop in a multi-culture or a multi-crop production setting. Other species can produce toxic root exudates in the soil (such as Marigold) or produce breakdown products when their canopy is tilled and decomposing in the soil which inhibit nematode growth or reproduction or even kill them (such as Sunn hemp, Sorghum, and Mustard) (Fig 2). Additionally, cover crops can help in altering the plant soil microbiome (soil microorganism interactions associated with plants) inhibiting nematode reproduction or creating unfavorable growing conditions.



**Figure 2:** Sunn hemp field in the summer after winter strawberry season. Credit W. Elwakil, UF/IFAS

## Recommended cover crops:

Five years of trials investigating crop cover options for sting nematode management indicate there are limited options of plant species that can be used in Florida due to its wide host range. Table 1 gives a list of potential cover crops and their host status for three important plant-parasitic nematodes in Florida strawberries. There are only few options when sting nematode is the primary nematode pest, which is the case in most strawberry fields. Sunn hemp which is widely planted as a cover crop in Florida, is a good choice (1), as it helps manage both root-knot and sting nematodes and grows fast producing high amounts of biomass. Sesame is another option, but it can be challenging in certain situations due to its relatively slower growth rate and fibrous nature. Sugar beet has a relatively longer season which is not ideal with long season cropping systems such as strawberry.

Some cover crops seed availability can be challenging which has slowed research evaluating more production-feasible options for cover crop species.

## Weeds and Nematodes interaction:

Weed management is also important as many weeds are hosts for nematodes. Table 2 shows the reproduction of sting nematode as well as northern root knot and northern root lesion nematodes in greenhouse trials on variety of common weed species in Florida. Weed species that are good nematode hosts (2) can increase their population in the soil if left unmanaged.

### References:

Crow, W. T. 2024. Nematode Management in the Vegetable Garden. ENY-012, Entomology and Nematology Department, UF/IFAS Extension. doi.org/10.32473/edis-ng005-2024. Available: <https://edis.ifas.ufl.edu/publication/NG005>

Dittmar, P. J., Dufault, N. S., Desaeger, J., Qureshi, J., Boyd, N. S., and Paret., M. L. 2023. Integrated Pest Management. CV298, Horticultural Sciences Department, UF/IFAS Extension. doi.org/10.32473/edis-cv298-2023 Available: <https://edis.ifas.ufl.edu/publication/CV298>

**Table 1:** Nematode host status of Sting, Northern Root-Knot, and Northern Root-Lesion nematodes.

1, 2, and 3 is the scale of host status where 1 means it is unfavorable host for the nematode species and is recommended as a cover crop (Watson and Desaeger, UF/IFAS).

Cover Crop common name	Nematode Host Status			Plant Biomass
	Sting	Northern Root-Knot	Northern Root-Lesion	
Buckwheat	3	2	2	Low
Marigold	3	1	1	Low
Mexican Sunflower	3	1	3	Low
Millet	3	1	1	Low
Pearl Millet	3	1	1	Low
Radish	3	2	3	Low
Sesame	1	1	2	Low
Sorghum Sudangrass	3	1	2	High
Cowpea	3	3	1	High
Sugar Beet	1	1	1	Low
Sunflower	3	1	3	Low
Sunn hemp	1	1	2	High

**Table 2:** Common weed species in Florida and their nematode host evaluation. 1 and 2 is the scale of host status where 1 means it is a poor/unfavorable host for the examined nematode species as observed in greenhouse trials. 2 means it is a good nematode host weeds will increase the nematode population in the soil (Watson and Desaeger, UF/IFAS).

Weed common name	Genus and Species	Nematode Host Status		
		Sting	Northern Root-Knot	Northern Root-Lesion
Bermuda Grass	<i>Cynodon dactylon</i>	2	1	2
Carolina Geranium	<i>Geranium carolinianum</i>	2	2	2
Carpetweed	<i>Mollugo verticillate</i>	1	2	1
False Daisey	<i>Eclipta prostrata</i>	2	2	2
Purple Nutsedge	<i>Cyperus rotundus</i>	2	1	1
Florida Pusley	<i>Richardia scabra</i>	1	1	1
Ragweed	<i>Ambrosia artemisiifolia</i>	1	1	1
Sandbur	<i>Cenchrus echinatus</i>	1	1	1
Yellow Nutsedge	<i>Cyperus esculentus</i>	2	1	2