

## 2024 Nematode Threshold Levels Crop = Alfalfa/Wheat/Small Grains

Shown below are estimated threshold values for injurious (pathogenic) nematodes on alfalfa, wheat, and small grain grown in the central United States. Threshold levels are those levels of nematodes which would reduce stand by 15%.

Local environmental factors such as water, heat, wind and soil type all come into play when assessing stress caused by pathogenic nematodes, therefore trying to make strict threshold values is not possible. However, some type of guideline is needed. We use information laid out by Dr. Glenn Dappen to determine thresholds for nematodes broken down into three seasons: Early Spring, Mid-Summer and Early Fall. Population dynamics of one nematode species may not follow another. This information may not be the same for areas in the southern United States.

Using Dr. Dappen's guidance, we consider five nematodes: sting, lance, lesion, root knot, and cereal cyst nematode, as having caused most of the damage seen. Four other damaging nematodes include needle, stubby root, stunt, and dagger. The spiral and ring nematodes can be injurious if found in high numbers. These indicated species are highlighted in the table below. In samples received at Ward Laboratories and those received by Dr. Dappen with Nema-Test, cereal nematodes have not ever been seen.

Nematodes Per 100 cm <sup>3</sup> soil	Threshold Levels		
	Early Spring April – May	Mid Summer July – August	Early Fall Sept - October
<b>A.Stylet Forms</b>			
Aphelenchoides	FF	FF	FF
Aphelenchus	FF	FF	FF
Belonolaimus (Sting)	1	1	1
<b>Criconema/Mesocriconema (Ring)</b>	200	400	600
Ditylenchus (Stem)	No Data	No Data	No Data
Dorylaimus/Dorylaimida	No Data	No Data	No Data
<b>Helicotylenchus (Spiral)</b>	400	600	800
Hemicycliophora (Sheath)	150	150	150
Heterodera (Cereal Cyst)	10	25	50
Hoplolaimus (Lance)	15	25	40
Meloidodera (Cystoid)	10	25	50
Meloidogyne (Root Knot) juveniles	50	100	150
Longidorus (Needle)	1	1	1
Paratrichodorus (Stubby Root)	25	50	100
Paratylenchus (Pin)	No Data	No Data	No Data
Pratylenchus (Lesion)	25	50	100
Rotylenchus	No Data	No Data	No Data
Rotylenchulus (Reniform)	No Data	No Data	No Data
Tylenchorhynchus/Quinisolcius (Stunt)	25	50	50
Tylenchus/Psilenchus	FF	FF	FF
Xiphinema (Dagger)	30	30	30
Other:			
<b>B.Non-Stylet Forms</b>	NP	NP	NP
<b>Nematodes Per Gram Dry Root</b>			
Hoplolaimus (Lance)	50	100	150
Pratylenchus (Lesion)	300*	400	500
Meloidogyne (Root Knot)	50	100	150
Other:			

**Threshold levels are those levels of nematodes that would reduce stand by 15%.**

FF = Fungal Feeders, no threshold value assigned

NP = Non-pathogenic to cotton plants

\* = Lesion often high in young plants due to small root mass concentrating them; but plants can outgrow feeding effects of lesion nematodes under this number.

= Severely injurious nematodes

= Nematodes injurious in high numbers

**2024 Nematode Threshold Levels**  
**Crop = Corn**

Shown below are estimated economical threshold values for injurious (pathogenic) nematodes on cotton in the United States. Threshold levels are levels of nematodes that would reduce yields by 10%.

Local environmental factors such as water, heat, wind and soil type all come into play when assessing stress caused by pathogenic nematodes, therefore trying to make strict threshold values is not possible. However, some type of guideline is needed. We use information laid out by Dr. Glenn Dappen to determine thresholds for nematodes broken down into three seasons: Early Spring, Mid-Summer and Early Fall. Population dynamics of one nematode species may not follow another.

Using Dr. Dappen’s guidance, we generally consider reniform, root knot, lance, and sting to be extreme pests while dagger, cystoid, cyst, needle, lesion, stubby root, and stunt are highly pathogenic. Spiral and ring nematode are harmful when high numbers are seen. The indicated species are highlighted in the table below.

Nematodes Per 100 cm <sup>3</sup> soil	Threshold Levels		
	Early Spring April – May	Mid Summer July – August	Early Fall Sept - October
A.Stylet Forms			
Aphelenchoides	FF	FF	FF
Aphelenchus	FF	FF	FF
Belonolaimus (Sting)	1	1	1
<b>Criconema/Mesocriconema (Ring)</b>	<b>200</b>	<b>400</b>	<b>600</b>
Ditylenchus (Stem)	No Data	No Data	No Data
Dorylaimus/Dorylaimida	No Data	No Data	No Data
<b>Helicotylenchus (Spiral)</b>	<b>400</b>	<b>600</b>	<b>800</b>
Hemicyclophora	No Data	No Data	No Data
Heterodera (Cyst)	NP	NP	NP
Hoplolaimus (Lance)	15	25	40
Meloidodera (Cystoid)	10	25	50
Meloidogyne (Root Knot) juveniles	50	100	250
Longidorus (Needle)	1	1	1
Paratrichodorus (Stubby Root)	25	50	100
Paratylenchus (Pin)	No Data	No Data	No Data
Pratylenchus (Lesion)	25	50	100
Rotylenchus	No Data	No Data	No Data
Rotylenchulus (Reniform)	No Data	No Data	No Data
Tylenchorhynchus/Quinisulcius (Stunt)	25	50	50
Tylenchus/Psilenchus	FF	FF	FF
Xiphinema (Dagger)	40	40	40
Other:			
B.Non-Stylet Forms	NP	NP	NP
Nematodes Per Gram Dry Root			
Hoplolaimus (Lance)	50	100	200
Pratylenchus (Lesion)	500*	400	1000
Meloidogyne (Root Knot)	50	100	300
Other:			

**Threshold levels are those levels of nematodes that would reduce yields by 5-8 bu/acre.**

FF = Fungal Feeders, no threshold value assigned

NP = Non-pathogenic to cotton plants

\* = Lesion often high in young plants due to small root mass concentrating them; but plants can outgrow feeding effects of lesion nematodes under this number.

= Severely injurious nematodes

= Nematodes injurious in high numbers

## 2024 Nematode Threshold Levels Crop = Golf Greens/Turf

Shown Below are estimated threshold values for injurious (pathogenic) nematodes on golf courses or turf grown anywhere in the United States. Threshold levels are those levels of nematodes which would reduce stand by 25%.

Local environmental factors such as water, heat, wind and soil type all come into play when assessing stress caused by pathogenic nematodes, therefore trying to make strict threshold values is not possible. However, some type of guideline is needed. We use information laid out by Dr. Glenn Dappen to determine thresholds for nematodes broken down into three seasons: Early Spring, Mid-Summer and Early Fall. Population dynamics of one nematode species may not follow another. Furthermore, courses in Florida and Texas may have variations to this when compared to courses found in the central states.

Using Dr. Dappen's guidance, we consider three nematodes, sting, lance, and root knot, as most detrimental to stand. Other damaging ones include needle, lesion, stubby root, stunt, and dagger. The spiral, ring, and sheath nematodes can be injurious if found in high numbers. These indicated species are highlighted in the table below.

Nematodes Per 100 cm <sup>3</sup> soil	Threshold Levels		
	Early Spring April - May	Mid Summer July - August	Early Fall Sept - October
A. Stylet Forms			
Aphelenchoides	FF	FF	FF
Aphelenchus	FF	FF	FF
Belonolaimus (Sting)	1	1	1
Criconema/Mesocriconema (Ring)	300	400	600
Ditylenchus (Stem)	No Data	No Data	No Data
Dorylaimus/Dorylaimida	No Data	No Data	No Data
Helicotylenchus (Spiral)	400	600	800
Hemicycliophora (Sheath)	150	150	150
Heterodera (Cyst)	NP	NP	NP
Hoplolaimus (Lance)	15	25	40
Meloidodera (Cystoid)	10	25	50
Meloidogyne (Root Knot) juveniles	50	100	150
Longidorus (Needle)	1	1	1
Paratrichodorus (Stubby Root)	25	50	100
Paratylenchus (Pin)	No Data	No Data	No Data
Pratylenchus (Lesion)	25	50	100
Rotylenchus	No Data	No Data	No Data
Rotylenchulus (Reniform)	No Data	No Data	No Data
Tylenchorhynchus/Quinisulcius (Stunt)	25	50	100
Tylenchus/Psilenchus	FF	FF	FF
Xiphinema (Dagger)	40	40	40
Other:			
B. Non-Stylet Forms	NP	NP	NP
Nematodes Per Gram Dry Root			
Hoplolaimus (Lance)	50	75	100
Pratylenchus (Lesion)	300*	400	600
Meloidogyne (Root Knot)	50	100	150
Other:			

**Threshold levels are those levels of nematodes that would reduce stand by 25%.**

FF = Fungal Feeders, no threshold value assigned

NP = Non-pathogenic to cotton plants

\* = Lesion often high in young plants due to small root mass concentrating them; but plants can outgrow feeding effects of lesion nematodes under this number.

= Severely injurious nematodes

= Nematodes injurious in high numbers

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## 2024 Nematode Threshold Levels Crop = Soybean

308-234-2418

Shown below are estimated economical threshold values for injurious nematodes in soybean fields in Nebraska or bordering states. Threshold levels are the nematode numbers it would take to reduce yield by 5-8%.

Local environmental factors such as water, heat, wind and soil type all come into play when assessing stress caused by pathogenic nematodes, therefore trying to make strict threshold values is not possible. However, some type of guideline is needed. We use information laid out by Dr. Glenn Dappen to determine thresholds for nematodes broken down into three seasons: Early Spring, Mid-Summer and Early Fall. Population dynamics of one nematode species may not follow another.

Soybean Cyst Nematode (SCN) *Heterodera glycines* is a severe pathogen on soybeans. It started by spreading from eastern states into the central states following river systems; it now completely covers states east of Nebraska.

Using Dr. Dappen's guidance, we consider the same eight nematodes injurious to corn, sting, lance, cystoid, needle, lesion, stubby root, stunt, and dagger, as also being injurious to soybeans. Root knot and reniform will also injure soybeans. The spiral nematode volume increases greatly on soybeans, 3X as much compared to corn, in just one growing season, but soybeans can handle 500-700 without much damage. The nematode species which has the largest pathogenic impact on soybeans is the soybean cyst nematode or SCN. These indicated species are highlighted in the table below.

Two extraction values are given below for SCN those seen in a regular soil nematode test and those seen in a cyst extraction count. The soil SCN threshold value is based upon juveniles seen. The cyst threshold value is 1000-1200 eggs/ juveniles per 100 cc of soil.

Soil Nematode Extraction	Threshold Levels		
	Early Spring April - May	Mid Summer July - August	Early Fall Sept - October
<b>Nematodes Per 100 cm<sup>3</sup> soil</b>			
A. Stylet Forms			
Aphelenchoides	FF	FF	FF
Aphelenchus	FF	FF	FF
Belonolaimus (Sting)	1	1	1
<b>Criconema/Mesocriconema (Ring)</b>	<b>200</b>	<b>400</b>	<b>600</b>
Ditylenchus (Stem)	No Data	No Data	No Data
Dorylaimus/Dorylaimida	No Data	No Data	No Data
<b>Helicotylenchus (Spiral)</b>	<b>500</b>	<b>600</b>	<b>800</b>
Hemicycliophora	No Data	No Data	No Data
<b>Heterodera (Cyst) SCN juveniles</b>	<b>60</b>	<b>100</b>	<b>100</b>
Hoplolaimus (Lance)	15	25	40
Meloidodera (Cystoid)	10	25	50
Meloidogyne (Root Knot) juveniles	50	100	150
Longidorus (Needle)	1	1	1
Paratrichodorus (Stubby Root)	25	50	100
Paratylenchus (Pin)	No Data	No Data	No Data
Pratylenchus (Lesion)	25	50	100
Rotylenchus	No Data	No Data	No Data
Rotylenchulus (Reniform) Not found in Nebraska	25	50	100
Tylenchorhynchus/Quinisulcius (Stunt)	25	50	50
Tylenchus/Psilenchus	FF	FF	FF
Xiphinema (Dagger)	40	40	40
Other:			
B. Non-Stylet Forms	NP	NP	NP
<b>SCN Cyst extraction per 100 cm<sup>3</sup> eggs/juveniles</b>	<b>1000-1200</b>	<b>1000-1200</b>	<b>1000-1200</b>
<b>Root Nematode Extraction as per gram dry root</b>			
Hoplolaimus (Lance)	50	100	150
Pratylenchus (Lesion)	500*	400	1000
Meloidogyne (Root Knot)	50	100	150
Other:			

**Threshold levels: numbers of nematodes that would reduce yields by 5-8%.**

FF = Fungal Feeders, no threshold value assigned

NP = Non-pathogenic to cotton plants

\* = Lesion often high in young plants due to small root mass concentrating them; but plants can outgrow feeding effects of lesion nematodes under this number.

= Severely injurious nematodes

= Nematodes injurious in high numbers

## 2024 Nematode Threshold Levels Crop = Cotton

Shown below are estimated economical threshold values for injurious (pathogenic) nematodes on cotton in the United States. Threshold levels are levels of nematodes that would reduce yields by 10%.

Local environmental factors such as water, heat, wind and soil type all come into play when assessing stress caused by pathogenic nematodes, therefore trying to make strict threshold values is not possible. However, some type of guideline is needed. We use information laid out by Dr. Glenn Dappen to determine thresholds for nematodes broken down into three seasons: Early Spring, Mid-Summer and Early Fall. Population dynamics of one nematode species may not follow another.

Using Dr. Dappen's guidance, we generally consider reniform, root knot, lance, and sting to be extreme pests while dagger, cystoid, cyst, needle, lesion, stubby root, and stunt are highly pathogenic. Spiral and ring nematode are harmful when high numbers are seen. The indicated species are highlighted in the table below.

Nematodes Per 100 cm <sup>3</sup> soil	Threshold Levels		
	Early Spring April - May	Mid Summer July - August	Early Fall Sept - October
<b>A.Stylelet Forms</b>			
Aphelenchoides	FF	FF	FF
Aphelenchus	FF	FF	FF
Belonolaimus (Sting)	1	1	1
<b>Criconema/Mesocriconema (Ring)</b>	200	400	600
Ditylenchus (Stem)	No Data	No Data	No Data
Dorylaimus/Dorylaimida	No Data	No Data	No Data
<b>Helicotylenchus (Spiral)</b>	500	600	800
Hemicycliophora	No Data	No Data	No Data
Heterodera (Cyst)	60	100	100
Hoplolaimus (Lance)	15	25	40
Meloidodera (Cystoid)	10	25	50
Meloidogyne (Root Knot) juveniles	25	50	100
Longidorus (Needle)	1	1	1
Paratrichodorus (Stubby Root)	25	50	100
Paratylenchus (Pin)	No Data	No Data	No Data
Pratylenchus (Lesion)	25	50	100
Rotylenchus	No Data	No Data	No Data
Rotylenchulus (Reniform)	25	50	100
Tylenchorhynchus/Quinisulcius (Stunt)	25	50	50
Tylenchus/Psilenchus	FF	FF	FF
Xiphinema (Dagger)	40	40	40
Other:			
<b>B.Non-Stylelet Forms</b>	NP	NP	NP
<b>Nematodes Per Gram Dry Root</b>			
Hoplolaimus (Lance)	50	100	150
Pratylenchus (Lesion)	500*	400	1000
Meloidogyne (Root Knot)	50	100	150
Other:			

FF = Fungal Feeders, no threshold value assigned

NP = Non-pathogenic to cotton plants

\* = Lesion often high in young plants due to small root mass concentrating them; but plants can outgrow feeding effects of lesion nematodes under this number.

= Severely injurious nematodes

= Nematodes injurious in high numbers