

Phytonematodes in Legume Crops: Distribution, Types and Control Measures

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Received: 2025, 04, Oct

Accepted: 2025, 05, Nov

Published: 2025, 06, Dec

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Annotation: Legumes (beans, peas, mung beans, soybeans, etc.) play an important role in the agriculture of Uzbekistan. These crops increase soil fertility through nitrogen fixation, provide protein-rich products and are of great economic importance. However, the group that causes serious damage to their yield is phytonematodes. Phytonematodes are microscopic roundworms that damage the root system of plants and disrupt growth processes.

General information about phytonematodes

Phytonematodes are parasitic worms that live in the soil, most of which penetrate the roots of plants and suck out nutrients. Their length is usually 0.2–2 mm. Several main groups damage legumes:

Meloidogyne spp. (root knot nematodes)

Heterodera spp. (cyst nematodes)

Pratylenchus spp. (root-penetrating nematodes)

Tylenchulus, Hoplolaimus and other genera

Main phytonematodes found in legume crops

1. Root-knot nematodes (*Meloidogyne spp.*)

The most common and economically damaging species.

Forms swellings (nodules) on the roots.

The plant stops growing, the leaves turn yellow.

2. Cyst nematodes (*Heterodera glycines* and others)

Found in soybeans and other legumes.

White-yellow cysts are visible on the root surface.

Plants grow slowly, and the yield is sharply reduced.

3. *Pratylenchus* spp. (root-penetrating nematodes)

Enter the root tissue and eat it.

Increases the development of secondary diseases (fungi, bacteria).

Damage caused by nematodes

- Reduction in yield by 20–80%.
- As a result of the decay of the root system, water and nutrients are poorly absorbed.
- Plant growth slows down.
- Plants become susceptible to other diseases.
- Eggs and larvae are stored in the soil for years.

Detection methods

- The following methods are used to detect phytonematodes:
- Laboratory analysis of soil samples
- Detection of signs of nodules or cysts on the roots
- Microscopic examinations
- Molecular methods (PCR, DNA markers)

Control measures

1. Agrotechnical methods

Planting siderate crops.

Proper organization of crop rotation.

Use of high-quality, healthy seeds.

2. Biological control

Biological preparations based on *Paecilomyces lilacinus*, *Trichoderma*, *Bacillus* species.

Antagonist fungi and bacteria.

3. Chemical methods

Nematocidal preparations (use only those that are allowed).

Light soil disinfection.

4. Use of resistant varieties

Choosing varieties resistant to nematodes increases yields.

Conclusion

Legumes are very important economically and agronomically, and phytonematodes are one of the factors that cause serious damage to them. Their early detection, the use of scientifically based control measures, and the correct organization of agrotechnical measures are one of the most effective ways to obtain high yields. Scientific research on this topic will serve to develop more

effective strategies against phytonematodes in the conditions of Uzbekistan.

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