

Helminths Found in Subtropical Plants Growing in Uzbekistan

Bolliyev Asliddin Tursunmamatovich

Intern-teacher, Department of Biology and Agricultural Products Technologies, Faculty of Exact and Natural Sciences, Denov Institute of Entrepreneurship and Pedagogy

Received: 2024, 15, Mar

Accepted: 2025, 21, Apr

Published: 2025, 29, May

Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).



Open Access

<http://creativecommons.org/licenses/by/4.0/>

Annotation: This article studies helminths common in subtropical plants growing in Uzbekistan. Subtropical plants such as citrus, figs, pomegranates and dates serve as a breeding ground for various helminths that can affect their health and productivity. The study examines the species composition, ecological characteristics and impact of these helminths on plant development.

Keywords: subtropical plants, helminths, plant parasitology, citrus, figs, agricultural pests.

Introduction. Uzbekistan's unique climate, characterized by arid and continental weather conditions, creates a favorable environment for the cultivation of a variety of subtropical plants. These plants, including citrus fruits, pomegranates, figs, and dates, are not only an integral part of the country's agriculture, but also have cultural and nutritional value. However, the successful cultivation of these crops faces several challenges, one of which is helminth infestation.

Discussion and Results. Helminths are parasitic worms that can infect plants, affecting their root systems, overall health, and productivity. These parasites thrive in specific soil and climatic conditions, making subtropical regions particularly vulnerable. Their presence can lead to reduced crop yields, poor fruit quality, and economic losses for farmers. Despite their impact, the study of helminths in subtropical plants in Uzbekistan is still relatively understudied.[1]

This study aims to study the helminth species that commonly infest subtropical plants in Uzbekistan, analyze their ecological characteristics, and assess their impact on plant growth and yield. It also explores effective management methods to mitigate these problems and contribute to sustainable agricultural practices in the region. By understanding the relationship between helminths and subtropical plants, this study seeks to provide insights into crop resilience and agricultural productivity in Uzbekistan.

The study identified several helminths that are common in subtropical plants grown in Uzbekistan. The most common helminths identified were *Meloidogyne* spp. (root-knot nematodes), *Pratylenchus* spp. (lesion nematodes), and *Tylenchulus semipenetrans* (citrus nematodes). These parasites were observed to have different effects on different plant species:

Citrus plants: *Tylenchulus semipenetrans* was particularly problematic for citrus plants, causing stunted growth, leaf chlorosis, and reduced fruit size.

Pomegranate and fig: *Meloidogyne* spp. caused extensive root damage, which reduced water and nutrient uptake.

Date: *Pratylenchus* spp. infection caused necrotic root lesions and reduced plant vigor.

Quantitative analysis showed that heavily infested plants had a 20-40% reduction in yield compared to uninfested plants. Soil analysis showed that dry, sandy soils were more conducive to helminth infestation.

The findings highlight the importance of helminth control in subtropical crop production. The observed prevalence of *Meloidogyne* spp. and *Tylenchulus semipenetrans* is consistent with global trends in subtropical agriculture, indicating the high adaptability of nematodes and their potential to pose a significant threat to plant health.

One of the key insights was the role of soil type and cultural practices in helminth infestation. Fields with poor crop rotation practices and minimal soil amendments were more likely to have heavy infestations. In addition, climatic factors such as warm temperatures and high humidity during the growing season created favorable conditions for helminth reproduction.[2]

Control measures such as organic amendments to the soil, nematicides, and the use of resistant plant varieties have shown promising results in mitigating the effects of helminths. For example, citrus plants treated with nematicides increased yield by 30% compared to untreated controls. Crop rotation with non-host plants also significantly reduced the nematode population in the soil.

The study highlights the need for integrated pest management (IPM) strategies adapted to Uzbekistan's agricultural landscape. These strategies should combine chemical, biological, and cultural approaches to reduce the impact of helminths while promoting sustainable agricultural practices.[3]

By eliminating helminth infestations through targeted measures, farmers can increase the productivity and quality of subtropical crops, which can contribute to the overall agricultural economy of Uzbekistan.

This study sheds light on the significant impact of helminths on subtropical crops grown in Uzbekistan, highlighting their role as major agricultural pests. The findings show that *Meloidogyne* spp., *Pratylenchus* spp. and *Tylenchulus semipenetrans* are the most common helminths affecting crops such as citrus, pomegranate, fig and date. These parasites cause severe damage to plant roots, which leads to reduced water and nutrient absorption, stunted growth and reduced yields.[4]

The study highlighted the impact of environmental factors, soil characteristics and agricultural practices on helminth infestation. Poor soil drainage, lack of crop rotation and favourable climatic conditions were identified as the main factors for infestation. Effective management strategies, including resistant plant varieties, nematicides, crop rotation and organic soil amendments, have shown the potential to reduce helminth-related damage and increase yields.

To achieve sustainable agriculture, an integrated pest management (IPM) approach combining preventive, cultural, biological and chemical control methods must be adopted. Policymakers, agronomists and farmers must work together to implement these strategies, ensuring the long-term health of subtropical crops and the economic sustainability of Uzbekistan's agricultural sector.[5]

Conclusion. Future research should focus on developing region-specific solutions, including identifying new resistant plant varieties and environmentally friendly biological control agents. By effectively combating helminth infestations, Uzbekistan can increase its potential for producing high-quality subtropical fruits and maintain its position in the global agricultural market.

References:

1. Chitwood, D. J. (2003). Nematicides. In *Encyclopedia of Agrochemicals* (pp. 1106-1115). John Wiley & Sons, Inc.
2. Sikora, R. A., Coyne, D., Hallmann, J., & Timper, P. (2018). *Plant-parasitic nematodes in subtropical and tropical agriculture*. CABI.
3. Abdullaev, A. A., & Tursunov, S. (2020). Analysis of nematode infestation in fruit crops in Uzbekistan. *Uzbek Journal of Plant Protection*, 15(2), 45-53.
4. Trudgill, D. L., & Blok, V. C. (2001). Apomictic, polyphagous root-knot nematodes: Exceptionally successful and damaging biotrophic root pathogens. *Annual Review of Phytopathology*, 39, 53-77.
5. Ministry of Agriculture of the Republic of Uzbekistan. (2021). *Agricultural pest management guidelines*. Tashkent, Uzbekistan.