



## Control of Parasitic Diseases in the Iranian Horse Population

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### Abstract

**Background:** Parasitic and protozoan infections pose significant threats to the health, performance, and welfare of Iran's equine population, particularly among indigenous breeds such as Kurdish, Caspian, and Turkmen horses. Key pathogens include gastrointestinal nematodes (e.g., strongyles, *Parascaris equorum*), cestodes, bots (*Gasterophilus* spp.), filarial parasites (*Setaria equina*), ectoparasites (ticks, mites), and protozoa (*Theileria equi*, *Babesia caballi*). These agents contribute to clinical manifestations such as colic, anemia, weight loss, and diminished athletic output, with cascading effects on cultural heritage and economic viability. The emergence of anthelmintic resistance underscores the urgency for integrated parasite management (IPM).

**Methods:** This review consolidates national and international data, emphasizing diagnostic modalities including fecal egg count (FEC), enzyme-linked immunosorbent assay (ELISA), and Knott's test. Therapeutic interventions encompass chemical agents benzimidazoles, tetrahydropyrimidines, macrocyclic lactones, praziquantel and imidocarb for protozoal infections. Complementary non-pharmacological strategies include rotational grazing, cross-species pasture use, nutritional optimization, and biological control via nematophagous fungi.

**Results:** Epidemiological surveys in Iran reveal a *Setaria equina* prevalence of 32.1% in Urmia, *Trichinella* spp. seroprevalence ranging from 2.2% to 4.3% in West Azerbaijan, and *Theileria equi* infection rates reaching 19.6% in northern provinces. Resistance to anthelmintics has been documented in cyathostomins and *Parascaris equorum*. Field trials demonstrate that pasture inoculation with *Duddingtonia flagrans* significantly reduces infective larval burdens. Preliminary genetic analyses suggest that Kurdish horses may possess inherent resistance traits, offering potential for selective breeding programs.

**Conclusion:** A comprehensive IPM framework integrating targeted deworming based on FEC, strategic pasture management, and innovative biocontrol measures offers a sustainable pathway for mitigating parasitic and protozoan disease burdens in Iranian horses. Region-specific epidemiological insights are essential for tailoring interventions and safeguarding the genetic integrity of native breeds.



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**Keywords:** Anthelmintic resistance, Integrated parasite management, Targeted deworming, Iranian equine breeds, Protozoan infections, *Duddingtonia flagrans*, Selective breeding.

### Introduction:

Iran's equine population comprising indigenous breeds such as Kurdish, Caspian, and Turkmen horses plays a pivotal role in agriculture, competitive sports, and cultural heritage. However, the health and productivity of these horses are increasingly compromised by a spectrum of parasitic and protozoan diseases. Key etiological agents include gastrointestinal nematodes (*Strongylus* spp., cyathostomins, *Parascaris equorum*), cestodes (*Anoplocephala perfoliata*), bots (*Gasterophilus* spp.), filarial parasites (*Setaria equina*), ectoparasites (ticks, mites), and hemoprotozoa (*Theileria equi*, *Babesia caballi*). These infections manifest clinically as colic, anemia, weight loss, and diminished performance, resulting in substantial economic and welfare-related consequences (1,2).

Epidemiological data from Iran underscore the urgency of intervention: *Setaria equina* exhibits a prevalence of 32.1% in Urmia; *Trichinella* spp. seroprevalence ranges from 2.2% to 4.3% in West Azerbaijan; and *Theileria equi* infection rates reach up to 19.6% in northern provinces (3,4,5). Compounding the challenge is the emergence of anthelmintic resistance, particularly among cyathostomins and *Parascaris equorum*, which undermines conventional control strategies (1-6).

Given Iran's ecological diversity and the genetic distinctiveness of its native horse breeds, a regionally adapted approach to parasite control is imperative. This review synthesizes current evidence and proposes integrated parasite management (IPM) strategies that emphasize sustainable, breed-sensitive practices. The overarching aim is to safeguard equine health, preserve genetic resources, and enhance the resilience of Iran's equine sector.

### Materials and Methods:

This review synthesizes both Iranian and international literature on equine parasitic and protozoan diseases, with a focus on epidemiology, diagnostics, treatment modalities, and integrated control strategies. Iranian data sources include regional surveys on *Setaria equina* (2021–2022), seroprevalence studies of *Trichinella* spp. (2025), and prevalence reports of *Theileria equi* and *Babesia caballi* in northern provinces (3,4, 5). International references encompass guidelines from the American Association of Equine Practitioners (AAEP), global studies on anthelmintic resistance, and research on biological control using *nematophagous fungi* (1,6, 8).



## Literature Review and Data Sources

A systematic literature review was conducted using Iranian and global academic databases, including PubMed, Scopus, SID, and IranMedex. Inclusion criteria focused on peer-reviewed studies addressing equine parasitic and protozoan infections, diagnostic protocols, treatment efficacy, and sustainable management practices relevant to Iran's ecological and breed-specific contexts.

## Diagnostic Techniques

Diagnostic methodologies included:

- Fecal Egg Count (FEC): McMaster technique for quantifying gastrointestinal nematode burdens.
- Enzyme-Linked Immunosorbent Assay (ELISA): Applied for detection of *Anoplocephala perfoliata*, *Theileria equi*, and *Babesia caballi*.
- Knott's Test: Used for identification of filarial parasites, particularly *Setaria equina*.

## Therapeutic Approaches

Pharmacological treatments were categorized as follows:

- Anthelmintics: Benzimidazoles, tetrahydropyrimidines, macrocyclic lactones, and praziquantel.
- Antiprotozoals: Imidocarb dipropionate for *Theileria* and *Babesia* spp.
- Targeted Deworming: Based on FEC thresholds (>200–500 eggs per gram), with efficacy monitored via Fecal Egg Count Reduction Tests (FECRT).

## Non-Chemical Control Strategies

Complementary management practices included:

- Weekly manure removal to reduce environmental contamination.
- Cross-grazing with sheep or cattle to interrupt parasite life cycles.
- Rotational grazing to minimize pasture infectivity.
- Nutritional support through high-protein diets to enhance host resilience.
- Application of *nematophagous fungi* (*Duddingtonia flagrans*) to pastures for biological larval suppression.



### Genetic Resistance Evaluation

Genetic studies on Kurdish horses were reviewed to assess the feasibility of selective breeding for parasite resistance. Particular attention was given to traits suited for Iran's semi-arid regions and indigenous breed preservation (9,12).

### Data Analysis and Integration

Findings were synthesized to formulate region-specific Integrated Parasite Management (IPM) recommendations, aligning diagnostic precision, treatment efficacy, and ecological sustainability with the goal of protecting Iran's equine genetic resources.

### Results and Discussion:

Epidemiological data from Iranian equine populations reveal notable regional variations in parasitic and protozoan disease prevalence. *Setaria equina* exhibits a prevalence of 32.1% in Urmia, contrasting with a markedly lower rate of 1.37% in northern and northeastern provinces, where clinical signs such as weakness are commonly reported (3). Serological studies in West Azerbaijan indicate a *Trichinella* spp. seroprevalence of 2.2–4.3%, suggesting a relatively low zoonotic risk in equine hosts (4). Hemoprotozoan infections show higher prevalence in northern regions, with *Theileria equi* reaching up to 19.6%, while *Babesia caballi* remains comparatively infrequent (5).

High fecal egg counts (FEC) for gastrointestinal nematodes—particularly cyathostomins and *Parascaris equorum*—have been documented in Tabriz, underscoring the parasitic burden in young and adult horses (11). Resistance to benzimidazoles and pyrantel has been confirmed, complicating control efforts; ivermectin remains the primary agent for *Setaria equina* management (3,6). Selective deworming protocols, involving one to two treatments annually for adult horses and more frequent interventions for foals, have demonstrated efficacy in reducing drug pressure and delaying resistance development (2).

Pasture-based interventions have proven effective in reducing environmental parasite loads. Weekly manure removal and cross-grazing with sheep or cattle disrupt host-specific parasite life cycles, with studies in Mashhad reporting up to 70% reduction in infective larvae (3). Biological control using *nematophagous fungi* particularly *Duddingtonia flagrans* has emerged as a promising strategy. When administered as feed supplements (e.g.,  $10^6$  spores/kg feed daily for 1–2 weeks), fungal spores pass through the gastrointestinal tract and colonize manure, trapping and neutralizing nematode larvae. Field trials indicate a 60–80% reduction in pasture contamination during peak grazing seasons (spring/summer) (8).

Nutritional support plays a complementary role in parasite resilience. High-protein diets have been shown to enhance immune responses, particularly in Caspian horses, which often face





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resource constraints (10). Genetic investigations suggest that Kurdish horses may possess inherent resistance traits, offering potential for selective breeding programs. However, small population sizes and the risk of inbreeding necessitate cautious genetic management (9-12).

Despite these advances, several challenges persist. Limited veterinary infrastructure in rural areas, low farmer awareness of integrated parasite management (IPM), and the complexity of protozoan control particularly due to tick-borne transmission remain significant barriers. Addressing these issues requires a multifaceted approach. Future research should focus on:

- Developing cost-effective delivery systems for fungal biocontrol agents.
- Advancing vaccine development for protozoan pathogens.
- Validating genetic markers for resistance traits in indigenous breeds.

Ultimately, effective control of parasitic and protozoan diseases in Iranian horses hinges on region-specific IPM strategies. Collaboration among veterinarians, farmers, and researchers is essential to safeguard Iran's equine heritage, promote sustainable health management, and preserve the genetic integrity of native breeds.

### References:

1. Nielsen MK, Mittel L, Grice A, et al. *AAEP Parasite Control Guidelines*. Lexington (KY): American Association of Equine Practitioners; 2019.
2. Nielsen MK. Equine parasitology: challenges and opportunities. *Vet Clin North Am Equine Pract*. 2021;37(2):453–66. <https://doi.org/10.1016/j.cveq.2021.04.002>
3. Faghihzadeh Gorji F, Sadr S, Eshrati H, Borji H. An investigation of the prevalence of equine filariosis in North and Northeast of Iran. *J Parasit Dis*. 2024; 48:163–7. <https://doi.org/10.1007/s12639-023-01645-2>
4. Pirkani Z, Araghi-Sooreh A, Kamalinejad F. Study of *Trichinella* spp. seroprevalence in horse population of West Azerbaijan, Northwestern Iran. *Iran J Parasitol*. 2025;20(1):122–9. <https://doi.org/10.18502/ijpa.v20i1.18112>
5. Sazmand A, Bahari A, Papi S, Otranto D. Parasitic diseases of equids in Iran (1931–2020): a literature review. *Parasit Vectors*. 2020; 13:586. <https://doi.org/10.1186/s13071-020-04472-w>
6. Matthews JB. Anthelmintic resistance in equine nematodes. *Int J Parasitol Drugs Drug Resist*. 2014;4(3):310–5. <https://doi.org/10.1016/j.ijpddr.2014.10.003>
7. Reinemeyer CR, Nielsen MK. *Handbook of Equine Parasite Control*. 2nd ed. Hoboken (NJ): Wiley-Blackwell; 2017.



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8. Braga FR, Araújo JV. Nematophagous fungi in the control of equine gastrointestinal parasites. *Vet Parasitol.* 2014;200(3–4):215–22. <https://doi.org/10.1016/j.vetpar.2013.12.008>
9. Hosseinzadeh MR, Seyedabadi HR, Shamsadini H, et al. Genetic diversity and signatures of selection in four indigenous horse breeds of Iran. *Genet Sel Evol.* 2023; 55:59. <https://doi.org/10.1186/s12711-023-00817-3>
10. Burke JM, Miller JE. Sustainable approaches to parasite control in ruminant livestock and horses. *Vet Parasitol.* 2009;160(3–4):285–91. <https://doi.org/10.1016/j.vetpar.2008.11.009>
11. Eslami A, Gharehdaghi Y, Hashemzadeh-Kargari A. Fecal examination of the equids of Tabriz from the viewpoint of gastrointestinal helminth infestation. *J Vet Clin Pathol.* 2008; 1:245–50.
12. Seyedabadi HR, Baneh H, Hosseinzadeh MR, et al. Microsatellite analysis of genetic diversity and population structure in Iranian Kurdish horse. *J Equine Vet Sci.* 2023; 129:104881. <https://doi.org/10.1016/j.jevs.2023.104881>



## Microscopic Investigation of Soil Contamination of Public Places with *Toxocara* Species Eggs in Semnan Province

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### Abstract

**Background:** *Toxocara canis* and *Toxocara cati* are parasitic nematodes belonging to the genus *Toxocara*. Their definitive hosts are dogs and cats, respectively, and they can cause toxocariasis in humans. The primary route of human infection is contact with and ingestion of embryonated eggs of *Toxocara* species present in the environment. Soil is a significant source of transmission for this infection. Therefore, investigating contamination in environments is crucial. Consequently, the present study was conducted to assess the level of contamination with *Toxocara* spp. eggs in public areas across Semnan Province, Iran.

**Methods:** The microscopic method (zinc sulfate flotation) was used to identify contamination. A total of 43 samples were collected from parks in 10 cities of Semnan Province. Following initial sample preparation (including drying and sieving), examination was performed using the zinc sulfate flotation method.

**Results:** Of the 43 samples taken, 11 were positive and infected with eggs of one of the *Toxocara* species. Therefore, the infection percentage was 25.58%.

**Conclusion:** According to the results obtained in this study, the contamination rate in Semnan province was 25.58%. *Toxocara* species eggs can cause disease in humans as accidental hosts and the children may be more susceptible to infection with this disease due to their exposure to contaminated environments such as parks and playgrounds, as well as their poor hygiene practices. Therefore, parks and children's play areas in Semnan Province, like other areas, are contaminated with *Toxocara* species eggs and can potentially endanger children's health.

**Keywords:** Soil contamination, Toxocariasis, *Toxocara canis*, *Toxocara cati*, Semnan Province.