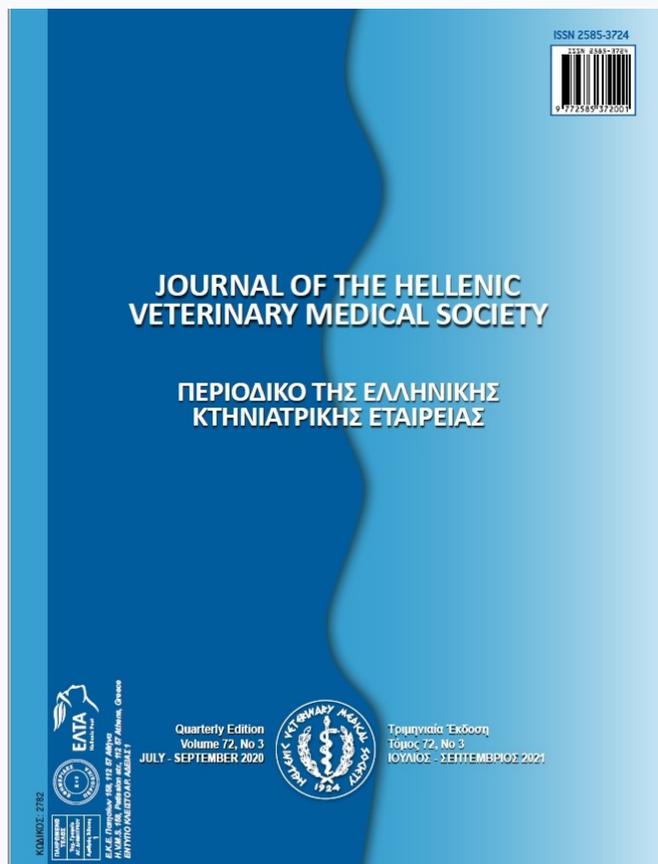


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First study on oxyuriasis in horses from Algeria: Prevalence and clinical aspects

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ABSTRACT: The present study was carried out the Tiaret region, on horses belonging to the Chaouchaoua National Haras, ONDEEC and on two private farms during the period from February 05th to April 17th, 2019. It aims to assess the overall prevalence of equine oxyuriasis in the area and to describe the most dominant clinical signs of this parasite infection.

Scotch tape test was applied on 176 horses randomly selected and the microscopic observation of slides was carried out at the parasitology laboratory of the Veterinary institute of Tiaret.

The overall prevalence of *Oxyuris equi* was 38.64% with females being more infected (37.04%) than males (20.45%). The prevalence of oxyuriasis was higher in fillies (70%) than in foals (48.39%). The high prevalence of *Oxyuris equi* was recorded in the private farms with a percentage of 85% and 44% in farm 1 and 2, respectively. The more commonly clinical signs were tail rubbing in 42% and scratching in 32% of positive horses. Equine oxyuriasis is a common infection in the study area and requires the application of hygienic measures with more therapeutic and preventive care.

Keywords: Oxyuriasis, horses, Algeria, prevalence

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INTRODUCTION

Horses are animals of great global economic importance and can be used for a wide variety of activities, such as sport, leisure and work (Rosa et al., 2018). The most common internal parasites of the horse are nematodes, among which strongyles (*Strongylus spp.*), ascarids (*Parascaris equorum*), pinworms (*Oxyuris equi*) and bots (*Gasterophilus spp.*) have the highest prevalence (Bulgaru and Tudor, 2016). These animals are considered very susceptible to helminths, which affect their health and decrease their performance (Rosa et al., 2018). Pinworms are the most frequent nematodes that affect horses of all ages and the infection is more common in stabled horses than in those at pasture because the eggs are poorly resistant in external conditions (Bussi eras and Chermette, 1995).

Oxyuris equi is a fairly large nematode (~1-6 cm in length) that resides as an adult in the small colon and dorsal colon of equids (Uquhart et al., 1996). *Oxyuris* is known as a pinworm because the tail end of the female is sharply pointed (Nielson et al., 2014). The predominant clinical sign of pin worm infection is the intense perianal pruritus caused by the sticky eggs deposited on the skin of perianal region (Beugnet et al., 2005).

Although oxyuriasis is of great importance in equine production, no study has been conducted in Algeria. For this reason, the present study was performed to assess the prevalence of this parasite infection in Tiaret province.

MATERIALS AND METHODS

The present study was conducted in Tiaret region (Algeria) on horses belonging to the Chaouchaoua National stud farm, to ONDEEC and two private stables from February to April 2019.

Study area description

Tiaret province is located in the west of Algeria (35° 15' N of latitude and 1° 26' E of longitude), 300 km to the southwest of Algiers. Its relief varies, with altitudes between 800 and 1200 m. It is an agropastoral zone with a Mediterranean continental type of climate with harsh winter, and hot and dry summer, and the rainfall is 300-400 mm per year on average. The maximum thermal average (26°C) is recorded in August and the minimum average (6°C) in January. The hot dry season can extend over six months (from May to October) (Boukabout, 2003; Houssou et al., 2018).

Animals

A total of 174 Barb and Arabian purebred horses of different sex and age were included in this study (Table 1). Most of horses (127) belong to the Chaouchaoua National Haras of Tiaret, which is of great importance in equine breeding. This stud farm was created in 1877 on a surface of 922 ha and it is the first source of horses used in racing. Other horses belonging to the national Office of Development of Equine and Camels Farms (ONDEEC) and two private stables were used in this study. All horses used in this study have not been dewormed two months at least prior to sampling.

Table 1. Number of horses examined

	Mares	Stallions	Foals	Fillies
Chaouchaoua National Haras	44	34	20	31
ONDEEC	01	10	0	0
Private stud farm 1	09	0	0	0
Private stud farm 2	27	0	0	0
Total	81	44	20	31

Clinical exam

All horses included in this study were subjected to clinical examination of the tail and the perineal region for any sign of pinworm infection.

Scotch tape test

This method is simple, fast and inexpensive (Gevrey, 1971). A transparent adhesive tape was applied to the skin of the perianal region, then removed and examined microscopically to identify the characteristic oxyurid eggs (Thienpont et al., 1979) (Fig. 1 and 2).



Figure 1: *Oxyuris equi* eggs at morula stage (without coloration) (G.X40).

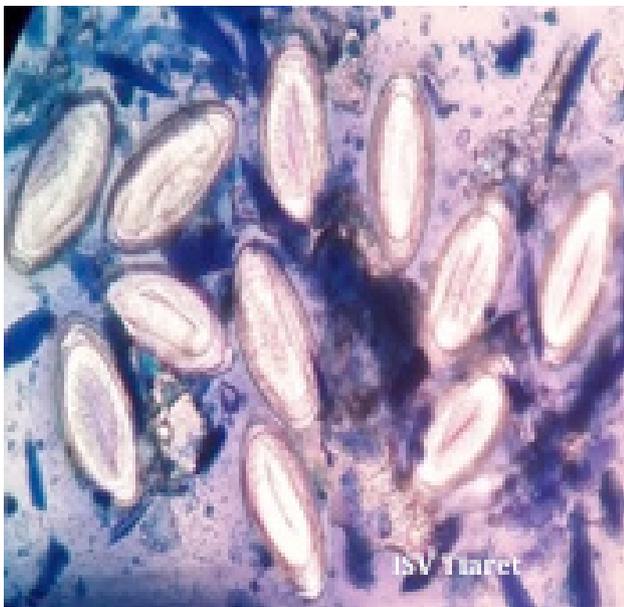


Figure 2: *Oxyuris equi* eggs at larval stage (G.X10).

RESULTS AND DISCUSSION

The present study conducted on the horses belonging to the national stud farm of Chaouchaoua, to the ONDEEC and two private stud farms has allowed the following results:

Overall Prevalence of pinworms infections among horses in Tiaret

The prevalence of horse pinworms in Tiaret is presented in Table 2.

Table 2. Overall prevalence of oxyuriasis in horses from Tiaret

Total number of samples	176
Positive samples	68 (38,64%)
Negative samples	108 (61,36%)

According to the results showed in table 2, the overall prevalence of pinworm infection in horses was 38.64%. A percentage of infection close to 36% was registered by Gawor (1995) in Poland. In contrast, high prevalence of 56.8% was reported by Torbert et al. (1986). Moreover, a low prevalence of oxyuriasis varying from 0.7 to 2% was recorded in Turkey and was mainly attributed to the sampling technique. In fact the eggs of *Oxyuris equi* are attached to the perianal skin and their research by coprological flotation technique in fecal samples taken from the rectum might not give the exact prevalence of the infection (Tolossa and Ashenafi, 2013; Sheferaw and Alemu, 2015).

Prevalence of horsepin worms based on sex and age group

The prevalence of *Oxyuris equi* based on sex and age group of animals is presented in table 3.

Table 3. Prevalence of *Oxyuris equi* in horses based on sex of animals and age groups

Horses	No. of animal examined	Positive	Prevalence
Stallions	44	9	20.45%
Mares	81	30	37.04%
Foals	31	15	48.39%
Fillies	20	14	70%
Total	176	68	38.64%

The results of table 3 indicated that the highest prevalence of *Oxyuris equi* was recorded in fillies with 70% followed by 48.39% in foals, 37.04% in mares and 20.45% in stallions. Our results are consistent with those of Collobert et al. (1996) who found that foals of less than 2 years of age are more susceptible to oxyurid infections than adults with a prevalence of 80% and 56.6%, respectively. In contrast, Belay and al. (2016) reported a prevalence of 2.1% in horses less than 2 years old and 2.3% prevalence in adult horses between 2 and 10 years old. Our findings disagree also with the work of Alanazi et al. (2011) who reported a prevalence of 2.22% and 6.66% in foals and adults, respectively in a study carried out in Saudi Arabia.

Regarding the sex of animals examined, the current study indicated that sex had influence on the prevalence of *Oxyuris equi* being females more infected than males and this agrees with the finding of Hassan et al. (2013) who have reported a prevalence of 54% in females and 46% in males. In contrast, the prevalence of *Oxyuris equi* was higher (65.90%) in males than females (35.55%) as reported by Alanazi et al. (2011).

Prevalence of *Oxyuris equi* in the different stables included in the study

Horses included in the current study belonged to four different stables and the rate of infection in each stable is presented in table 4.

Table 4. Prevalence of *Oxyuris equi* in horses based on their origin

Stable	No. of examined animals	No. of positive	Prevalence
Chaouchaoua National Haras	129	40	31.01%
ONDEEC	11	1	9.09%
Private stable 1	9	4	44.44%
Private stable 2	27	23	85.19%
Total	176	68	38.64%

Data represented in table 4 showed that the greatest percentage of horses with oxyurids belonged to both private stables with 85.19% for stable 2 and 44.44% for stable 1 and the lowest prevalence (9.09%) was obtained in horses from ONDEEC. However, the Chaouchaoua National Haras has registered a prevalence of 31.01%. The observed difference could be attributed to the conditions of housing and some management practices applied in each stable.

In fact, the highest prevalence recorded in the two private stables could be explained by the poor hygienic conditions and the neglected veterinary care given to these horses. It is well known that *Oxyuris equi* has direct life cycle where adult female worms living within the caecum and colon shed eggs which are excreted in faeces, then the larvae develop, hatch and moult to the infective third stage (L3) which serve as a source of contamination of housing facilities, pasture and feedstuff resulting thereby in infection or re-infection of susceptible horses (Wosu and Odubi, 2014).

Therefore, the main way to inhibit parasite from completing its life cycle and to prevent horses from infection is to apply some simple management practices such as regular removal of faeces from stables (several times daily or at least once a day), cleaning thoroughly water and feed buckets (Proudman and Matthews, 2000). Unfortunately, these conditions were not respected in the private stables. Other management problems could play an important role in the prevalence of oxyurid infection in horses belonging to these stables such as use of a single rectal sleeve for rectal examination of many mares during pregnancy diagnosis, use of the same stall by multiple horses and irregular change of bedding.

Clinical signs of horse's pinworms

Table 5. Principal signs observed in infected horses

Clinical signs	Number of animals	Prevalence (%)
Scratching	50	31,65
Tail rubbing	67	42,41
Yellow-grey egg masses on the perianal skin	33	20,89
Injuries on the perineal region	08	5,06
Total	158	100

Results shown in table 5 revealed that the more observed sign was tail rubbing (Fig. 3) with a prevalence of 42.41% followed by scratching (31.65%) and the presence of grey-yellowish egg masses on the perianal skin (20.89%) while the presence of injuries on the perineal region (Fig. 4) was only recorded in 5.06% of infected animals. Our results revealed that 86.76% of infected horses presented more than one sign (47.06% presented two signs, 33.82% three signs and 5.88% four signs). Beugnet et al. (2005) reported that severe itching of the perineal skin was the more common clinical sign. The infected animal rubs very frequently against any object in its environment causing consequently the break off hairs and giving the tail a rat tail appearance (Fig. 5).

**Figure 3:** Tail rubbing.



Figure 4: Injuries and lesions on the perianal skin



Figure 5: Rat tail.

CONCLUSION

The present study conducted on equine oxyuriasis in Tiaret showed the high occurrence of *Oxyuris equi* pinworms in this region. However, the attention given to this disease often confused with scabies and pthiriosis and affecting the well-being and productivity of stabled horses remains insufficient and needs more importance.

This is the first study on equine oxyuriasis in Algeria, so further investigations are needed in order to know the different risk factors affecting the prevalence of *Oxyuris equi* infection in horses and other equids.

In the light of our findings, regular screening of *Oxyuris equi* infection in stabled horses is highly recommended. In addition, strategic deworming programmes should be applied regularly. Also, it is well recommended to improve housing and to apply some management practices based primarily on appropriate hygienic conditions. Further, each newly purchased animal must be quarantined, and properly screened to prevent the spread of parasite infection.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this study.

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