

Rapid Communication

Vector Borne Diseases in Mid Western Argentina, First Report of *Setaria Equina* [Nematoda: Onchocercidae] in A Horse [*Equus caballus*]

Mera y Sierra R^{1*}, Iranzo J² and Neira G¹

¹Research Center in Regional Parasitology, Juan Agustín Maza University, Argentina

²Faculty of Veterinary and Environmental Sciences, Juan Agustín Maza University, Argentina

*Corresponding author: Mera y Sierra R, Research Center in Regional Parasitology, Juan Agustín Maza University, Argentina

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Abstract

Vector borne diseases are spreading worldwide. Companion animals can be useful as sentinels for disease surveillance. *Setaria spp.* are filarial nematodes transmitted by *Aedes spp.* and *Culex spp.* *Setaria equina* has been reported in Asia, Africa and North America. This zoonotic nematode is frequently asymptomatic in horses, except during its erratic migrations. Filarial worms have a tropism for ocular and nervous tissues, having important implications in veterinary and public health. In mid west Argentina, *Dirofilaria immitis* has already been described affecting a woman and dogs. There are no published reports of *Setaria equina* in Argentina. During spring of 2016, an adult mare died and at necropsy, nematodes were found in the peritoneal cavity. These parasites were morphologically identified as *Setaria equina*. The occurrence of this disease in the region highlights the importance of entomologic and sanitary surveillance.

Keywords: *Setaria equina*; Vector borne diseases; Argentina; Horse

Abbreviations

VBD: Vector Borne Diseases

Introduction

Nowadays, vector borne diseases are a matter of concern for animal and public health. These diseases are expanding at an alarming rate. Animals play a crucial role as reservoirs of many VBD, and can act as sentinels, giving early warning of the presence of VBD thus aiding in the application of prevention strategies [1-3]. Companion animals, such as dogs, cats and horses are reservoirs of parasitic, bacterial and viral VBD [4]. Filarial worms of *Setaria spp.* genus are vector borne pathogens of ungulates and recently, *Setaria equina*, was confirmed to affect humans [5,6]. This nematode is transmitted by *Aedes aegypti*, *A. pampaensis*, *Culex pipiens fatigans* [7], *Cx. quinquefasciatus* [8], *Ae. caspius*, *Ae. claviger*, *Ae. maculipennis* [9,10], *Ae. Albopictus* [11], *Ae. Togo* [12] and *Ae. Canadensis* [13]. There are reports of *Setaria equina* infecting equines on Asia [14], Africa [15], Europe [16], United States [17] and Mexico [18]. In South America, there are no published reports of *Setaria equina*. The only filarial worm affecting horses published is *Onchocerca cervicalis* in animals of Colombia [19], Brazil [20] and northern Argentina [21]. In mid western Argentina, *Dirofilaria immitis*, a mosquito borne nematode, has been recently found in a human and dogs [22]. There is no other mosquito transmitted nematode published for this region, despite the fact that both parasites share the same vector genus [11,23]. The aim of this study is to report the first case of *Setaria equina* in a horse from mid western Argentina.

Materials and Methods

In October of 2016 a Peruvian step horse adult mare died from acute abdomen syndrome. During the necropsy, nematodes were

found in the abdominal cavity. The parasites were kept in 70% ethanol until they were analyzed at the laboratory. Their identification was done by morphological characterization of the cephalic and caudal end according to Anderson 1967 and Thwait 1927 [24,25].

Results and Discussion

The nematode was identified as a filarial worm of the specie *Setaria equina* (Figure 1). This finding is, to the best of our knowledge, the first report of *Setaria equina* in Argentina. *S. equina* was recently found in the subconjunctival tissue of a woman from Iraq [6], confirming its zoonotic potential. In the mid western region of Argentina, *D. immitis* was also found in the subconjunctival tissue of a woman's eye [22]. Other species like *Setaria labiatopappilosa* and *Setaria digitata*, parasites of cattle, have been also found in the eyes of humans and animals [26,27]. It has been affirmed that filaroid nematodes that erratically migrate have a tropism for the ocular tissue and the nervous system in humans and animals [5,28,29]. Therefore, this nematodiasis has very important implications in animal and human health due to its erratic localizations. Besides the importance of reporting an emerging VBD in the region, the presence of this nematode alerts about the active spreading to this area of the nation of vector borne zoonotic diseases as it is happening all over the world [29,30]. This is another example of how animal disease surveillance alerts of the presence of zoonotic diseases [31].

Conclusion

The emergence of *Setaria equina* in mid west Argentina confirms the active spread of VBD into the region. Moreover, it has sanitary consequences for horses, taking into account that erratic migration is frequent in filariasis. This could mean economic losses, due to the fact that horses are important in sports and as working animals in Argentina. On the other hand, the occurrence of this VBD should

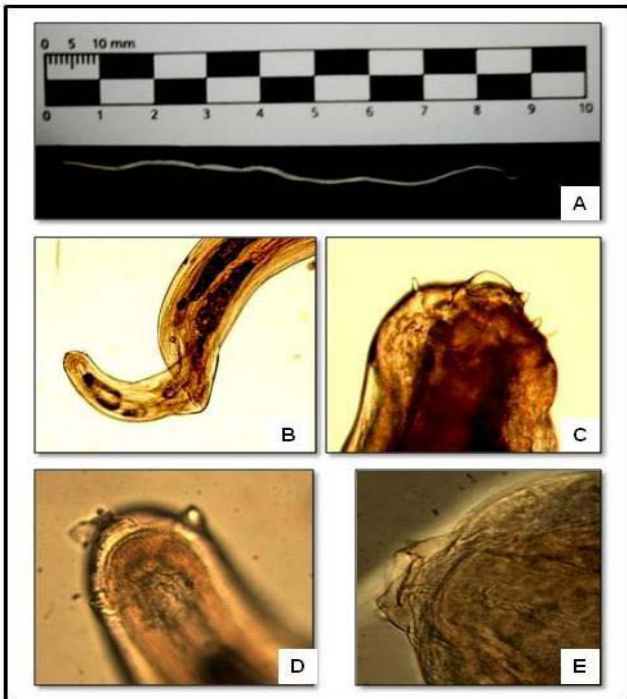


Figure 1: A) Macroscopic view of *Setaria equina*; B, D) Caudal end of a female *Setaria equina* with cuticular appendages near the caudal tip (100X and 400X); C, E) Anterior end with four triangular spine like structures near the oral opening (100X and 400X).

aware public health for the strengthening of entomologic and sanitary surveillance.

References

- National Academies of Sciences Engineering and Medicine. Global health impacts of vector-borne diseases: Workshop summary. In: Press TNA, editor. Washington, DC. 2016.
- Halliday JEB, Meredith AL, Knobel DL, Shaw DJ, Bronsvoort BMDC, Cleaveland S. A framework for evaluating animals as sentinels for infectious disease surveillance. 2007; 4: 973-984.
- Day MJ. One health: the importance of companion animal vector-borne diseases. Parasit Vectors [Internet]. 2011; 4: 49.
- Harrus S, Baneth G. Drivers for the emergence and re-emergence of vector-borne protozoal and bacterial diseases. Int J Parasitol. 2005; 35: 1309-1318.
- Innes JRM, Shoho C. Cerebrospinal nematodiasis. Focal Encephalomyelomalacia of Animals Caused by Nematodes (*Setaria digitata*); A disease which may occur in Man. AMA Arch Neurol psychiatry. 1953; 70: 325-349.
- Nabie R, Spotin A, Rouhani S. Subconjunctival setariasis due to *Setaria equina* infection; a case report and a literature review. Parasitol Int [Internet]. 2017; 66: 930-932.
- Heisch RB, Nelson GS, Furlong M. Studies in filariasis in East Africa. 1. Filariasis on the Island of Pate, Kenya. Trans R Soc Trop Med Hyg. 1959; 53: 41-53.
- Tung KC, Cheng FP, Lai CH, Wang KS, Wang JS, Lee WM. Demonstration of vector competence of *Culex quinquefasciatus* (Diptera: Culicidae) for *Setaria digitata*. Vet Parasitol. 2004; 123: 279-284.
- Pietrobelli M, Cancrini G, Frangipane di Regalbono A, Gallupi R, Tampieri P. Development of *Setaria labiatopapillosa* in *Aedes caspius*. Med Vet Entomol. 1998; 12: 106-108.
- Cancrini G, Pietrobelli M, Frangipane Di Regalbono A, Tampieri MP. Mosquitoes as vectors of *Setaria labiatopapillosa*. Int J Parasitol. 1997; 27: 1061-1064.
- Cancrini G, Pietrobelli E, Frangipane di Regalbono A, Tampieri P, della Torre A. Development of *Dirofilaria* and *Setaria* nematodes in *Aedes albopictus*. Parasitologia. 1995;37: 141-145.
- Yen PKF, Zaman V, Mak JW, Road P. Identification of some common infective filarial larvae in Malaysia. J Helminthol. 1982; 56: 69-80.
- LeBrun R, Dziem G. Natural incidence of *Setaria equina* Nematoda Filarioidea from *Aedes canadiensis* Diptera Culicidae in North America. J Med Entomol. 1984; 21: 472-473.
- Suleiman EG, Aghwan SS, Al-Iraqi OM. Detection of microfilaria infection in horses in Mosul city. Iraqi J Vet Sci. 2012; 26: 23-26.
- Radwan AM, Ahmed NE, Elakabawy LM, Ramadan MY, Elmadaawy RS. Prevalence and pathogenesis of some filarial nematodes infecting donkeys in Egypt. Vet World. 2016; 9: 888-892.
- Zanzani S, Piseddu E, Barelli A, Manfredi MT. What is your diagnosis? CBC and blood film from an Italian thoroughbred gelding. Vet Clin Pathol. 2014; 43: 609-610.
- Yeangan MR, Lyons ET, Kania SA, Patton S, Breathnach CC, Horohov DW, et al. Incidental isolation of *Setaria equina* microfilariae in preparations of equine peripheral blood mononuclear cells. Vet Parasitol. 2009; 161: 142-145.
- Rodríguez-vivas RI, Dzul-canché U, Sierra-lira EM, Aranda-cirerol FJ. Filariosis por *Setaria equina* en un caballo del estado de. Rev Biomédica. 2000; 11: 183-185.
- Eberhard M, Orihel T. Equine and Bovine Onchocerciasis in Colombia, S. A. J Parasitol. 1978; 64: 191-192.
- Marques SMT, Scroferneker ML. *Onchocerca cervicalis* in Horses from Southern Brazil. Trop Anim Health Prod. 2004; 36: 633-636.
- Mancebo OA, Verdi JH, Bulman GM. Comparative efficacy of moxidectin 2% equine oral gel and ivermectin 2% equine oral paste against *Onchocerca cervicalis* (Railliet and Henry, 1910) microfilariae in horses with naturally acquired infections in Formosa (Argentina). Vet Parasitol. 1997; 73: 243-248.
- Cuervo PF, Mera R, Waisman V, Gerbeno L, Sidoti L, Albonico F, et al. Detection of *Dirofilaria immitis* in mid-western arid Argentina. Acta Parasitol. 2013; 58: 612-614.
- Kronefeld M, Kampen H, Sassnau R, Werner D. Molecular detection of *Dirofilaria immitis*, *Dirofilaria repens* and *Setaria tundra* in mosquitoes from Germany. Parasit Vectors [Internet]. 2014; 7: 30.
- Anderson RC. The comparative morphology of cephalic structures in the superfamily Filarioidea (Nematoda). Can J Zool. 1968; 46: 181-199.
- Thwaite JW. The Genus *Setaria*. Ann Trop Med Parasitol. 1927; 21: 427-466.
- Țălu S, Ștefănuț A, Mihalca A, Coroiu Z. Subconjunctival infestation with *Setaria*. Helminthologia [Internet]. 2012; 49: 119-121.
- Panaiteșcu D, Preda A, Bain O, Vasile Bugariu A. Four cases of human filariasis due to *Setaria labiatopapillosa* found in Bucharest, Romania. Roum Arch Microbiol Immunol. 1999; 58: 203-207.
- INNES JRM, SHOHO C. Nematodes, nervous disease, and neurotropic virus infection; observations in animal pathology of probable significance in medical neurology. Br Med J [Internet]. 1952; 2: 366-368.
- Otranto D, Eberhard ML. Zoonotic helminths affecting the human eye. Parasit Vectors [Internet]. 2011; 4: 41.
- Mera y Sierra R, Neira G, Cargnelutti DE. Dissemination of visceral leishmaniasis to Western Argentina: When will imported canine vector-borne zoonotic diseases start being local? J Microbiol Immunol Infect. 2016; 05: 001.
- Morse SS. Factors and determinants of disease emergence. Rev Sci Tech [Internet]. 2004; 23: 443-51.