



Oestrid myiasis in European Mouflon from Spain

Authors: Moreno, Virginia, Pérez, Jesus M., Moreno, Pedro A., Granados, José E., Ruiz-Martinez, Isidoro, et al.

Source: Journal of Wildlife Diseases, 35(1) : 78-81

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-35.1.78>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Oestrid myiasis in European Mouflon from Spain

Virginia Moreno,¹ Jesus M. Pérez,^{1,5} Pedro A. Moreno,¹ José E. Granados,¹ Isidoro Ruiz-Martínez,^{1,4} Ramon C. Soriguer,² and Miguel A. de Simon,³ ¹ Departamento de Biología Animal, Vegetal y Ecología. Universidad de Jaén. Paraje Las Lagunillas, S.N. E-23071, Jaén, Spain; ² Estación Biológica de Doñana (CSIC). Av. María Luisa, S.N. E-41013, Sevilla, Spain; ³ Parque Natural de las Sierras de Cazorla, Segura y Las Villas. C/ Martínez Falero, 11, E-23470, Cazorla, Jaén, Spain; ⁴ We dedicate this work to our friend and colleague Dr. Ruiz-Martínez, who died last July in a tragic mountain accident; ⁵ Corresponding author (e-mail: jperez@ujaen.es).

ABSTRACT: From February 1992 to March 1997, 245 European mouflon (*Ovis orientalis musimon*) from Sierras de Cazorla, Segura y Las Villas Natural Park (southern Spain) were surveyed for oestrid larvae in order to estimate prevalence and mean intensity of parasitism by *Oestrus ovis*. Over 46 percent of the animals surveyed were infected, with a mean intensity of 9.6 larvae/host parasitized. No significant differences in prevalence rates between host sexes were observed, but older mouflons were infected with more larvae than younger ones.

Key words: European mouflon, nasal myiasis, *Oestrus ovis*, *Ovis orientalis musimon*, sheep bot fly, survey.

The sheep bot fly, *Oestrus ovis*, a cosmopolitan species with a Palaearctic origin, is mainly a parasite of domestic sheep and goats (Zumpt, 1965; Haeselbarth et al., 1966; Jagannath et al., 1989b). This fly also has been reported from wild sheep and goats including the Siberian ibex (*Capra ibex sibirica*), argali (*Ovis ammon*) (Grunin, 1957; Wetzell and Bauristhene, 1970) and bighorn sheep (*O. canadensis*) (Capelle, 1966; Bunch and Webb, 1979; Allen and Bunch, 1982). Due to similarity to other *Oestrus* spp., *O. ovis* has not been confirmed from African antelopes. However, Howard (1980) reported that it may occur in Nubian ibex (*C. ibex nubiana*) and Barbary sheep (*Ammotragus lervia*). A case of nasal myiasis by *O. ovis* in a domestic dog from the Canary Islands (Spain) has been recently reported by Lucientes et al. (1997), and *O. ovis* larvae fairly frequently have been identified as causing human ophthalmomyiasis (Nabeel and Saliba, 1978; Apt et al., 1980).

This parasitism may be a predisposing factor for caprine pleuropneumonia (Jagannath et al., 1989a). In bighorn sheep, chronic sinusitis is considered as a major

mortality factor, especially in captive conditions. Presumably, chronic sinusitis is due to bacterial infection induced by the bot fly parasitism (Bunch and Webb, 1979; Allen and Bunch, 1982).

The impact of *O. ovis* in livestock is well known (e.g., Cobbett and Mitchell, 1941; Unsworth, 1949; Horak, 1977; Horak and Butt, 1977; Pangui et al., 1988; Pandey, 1989; Ruiz et al., 1992), and the biology, ecology, and bionomics of this oestrid have been investigated (see Rogers and Knapp, 1973; Breev et al., 1980; Jagannath et al., 1989b; Bart and Minar, 1992). Climate influences life-cycle duration and number of generations per year, and is related to a high mortality rate (up to 99%) in larval stages. Nevertheless, data on occurrence of this parasite on wild hosts are scarce. The main goal of our study was to analyze basic epidemiological parameters influencing oestrosis affecting the European mouflon (*Ovis orientalis*), an exotic ungulate species which was released in southern Spain during the 1950's and 1960's. Presently mouflon are sympatric with red and fallow deer (*Cervus elaphus* and *Dama dama*) and Spanish ibex (*Capra pyrenaica*) in this mountain range.

From February 1992 to March 1997, 245 European mouflon were surveyed for oestrid larvae. Samples came from the Sierras de Cazorla, Segura y Las Villas Natural Park, southern Spain (38°30'N, 2°45'E). Sampling was limited to the official hunting season (October to March). The head and neck were removed from each carcass and frozen in plastic bags (−4C, 12 to 48 hr after death) until they were examined. Age of mouflon was assessed by counting horn rings and teeth

replacement (Pfeffer, 1967). Necropsies were conducted following the method described by Ruiz et al. (1993) and Pérez et al. (1996), and oestrid larvae were identified according to Grunin (1957), Zumpt (1965) and Wetzel and Bauristhene (1970). Prevalence and mean intensity of oestrosis were calculated according to Margolis et al. (1982) and Bush et al. (1997). Differences in intensities and prevalences between different host sex and age classes were tested by means of ANOVA or Mann-Whitney analyses and chi-squared, respectively, (Sokal and Rohlf, 1995), using the BMDP program (Dixon, 1990). Type material, consisting of 5 L₂ and 5 L₃ larvae, was deposited at the Museo Nacional de Ciencias Naturales (CSIC: Madrid, Spain).

A total of 1,100 bots were removed from 114 mouflon, for a prevalence of 47%. All larvae were *O. ovis*. Prevalence was similar in males (46%) and females (47%) (Table 1). Prevalence tended to increase with host age (Table 1), but these differences were not significant ($\chi^2 = 16.985$; $df = 10$; $P = 0.0747$). The mean (\pm SD) intensity was 9.6 ± 17.9 larvae/host parasitized (range = 1–142), with 105 and 142 larvae from an 11-yr-old female and an 8-yr-old male, respectively. If these extreme values are deleted, no significant differences were observed in the intensity of oestrid larvae across sexes (Mann-Whitney's $U = 51.61$; $P = 0.9397$). The mode in the parasitized hosts was 1 ($n = 16$). However, intensity of parasitism in older mouflons was higher relative to younger ones (Levene's $F = 4.47$; $df = 10$; $P < 0.0001$). The distribution of larvae within hosts followed a negative binomial distribution ($K = 0.251$; $\bar{x} = 2.463$; variance = 16.372; Diggle, 1983).

The prevalence observed in this study are close to values given by other authors for domestic sheep and goats parasitized by *O. ovis*. Prevalence observed in mouflon was less than levels in sheep in southern Spain and Morocco (Ruiz et al., 1992), and less than those seen in other wild ungulate species such as Spanish ibex, red

TABLE 1. Parasitism in 245 European mouflon by *Oestrus ovis*, according to sex and age classes collected February 1992 to March 1997 in southern Spain.

Statistic	Age									
	≤2-yr-old		3- to 5-yr-old		6- to 9-yr-old		≥10-yr-old			
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Number examined	38	63	18	46	13	53	0	14	0	14
Number infected (%)	14 37	20 32	9 50	23 50	9 69	30 57	—	9 64	—	9 64
Mean intensity (\pm SD)	6.7 \pm 6.4	7.2 \pm 7.8	11.2 \pm 10.6	6.8 \pm 4.2	29.0 \pm 44.2	6.0 \pm 8.7	—	17.6 \pm 31.2	—	17.6 \pm 31.2
Range of intensity	1–22	1–32	1–37	1–17	1–142	1–44	—	2–105	—	2–105

deer and fallow deer, from the same study area (Ruiz et al., 1993; Pérez et al., 1996).

The mean intensity of *O. ovis* also was within the range of values obtained in other studies on the occurrence of larvae of this species in domestic animals. Increased numbers of larvae with host age has been reported previously in wild ungulates (Ruiz et al., 1993; Pérez et al., 1996) and this may be explained by the availability of greater space provided by the nasopharyngeal areas and the frontal and horn sinuses of older animals. More data acquired during different months are needed to determine the seasonal dynamics of oestrosis in mouflon as well as in the domestic sheep which are sympatric.

Price (1980) analyzed the host-specificity of different kinds of parasites, including Old World oestrids, and noted that 49% of oestrid species are specific to a single host species. This author suggested that specificity in the Oestridae results partially from limitation in the number of available hosts rather than strong selection pressures for specialization on one or a few hosts. The record of *P. picta*, normally a parasite of red deer, parasitizing mouflon in Hungary (Sugar, 1974) supports the idea that oestrid flies can be opportunists. The same happens with *O. ovis* when it accidentally parasitizes the dog or human.

We thank E. González-Capitel, Director-Conservator of the Sierras de Cazorla, Segura y Las Villas Natural Park, for coordination in obtaining samples. We also are indebted to J. Navarro, M. C. Pérez and M. L. Bueno for their help in transporting samples and performing necropsies.

LITERATURE CITED

- ALLEN, S. D., AND T. D. BUNCH. 1982. Cranial lesions attributable to chronic sinusitis in bighorn sheep. *Journal of the American Veterinary Medical Association* 181: 1418–1419.
- APT, W., C. SALINAS, AND F. GUERRERO. 1980. Myiasis ocular externa por larvas de *Oestrus ovis*. *Revista Médica de Chile* 108: 921–923.
- BART, A. G., AND J. MINAR. 1992. Probability description of regulation on the level of population and individual in the host-parasite system using *Oestrus ovis* (Diptera: Oestridae) as an example. *Folia Parasitologica* 39: 75–83.
- BREEV, K. A., R. G. ZAGRETDINOV, AND J. MINAR. 1980. Influence of constant and variable temperatures on pupal development of the sheep bot fly (*Oestrus ovis* L.). *Folia Parasitologica* 27: 359–365.
- BUNCH, T. D., AND P. WEBB. 1979. Desert bighorn chronic sinusitis in Arizona. *Desert Bighorn Council Transactions* 1979: 25–32.
- BUSH, A. O., K. D. LAFFERTY, J. M. LOTZ, AND A. W. SHOSTAK. 1997. Parasitology meets ecology on its own terms: Margolis et al. revisited. *The Journal of Parasitology* 83: 575–583.
- CAPELLE, K. J. 1966. The occurrence of *Oestrus ovis* L. (Diptera: Oestridae) in the bighorn sheep from Wyoming and Montana. *The Journal of Parasitology* 52: 618–621.
- COBBETT, N. G., AND W. C. MITCHELL. 1941. Further observations on the life-cycle and incidence of the sheep bot, *Oestrus ovis*, in New Mexico and Texas. *American Journal of Veterinary Research* 1/2: 358–360.
- DIGGLE, P. J. 1983. *Statistical analysis of spatial point patterns*. Academic Press, London, UK, 148 pp.
- DIXON, W. J. (ED.). 1990. *BMDP statistical software manual*. University of California Press, Berkeley, California, 1385 pp.
- GRUNIN, K. Y. 1957. Nasal bot flies (Oestridae). *Fauna of the U.S.S.R. Dipterous insects* 19: 1–147. [in Russian.]
- HAESSELBARTH, E., J. SEGERMAN, AND F. ZUMPT. 1966. The arthropod parasites of vertebrates in Africa south of the Sahara (Ethiopian region). Vol. III (Insecta Excl. Phthiraptera). The South African Institute for Medical Research, Johannesburg, South Africa, 283 pp.
- HORAK, I. G. 1977. Parasites of domestic and wild animals in South Africa. I. *Oestrus ovis* in sheep. *Onderstepoort Journal of Veterinary Research* 44: 55–64.
- , AND M. J. BUTT. 1977. Parasites of domestic and wild animals in South Africa. II. *Oestrus ovis* in goats. *Onderstepoort Journal of Veterinary Research* 44: 65–68.
- HOWARD, G. W. 1980. Second stage larvae of nasal botflies (Oestridae) from African antelopes. *Systematic Entomology* 5: 167–177.
- JAGANNATH, M. S., N. COZAB, AND S. K. VIJAYASARATHI. 1989a. Histopathological changes in the nasal passages of sheep and goats infested with *Oestrus ovis* (Diptera: Oestridae). *Indian Journal of Animal Sciences* 59: 87–91.
- , ———, S. A. RAHMAN, AND T. G. HONNAPPA. 1989b. Studies on the biology of *Oestrus ovis* Linnaeus, 1761 (Diptera: Oestridae). *Indian Veterinary Journal* 66: 677–679.
- LUCIENTES, J., M. FERRER, M. J. ANDRES, M. A. PERIBANEZ, M. J. GRACIA, AND J. A. CASTILLO.

1997. Canine myiasis by sheep bot fly (Diptera: Oestridae). *Journal of Medical Entomology* 34: 242–243.
- MARGOLIS, L., G. W. ESCH, J. C. HOLMES, A. M. KURIS, AND G. A. SCHAD. 1982. The use of ecological terms in Parasitology (report of an ad hoc committee of the American Society of Parasitologists). *The Journal of Parasitology* 68: 131–133.
- NABEEL, C., AND E. K. SALIBA. 1978. External ophthalmomyiasis due to *Oestrus ovis* L. in Jordan. *Jordan Medical Journal* 13: 29–34.
- PANDEY, V. S. 1989. Epidemiology of *Oestrus ovis* infection on sheep in the Highveld of Zimbabwe. *Veterinary Parasitology* 31: 275–280.
- PANGUI, L. J., P. DORCHIES, AND J. BELOT. 1988. Contribution a l'étude épidémiologique de l'oestrose ovine au Sénégal. *Revue Médicale et Veterinaire* 139: 701–704.
- PÉREZ, J. M., J. E. GRANADOS, R. C. SORIGUER, AND I. RUIZ. 1996. Prevalence and seasonality of *Oestrus caucasicus* Grunin, 1948 (Diptera: Oestridae) parasitizing the Spanish ibex, *Capra pyrenaica* (Mammalia: Artiodactyla). *The Journal of Parasitology* 82: 233–236.
- PFEFFER, P. 1967. Le mouflon de Corse (*Ovis ammon musimon*). Position systématique, écologie et éthologie comparées. *Mammalia* 31 (supplement): 1–262.
- PRICE, P. W. 1980. *Evolutionary biology of parasites*. Princeton University Press, New Jersey, 237 pp.
- ROGERS, C. E., AND F. W. KNAPP. 1973. Bionomics of the sheep bot fly, *Oestrus ovis*. *Environmental Entomology* 2: 11–23.
- RUIZ, I., J. M. PÉREZ, AND M. LOUASSINI. 1992. Comparative analysis of prevalence of *Oestrus ovis* L. (Diptera: Oestridae) in sheep horns of southern Spain and northern Morocco. *Boletim da Sociedade Portuguesa de Entomologia* 2 (Suplemento No. 3): 421–428.
- , R. C. SORIGUER, AND J. M. PÉREZ. 1993. Pharyngeal bot flies (Oestridae) from sympatric wild ungulates (Cervidae) in southern Spain. *The Journal of Parasitology* 79: 623–626.
- SOKAL, R. R., AND F. J. ROHLF. 1995. *Biometry. The principles and practice of statistics in biological research*. 3rd Edition. W. H. Freeman and Company, New York, New York, 887 pp.
- SUGAR, L. 1974. The occurrence of nasal throat botflies (Oestridae) in wild ruminants in Hungary. *Parasitologia Hungarica* 7: 181–189.
- UNSWORTH, K. 1949. Observations on the seasonal incidence of *Oestrus ovis* in the nasal cavities and frontal sinuses of goats in Nigeria. *Annals of Tropical Medicine and Parasitology* 42: 249–250.
- WETZEL, H., AND E. BAURISTHENE. 1970. The identity of the third larval stage of *Oestrus ovis* Linnaeus (1758) (Diptera: Oestridae). *Zoologischer Anzeiger* 184: 87–94.
- ZUMPT, F. 1965. *Myiasis in man and animals in the old world*. Butterworths, London, UK, 267 pp.

Received for publication 22 June 1998.