SAR Journal of Pathology and Microbiology

Abbreviated Key Title: *SAR J Pathol Microbiol*
Home page: https://sarpublication.com/journal/sarjpm/home
DOI: 10.36346/sarjpm.2024.v05i03.005

OPEN ACCESS

ISSN 2707-7756 (P)
ISSN 2709-6890 (O)

Original Research Article

Prevalence and Histological Study of *Oestrus ovis* Larvae in Slaughtered Goat of Babylon City, Iraq

Noor-Aldeen Adhem[1*], Safaa M. Al-Bermani[1]

[1]College of Veterinary Medicine, Al-Qasim Green University, Babylon 51013, Iraq

***Corresponding Author:** Noor-Aldeen Adhem
College of Veterinary Medicine, Al-Qasim Green University, Babylon 51013, Iraq

Article History: | Received: 07.04.2024 | Accepted: 16.05.2024 | Published: 18.05.2024 |

Abstract: This study was carried out to investigate the prevalence of larval stage *Oestrus ovis* conducted during the period from September 2023 to the end of March 2024 at Babylon city, Iraq. 250 goats firstly were examined grossly and postmortem by longitudinally cutting with a manual saw, secondly, the collected larvae (45) were examined microscopically to measure its length and overall morphology. The total infestation rate was 26% (65/250). The highest rate of infestation was in female which was 44/150 (29.3%) while in male the infestation rate was 21/100(21%). The rate of infestation increases with the progression age of animal, older adult (over three years) was more susceptible to infestation was recorded 30/85(35.3%), while 17% (14/80) were in ages less than one year. Therefore, it showed a highly significant difference at (P<0.01). Furthermore, the histopathological sections of nasal cavity showed that Numerous mucous glands, thickening of epithelium, hyperplasia of blood vessels and severe Infiltration of inflammatory in goat infected with O.ovis larvae. In contrast, the uninfected goat showed moderate inflammatory cell infiltration in mucosal layer of nasal cavity and several dense glandular aggregates encircled by a dense network of elastic fibers. In conclusion, this study shows the important of O. ovis that infect goat in Babylon city, Iraq. Moreover, the morphology of all larval stage is similar except their measurement, color, and the shape of respiratory spiracles.

Keywords: *Oestrus.Ovis*, Goat, Babylon, Larvae and Histopathology.

INTRODUCTION

Oestrus ovis is a parasite botfly that belongs to the Oestridae family of the Diptera order whose larval stages cause cavitary myiasis in the paranasal sinus of sheep, goats, and other animals, including humans accidentally (Scholl *et al*., 2019). Oestrus ovis is a cosmopolitan agent of myiasis in sheep and goats. Nasal discharges and Sneezing are the most common clinical signs in infested animals (Bello *et al*., 2022). It is a brownish fly about the size of a honeybee that deposits its first-stage larvae in the nostrils of sheep in most areas of the world. Microscopic larvae mature into large bots (maggots) (Van Hoy *et al*., 2022). which spend most of their larval stages in nasal passages and sinuses, causing irritation, inflammation, and obstruction of airways the airway obstruction are the main causes of death a chronic or recurrent rash of numerous very itchy nasal cavity sheep and goat (Warrell, 2020). Mature larvae drop to the ground and pupate into flies. This type of parasitism in which living tissues are invaded by larvae of flies is known as myiasis (Bautista *et al*., 2023). The larval stages cause irritation, thickening and bleeding of the mucous membranes in the host due to the action of the oral hooks and integumentary thorns (Hidalgo, 2015). This is expressed as rhinitis with an overproduction of mucus, which promotes the feeding of the larvae. Some animals may present a serious infection when the larvae enter the brain through the foramina and they may develop encephalitis manifesting ataxia, hemiparesis, and blindness (Dasovic *et al*., 2022). The disease is worldwide and specifically reported in Saudi Arabia, Egypt, Algeria, Benin, and Brazil (Ahaduzzaman, 2019; Alhayali *et al*., 2022). The disease is significant for the Iraqi small ruminant industry that causes detrimental economic losses. The current work was carried out to morphologically- and molecularly-characterize O. ovis larvae collected from goat in a slaughterhouse in Babylon city, Iraq.

Citation: Noor-Aldeen Adhem & Safaa M. Al-Bermani (2024). Prevalence and Histological Study of *Oestrus ovis* Larvae in Slaughtered Goat of Babylon City, Iraq. *SAR J Pathol Microbiol*, 5(3), 67-71.

MATERIALS AND METHODS

Animals Study and Sample Collection

Two hundred and fifty study clinical exam the goats in Babylon Governorate throughout the period from the 1-9-2023 to 1-3-2024, in Hilla city exam both sex (150 female goats and 100 male goats). And different age (<one years, 1-3years,>three years). All samples collected directly from goats after slaughtering. The larvae were collected in clean plastic containers with normal saline and marked with sample's numbers of the according, age and sex; Then these samples were transported in refrigerator bag to the parasitology laboratory which belongs to the College of Veterinary Medicine University of Al-Qassim Green for laboratory examination.

Laboratory Examination

The morphological characteristics of the larvae were studied by measuring the length of each larvae using a ruler under the dissecting microscope, the larvae were identified, through its colors and the form of respiratory spiracles in the last segment of larvae as described by (Hanan, 2018).

Histological Study

Organs samples were collected and fixed in 10% formalin for 48 hours with changing the formalin of samples after 24 hours after samples collection. organs samples were sliced to 0.5 cm thick and placed in plastic cassettes for dehydration and clearing process using an automated tissue processor (Histo-Line ATP700, Italy), before embedded in paraffin using the routine paraffin embedding method using tissue embedding system (HESTION TEC2800-C, China).

Statistical Analysis

The Statistical Analysis System-SAS, (2012) program used the Chi-square test to evaluate the influence of various factors in this study such as months of study on prevalence, a region of study, age and sex. Then, compare.

RESULTS AND DISCUSSION

Microscopic Examination

The results showed the difference in their measurements and colors,65 larvae of *Oestrus ovis* were detected by using dissecting microscope and ruler for 45 larvae (11 of L1, 15 of L2 and 19 of L3). These larvae showed a variable length. The average length of the first larvae was 2.01mm and white in color, while the second larvae distinguished by its large size comparison of the first larvae, where the mean of its measurements 13.73 mm and its color is yellowish or creamy. The third larvae were 19.84 mm and yellow when it is young and at the maturity it turns with brown to black color as illustrated in Fig 1.

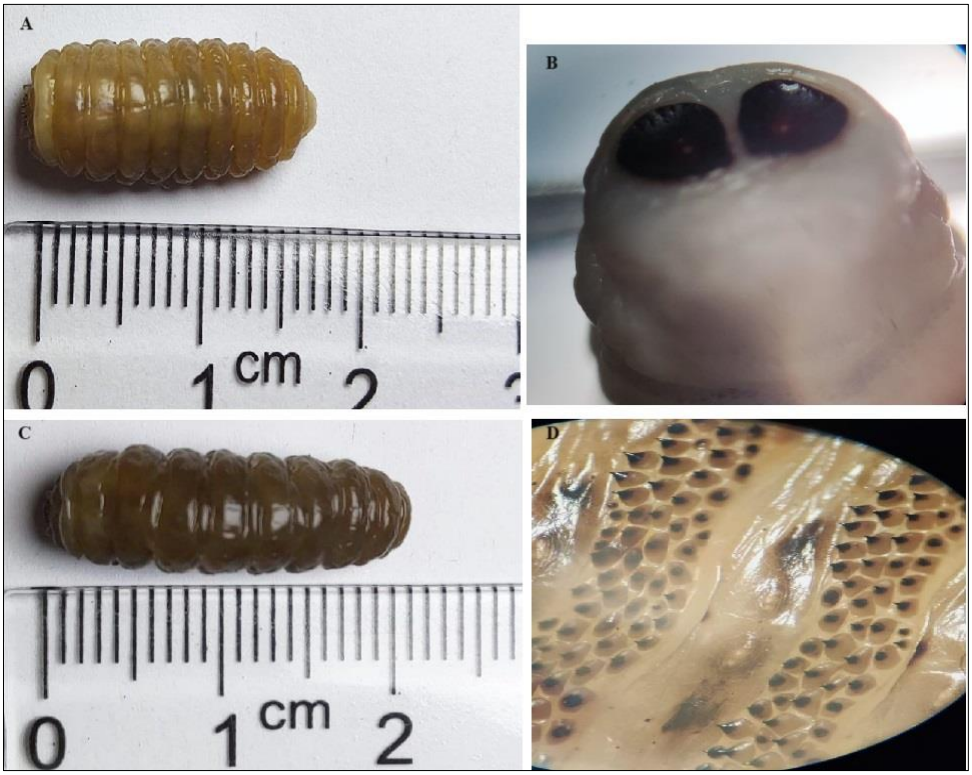

Figure 1: Larvae stage measurements A/3 rd instar larvae (L3): initial stage, B/ Posterior spiracles is D shape with a central button without suture. C/ final stage of L3, D/ mouth hooks of L3 under microscope x100

Prevalence of O.ovis in Goat

Out of 250 goat head, the percentage of prevalence of nasal bot fly larvae was 26% (65/250) (Table 1). The total prevalence recorded in the current study was lower that the study conducted in Misan city. Iraq, where it was recorded 40.83% (Mohammed *et al*.,

2020). The current infestation was matching with the study recorded (29.99%) by Alikhan *et al*., (2018) in Saudi Arabia. Iran had a lower infestation rate 30.35% than the current study (Tajik *et al*., 2012). While in Jordan, recorded high percentage 58.03% (Abo-Shehada *et al*., 2000). The reason for the difference is due to environmental condition difference, immune state of the animals, the method of conducting the examination, healthy and breed type of animal rearing and use of drugs have significant impact of infestation rate (Hidalgo *et al*., 2015).

Table 1: Rate of infection with *oestrus. ovis* in Goats according to Gender

Gender	No. of samples examined	No. of positive	Percentage of total (%)
Male	100	21	21%
Female	150	44	29.3%
Total	250	65	26%
X^2	2.165627		
P value	0.141127 NS		

Furthermore, the current study indicated a significant deference between male and female at ($P<0.05$), the female showed numerically higher than male which recorded 44/150 (29.3) while in male 21/100 (21%) (Table 1). This does agree with (Gebremedhin, 2011); (Barroso *et al*., 2017). While disagree with (Negm-Eldin *et al*., 2015). Reason in this study due to most of females were young ages, but this variation may be due to physiological state of female compared with male or may be due to the increased density of males to females and/or the habit of securing of male animals which facilitate their attack by O. ovis flies. A as well as a, most males animals are raised for meat industry, whereas females are raised for long period for milk production and reproduction, and they are not slaughtered except when they are old (Negm-Eldin *et al*., 2015).

The rate of infestation at the age of more than three years and more was 35.3%, while it was 24.7% at the age of (1-3 year) and 17.5% in goat less than 1 year with highly significant difference at ($P<0.05$) (Table 2).

Table 2: Rate of infection with oestrus. ovis in Goats according to age groups

Age(year)	No. of the exam. samples	Positive samples	
		No.	% of total
1 years≥	80	14	17.5
1-3 years	85	21	24.7
3 years≤	85	30	35.3
Total	250	65	26
X^2	6.894338		
P value	0.031836*		

This study agrees with Mohammad, (2018) in Iraq, in Benin (Attindehou *et al*., 2012), in Ethiopia (Gebremedhin, 2011), on a contrary (Alem *et al*., 2010; Balegh, 2013) was indicated older animals are more vulnerable to infestation. This the cause of the increase infestation with increased age attributed to animals continues exposure for the adult fly (Gebremedhin, 2011). The older animals are more attractive to the adult flies because of slow movement than younger animals or less ability than younger to excrete the first larvae of adult flies by sneezing and immunosuppression induced by age (Alamery, 2007).

Histopathological Sections of Nasal Cavity

Infected Goat:

Numerous mucous glands, thickening of epithelium, hyperplasia of blood vessels and severe Infiltration of inflammatory cells that may be due to the presence oestrus ovis larvea and thickend wall of blood vessels was observed (Fig 2 A and B).

Uninfected Goat:

In this slide note moderate inflammatory cell infiltration in mucosal layer of nasal cavity due to presence oestrous ovis and several dense glandular aggregates encircled by a dense network of elastic fibers (Fig 2 C and D).

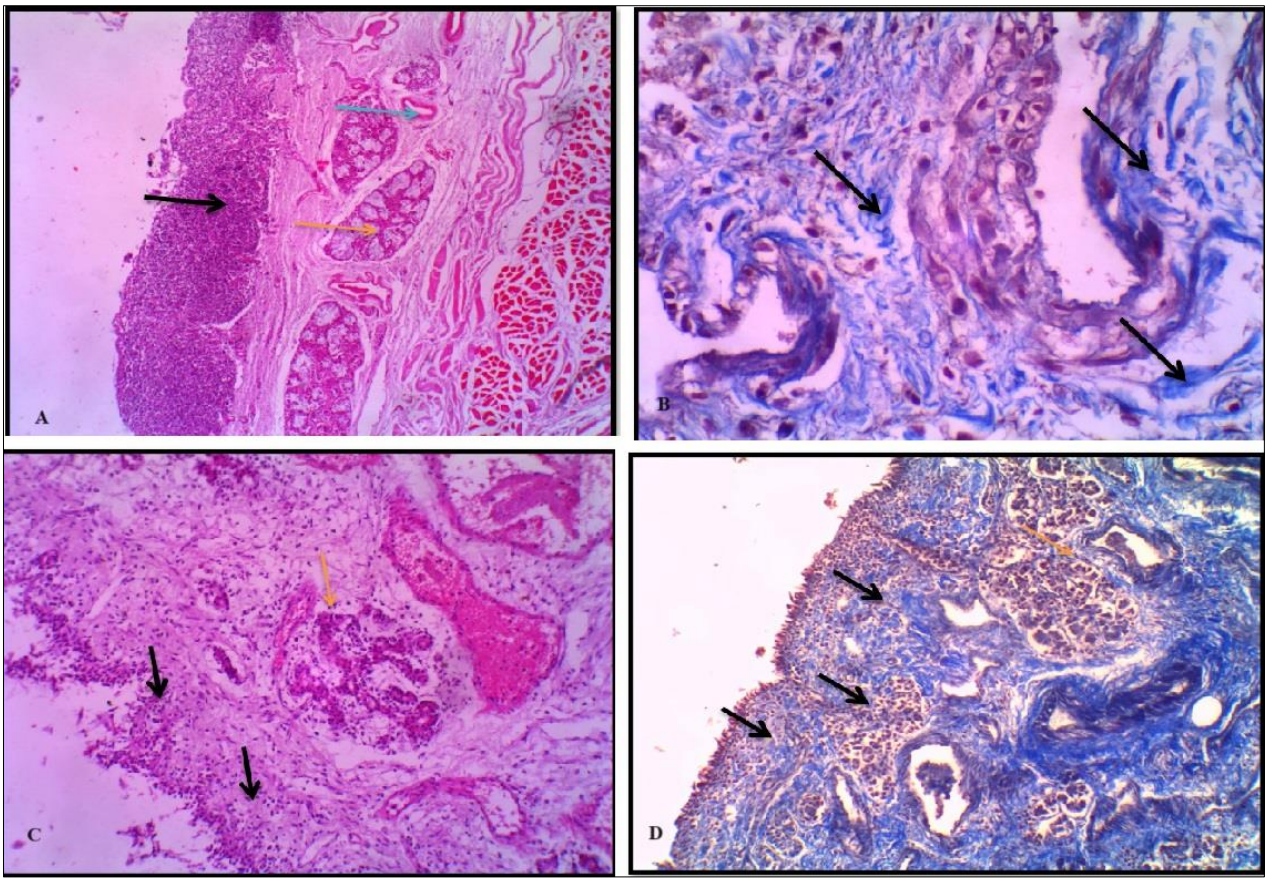

Figure 2: A/ Photomicrograph of nasal cavity of goat infected by oestrus ovis, showed Numerous mucous glands (yellow arrow), thickening of epithelium, hyperplasia of blood vessels (blue arrow) and severe Infiltration of inflammatory cells (black arrow) due to presence oestrus ovis larvea and thickend wall of blood vessels was observed. Hematoxylin and Eosin.A:40x. B/Nasal cavity of infected goat showed destruction of epithelial cells of nasal cavity mucosa due to presence oestrus ovis larvea and inflammatory cells infiltration and fibrosis (black arrow) was observed. Masson trichrome stain. 400x. C/ Nasal cavity of healthy goat. note moderate inflammatory cell infiltration (black arrow) in mucosal layer of nasal cavity due to presence oestrous ovis and several dense glandular aggregates encircled by a dense network of elastic fibers (yellow arrow), Hematoxylin and Eosin. 100x. D/ Nasal cavity of healthy goat showed Inflammatory cell infiltration and fibrosis of mucosal layer (black arrow) of nasal cavity and several dense glandular aggregates encircled by a dense network of elastic fibers (yellow arrow). Masson trichrome stain.40x

CONCLUSIONS

This study shows the important strain differences of O. ovis that infect goat in Babylon city, Iraq. Moreover, the morphology of all larval stage is similar except their measurement, color, and the shape of respiratory spiracles.

REFERENCES

- Abo-Shehada, M. N., Arab, B., Mekbel, R., Williams, D., &Torgerson, P. R. (2000). Age and seasonal variations in the prevalence of Oestrus ovis larvae among sheep in northern Jordan. *Prev. Vet. Med*, *47*(3), 205–212.
- Ahaduzzaman, M. (2019). The global and regional prevalence of oestrosis in sheep and goats: A systematic review of articles and meta-analysis. *Parasit Vect*, *12*(7), 346.
- ALamery, A. M. (2007). Serepidemiological study of myasis caused by Oestrus ovis larvae. PhD thesis, College of Veterinary Medicine, University of Baghdad, Baghdad, Iraq.
- Alem, F., Kumsa, B., & Degefu, H. (2010). Oestrus ovis larval myiasis among sheep and goats in central Oromia, Ethiopia. Trop. *Anim. Hlth. Prod*, *42*(4), 697–703.
- Alhayali, N. S., Alsaadawi, M. A., Al-Fatlawi, M. A., & Alkhaled, M. J. (2022). Morphological and phylogenetic characterization of Oestrus ovis larvae in sheep: Al-Qadisiyah province, Iraq. *Iraqi Journal of Veterinary Sciences*, *36*(1), 133-137.
- Alikhan, M., Ghamdi, K., Al Zahrani, F. S., Khater, E. I., & Allam, A. M. (2018). Prevalence and salient morphological features of myiasis causing dipteran flies in Jeddah, Saudi Arabia. Biosci., *Biotech. Res. Asia*, *15*(1), 101–109.
- Attindehou, S., Salrfou, S., Gbangboche, A. B., & Abiola, F. A. (2012). Prevalence of the small

ruminant oestrosis in Benin. *J. Anim. Vet. Ad., 11*(10), 1647–1650.

- Balegh, A. A. (2013). *Advanced studies on Oestrus ovis larvae.MSc thesis Faculty of Veterinary Medicine*, Benha University, Egypt.
- Barroso, P., Ruiz-de-Ybanez, R., Martinez-Carrasco, C., Gens, M. J., Escribano, F., Sanchez, A., & Perez, J. M. (2017). First report of oestrosis in Aoudad from Southeastern Spain. *Parasitol. Res, 116*(7), 2053–2055.
- Bautista-Garfias, C. R., Aguilar-Marcelino, L., & Nogueda-Torres, B. (2023). Myiasis infections in animals and men. One Health Triad, Unique Scientific Publishers, Faisalabad, *Pakistan, 3*, 20-27.
- Bello, H. J. S., Lins, J. G. G., Albuquerque, A. C. A. D., Ferreira, G. B., Amarante, M. R. V., & Amarante, A. F. T. D. (2022). Prophylactic Effects of Ivermectin and Closantel Treatment in the Control of Oestrus ovis Infestation in Sheep. *Frontiers in Veterinary Science, 8*, 798942.
- Dasovic, B., Borys, E., & Schneck, M. J. (2022). Granulomatous diseases of the central nervous system. *Current Neurology and Neuroscience Reports, 22*(1), 33-45.
- Gebremedhin, E. Z. (2011). Prevalence of ovine and caprine oestrosis in Ambo, Ethiopia. *Trop. Anim. Hlth. Prod, 43*(1), 265–270.
- Hanan, A. (2018). Molecular identification studies on Oestrus ovis L.(Diptera: Oestridae) larvae infested sheep in jazan region, Saudi Arabia. *Indian Journal of Animal Research, 52*(1), 105-110.
- Hidalgo, A., Palma, H., Oberg, C., & Fonseca-Salamanca, F. (2015). Oestrus ovis infection of grazing sheep during Summer in Southern Chile. Pesq. *Vet. Bras, 35*(6), 497–500.
- Mohammad, N. H. (2018). Occurence of Oestrus ovis in sheep with morphological, histopathological and histochemistry. *Iraqi J.Vet. Sci, 32*(1), 21–25.
- Mohammed, R. G., Josef, S. S., & Abed, K. J. (2020). Prevalence of Oestrus ovis larvae in slaughtered sheep of Misan city, Iraq. Sys. *Rev. Pharm, 11*(4), 652–655.
- Negm-Eldin, M. M., Elmadawy, R. S., & Hanan, G. M. (2015). Oestrus ovis larval infestation among sheep and goats of Green Mountain areas in Libya. *J.Adv. Vet. Anim. Res, 2*(4), 382–387.
- Scholl, P. J., Colwell, D. D., & Cepeda-Palacios, R. (2019). Myiasis (Muscoidea, Oestroidea). In Medical and veterinary entomology (pp. 383-419). Academic Press.
- Tajik, H., Malekifard, F., Soleimanzadeh, A., & Mardani, K. (2012). Seasonal infestation of Oestrus Ovis larvae in slaughtered sheep in Urmia, Iran. *Iran.J.Vet. Res,7*(4), 98-104.
- Van Hoy, G., Marsh, A. E., & Carman, M. K. (2022). External Parasites. In Medicine and Surgery of Camelids (pp. 174-223). John Wiley & Sons.
- Warrell, D. A. (2020). Injurious Arthropods. In Hunter's Tropical Medicine and Emerging Infectious Diseases (pp. 988-1005). Elsevier.