Plant Archives Volume 20 No. 2, 2020 pp. 6288-6292 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

PREVALENCE AND MORPHOLOGICAL STUDY OF *OESTRUS OVIS* LARVAE IN SHEEP IN BAGHDAD CITY, IRAQ

Rawaa Ibrahim Hayeif[1] and Azhar Ali Faraj[2]

[1]College of Veterinary Medicine, University of Fallujah, Iraq.
[2]Department of Parasitology, College of Veterinary Medicine, University of Baghdad, Iraq.

Abstract

This study was carried out to investigated for the prevalence of larval stage *Oestrus ovis* conducted during the period from October 2019 to the end of March 2020 at Baghdad city. 162/180 sheep heads firstly were examined grossly at post mortem by longitudinally cutting with a manual saw, secondly, the collected larvae (186) were examined microscopically to measure its length and overall morphology. 18/180 examined ante-mortem by stimulating the animal's sneezing via black pepper powder & drops of cypermethrin solution. The total infestation rate was highly significant at ($P \leq 0.01$) 40.55% (73/180) but, without stimulating the animal's sneezing was 45.06% (73/162). The highest rate of infestation in November was 53.33% (16/30), while the lowest infestation rate in December was 23.33% (7/30). All larval stages were observed during the study months, except for first larvae L1, which were not observed during October and February, the intensity of larval burden was highest in February 50 larvae (26.88%) and the lowest in December 15 larvae (8.06%), in addition, the largest number of larvae obtained from one head was 17 larvae and the average number of larvae per sheep's head was 2.54. The rate of infestation increases with the progression age of animal, older adult (over three years) were more susceptible to infestation was recorded 75% (3/4), while 22.78% (18/79) were in ages less than one year. Therefore, it showed a highly significant difference at ($P \leq 0.01$). As well as for sex, infestation rate showed different rate male 47.18% 67/142 & female 15.78% (6/38), with a significant difference at ($P \leq 0.01$).

Key words: Morphological, Larval *Oestrus ovis,* Bot fly , Sheep, Iraq.

Introduction

The sheep bot fly *Oestrus ovis* (*Diptera*: *Oestridae*) is a cosmopolitan and obligate parasite nasal cavities and the adjacent sinuses in domestic and wild ruminants, mainly founding sheep and goats and human (Fasih *et al*., 2014; Barroso *et al*., 2017). Belong to phylum: Arthropoda, class: insect, order: Dipetera, suborder: Cyclorrhpha Series: schizophora, Section: Calypterae, Super family: Oestroidea, family: Oestridae, Genus: *Oestrus*, Species: *Oestrus ovis* (Alubide, 2018). Adult looks like a honeybee, do not feed have a reduced and nonfunctional oral apparatus Larvae have 12 segment (Arslan *et al*., 2009). The young larva are white or slightly yellow; when they become mature,dark transverse bands develop on the dorsal surfaces of the segments, there are large, black, oral hooks connected to the internal cephalo-pharyngeal skeleton, the ventral surface bears rows of small spines, two caudal pigmented respiratory spiracles were in the caudal segment (Hasheminasab *et al*., 2016) females deposit first-stage larvae into the nostrils of sheep,molting and migrate to the sinuses and cavities (Frugère *et al*., 2000). When the third instar larvae reach mature larval weight and size, they expelled by host sneezing on the ground, they initiate pupation The infestation period is generally 25-30 days. Oestriosis is present in different regions and habitats and has been reported worldwide (Ortega-Muñoz *et al*., 2019). Nasal discharges and sneezing are the most common clinical signs in infested animals and caused myiases which weaken animals' cause economic loses to the livestock industry, both in developing and developed countries losses in terms of weight gain, reduction of milk production, fertility and hide quality (Sotiraki and Hall, 2012).

Several methods contributing to the diagnosis of nasal myiasis include clinical presentation, morphological characterization of the larvae (e.g. slits of the posterior spiracles located on the posterior spiracle plates) and occasional identification of the adult fly (Hanan, 2018).

The purpose of this study to detection of *Oestrus ovis* larvae in sheep at central Iraq, Baghdad city with studying the morphological characteristics of larvae.

Materials and Methods

Sample collection

One hundred and eighty samples from sheep were collected by weekly visit, twice a week in Baghdad city during the period from the beginning of October 2019 to the end of March 2020, at three regions of Baghdad city; 46 samples from Abo-Ghraib, 42 from Al-Amiriya unlicensed butcher shops and 92 samples from Al-Shullaa abattoir, where it relied on grossly observation and determined of infestation site in the animal's head and a numerous of larvae. These samples were collected from different ages (<one year to >3 years) and both sex (female 38 and male 142). All the samples collected directly from animals after slaughter and removal of the skin, heads were removed and cut along their longitudinal axis with an hand saw and collect the larvae in clean plastic containers with normal saline and labeled it with the numbers of the samples, age and sex. Then the samples were transported in refrigerator bag to the parasitology laboratory which belongs to the college of veterinary Medicine-University of Baghdad 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).

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

Table 1: Infestation site of *Oestrus ovis* larvae according on their position in the sheep's head.

No.	Site of infestation	Number of larvae	Percentage (%)
1	Nasal passage and septum	40	21.50%
2	Brain	5	2.68%
3	Frontal nasal sinus	132	70.96%
4	Pharynx	9	4.83%
5	Total	186	100%
	Chi-Square (X^2)	-	12.942 **
	P-value		-0.0001
**(P≤0.01).			

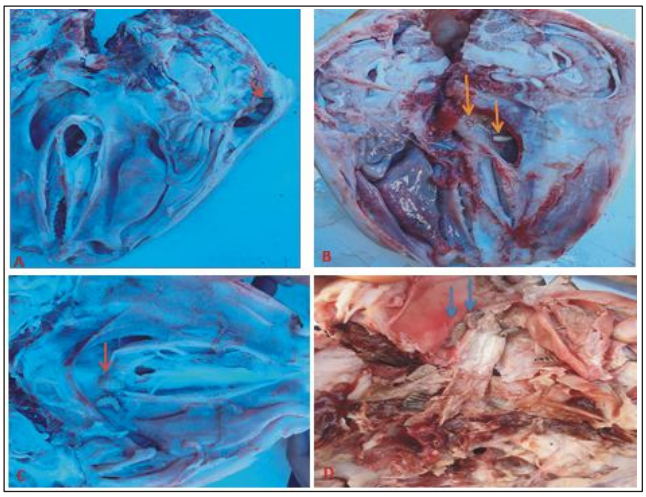

Fig. 1: Demonstrating larval positioning in the frontal nasal sinus (A), nasal meatus (B), mucosal layer of pharynx (c) nasal median septum (D).

the significant difference between percentages in this study (P≤0.01) SAS, (2012).

Results and Discussion

The study revealed that all the developmental stages of larvae were identical in shape.

The results showed the difference in their measurements and colors, as for grossly observation to determine of infestation site in the animal's head and number of larvae. The study revealed that the nasal passage and frontal sinuses are the most common places of infestation has been recorded (21.50%) and (70.96%) respectively (Table 1) (Fig. 1, 2). These results are consistent with the mentioned (Soulsby, 1982).

186 larvae of Oestrus ovis were detected by using a dissecting microscope and ruler. Then, 57 larvae (17of L1, 20 of L2 and 20 of L3), these larvae showed a variable length (mm) as in the (Table 2) (Fig. 3). These results

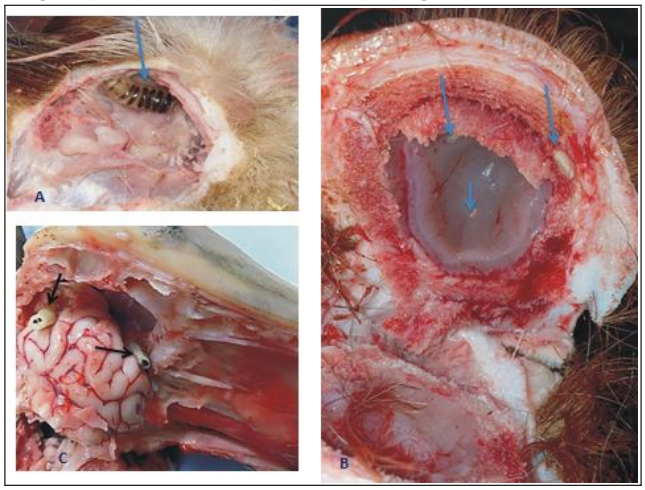

Fig. 2: Demonstrating larval positioning in the frontal sinus (A&B), brain (c).

Table 2. The mean length and range of *Oestrus ovis* larvae.

Range	Mean length (mm)	Larval stage
1-5	2.58	Larvae 1
6-17	12.225	Larvae2
18-28	21.5	Larvae 3

are somewhat similar to (Alubide, 2018). Several rows of ventral spines were more prominent with the maturity of larvae and the sharply curved oral hooks connected the cephalo-pharyngeal skeleton (Fig. 4) this results agree with (Moya *et al*., 2012) and 'D' shaped, dark brown or black colored, stigma plates with radially arranged respiratory holes (Fig. 4). The results were in accordance with that stated in identification (Hazratian *et al*., 2017; Hanan, 2018).

Out of 180 sheep head, the percentage of prevalence of nasal bot fly larvae was 40.55% (73/180) (Table 3). The total prevalence recorded in the current study was matching with study conducted in Misan city. Iraq, where it was recorded 40.83% (Mohammed *et al*., 2020). The current infestation rate was consider higher than that 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).

Moreover, 186 larvae were collected from the infested animals with average 2.54% larvae per head (Table 3), it is matched with Al-amery, (2007) was recorded 2.5. It is higher than what was recoded 2.25 in Brazil (Carvalho *et al*., 2015) and also lower than it recorded 37.9 in northeast Spain (Gracia *et al*., 2010). The reason for the

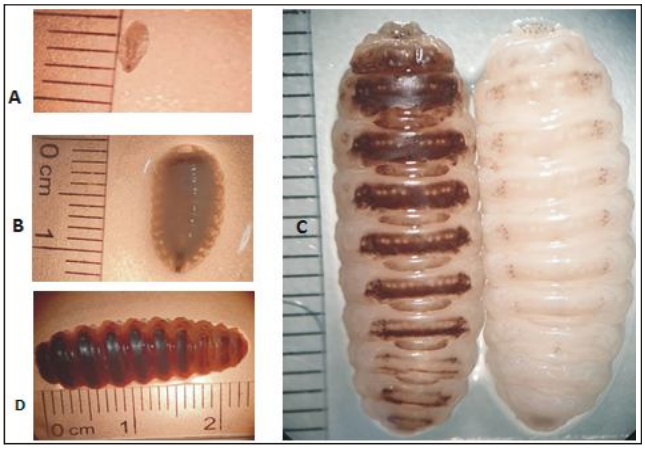

Fig. 3: Larval stage measurements (A) larvae 1 L1, (B) larvae 2 L2, (C) Larvae 3 L3 initial stages, (D) mature L3.

Table 3: Demonstrating infestation rate of *Oestrus ovis* larvae at Baghdad city.

Number of head examined	Number of infested head	Infestation rate (%)	Number of larvae	Average larvae per heads
180	73	40.55	186	2.54

variation in these proportions may be related to climatic condition for each region affected by several factors: wind speed, temperature and solar irradiance which affect the numeral of larviparous females to which the animals exposure, where it was found that on a sunny day the optical range of the fly is 7meters and less to 3.5meters in the semi-cloudy weathers and 2meters in the cloudy weathers (Al-Ubide, 2018).

Most of larvae that have been collected were (L2 & L3) (83 & 86 larvae), this indicates the continuity of the larval development. The results of current study agree with the results of studies by (Hidalgo *et al*., 2015), whereas L1 was the lowest 17 larvae and it was lost in October and February (Table 4), may be due to her inability to inter the animal's respiratory tracts, destroyed during hypobiotic period and development of immune system of animal. In this study the highest number of larvae collected from one head reached 17 larvae, Al-amery, (2007) recorded 34, Karatepe *et al*., (2014) recorded 41 larvae.

The presence of infestation of nasal bot fly larvae in varying proportions where it was higher rate in November 53.33%, while the lowest rate in December 23.33% (Table 5). This is not consistent with the results with Karatepe *et al*., (2014) who recorder the prevalence was

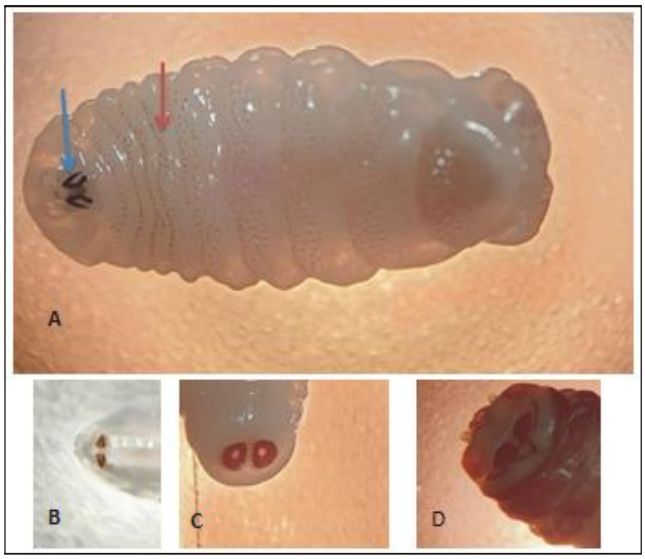

Fig. 4: Demonstrating A: oral hooks (blue arrow) and small spines of the ventral surface (red arrow) B: postereir spiracles with suture, C & D: Posterior spiracles is D shape without suture.

Table 4: Number of larva of *Oestrus ovis* in sheep according to months.

Month	L1	L2	L3	Total
October (2019)	0 (0.00%)	8 (9.64%)	9 (10.47%)	17 (9.14%)
November	8 (47.06%)	16 (19.28%)	13 (15.12%)	37 (19.86%)
December	5 (29.41%)	7 (8.43%)	3 (3.49%)	15 (8.06%)
January (2020)	1 (5.88%)	6 (7.23%)	22 (25.58%)	29 (15.59%)
February	0 (0.00%)	24 (28.98%)	26 (30.23%)	50 (26.88%)
March	3 (17.65%)	22 (26.50%)	13 (15.12%)	38 (20.43%)
Total	17	83	86	186
Chi-Square -X^2 (P-value)	11.48 ** -0.0001	9.027 ** -0.0046	9.771 ** -0.0039	7.166 ** -0.0081
**(P≤0.01)				

highest in October, in Ethiopia recorded the minimum prevalence in January (Yilma and Genet, 2000), also we find quite the opposite with Saleem *et al*., (2017) which found lowest infestation rate was in November in India. The difference in the results of the study is caused by climatic conditions, unscientific rearing of animals and poor hygienic measures, geographical location of these countries and the highest number of slaughtered animals.

Table 5: Demonstrating infestation rate according months.

Month	Examined No. (%)	Infected No.	Infestation rate
October (2019)	30	12	40%
November	30	16	53.33%
December	30	7	23.33%
January (2020)	30	11	36.66%
February	30	13	43.33%
March	30	14	46.66%
Total	180	73	40.55%
Chi-Square -X^2 (P-value)	-	-	8.552 ** -0.006
**(P≤0.01)			

Table 6: The relationship between infestation rate and age of animals.

Age group	Examined No.	Infected No.	Infestation rate %
<1 years	79	18	22.78%
1-2 years	86	45	52.32%
2-3 years	11	7	63.63%
3 years <	4	3	75.00%
Total	180	73	40.55%
Chi-Square -X^2 (P-value)	-	-	11.062 ** (0.0001)
**(P≤0.01)			

Table 7: Infestation rate of *Oestrus ovis* in sheep according to sex.

Sex	Examined No.	Infected No.	Infestation rate %
Male	142	67	47.18%
Female	38	6	15.78%
Total	180	73	40.55%
Chi-Square -X^2 (P-value)	-	-	9.167 ** (0.0026)
**(P≤0.01)			

The rate of infestation at the age of more than three years and more was 75.00%, while it was 22.78% at the age of less than one years with highly significant difference at (P≤0.01) (Table 6). This study agree 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 younger 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 also immunosuppression induced by age (Alamery, 2007).

The current study indicated a significant deference between male and female at (P≤0.01), the male showed numerically higher than female which recorded 67/142 (47.18) and 6/38 (15.78) respectively (Table 7). This not agree (Gebremedhin, 2011); (Barroso *et al*., 2017). While agree 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).

References

Abo-Shehada, M.N., B. Arab, R. Mekbel, D. Williams and P. R. Torgerson (2000). Age and seasonal variations in the prevalence of Oestrus ovis larvae among sheep in northern Jordan. *Preventive Veterinary Medicine*, **47(3):** 205-212.

ALamery, A.M. (2007). Serepidemiological study of myasis caused by.

Alikhan, M., K. Ghamdi, Al, F.S. Al-Zahrani, E.I. Khaterand and A.M. Allam (2018). Prevalence and Salient Morphological Features of Myiasis Causing Dipteran Flies in Jeddah,

Saudi Arabia. *Biosciences, Biotechnology Research Asia*, **15(1):** 101-109.

Alem, F., B. Kumsa and H. Degefu (2010). Oestrus ovis larval myiasis among sheep and goats in Central Oromia, Ethiopia. *Tropical Animal Health and Production*, **42(4):** 697-703.

Al-Ubeidi, N.H. (2018). Occurrence of *Oestrus ovis* in Sheep with Morphological, Histopathological and Histochemistry, PHD thesis, University of Mosul: Mousl, iraq (Arabic) animals. 7th ed. Baillier, Tindal, London, 430-431.

Arslan, M.O., M. Kara and Y. Gicik (2009). Epidemiology of Oestrus ovis infestations in sheep in Kars province of north-eastern Turkey. *Tropical Animal Health and Production*, **41(3):** 299-305.

Attindehou, S., S. Salrfou, A.B. Gbangboche and F.A. Abiola (2012). Prevalence of the Small Ruminant's Oestrosis in Benin. *Journal of Animal and Veterinary Advances*, **11(10):** 1647-1650. Baghdad, Iraq (Arabic).

Balegh, A.A. (2013). Advanced studies on *Oestrus ovis* larvae. M.Sc. thesis.

Barroso, P., R. Ruiz-de-Ybáñez, C. Martínez-Carrasco, M.J. Gens, F. Escribano, A. Sánchez and J.M. Pérez (2017). First report of oestrosis in aoudad from southeastern Spain. *Parasitology Research*, **116(7):** 2053-2055.

Carvalho, R.S., M.A. Ruivo, M.H. Colli, V. Pereira, A.C. Martinez, B.C. Mazzucatto, B.C. Cruz, W.G Maciel, G. Felippelli, W.F. Teixeira, V.E. Soares, A.J. da Costa and W.D. Lopes (2015). Ocorrência de parasitismo por Oestrus ovis em ovinos necropsiados da microrregião de Umuarama - Paraná, Brasil. *Revista Brasileira de Parasitologia Veterinaria*, **24(3):** 370-374.

Fasih, N., K.N. Qaiser, S.A. Bokhari, B. Jamil and M.A. Beg (2014). Human ophthalmomyiasis externa caused by the sheep botfly Oestrus ovis: A case report from Karachi, Pakistan. *Asian Pacific Journal of Tropical Biomedicine*, **4(10):** 835-837.

Frugère, S., A. Cota Leon, F. Prévot, R. Cepeda Palacios, G. Tabouret, J.P. Bergeaud, C. Duranton, P. Dorchies and P. Jacquiet (2000). Immunisation of lambs with excretory secretory products of *Oestrus ovis* third instar larvae and subsequent experimental challenge. *Veterinary Research*, **31(5):** 527-535.

Gebremedhin, E.Z. (2011). Prevalence of ovine and caprine oestrosis in Ambo, Ethiopia. *Tropical Animal Health and Production*, **43(1):** 265-270.

Gracia, M.J., J. Lucientes, M.A. Peribáñez, J.A. Castillo, C. Calvete and L.M. Ferrer (2010). Epidemiology of *Oestrus ovis* infection of sheep in northeast Spain (mid-Ebro Valley). *Tropical Animal Health and Production*, **42(5):** 811-813.

Hanan, B.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.

Hasheminasab, S.S., H.M., Talvar and I. Wright (2016). First case report of *Oestrus ovis* in horns of goat despite the healthy sinuses and nasal passages with its morphological study from Iran. *Indian Journal of Animal Research*, **50(2):** 278-280.

Hazratian, T., A. Tagizadeh, M. Chaichi and M. Abbasi (2017). Pharyngeal myiasis caused by sheep botfly, *Oestrus ovis* (Diptera: Oestridae) larva, Tabriz, East Azarbaijan Province, Iran: A case report. *Journal of Arthropod-Borne Diseases*, **11(1):** 166-170.

Hidalgo, A., H. Palma, C. Oberg and F. Fonseca-Salamanca (2015). *Oestrus ovis* infection of grazing sheep during summer in Southern Chile. *Pesquisa Veterinaria Brasileira*, **35(6):** 497-500.

Karatepe, B., M. Karatepe and S. Güler (2014). Epidemiology of *Oestrus ovis* L. infestation in sheep in Nigde province, Turkey. *Revue de Medecine Veterinaire*, **165(7-8):** 225-230.

Mohammad, N.H. (2018). Occurence of *Oestrus ovis* in Sheep with Morphological, Histopathological and Histochemistry. *Iraqi Journal of Veterinary Sciencee*, **32(1):** 21-25.

Mohammed, R.G., S.S. Josef and K.J. Abed (2020). Prevalence of *Oestrus ovis* larvae in slaughtered sheep of Misan City, Iraq. *Systematic Reviews in Pharmacy*, **11(4):** 652-655.

Moya, V.M., R. Diego, P. Alfonso, M. Pérez and J. Olivares (2012). *Morfometría de larvas de Oestrus ovis* (*Diptera/ : Oestridae*) *de ovinos, en Cuba Morphometric characterization of Oestrus ovis* (*Diptera/ : Oestridae*) *larvae from infested sheep in Cuba*, **34(3):** 184-187.

Negm-Eldin, M.M., R.S.Elmadawy and G.M. Hanan (2015). *Oestrus ovis* larval infestation among sheep and goats of Green Mountain areas in Libya. *Journal of Advanced Veterinary and Animal Research*, **2(4):** 382-387.

Oestrus ovis larvae. PHD thesis, university of Baghdad.

Ortega-Muñoz, G., N. Luzuriaga-Neira, R. Salazar-Silva and R. Rodríguez-Hidalgo (2019). *Oestrus ovis* in Ecuador: Importance in the Andean sheep farming. *Veterinary World*, **12(4):** 522-526.

Saleem, T., R. Katoch, A. Yadav, I.A. Mir, R. Godara and I. Ahamed (2017). Prevalence of ovine oestrosis in Plain and Kandi areas of Jammu, North India. *Online Journal of Veterinary Research*, **6(2):** 1117-1122.

SAS (2012). Statistical Analysis System, User's Guide. Statistical. Version 9.1th ed. SAS. Inst. Inc. Cary. N.C. USA.

Sotiraki, S. and M.J. Hall (2012). A review of comparative aspects of myiasis in goats and sheep in Europe. *Small Ruminant Research*, **103(1):** 75-83.

Soulsby, E.J.L. (1982). Helminthes, arthropods, protozoa of domesticated submitted to faculty of Veterinary Medicine, Benha University, Egypt.

Yilma, J.M. and A. Genet (2000). Epidemiology of the sheep nasal bot, *Oestrus ovis* (Diptera/ : Oestridae), in Central Ethiopia. *Revue de Medecine Veterinaire*, **151(2):** 143-150.