NTU Journal of Agricultural and Veterinary Sciences (2025) 5 (1): 32-35
DOI: https://doi.org/10.56286/b4t1x393

IRAQI Academic Scientific Journals

P-ISSN: 2788-9890 E-ISSN: 2788-9904
NTU Journal of Agricultural and Veterinary Sciences
Available online at: https://journals.ntu.edu.iq/index.php/NTU-JAVS/index

Prevalence of lice infestation in Iraqi local buffaloes in Mosul city

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Article Informations

Received: 23-06- 2024,
Accepted: 02-10-2024,
Published online: 28-03-2025

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Key Words:
Prevalence,
Lice infestation,
Iraqi local buffaloes,
Mosul,
Risk factors.

A B S T R A C T

This current study focused on the evaluation of epidemiological data risk factors such as seasons, sex, age, and area of 1060 of buffaloes were examined from January – December 2022. The results showed a total infestation rate with lice 54.06%. The results of the gross clinical examination of the buffalo skin showed the presence of lice and eggs with damaged hair and hair loss spots due to severe infestation.
Microscopical examination under the dissecting microscope of local Iraqi buffaloes raised indoors are infested with sucking lice species *Haematopinus tuberculatus*, morphological identification of this species is the sucking lice *H. tuberculatus*, adults are 3.8mm long 1.9mm wide, black to brown and eyes are absent with prominent paratergal plates, five segmented antennae, Pointed head with a large claw on each leg. The overall infection rate (573/1060) was 54.06%. The highest infection rate was 79% in January, February and March at p≤ 0.05. The study results recorded an infection rate of 64.09% in animals over 3 years of age while it was 37.5% in animals under 3 years of age at p≤ 0.05. The highest infection rate was 61.09% in females and 43.09% in males. As for the site, the highest infection rate was 80% inside the Maslag pit (right side) while the lowest infection rate was 36% in Hamam Al-Alil.

Introduc tion

Buffaloes are one of the important economic livestock and are affected like other ruminants with many parasitic diseases such as internal and external parasites such as ticks, flies, and lice [1, 2]. Pediculosis is parasitic disease caused by lice, water Buffaloes (*Bubalus bubalis*) infested with the strict blood-sucking lice *Haematopinus tuberculatus* are closely related and easily diagnosed by the naked eye due to their characteristics, size 3.5 mm [3]. Recently, different countries used buffaloes as an alternative for cattle as a source for production which led to movement of this kind of livestock between countries causing increase and spread of this species [4]. Sucking lice have feeding behavior besides the bites, they cause many skin effects such as irritation, itching, rubbing, lose wight gain, anemia in heavy infestation and skin peeling [2, 5]. Many studies in Iraq, especially in Mosul, have documented the prevalence of lice infestation in buffalo [6, 7]. The present study focused on the prevalence of lice infestation in buffaloes related to the risk factors such as age, sex, season and location. Identifying species of louse affecting buffaloes based on morphological characteristics using a stereoscope.

Materials and methods

Sample collection

The study was conducted during the period from January to December 2022. A total of 1060 local Iraqi water buffaloes fed with concentrated food (indoors) were examined. Lice were obtained from the animals by brushing with a lice comb [8]. Samples were collected in 70% ethyl alcohol and then transferred to the parasitology laboratory at the College of Veterinary Medicine - University of Mosul. Lice were identified using a dissecting microscope . Morphometric characterization was based on the identification Keys by Taylor *et al.*, 2016 [9]. Lice specimens were collected from buffalo herds Located at: Hawa Al-Maslagh , Hammam Al-Alil (right side) Quneitra, Qabr Al-Abd, Jamasa, Arab Al-Quneitra, Damarji Al-Saghir and Badush Jamasa (right side).

Gross examination

Lice were detected by the naked eye in infested buffaloes by using special lice comb from head across the trunk in buffaloes.

Statistical analysis

Data were analyzed using (IBM, SPSS v27, UK) and then the distribution was confirmed using the Shapiro-Wilks test, and differences between groups were performed using chi-square and then Bonferroni correction to estimate differences within groups at $P \leq 0.05$ [10].

Results

Clinical examination of the skin revealed eggs and adult lice with damaged hair and patches of hair loss due to severe infestation.(Figure 1, 2, and 3).

Figure 1. Calf of buffalo suffering from lice infestation.

Figure 2. Eggs of *Haimatopinus tubercalatus* (nests).

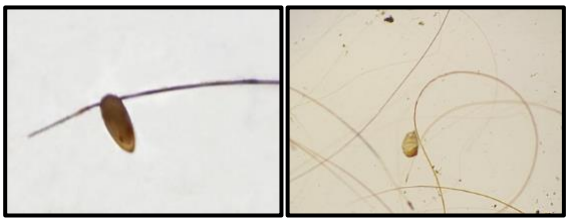

Figure 3. One egg of *Haimatopinus tubercalatus* (sucking lice of buffalo) 25X.

According to the microscopical examination under dissecting microscope of local Iraqi buffaloes raised indoor are infested with sucking lice species *H.tuberculatus*, morphological identification of lice identify the species of lice in buffaloes. It is a sucking louse H.tuberculatus with the following morphological features: 3.8 mm long, 1.9 mm wide, eyes absent, black to brown in colour with very prominent peripheral plates with five segmented antennae and a pointed head with a large claw on each leg as in (Fig. 4).

Figure 4. Buffalo sucking lice *Haematopinus tubercalatus* 10X.

The total rate (573/1060) is 54.06% of lice infestation according to the months shown in (Table 1). The highest infestation rate was 79% in Jan., Feb., and Mar. followed by 56.67% in Apr., May, and Jun. while 43.64% was lowest infestation rate in Jul., Aug., and Sep. and 43.86% in Oct., Nov. and Dec. at $p \leq 0.05$.

Table 1. Infection rate of lice in buffaloes depending on months

Months.of. study 2022	No.. of. examined animals	No..of infected animals	Percentage.
Jan., Feb., Mar.	200	158	79% a
Apr., May, Jun.	300	170	56.67% b
Jul., Aug., Sep.	275	120	43.64% c
Oct., Nov., Dec.	285	125.	43.86% c.
Total.	1060.	573.	54.06%.

Different letters Show significant differences at $p \leq 0.05$

Age risk factor was recorded 64.09% in buffaloes more than 3 years while 37.5% in buffaloes less than 3 years with significant differences at $p \leq 0.05$ (Table 2).

Table 2. Lice rate in infested buffaloes depending on age

Age.	.No.of animals examined	.No.of animal infested.	Percentage.
Less.than3 years.	400.	150.	.37.50%
More.than. 3 years.	660.	423.	.64.09% *
Total.	1060.	573.	54.06%.

***** means significant difference between age groups.

Sex risk factor results showed highest infection rate 61.09% in females while 43.09% in males at $p \leq 0.05$ (Table 3).

Table 3. Lice infestation rate of buffalo according to sex.

Sex	No. of animals tested	No. of animals infested	Percentage
Male	550	237	43.09%
Female	550	336	61.00%*
Total	1060	573	54.06%

***** means significant difference between sex groups.

Results in (Table 4) according to locations recorded 80% highest infestation rate inside Hawy Al-Maslagh (right side) while 36% lowest rate in Hammam Al-Alil (Tomb of the slave).

Table 3. Lice infestation rates of buffalo depending on the Sampling area

Sampling area	Number of examined animals	No. of infested animals	Percentage
Hawy Al maslagh (right side)	150	120	80% a
Hammam Al-Alil (Quneitra)	50	38	76% a
Hammam Al-Alil (Jamasah)	115	70	60.86% b
Hammam Al-Alil (Tomb of the slave)	250	90	36% c
Hammam Al-Alil (Quneitra Arabs)	50	35	70% a
Damerchy Al sagher	200	95	47.5% d
Badoush Jamasa (right side)	245	125.	51.02% d.
Total.	1060.	573.	54.06%.

Different letters Show significant differences at $p \leq 0.05$

Discussion

The current research has revealed the infestation rates associated with some risk factors. The total infestation rate was 54.06%. This study agreed with a study in Mosul by [7] which recorded an infestation rate of 48.63% with *Haematopinus tubercalatus*. This infestation rate is significantly high indicating a real problem. Another study in Baghdad by [11] recorded a 66.06% rate with *Haematopinus tubercalatus*. Similarities and differences in the infestation rates may be due to different factors such as health state, stress, malnutrition, and management [12]. Veterinarians and farmers focus more on diseases with lethality and high morbidity such diseases are foot and mouth disease, tuberculosis or brucellosis. Whereas endemic parasitic diseases like ecto and endo and blood parasites, which are often neglected, a high percentage of the Population may last for several years sometimes The whole life of the animal and animals Infected by external parasites are not considered sick and thus do not receive specifc health care [9, 12]. The results of the present study recorded a higher infestation rate of 79% in the winter months of January, February and March. This result is consistent with [11], possibly due to less hygienic practices or possibly due to the overcrowding of animals, humidity, temperature and high animal density in intensive housing [9, 13]. The highest lice numbers are usually recorded in the winter months and the lowest are recorded during the summer months. Severe lice infestation occurs at cooler skin temperatures and lice survival prefers cold weather. Healthy, well-fed cattle do not develop severe lice infestation and the lice present do not seriously affect performance [13]. Also, severe lice occurs in poor cattle conditions, especially if they are chronically ill. Greasiness of the hair coat is also another important factor that increases susceptibility to infection. However, lice burdens vary according to many factors such as immunity, nutrition and health status among animals, breed and husbandry system and health status are the main risks that influence the occurrence and spread of lice in goats [13, 14 , 15]. Lice dwell permanantly on animal's skin and infection occures by direct contact bewteen animals [16,17]. Location, climate, breed, system of rearing, immune status, and hygiene are the major factors affecting the prevalence and distribution of lice among animals [18]. Our study documented higher infestation rate 64.09% in the age group more than 3 years compared with 37.5% in less than 3 years, this is

similar to researchers in Baghdad [11] who recorded 79.01% and 48.1% more than and less than 3 years respectively. Our results recorded 61.09% infestation rate according to sex risk factor in females of buffaloes. This is contributed to the number of animals reared and keeping females for meat and milk production contrary to cattle which is bred for meat production. The infestation rate as shown in this study reported significant difference in different areas inside and outside Mosul city depending on the geographical distribution, number and type of animal, environmental and type of management. Haematopinidae family contains a single genus Haematopinus which is considered the largest louse parasitic family in domestic animals [19].

Acknowledgments

The authors express gratitude and thanks to College of Veterinary Medicine, University of Mosul and North Technical University for their support throughout this research.

Competing Interests

The authors declare that there are no competing interests.

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