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Prevalence of *Sarcoptes scabiei*, clinical sings and some hematological parameters in sheep in Bqubah city, Diyala province, Iraq

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Abstract

Scabies is one of the important neglected tropical skin diseases which caused by the parasitic mite *Sarcoptes scabiei*. This study was designed to investigate the prevalence and clinical some hematological alterations induced by mite infestation in sheep at in the Baqubah city, Iraq. Beside the effects of age, gender and Season. A random selection of total sheep flocks 681 included 266 males and 415 females. Samples were collected from November 2021 to March 2022. Skin scrapings were collected from sheep clinically showed lesion of mange for diagnosis the *Sarcoptes scabiei*. Clinical and hematological parameters were adopted in this study. Results showed that the main clinical signs, wool loss, crusts, pityriasis, pustules,Significant increase in the respiratory and heart rate. with an infection rate of 8% distributed as 266 male with 19(3%) infested and 415 female with 37(5%) , prevalence of the infestation was highest in sheep under one year old compared with sheep more than one years old . The prevalence of the infestation was highest in wintertime January and February 12%, 18% respectively. Hematological parameters in sheep infested with *S. scabiei* species were significant differs in values of total red blood cells (RBCs $\times 10^6$ /µl), white blood cell (WBC $\times 10^6$/µl), hemoglobin concentration (Hb g/dl) , Although the packed cell volume (PCV %) in infested sheep was lower than non- infested ones but it did not differ. In conclusion, the present study has shown that mange is still constitutes a notable problem, even with a limited percentage in Baqubah city, Iraq. Infestation with *Sarcoptes scabiei* does not affected by gender. Age under than one year is more susceptible to infestation. And the more infestation sheep with poor condition and malnutrition and bad management from owner.

Keywords: Sarcoptic mange, sheep, age, gender, Prevalence.

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Introduction

Scabies is a disease caused by mange mite *Sarcoptes scabiei*, it's a widespread on domestic and wild mammals (1). They are microscopic ectoparasites that can infect a variety of hosts, including domestic, farm and wild animals, with producing produce the mild to chronic skin condition known as "Mange"(2). In addition to having the potential to result in significant economic loss due to decreased productivity and higher animal mortality (3).

Due to skin and wool damage, anemia, poor physical condition, decreased milk and meat, decreased growth rates and general weakness that makes the affected animals more susceptible to other diseases (4). However, sheep can pick mites from the immediate environment or fomites. There are no external vectors that transmit the mites, e.g. insects, worms, birds, etc., as it happens with many other parasites (1).

The mites dig tunnels beneath the skin, Their saliva has potent digestive enzymes that dissolve the skin tissues, They feed on the resulting liquids, They do not suck blood, Adult females de posit their eggs in tunnels, which hatch in 3 to 5 days, The whole development through several larval and nymphal stages can be completed in less than 2 weeks (5). Adults live for 2 to 3 weeks, off the host the mites survive only a few days, Sarcoptic mange is also a winter pest in regions with a cold season, for the same reasons and with similar dynamics as previously mentioned for sheep scab, As soon as the animals go back to pasture in spring exposure to sun reduces the humidity in the hair coat, which slows down mite development, and without crowding mire transmission is significantly reduced (6).

This study was designed to determine the prevalence of mange mite infestation in sheep beside the effects of age, gender, time, in addition clinical and some hematological change in different regions of Baqubah city, Iraq.

MATERIALS AND METHOD

Sampling was done from different region of Baqubah city, Iraq, which represented same locations. A random selection of sheep flocks included 266 males and 415 females. Samples were collected from November 2021 to March 2022.

Evaluation of the general state of the animals, temperature, respiratory rate and heart rate which were carried according to Constable et al., (7). The distribution of the skin lesions as well as the age of the animals were also recorded.

The skin scales were collected by scraping of the lesion deeply using a sterile scalpel. These scraping samples were taken from the peripheral or edge of the lesion, then collected into sterile Petri dish and transmitted to the laboratory under aseptic conditions (8).

The skin cells sample was placed on a microscopic slide, mixed with few drops of 10-30% KOH to dissolve tissue material, then gently wormed and left for few minutes then a cover is placed, pressed and the slide was examined by low and high power under the reduced light(9).

About 2 ml of whole blood was collected in EDTA tubes from jugular venipuncture for hematological analysis. Blood samples were analyzed manually to evaluate RBC, WBC, HB and PCV. Were estimated by the haemocytometer method according to Coles, (10) and Brockus and Andreasen, (11).

Data analysis performed using Microsoft EXCEL for windows 2010.. The level of significance was 0.05 (two-tail).

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RESULTS

The main clinical signs recorded in sheep infested by mange mite was itching, the animal attempts to rub the infested region with the legs or walls, fences and some of sheep biting the infested area with teeth in addition to wool loss, crusts, pityriasis, and pustules as show in Figure (1). The results of respiratory and heart rate show significant increase in infestation sheep (35.3 ± 1.1; 92.1 ± 2.44 respectively) in comparison healthy sheep table (1).

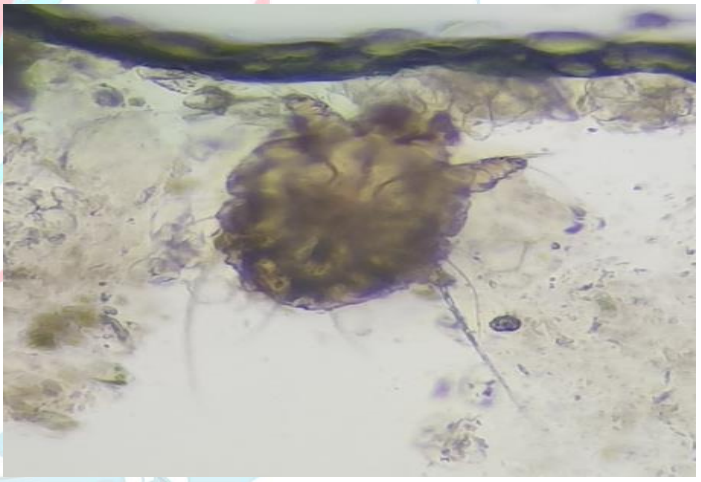
Figur (1). Distribution of disease lesions of the head area

Table (1): Clinical values (Mean±SD) of sheep infested with s. ovis and control group.

Parameters	Healthy group	Infested group
Temperature ^{o}C	38.53 ± 0.11	38.71 ± 0.06
Heart rate beat/min	84.5 ± 2.51	92.1 ± 2.44 *
Respiratory rate/min	30.9 ± 1.17	35.3 ± 1.1 *

Values are Mean ± SE, * P < 0.05 significance difference.

Microscopic examination of deep skin scrapings revealed the presence of Sarcoptes mites, which could be differentiated based on morphological characters due to the presence of short legs, unsegmented pedicels, and terminal anus. Microscopic examination of deep skin scrapings under 10x, 20x, and 40x to evaluate the mobility and morphology of the mites, which invade superficial and burrowing keratinized structures such as skin and hair. (Figure, 2).



Figur 2: Adult female of *Sarcoptes scabiei*

Macroscopic and microscopic examination of the skin scraping revealed that out of 681 of sheep investigated, 56 were infested with mites with an infection rate of 8% distributed as 266 males with 19(3%) infested and 415

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female with 37(5%) as show in table (2). prevalence of the infestation was highest in sheep under one year old compared with sheep more than one years old as show in table (3).

Table (2). The rate of mange infection according to the total numner and gender of the sheep.

Gender of animal	Total number	examined number	Postaive number	Percentage
Male	266	61	19	3%
Female	415	85	37	5%
SUM	681	146	56	8%
p>0.05 No significant difference				

Table (3). Relationship between age animals and percentages of sheep mite infestation.

Age of animal	examin animal	Positive animal	Percentage
(>) one year	101	39	27%
(<) one year	45	17	12%
Sum	146	56	38%
P < 0.05 ther is significant difference			

The prevalence of the infestation was highest in wintertime January and February 12%, 18% as show in table (4). The distribution of disease lesions in different areas of the body was studied and identified that the highest rate of infection was recorded in the head area (61%), followed by the neck (20%), back (7%), tail (13%), and legs (0%) as show in table (5).

Table (4): Distribution of infestation among study period

months	Total number	positive	percentage
November	122	2	2%
December	129	4	3%
January	151	18	12%
February	137	25	18%
March	142	7	5%
sum	681	56	8%

Table (5). Distribution of the disease lesions in the different body area.

Infected region	Infected Sheep	Percentage%
Head	34*	61%
Neck	11	20%
Back	4	7%
Tail	7	13%
Legs	0	0
Sum	56	
*** (p<0.05) significant value**		

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The hematological parameters in sheep infested with *Sarcoptes scabiei* species were significantly decreased in values of total red blood cells (5.81 ± 1.45 $\times 10^6$ /µl), white blood cell (8.98 ± 0.42 $\times 10^6$/µl) and hemoglobin concentration (7.72 ± 0.24 g/dl) , Although the packed cell volume (22.4 ± 0.56%) in infested sheep was lower than non- infested ones but it did not differ significantly as show in table (6).

Table (6): Hematological values (Mean±SD) of sheep infested with s. ovis and control group

Parameters	Infested group	Control group
RBC $\times 10^6$/µl	5.81 ± 1.45 *	8.13 ± 1.3
WBC $\times 10^6$/µl	8.98 ± 0.42 *	6.79 ± 0.3
Hb (g/dl)	7.72 ± 0.24 *	10.45 ± 0.44
PCV %	22.4 ± 0.56	34.6 ± 0.83

Values are Mean ± SE, * P > 0.05 significance difference.

Discussion

The results of clinical signs of current study agree Earlier workers reported lesions like intense pruritus, erythema, crust formation, hyperkeratosis, alopecia and thickened, rough and wrinkled skin in animal affected with Sarcoptic mange (7),(12). Giadinis *et al.*, (13).The findings of anemia were also in agreement with the findings of De and Dey as well as Parmar and Chandra (14) in goats and sheep increase in heart rate and respiration rate and significant increase in hemoglobin and hematocrit values indicative of increase in haemogram in the treated animal(14).

The result has revealed the rate of the mange infection (8%) in male and female sheep reached to 3 %, 5% respectively. This study agrees with AL-Kardi and Khudhair, (9) who found the rate of mange mites infestation reach to 7.17% in Al-Najaf province. This study didn't agree with Al-Shebani, *et al.*, (15) study, who found the rate of Mange mites infestation reach to 3.65% in Al-Diwaniyah province. Also this study disagree with Husain and Yaqoob, Husain and Ali, (16) who found that the rate of mange mites infestation reached to 3.65% in Baghdad and Diyala province. Also this study disagreed with Asghar (17) who refers the total rate of infection by different species of mites in the examined sheep and goats reached to 2.8 %. Cause of different may be to body condition relatively higher prevalence of mange mite infestation was found in animals with poor body condition score (3).

The results shown revealed the rate of mange infection according to the age of the infected animals so the highest rate in age under than one year old while, the lowest in more than one year old. This study disagree with Al-Shebani, *et al.*(15) study who found the highest rate in sheep more than two years old (3.74%) and the lowest in sheep with age less than two years old (3.40%). Also this study disagree with Husain and Yaqoob, (16) study who found the highest rate was 22.96% in age stage 2 to 4 years, while the lowest was 15.91% in age stage 1 to 2 years. Other study done by AL-Kardi and Khudhair (9), which refers to the prevalence of the infestation was highest in sheep

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older than two years (9.02%) and the lowest in sheep with age younger than two years (1.9%).

According to seasons, the rate of the mange infection so the highest infection was 7.457% in February, while the lowest rate was 2.71% in December. This study agrees with Husain and Ali (18) findings, who found the highest infection rate in February (19) found The head area in the sheep affected by scabies showed the highest rate of 72.84 %compared to the areas of the body that close result head is the most infected leasion .

Hematological findings of lowered hemoglobin and hematocrit with granulocytic leukocytosis observed in goats were in agreement with the findings of Sengupta *et al.*, (20) in total leukocyte count while highly significant. And disagree with al zuhiri *el al.*, (21) Hematological results showed decrease significantly in total WBC but agree in decrease in total leucocytes count, HB and PCV.

Conclusion

The present study has shown that mange is still constitutes a notable problem, even with a limited percentage in Baqubah city, Iraq. Infestation with *Sarcoptes scabiei* does not affected by gender. Age under than one year is more susceptible to infestation. And the more infestation sheep with poor condition and malnutrition and bad management from owner.

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