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Incidence and Haematological Effects of Ectoparasitic Infestation and Fungal Skin Infections in Sheep and Goats in Sulaimani Province/ Iraq

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Abstract

THIS COMPREHENSIVE research examines the incidence, seasonal variations, and haematological impacts of ectoparasitic and fungal skin diseases in sheep and goats in Sulaimani province, Kurdistan Region/Iraq. The study examined 63 mixed flocks and found that ticks were the primary ectoparasite affecting sheep (65.3%), while lice were the main infestation in goats (14.15%). Seasonal research revealed a surge in dermatological conditions throughout the spring season, which reached (66.64%) in sheep and (16.78) in goats. Blood samples were taken from a jugular vein in all infected animals and placed in anticoagulant tube (EDTA), the amount of one drop of blood in all samples examined by the blood analyzer for packed cell volume (PCV), total leukocyte count (WBC), total red blood cell count (RBC), haemoglobin (Hb), and differential leukocyte count (DLC). Blood samples were transferred to centrifuge for 3500(Gravity converter) for 8 minutes to separate serum. Significantly, the study determined a threshold value for notable alterations in blood parameters, especially eosinophil and neutrophil, which could potentially be used as a diagnostic indicator for these diseases. This study highlights the health difficulties that small ruminants face as a result of skin diseases. It proposes that changes in blood parameters can serve as a diagnostic reference point, thus improving disease management techniques in the agricultural industry.

Keywords: Ectoparasitic, Ringworm, Skin diseases, and Small Ruminants.

Introduction

Ectoparasites in small ruminants have considerable impact on transmitting prevalent pathogens and economic losses in animals' industry [1]. In addition, it causes restrictions via sheep and goat industry production in numerous ways; through their advisable effect on body tissue, blood, skin, beside mortality of animals, decreased production, downgrading, and rejection of skin and hide [2]. Furthermore, the ectoparasitic behaviour affect indirectly through high intense trouble, rubbing, reducing time of grazing and self-wounding [3]. Several studies have exposed the foremost skin ectoparasites; (ticks, lice, mites, fleas and sheep, keds). Ticks can be classified as three families while just two of them are well known in veterinary practice: Ixodidae (hard ticks) and Argasidae (soft ticks) [4]. Depending on report of the economic impact of tick infestations is enormous worldwide In

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1984, the United Nation Food and Agriculture Organization (FAO) estimated the global cost of Ixodidae tick infestations to be US$7.0 billion annually, the tick's saliva of some species may lead to allergies, toxicoses and paralysis of host [4,5]. Sarcoptic, chorioptic, and psoroptic mites considered as the core causes of mange in small ruminants and about 300 million humans worldwide, with different age with poor management particularly in winter [6]. Pediculosis or lice infestation (chewing or biting lice (Damalinia caprae) and hematophagous sucking lice (Linognathus africanus) in sheep and goats measured as serious problems amongst the flocks worldwide [7]. Fleas are crucial parasites of humans, sheep, and goats and wild animals around the world, in case of dense flea infestation, specifically in young animals, can cause decreasing of iron deficiency anaemia; Fleas are essential vectors in the biological transmission of viral, bacterial, protozoal and filaroid nematode pathogens [8]. According to many repots there are over 300 fungi that are actually pathogenic for animals; the immunocompromised host will be more susceptible to fungal infections, There are superficial and cutaneous mycoses which can be caused by Microsporum, Trichophyton and also Malassezia and Candida species. Dermatophytosis is an infectious disease of animals caused by Microsporum and Trichophyton species that affect the hair shafts, claws and the keratin of the epidermis [9].

The aim of this study was to examine the prevalence and effect of seasonal variations in incidence of ectoparasitic and fungal skin diseases in sheep and goats in the Sulaimani province, Iraq. Additionally, this study tended to identify the predominant pathogens that affect these animals and to assess the influence of these diseases on the haematological parameters of affected animals. Moreover, this study aimed to provide valuable information that could contribute to improving diagnostic, treatment, and management approaches to effectively control ectoparasitic infestation and fungal infections in small ruminants in the investigated region.

Material and Methods

Study area

This study was carried out in four districts in the Sulaimani province (Piramagroon, Chamchamal, Sharazor, and Penjwen). These areas include nearly 255 villages, and contain 152547 sheep, 53324 goats of different ages according to the Veterinary Directorate of Sulaimani as shown in (Figure 1). Sulaimani is geographically located in the north eastern part of Iraq. The city shares common borders with the Republic of Iran. Rainfall starts in late October and ends in early June with a mean rainfall ranging between 500 and 700mm. There are four main seasons in the city but can be classified as the wet and dry season. The dry seasons start from October and last up to April, and the wet season begins in most parts of the state in May and lasts up to September or October.

Animals of the Study

The study was carried out approximately 10% of the total target population examined from October 2022 to end of June 2023, and the total examined flocks were 63 in number, corresponding to 24640 animals (22652 and 1988 were sheep and goats, respectively). The animals were passed through clinical examination according to the guideline [10].

Ectoparasite sample collection

Samples were collected from animals that presented clinical signs of skin diseases. Clinical manifestation in flocks included severe itching, hair loss, and crusty or scaly skin lesions. A general routine examination had been performed for each case. Samples were collected in each visitation; as well as the whole body of each individual animal was inspected for the presence of ectoparasites such as ticks, fleas, louse, ked, burrowed larvae of insects. All visible adults, larvae, nymph of ticks and lice, keds were picked up by using a fine forceps. Living ticks were removed by dipping the tick and surrounding skin in 70% ethyl alcohol. Furthermore, the adult louse, ked, and fleas were collected by individual capture with thumb forceps and kept in glass tubes with alcohol 70%. The skin scraping technique was performed for all animals who suffered from alopecia, partial hair loss, and crusting and were kept in a Petri dish. Two blood samples were harvested from each animal under investigation, the first was collected in plain tube needed for serum collection, while the second was added to EDTA (ethylene diamine tetra acetic acid), and kept in the ice box immediately. Finally, they were transported directly to the laboratory of the College of Veterinary Medicine of the University of Sulaimani.

Skin scraping technique

According to [11,12], the technique for mite was performed as follows: the wool/ hair in sheep and goats were cut out with a scissor. A few drops of

mineral oil were then added to the edge of the skin lesions to moisten the area. The skin scraping was performed using a scalpel and the skin was scraped until blood oozed the scraped skin. During the scraping process, approximately 6-8 cm of the infested area was scraped. The scraped material was then placed into a Petri dish and sealed with tape. Lastly, all samples in the Petri dishes were labelled with sufficient information for separately.

According to [13] for the diagnosis of ringworm, the technique was performed as follows: The lesion area was cleaned with 70 % ethanol to remove bacterial contamination. The border of the lesion was then scraped with a blunt edge of a sterile scalpel. The hairs and scales were plucked from the lesion without breakage with a clean, dry and Petri dish. All collected samples were labeled and directly transported to the laboratory for examination.

Skin scraping examination

According to [11], the method was carried out as follows: A part of the scraping was taken and placed in a test tube containing 10 ml of KOH 20%. The tubes are warmed gently; later, they were centrifuged at a speed of 2000 (rpm) for 5 minutes. The supernatant was discarded by pipette, and the sediment was mixed well in a test tube. Then, two drops of the sediment were drawn with a pipette, and placed on a glass slide and covered with a cover slide. Finally, examined under a microscope with power x10, x40, and x100 to confirm the presence of parasite and diagnose the species.

According to [14], method for direct examination and diagnosis of ringworm was performed as follows. A part of the scraping was mounted with 10 or 20% KOH (potassium hydroxide) and warmed gently. The mixture was stained with drop of lacto-phenol cotton blue. A drop of mixture was placed on a glass slide covered by the cover slide. Finally, and examined under the microscope with power x10, x20, and x100 to confirm the presence of hyphae and spores.

Blood Analysis

Blood samples were taken from a jugular vein in all infected animals and placed in anticoagulant tube (EDTA), the amount of one drop of blood in all samples examined by the blood analyzer for packet cell volume (PCV), total leukocyte count (WBC), total red blood cell count (RBC), haemoglobin (Hb), and differential leukocyte count (DLC). Blood samples were transferred to centrifuge for 3500(Gravity converter) for 8 minutes to separate serum. Serum was examined with a refractometer to calculate the total protein count.

Statistical Analysis

The dataset was processed and analyzed using Microsoft Excel and SPSS version 25.0. Descriptive statistics were employed to streamline the data for improved interpretability. The Shapiro-Wilk test was used to assess normality, whereas the Levene test was used to assess homogeneity. The chi-square test, which incorporates the Bonferroni correction, was used to investigate the association between geographical regions, seasons, and disease incidence. An independent t-test was used to assess variations in blood parameters between healthy and infected sheep and goats. $P \leq 0.05$ considered to be statically significant. Correspondence analysis was used to determine the occurrence of diseases in various regions and seasons, while the ROC curve and AUC were used to evaluate the statistical significance of infection in animals.

Results

This study was carried out in 63 flocks consisting of 22652 sheep and 1988 goats in four districts namely Chamchamal, Sharazor, Penjwen, and Piramagroon around the Sulaimani province. Out the 22652 sheep and 1988 goats examined for ectoparasitic and fungal skin diseases, 7242 (32%) sheep and 1612 (81%) goats were found to be infested with one or more ectoparasites and ringworm. The main clinical signs that were observed in examined animals include weakness, loss of appetite, capillary engorgement, rough, wrinkled skin and pale mucous membrane. Likewise, severe itching, scratching, alopecia, crusting, scaling, and fissuring, due to the animal rub the infested or infected region to the hard surface.

The highest rate of ectoparasitic and fungal skin diseases was in the Piramagroon district, which was (10.02%). The lowest rate of skin diseases was in Penjwen district, which were (2.6%). Furthermore, in Chamchamal and Sharazoor there were (15.54%) and (7.75%), respectively (Fig.3 a).

The rate of skin diseases regarding seasons in sheep and goats, the results refer to which the highest rate of infection of ectoparasitic and fungal skin diseases in sheep was in spring (66.64%), while the lowest rate of skin disease was in autumn (0.43%). In winter and summer, they were (0.86%) and (13.87%), respectively. The highest rate of infection

of ectoparasitic and fungal skin diseases in goats was in spring (16.78%), and the lowest rate of skin diseases was in autumn (0.02%) (Fig.3 b).

The highest ectoparasite in sheep was tick (65.30%), and the lowest was lice (0.94%). Furthermore, mites and fleas were found as (3.34%) and (5.55%), respectively, and ringworm in sheep was (0.83%). On the other hand, the highest ectoparasite in a goat was lice (14.15%), and the lowest was mite (0.01%). Additionally, the ticks and fleas found as (8.16%) and (1.70%) respectively and the ringworm in a goat was (0.01%) (Fig. 3 c).

During the investigation of hematological parameters, we found that monocytes, lymphocytes, neutrophiles, and eosinophiles were statistically significant in sheep (P value < 0.05). Neutrophile and eosinophile increased significantly, while lymphocyte and monocytes decreased significantly (Table 1). During the investigation of hematological parameters, we found that neutrophiles, and eosinophiles were statistically significant in goats (P value < 0.05), they increased significantly (Table 1).

There are statistically significant differences between infected and healthy sheep in the following blood parameters. Lymphocyte, monocyte, neutrophile, and eosinophile. While, there are statistically significant differences between the infected and healthy goat in the following blood parameter: neutrophile, and eosinophile. These findings are valuable for veterinarians, as they improve their understanding of the physiological alterations linked to infections in these animals. This allows us to determine the specific threshold values for each parameter in each species using the ROC curve, which is used to establish the level at which animals are classified as infected or non-infected.

In sheep, the appropriate thresholds on the ROC curve for neutrophile (4.15) and eosinophile (0.15). Neutrophile (Area under the Curve = 0.862): The AUC value for the neutrophile test is excellent, suggesting that it has a strong ability to differentiate between the positive and negative actual state groups. Eosinophil (AUC = 0.942): The AUC value indicates that the eosinophile test exhibits exceptional discrimination capability, surpassing even that of the neutrophile test. Both tests demonstrate strong diagnostic potential as indicated by their AUC values. However, the eosinophile test, with a higher AUC, demonstrates superior overall accuracy and may be the favoured diagnostic test for skin disease (Fig. 4).

In goats, a threshold value for neutrophiles was 4.6. And eosinophile was 0.45. This can be determined as a cut-off value. Eosinophil (AUC = 0.861). This demonstrates a high level of discrimination, indicating that the test is highly effective in differentiating between individuals who are actually infected (positive actual state) and those who are not infected (negative actual state). Neutrophile (Area under the Curve = 0.774): This suggests a satisfactory level of discernment, while not as elevated as Eosinophile, yet still valuable. Taking into account the AUC values, eosinophile is shown to be a superior indicator of the investigated condition in compared to neutrophile. It exhibits greater precision in distinguishing between the groups that are infected and those that are not affected (Fig.4).

In Penjwen, the prevalence of diseases was the highest during the autumn and winter seasons, while in Sharazor it was the most common during the summer. On the contrary, in Chamchamal and Piramagron, the highest incidence of infection was during spring (Fig. 5).

Discussion

Sheep and goats might represent an important segment in the livestock system in the world [15,16]. In the Kurdistan Region sheep and goats are considered the main source of meat and milk. This study considered the first work on skin diseases in sheep and goats in the Sulaimani province. In addition, the ectoparasitic skin diseases in sheep and goats cause vital economic losses, low productivity, and mortality [17,18]. Similarly, there are no data on the economic losses caused by skin diseases in the Kurdistan Region. However, in other countries, such as Ethiopia's tanneries report about 35% of sheep skin, and 56% goat skin are rejected due to the external parasites [19]. In 1997, scabies caused to lose £3-4 million per year in the UK in sheep industry income [20]. Among others, ectoparasites have caused several economic implications for the livestock industry, such as the costs of treatment in sheep scab in the UK industry which is an excess of £8 million per year [21]. Sheep afford direct cash income through the sale of the animals, wool, and hides [22-24]. Additionally, ringworm is considered as the veterinary and public health problem that has been reported from different parts of the world [22, 25]. Ringworm can also cause damage to the hide and skin industries, such as the scars reappeared on leather and tannery, for example, about 40% of the

skins in France, which is bought at spring by tanners, were damaged by ringworm lesions [26].

Infact, skin scraping and direct skin examination is the main technique for diagnosis of skin abnormities, mange and ringworm. The technique can be rapid, easy, not expensive and applicable. Additionally, skin scrapings are part of the basic approach for all skin diseases diagnosis [27]. But it has low sensitivity [28]. However, the specificity of skin scraping is about 96% close to those of ELISA 100% [29]. Understandably, the sensitivity to skin scraping is lower compared to ELISA as it only has 62.8% accuracy while in ELISA it is 87.6% for mange diagnosis [30].

In Sulaimani province there are three climate zones, including very cold and heavy raining area (the rate of snow, and rain) as Penjwen. Moderate cold and raining area such as Sharazor, Piramagroon, and less cold and raining area such as Chamchamal, as well as, in these four districts there are variation in densities, habit of rising of animals, type of flocks, and ratio of goats and sheep in one flock. In order cover this variation in climate and other dissimilarities, these four districts have been selected in this study. According to the results of this study, there are significant differences in the prevalence of ectoparasitic and fungal skin diseases ($P<0.05$) among four selected districts. The highest prevalence rate of ectoparasitic and fungal skin diseases was in Piramagroon (10.02%), While, the lowest prevalence rate was in Penjwen (2.62%). This may be due to many factors such as climate variation, flock size, and close contact [20]. The unsanitary housing, worm and humidity play an important role in the development of Fleas and, enables eggs to develop due to the increased warm and humidity [31].

In sheep the most frequent ectoparasite was tick (65.30%), This result is higher than that recorded by each of [12] in Duhok was (46.7%), and [32] in Sulaimani was 55.46%. In south Iraq it was (46.9%). This is probably due to many factors such as, climate variation, the season of study [33], or may be due to the number of samples and the increase in use of insecticide by the owners [34].

The lowest frequency of ectoparasitic skin diseases in sheep was lice (0.94%), this result is inconsistence with each of [12]. In Duhok was (3.8%) and [35], in Al-Mosul city was (13%), the main reasons for this variation is due to the habits of owners in their treatments of lice and in Sulaimani province, and there is a program for shearing and dipping in early summer and late autumn. On the other hand, the most common ectoparasitic skin diseases in goats were tick (8.16%) this result is lower than that reported by [12] was (33.8%) and in Ethiopia was (34%), probably due to variety in goat rearing and easy contact of lice with goat skin because sheep wool acts as Insulator [36]. However, the lowest prevalence rate of ectoparasitic skin diseases in goats was mite (0.01%), which may be due to the densities of goats in flocks compared to sheep.

In this study, the prevalence rate of ringworm in sheep is (0.83%). The result of this study in sheep and goats is lower than that reported by [25] in the Basraha in sheep was (5.45%) and recorded by [37] in Egypt were (71.4%) and (65%) in sheep and goats, and by [38] in the Diyala province-Iraq was (80%). However, in goats the result of this study was (0.01%). This result is lower than that recorded by [37] in Egypt (65%). This variation of result may be due to climate conditions of area of these studies that are hotter and more humid than overcrowding in Sulaimani province and the age of animals [39].

Regarding seasons, the highest prevalence rate of skin disease in sheep and goats was in spring (66.64%) sheep and (16.78%) goats, due to an optimal suitable environment (suitable for activity, growth, development and reproduction of ectoparasites [40]. While the lowest rate was in autumn (0.43%) sheep and (0.02%) goats, this may be due to annual dipping [41], and shearing during summer and early autumn [20].

As a result of some hematological parameters in sheep and goats suffering from skin diseases and compare with healthy animals. There was a significant decrease in monocytes and lymphocytes and is an increase in neutrophiles and eosinophiles in sheep. This result in agreement with that reported by [41] and probably due to anemia or according to some reports ectoparasites drain erythrocytes and consequently cause marked decrease in erythrocyte counting. Although, there is a significant increase in eosinophiles, and neutrophiles in goats with skin diseases, this result is in agreement with and [42], probably due to an allergic reaction and an inflammatory reaction that is associated with a chronic inflammatory reaction in the skin [43]. Along with depending on many studies on ruminated suffering from skin diseases there were change blood parameters such as increasing in WBC, RBCs,) and

biochemical parameters (increasing of Total protein) which is strongly agree with our study [44,45].

Conclusion

Ectoparasitic and fungal skin diseases are serious problems in sheep and goats and are widely distributed. The most common ectoparasites detected in sheep and goats were ticks and lice. While, fleas, mites and dermatophytes are less common, according to the results of this study, there is statistical difference among the districts around the Sulaimani province. Seasons have significantly affected the ectoparasitic and fungal skin diseases in sheep and goats. Sheep and goats are not similarly affected, in sheep the tick is the most common infection while in goats the lice are the most common infection. Ectoparasitic and fungal skin diseases have been significantly affected on some blood parameters, such as lymphocytes, monocytes, neutrophiles, and eosinophiles.

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Funding statement

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Declaration of Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical of approval

All procedure operation were conducted in consent with the owners according to the approved principles of ethics by the College of Veterinary Medicine Research Committee, University of Sulaimani, Kurdistan Regional Government, Kurdistan/ Iraq.

TABLE 1. Comparison of the hematological response in sheep and goats to skin infections.

Blood parameters	Species				
		Sheep		Goat	
	Infection status	Mean ± S.D	P value	Mean ± S.D	P value
WBC	Infected	12.05 ± 3.6	0.94	12.45 ± 5.55	0.47
	Non infected	11.98 ± 2.18		11.01 ± 3.63	
Lymphocyte	Infected	4.49 ± 1.99	0.012	5.34 ± 2.45	0.76
	Non infected	6.12 ± 2.09		5.62 ± 2.48	
Monocyte	Infected	0.93 ± 0.51	0.001	1.27 ± 0.86	.954
	Non infected	1.53 ± 0.63		1.26 ± 0.52	
Neutrophil	Infected	6.06 ± 1.96	0.001	5.2 ± 1.73	0.013
	Non infected	3.54 ± 1.52		3.6 ± 1.05	
Eosinophil	Infected	0.5 ± 0.28	0.001	0.84 ± 0.39	0.001
	Non infected	0.09 ± 0.06		0.32 ± 0.31	
Hb	Infected	8.67 ± 2.7	0.73	7.56 ± 1.82	0.55
	Non infected	8.93 ± 0.99		7.96 ± 1.4	
PCV	Infected	24.15 ± 7.31	0.27	19.98 ± 6.46	0.192
	Non infected	25.52 ± 2.47		22.99 ± 3.6	
Total plasma protein	Infected	5.84 ± 0.94	0.07	5.87 ± 0.91	0.71
	Non infected	5.5 ± 0.47		5.76 ± 0.54	

Fig. 1. Shows the geographical location of Sulaimani province on the map (red patch), where skin and blood samples were collected for tests.

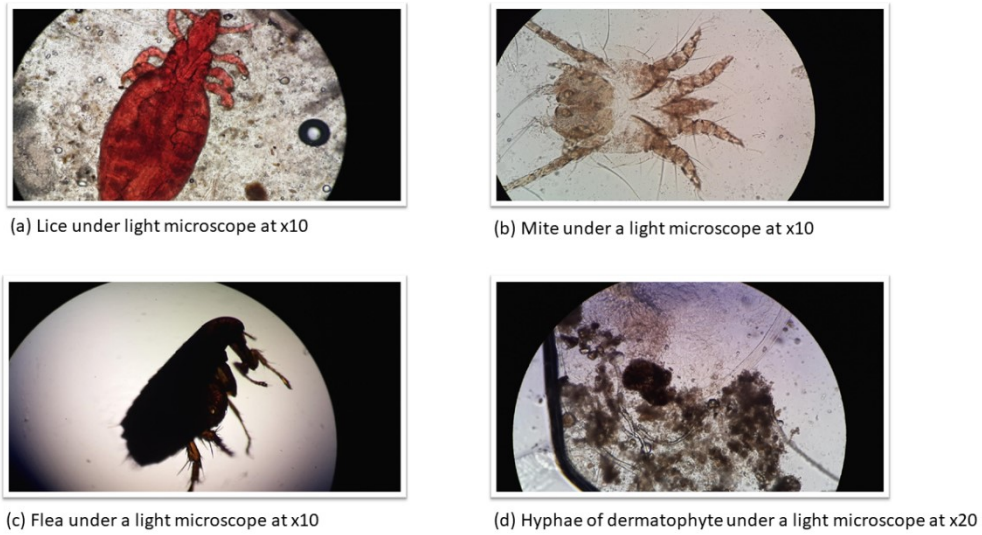


Fig. 2. Types of ectoparasites found during skin examination.

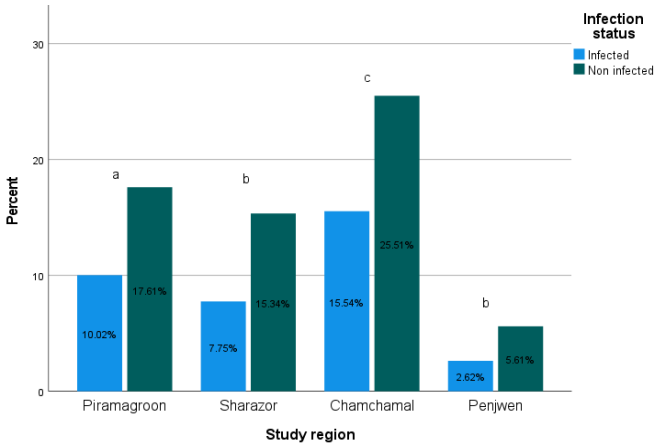


Fig. 3.a. Percent positivity of ectoparasitic and fungal skin diseases in small ruminants according to study region

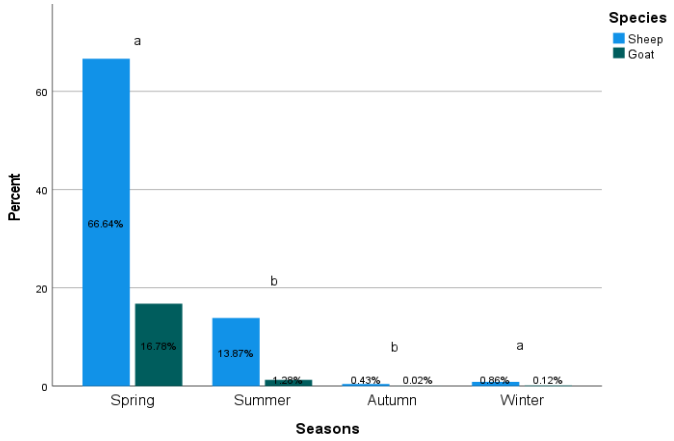


Fig. 3.b. Percent positivity of ectoparasitic and fungal skin diseases in small ruminants according to seasons.

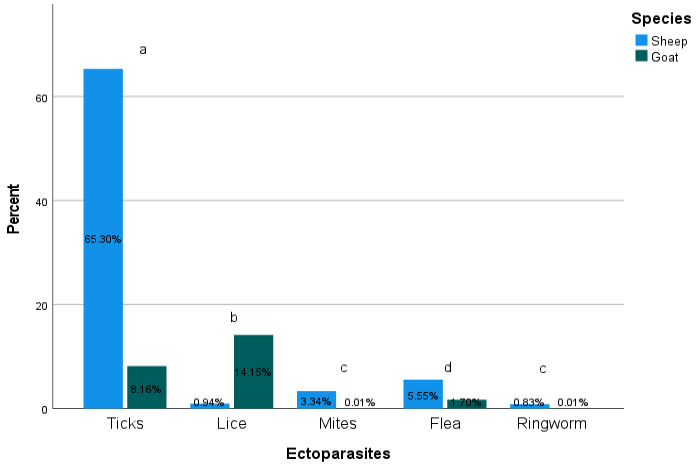
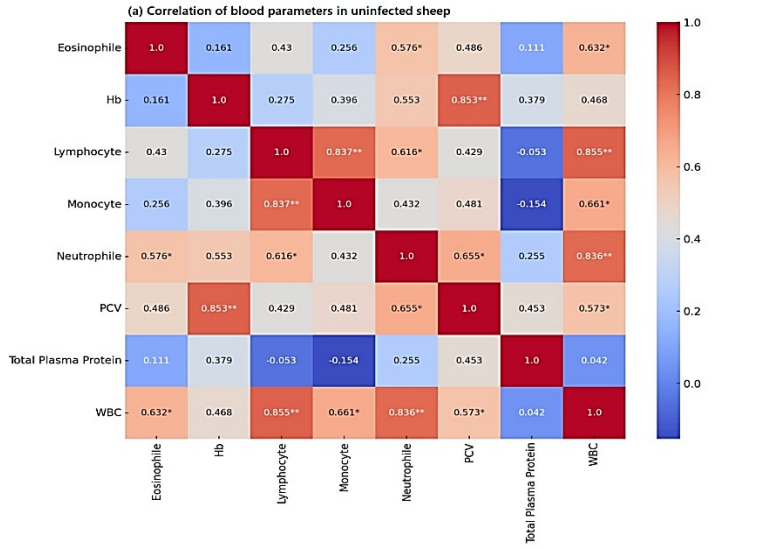
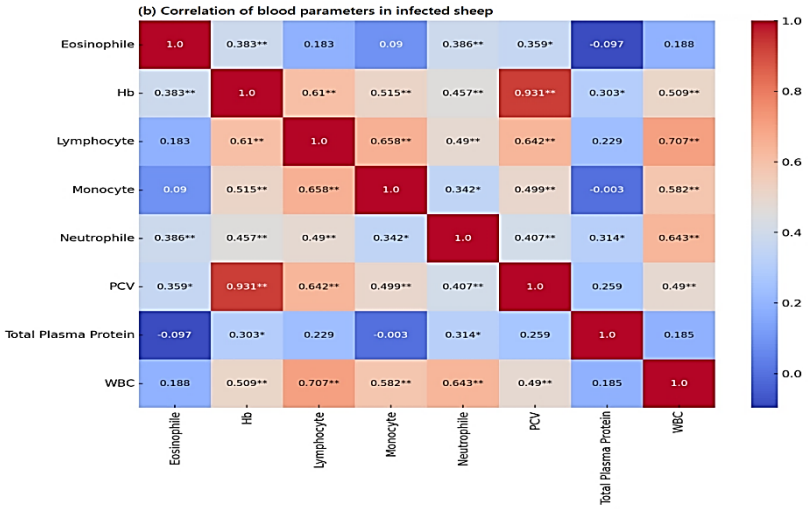
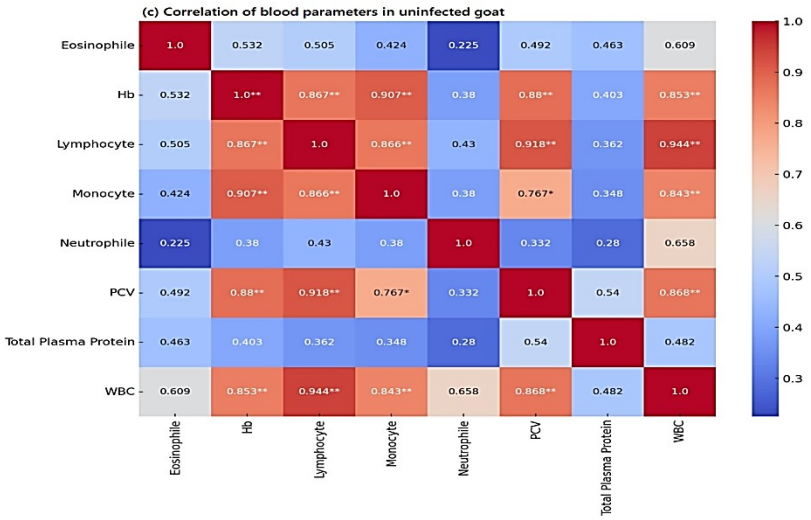


Fig. 3. c. Percent positivity of ectoparasitic and fungal skin diseases in small ruminants according to the types of ectoparasites and fungal infection.


(a) Correlation of blood parameters in uninfected sheep
Eosinophile 1.0 0.161 0.43 0.256 0.576* 0.486 0.111 0.632*
Hb 0.161 1.0 0.275 0.396 0.553 0.853** 0.379 0.468
Lymphocyte 0.43 0.275 1.0 0.837** 0.616* 0.429 -0.053 0.855**
Monocyte 0.256 0.396 0.837** 1.0 0.432 0.481 -0.154 0.661*
Neutrophile 0.576* 0.553 0.616* 0.432 1.0 0.655* 0.255 0.836**
PCV 0.486 0.853** 0.429 0.481 0.655* 1.0 0.453 0.573*
Total Plasma Protein 0.111 0.379 -0.053 -0.154 0.255 0.453 1.0 0.042
WBC 0.632* 0.468 0.855** 0.661* 0.836** 0.573* 0.042 1.0
Eosinophile Hb Lymphocyte Monocyte Neutrophile PCV Total Plasma Protein WBC
1.0 0.8 0.6 0.4 0.2 0.0


(b) Correlation of blood parameters in infected sheep
Eosinophile 1.0 0.383** 0.183 0.09 0.386** 0.359* -0.097 0.188
Hb 0.383** 1.0 0.61** 0.515** 0.457** 0.931** 0.303* 0.509**
Lymphocyte 0.183 0.61** 1.0 0.658** 0.49** 0.642** 0.229 0.707**
Monocyte 0.09 0.515** 0.658** 1.0 0.342* 0.499** -0.003 0.582**
Neutrophile 0.386** 0.457** 0.49** 0.342* 1.0 0.407** 0.314* 0.643**
PCV 0.359* 0.931** 0.642** 0.499** 0.407** 1.0 0.259 0.49**
Total Plasma Protein -0.097 0.303* 0.229 -0.003 0.314* 0.259 1.0 0.185
WBC 0.188 0.509** 0.707** 0.582** 0.643** 0.49** 0.185 1.0
Eosinophile Hb Lymphocyte Monocyte Neutrophile PCV Total Plasma Protein WBC
1.0 0.8 0.6 0.4 0.2 0.0


(c) Correlation of blood parameters in uninfected goat
Eosinophile 1.0 0.532 0.505 0.424 0.225 0.492 0.463 0.609
Hb 0.532 1.0** 0.867** 0.907** 0.38 0.88** 0.403 0.853**
Lymphocyte 0.505 0.867** 1.0 0.866** 0.43 0.918** 0.362 0.944**
Monocyte 0.424 0.907** 0.866** 1.0 0.38 0.767* 0.348 0.843**
Neutrophile 0.225 0.38 0.43 0.38 1.0 0.332 0.28 0.658
PCV 0.492 0.88** 0.918** 0.767* 0.332 1.0 0.54 0.868**
Total Plasma Protein 0.463 0.403 0.362 0.348 0.28 0.54 1.0 0.482
WBC 0.609 0.853** 0.944** 0.843** 0.658 0.868** 0.482 1.0
Eosinophile Hb Lymphocyte Monocyte Neutrophile PCV Total Plasma Protein WBC
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3

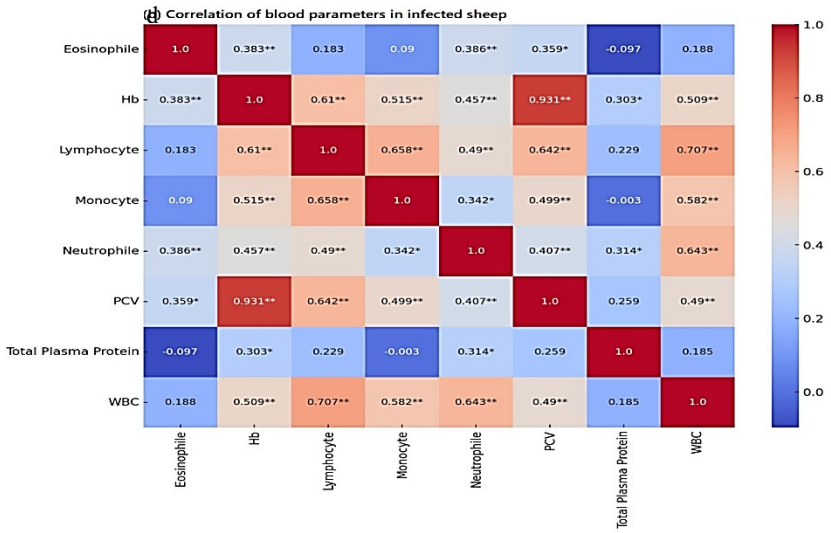


Fig. 4(a-d). Shows the correlation of blood parameters in healthy and infected sheep and goats.

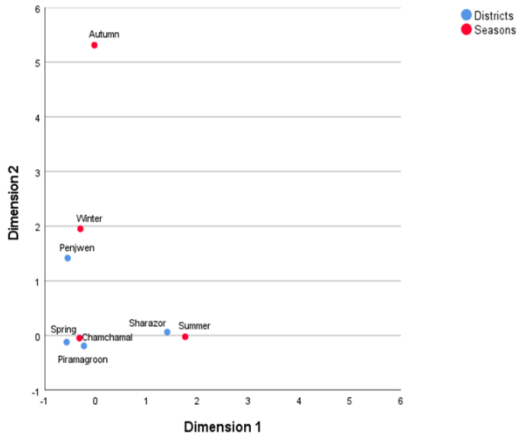


Fig. 5. Show the frequency of ectoparasitic and fungal skin diseases in small ruminants in different districts varies throughout the year.

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الإصابة والتأثيرات الدموية للإصابات الجلدية بالطفيليات الخارجية والفطرية في الأغنام والماعز في محافظة السليمانية/ العراق

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الملخص

يتناول هذا البحث الشامل حالات الإصابة والتغيرات الموسمية والتأثيرات الدموية للأمراض الجلدية الطفيلية الخارجية والفطرية في الأغنام والماعز في محافظة السليمانية، إقليم كردستان/العراق. فحصت الدراسة 63 قطعاناً مختلطة ووجدت أن القراد كان الطفيلي الخارجي الأساسي الذي يصيب الأغنام (65.3%)، بينما كان القمل هو الإصابة الرئيسية في الماعز (14.15%). كشفت الأبحاث الموسمية عن ارتفاع كبير في الأمراض الجلدية طوال فصل الربيع، حيث بلغت (66.64%) في الأغنام و(16.78%) في الماعز. تم أخذ عينات الدم من الوريد الوداجي في جميع الحيوانات المصابة ووضعها في أنبوب مضاد للتخثر(EDTA) ، وكمية قطرة دم واحدة في جميع العينات التي تم فحصها بواسطة محلل الدم لحجم خلايا الرزمة (PCV) ، وإجمالي عدد كريات الدم البيضاء .(WBC) إجمالي عدد خلايا الدم الحمراء (RBC)، الهيموجلوبين(Hb) ، وعدد كريات الدم البيضاء التفاضلية .(DLC) تم نقل عينات الدم إلى جهاز الطرد المركزي لـ 3500 (محول الجاذبية) لمدة 8 دقائق لفصل المصل. وبشكل ملحوظ، حددت الدراسة قيمة عتبة للتغيرات الملحوظة في بارامترات الدم، وخاصة اليوزينيات والعدلات، والتي يمكن استخدامها كمؤشر تشخيصي لهذه الأمراض. تسلط هذه الدراسة الضوء على الصعوبات الصحية التي تواجهها المجترات الصغيرة نتيجة الأمراض الجلدية. ويقترح أن التغييرات في معايير الدم يمكن أن تكون بمثابة نقطة مرجعية تشخيصية، وبالتالي تحسين تقنيات إدارة الأمراض في الصناعة الزراعية.

الكلمات المفتاحية: الطفيليات الخارجية، السعفة، الأمراض الجلدية، المجترات الصغيرة.