

PARASITOLOGICAL STUDY OF SCABIES, IN SHEEP AND HUMAN.

Khairy A. Dawood¹, Aalan H. Al-Zamili¹, Ghyda'a A. Jassim², Maitham A. Alwan²

ABSTRACT

Objective: 1- Isolation and diagnosis of mites species in sheep. 2-To study the pathological changes in the skin. 3-To know the epidemiological distribution of Scabies in human.

Materials and Methods: Scrabing was collected from infected area of skin of sheep and human. These specimens were treated with 10% KOH to remove scales and hairs, and then fixed on slides for diagnosis. Biopsies were taken from infected skin for pathological study.

Results: Three species of mites were diagnosed on sheep, *Sarcoptes scabiei*, *Psoroptes ovis* and *Chorioptes sarcoptes*, with percents of infection 34.95%, 58.27%, 4.71% respectively. Gross pathological changes observed were, toughness, dryness, fissuring of the skin with white scales, while microscopical pathological changes revealed, hyperkeratosis, acanthosis, infiltration of chronic inflammatory cells (eosinophils, macrophages and lymphocytes) and oedema in the dermis. Age group of 11-30 years of age were highly affected (28.2%). Housewives were the highest percent among other occupation (29.1%).

Conclusions: Scabies is a big public health problem and should be looked after among sheep as well as human beings.

دراسة طفيلية عن الجرب بين الأغنام والإنسان

د. خيرى عبدالله^١، د. الان الزاملي^١، د. غيداء احمد جاسم^٢، د. ميثم علوان

كلية الطب/جامعة القادسية^٢، كلية العلوم/جامعة القادسية

الأهداف: ١. عزل وتشخيص نوع العث في الأغنام. ٢. دراسة التغيرات المرضية في الجلد. ٣. معرفة الانتشار البيئي لمرض الجرب في الإنسان. **المواد والطرق:** تم جمع نماذج من المنطقة المصابة للجلد في الأغنام والإنسان. عوملت النماذج مع ١٠% هيدروكسيد البوتاسيوم لإزالة القشور والشعر ثم ثبتت على شريحة زجاجية بغية التشخيص. أخذت نماذج من الجلد لغرض الدراسة المرضية.

النتائج: تم تشخيص ثلاث أنواع من العث في الأغنام *Sarcoptes scabiei*, *Psoroptes ovis*, *Chorioptes sarcoptes* بنسب إصابة ٣٤.٩٥%، ٥٨.٢٧% و ٤.٧١% على التوالي. شملت التغيرات المرضية الخارجية، الخشونة، الجفاف، التشقق للجلد مع قشور بيضاء. بينما شملت التغيرات المرضية المجهرية زيادة الكيراتين مع وجود الخلايا الالتهابية المزمنة مع استسقاء في طبقة الجلد. وجدت الفئة العمرية ١١-٣٠ سنة الأكثر إصابة ٢٨.٢%. كانت ربات البيوت الأكثر إصابة (٣٥.٩%) نسبة الى نوع العمل.

الخاصية: مرض الجرب مشكلة اجتماعية يجب الاهتمام بها والتقصي عنها في الأغنام وكذلك الإنسان.

INTRODUCTION

Sarcoptes females burrow into the epidermis and feed on tissue fluids. The burrowing and feeding of mites cause irritation and consequential scratching, leading to inflammation and exudation to form crusts. If left untreated, the skin become wrinkled and thick due to proliferation of connective tissue followed by depletion. Death of the animals may occur in severe cases.^[1,2] Many of the symptoms of mites infection are due to an

allergic reaction that the body was developed and their by-products under the skin such as the feces or the eggs which produce a massive allergic response and more intense itching sensation.^[3,4] In chronically infected animals, the skin becomes thickened and crusty with asbestose-like scabs particularly around the eyes and on the ears, snout, hocks, pasterns, crutch and tail. Skin folds developed on thickened skin, which looses its sheen and

¹Prof. College of Medicine University of Al- Qadisiya, Iraq

²Assisstant .Lec, College of Vet .Medicine, University of Al-Qadisiya, Iraq

become discoloured by a brownish–grey scruffiness. The hair may become long and curly in some animals and in severe cases, there may be foul odour.^[3] *Psoroptes* non burrowing mites which are parasitic on mammalian skin and live on the body surface and in the ears of susceptible hosts^[5,6] *Psoroptes ovis* cause an intense immuno-inflammatory response dominated by eosinophils accompanied by infiltration of lymphocytes. The skin become thickened, folded, scaly and with crust developed on its surface. So it becomes more damaged and losses its ability to protect the animals against bacterial secondary infections.^[7] The mites graze the skin around the moist periphery of the lesion, feed on serous exudates. The sheep scab is of an allergic dermatitis initiated by feces of mites.^[8] *Chorioptic* scab mite causes *chorioptic* mange in domestic animals especially in cattle, sheep, goats and horses.^[9] Based on biological, morphological and molecular genetic studies, two species of *Chorioptes* are recognized; *C.bovis* and *C. texanus* infected cattle, goats, horses, sheep, camels and rabbits.^[10]

MATERIALS AND METHODS

Samples: Samples were collected weekly from sheep which is showed clinical picture and gross lesions such as loss of hair, severe itching, crust and wrinkled skin. The wool was clipped out with scissors and then drops of glycerine were added on the edge of lesion to moisten the area then a skin scraping by a sharp scalpel number 21 deeply until blood begins to ooze. Scraping was distributed on several petridishes and all informations were written on them. These samples were transported directly to the parasitology laboratory for identification.^[5]

Laboratory Test: Samples were placed in test tubes contain 5ml KOH 10%. The tubes were placed in water bath (80°C) for 15 min, then centrifuged with speed 2000 r.p.m for 5 min. The supernatant was discarded while the

sediment was mixed well in a test tube and one drop was drawn by a pipette and placed on glass slide then covered by cover slide ready for microscopical examination.^[11] Fixation of positive cases of mites was done by adding one drop of Hoyer's solution on the samples that present on slide, mixed well then covered with cover slide.^[6]

Hoyer's solution: -----

Arabic gum	30 gm
Chloral hydrate	100 gm
Glycerine	20 ml
Distilled water	50 ml

These materials were mixed in a flask, heated in water bath (100°C) for 3 hours and then this solution was filterated and placed in incubator (60°C) for 24 hours, then cooled and saved until used.^[12]

Sectioning: Biopsies (1-2cm) were taken from the infected skin and fixed in 10% formalin. After 3 days, processing was done depending on method of Banks^[7] which includes fixation, dehydration in ascending concentration of ethyl alcohol, infiltration by wax, embedding in wax, sectioning, clearing, rehydration in descending concentration of ethyl alcohol, staining by H&E stains and then mounting. Data for human infection were obtained from Teaching Hospital of Diwania, which were distributed on the months of the year, sex and on 5 groups of occupation.

RESULTS

One hundred forty-four cases were diagnosed in human clinically and in laboratory of Diwania Teaching Hospital. Infected males were 65(45%) while 79(55%) of females were infected. These cases were distributed to 5 groups of occupations (Table-1). Infection was commonest in housewives (29.1%) and lowest in children (10.4%).

Table 1. The number and percent of infection of each Occupation.

	Occupation	No.	%
1	Student	25	17.3
2	Workers	30	20.8
3	Farmers	32	22.2
4	Housewives	42	29.1
5	Children	15	10.4

Laboratory diagnosis: microscopical diagnosis was revealed two species. First was *Sarcoptes scabiei* which is round in shape with four pairs of short legs especially 3rd and 4th pairs, the last pair not extend much out of the body

margin. The ventral surface characterized by the epimeres which form Y shaped (Fig-1). Ninety-two cases out of 144(63%) were infected by this parasite.



Fig 1. Ventral surface of *Sarcoptes scabiei* 25X.

The second species identified is *Psoroptes ovis*. It has an oval shaped body with four pairs of long hairy legs which extend out of the body

margin especially the first two pairs (Fig-2). Fifty-two cases (37%) were infected by this parasites.



Fig 2. Ventral view of male *Psroptes ovis* a. Two adanal suckers b.empodial suckers of legs 25X.

Scabies in sheep (Mange): The same specieses (*S.scabiei* and *P. ovis*) that infect human were also isolated from sheep except the third species (*Chorioptes*)which was found in sheep only (Fig-3). There are variations in percents of

infection of these parasites in sheep. *P.ovis* was the highest rate (58.32%) while *S. scabiei* was (34.65%) whereas *Chorioptes* was the lowest rate of infection (3.34%).

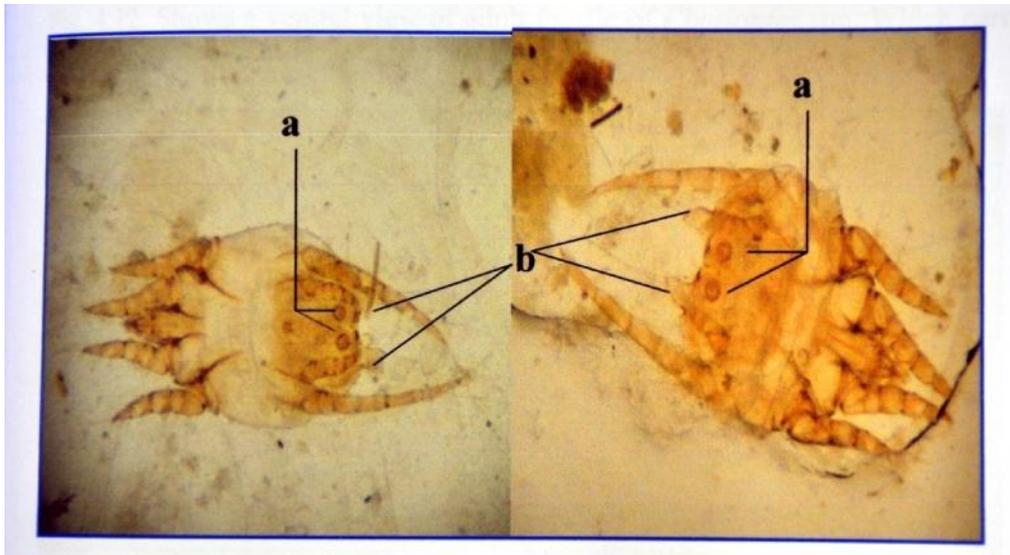


Fig 3. Ventral surface of *chorioptes* male, a. showing two adanal suckers, b. short fourth pair of legs. 25X

Pathological Changes:

Gross appearance: In human, skin lesions were present on the back of hands, between the digits, grion, umbilicus, axillae, penis, buttocks and back. The patients were suffer from intense

itching with scratching and bleeding. The lesions were visible by necked eyes and showed redness of infected area, small vesicles, papules, and pastules. Urticaria and eczema were noticed in

chronic cases. In animals cases, *S. scabiei* was isolated from the head, neck, back, and tail, while *P. ovis* concentrated on the back region, shoulder, abdomen and tail. *Chorioptes spp.* were isolated from the legs, shoulder and flanks. Gross pathological changes, were shedding of wool, yellow white crust, and thickened layers of scales. Redness and vesicles were noticed at the margin of the infected area. Sometimes due to rubbing with an objects, bleeding occur. Therefore, blood clot, scar, and serous or suppurative exudate were present.

Histopathological changes:

The epidermis appeared with waves due to variation in thickening and wrinkled skin with tunnels of mites (Fig-4). Acanthosis and hyperkeratosis also present (Fig-5) in comparison with normal skin (Fig-6). Cellular infiltration occurred in inflamed area such as lymphocytes, eosinophils, macrophages, and few neutrophils. Cross section of skin specimens included the tunnels and revealed females, larvae and eggs of mites. In epidermis, there was fibroblasia surrounded the hair follicles. The epithelial cells in epidermis were intensely basophilic.

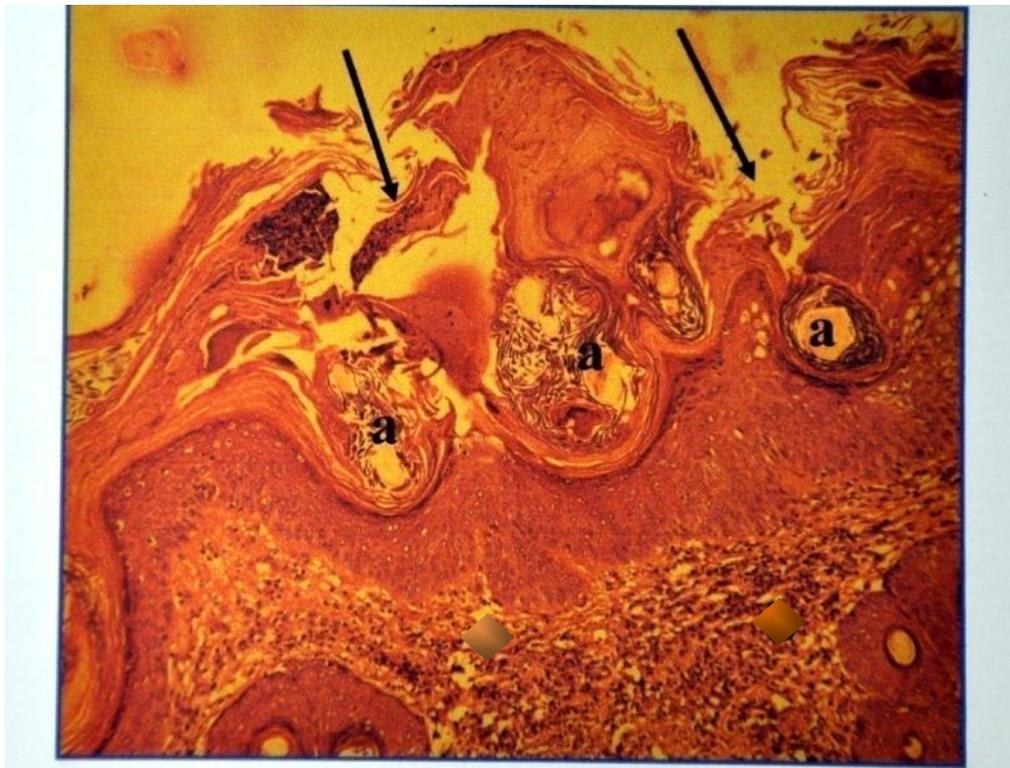


Fig 4. Thickening of skin of sheep with tunnels of mites (a), H.&E. stain 40X.



Fig 5. Hyperkeratinization of squamous layer of epidermis with several tunnels of mites (a), H.& E. stain, 40X.

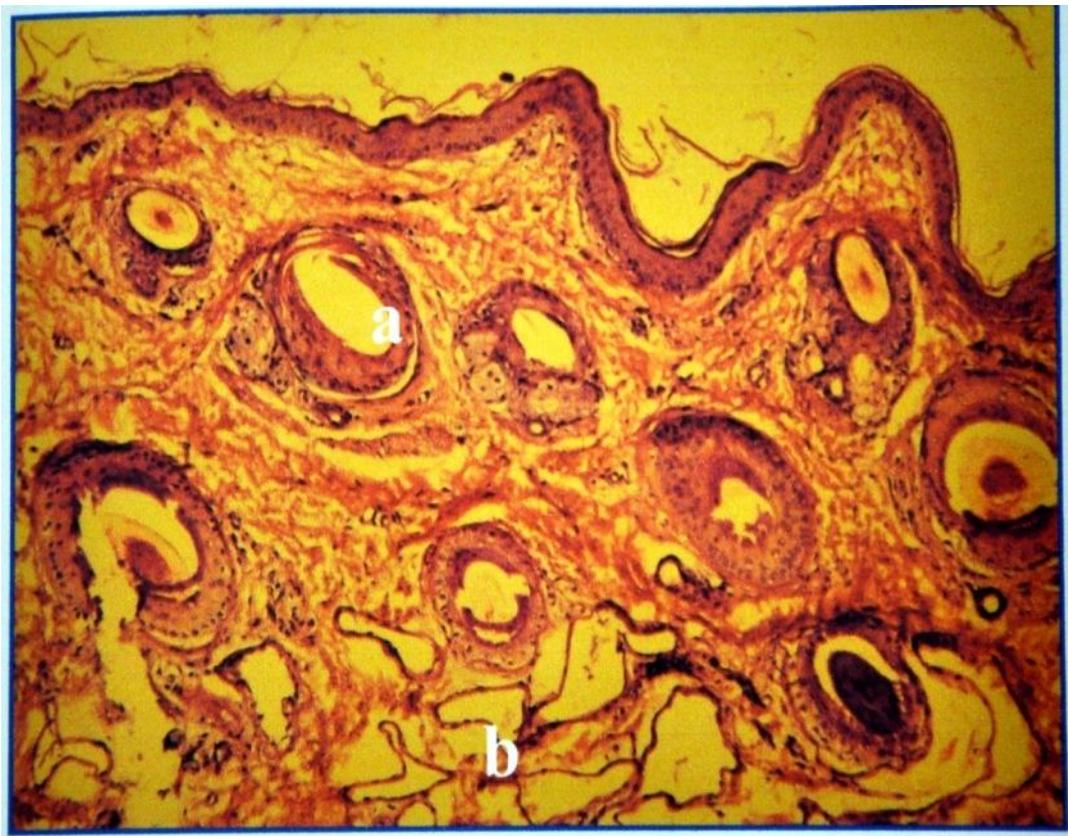


Fig 6. Normal skin of sheep with normal thickness of epidermis, normal hair follicles (a) with sebaceous gland (b), H.&E. stain 40X.

DISCUSSION

The results of human cases showed variation in percents of infection related to occupation. Housewives were the commonest and might be due to direct contact with animals and/or hormonal factors. There were seasonal variations in human and animal infection with mites due to changes in weather temperature and humidity which activate mites to be transmitted from one patient to another. As well as during winter time (climate low temperature), people become close to each other and close to animals (may all of them sleep in one room), these circumstances help mite transmission. Laboratory diagnosis proved that *P. ovis*, *S. scabiei* and *Chorioptes* were endemic in the sheep of this area while among human patients only *P. ovis* and *S. scabiei* were diagnosed. In contrast, Al-Zubaidei^[13] has proved the absence of *Chorioptes* in sheep. Biu and Wakawa^[14] in Pakistan confirm, that higher prevalence of mange occurred during rainy months more than drier months. In addition, Purcherea and Boulakroune^[15] revealed the infection with mites increased during winter months (77%) in comparison with other season. In this study, clinical signs and gross finding of infected humans and animals such as itching and redness due to allergic inflammation were found. Bleeding, blood clot and severe dermatitis occurred if there is no treatment. In sheep, shedding of wool was noticed due to necrosis of the hair follicles. Infected area in human showed vesicles with crusts and scales. In addition, hyperkeratinization of epidermis with laceration and secretion of mites were noticed. O'Brien et al^[16] have explained that pathological changes as crusts and scales increased with rise of number of mites which lead to loss of infected skin of animals and humans therefore, the skin losses its flexibility due to thickness and hardness. Sometimes, secondary infection was occurred by bacteria so pus can be noticed.

REFERENCES

1. Qudoos A, Rafique S, Khan V, Iqbal Z, and Riaz M. Sarcoptic mange in Highland Balochistan. Pak.J. Agr. Sci 1997, 34(1-4): 117-118.
2. Martin WB, Aithen ID. Diseases of sheep 3rd ed. Blackwell Science 2000:281-287.
3. Dvorak G, Spickler AR. Acariasis (Mange), the center for food security and public health, 2170 coll. of Vet. Med. Iowa State Uni. 2005:1-9.
4. Roberts LS, Janovy J Jr. Foundation of Parasitology 7th ed. Inter. Ed. McGraw Hill, New York. 2006: 653-655.
5. Hendrix CM, Robinson E. Diagnostic Parasitology for Vet. Technicians, 3rd ed. Linda L. Duncan, Missouri, New York, 2006: 172-189.
6. Vallant B, Edwards S, Schlater JL and Mertins JW. Manual of Diagnostic Tests and Vaccines for Terristerial Animals (Mammals, Birds and Bees). 2008; 6th ed. Vol. 2.
7. Banks WJ. Applied Vet. Histology, Mosby. 3rd ed. 1993: 5-6, 326-331.
8. Hamito D, Zelleke T, Yami A and Merkel RC. Common defects of sheep and goat skins in Ethiopia and their causes. Ethiopia sheep and goat productivity Improvement Program. Technical Bulletin. 2009; (19): 1-11.
9. Talley J (2007). External parasites of goats. Pages 76-80 in proc. 22nd Ann.goat feild day, Langston Uni., Langston, UK. Bhatia, B.B. Pathak, K. M. Banerjee, D.P. and Kulkarni, S.M. A Text book of veterinary parasitology. (2nd ed.) Kalyani Puplicher, New delhi, India, 2008: 272-280.
10. Bates P, Cook A, Philips K, Temple M, Gettinby G and Kelly L. An evidence base for new legislation and guidance for implementation of a compulsory treatment period for sheep scab. 2008:1-40.
11. Baker AS. Mites and Ticks of domestic animals and identification guide and information source. Text book, Dept of Entomology, the Natural History Museum. London, The Stationary office, 1999.
12. Ben Brook, EA, Sloss MW. Vet. Clinical Parasitology 3rd ed. Iowa State University Press, Iowa, 1961: 197.
13. Al-Zubaidei H. A study of prevalence of ectoparasitofestation of sheep in Baghdad. M.Sc. thesis, College of Vet. Med. Baghdad Uni, 2003.
14. Biu AA, Wakawa MM. Chorioptes mange infestation in cattle in Borno State, Nigeria. Pakistan Vet.J. 2004; 24(3): 155-156.
15. Purcherea A, Boulakroune A. Sarcoptic mange in sheep, 1. Epidemiological, Clinical and Pathogenic aspect. 2. Therapy lucrui Stiintifice Institutul Agronomic "Nicolae Balcescu" Med. Vet. 1986; 29: 55-65.
16. O'Brien DJ. *Psoroptes ovis* the great escapologist. Irish grass land and animal prod. Asso. Inter. 2001; 48: 123-126.