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Investigation the Effects of Sheep Scabies on Wool Quantity and Quality in Maidan Wardak Province

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ABSTRACT

Psoriatic mange (sheep scab) is an important ectoparasitic disease of sheep causing considerable economic losses through reductions in wool production, milk yield, body weight, and skin quality. This cross-sectional study used field observations, structured questionnaires, and interviews with 100 participants, including 80 sheep farmers and 20 veterinary health officials, to assess the prevalence of psoroptic mange, farmers' awareness, management practices, and economic impacts. Among the farmers, 90% were male and 10% female; most were aged 36–50 years, and the majority were illiterate. In terms of management, 90% raised sheep under traditional systems, while 10% used semi-intensive systems. Results showed that 84% of farmers reported psoroptic mange in their flocks, with outbreaks mainly in winter (95%). The mean flock size was 97 sheep (range: 8–186). Average wool production was 1.75 kg per sheep, with a mean fiber length of 13.5 cm. The average wool price was 50 AFN/kg, and mean annual income from wool production was 8,335 AFN per household. According to farmers' and veterinarians' reports, psoroptic mange caused up to 50% body weight loss, a 40–50% reduction in milk yield, and up to 50% decrease in market value. In conclusion, psoroptic mange is highly prevalent in the study area. It poses a serious threat to sheep production, highlighting the need for improved farmer awareness, better management, and enhanced access to veterinary services to reduce its economic impact.

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INTRODUCTION

Mites constitute an extremely diverse group of arachnids, with more than 40,000 described species and potentially many more species remaining undiscovered. They exhibit remarkable diversity in morphology, behavior, ecology, and biological adaptations. Although many mite species are free-living, numerous species are associated with or parasitize invertebrate and vertebrate hosts, including birds and mammals. Mites occur in a wide variety of terrestrial and aquatic environments worldwide. Parasitic mites may live externally on their hosts or, in

some cases, occupy internal sites, including the respiratory tract and nasal passages of animals (Walter & Proctor, 1999; Walter & Proctor, 2013).

The causative agents of mange reside primarily within the stratum corneum of the skin in humans and mammals. In ruminants, mite infestations lead to substantial economic losses, mainly due to reduced growth performance and impaired feed intake (Rehbein et al., 2000) .

Moreover, mange is recognized as an important zoonotic disease and is considered contagious; globally, an estimated 300 million people are affected. Transmission can occur through close contact, including between spouses as well as among family members such as parents and children (Khoobdel et al., 2022).

Psoroptic mange, locally known as Kark or Jarb, is a highly contagious parasitic disease affecting various mammalian species (Mullen & OConnor, 2019). It is also called psoroptic mange, sheep scab, or psoroptosis. The disease has a long history in sheep, and Psoroptes ovis is the principal causative mite of sheep scab (O'Brien, 1999; Mullen & O'Connor, 2019). Psoroptic mange has been eradicated from countries including the United States and New Zealand, although it remains present in several other regions (O'Brien, 1999). The disease can cause substantial economic losses in sheep production, particularly through effects on animal health and productivity (Mullen & O'Connor, 2019).

The causative agents of mange are mites belonging to the family *Psoroptidae*, which are classified under the order *Acari* within the phylum *Arthropoda*. Key species include Psoroptes ovis in sheep and Sarcoptes scabiei, with various variants affecting humans, dogs, goats, horses, sheep, and other hosts. The body of these mites consists of two main regions: the gnathosoma (mouthparts) and the idiosoma (which contains the remaining body structures). Larvae possess three pairs of legs, whereas adults have four pairs (Bates, 1999).

Female mites lay relatively large eggs, from which six-legged larvae emerge. A few mite species produce eggs containing already developed larvae, giving rise to live young. The larvae undergo molting and develop into eight-legged nymphs. There may be up to three nymphal stages, referred to as the first, second, and third nymphal instars. In at least one of these stages, the nymph develops passively without feeding. After completing the nymphal stages, the mites molt into eight-legged adults. Mites are small, highly adaptable organisms that can survive in a range of environmental conditions. The number of eggs produced varies among species, and the reproductive lifespan of female mites may result in fewer than 16 eggs per individual. Nevertheless, many species complete their life cycle in less than four weeks, and some take less than eight days. Consequently, these mites possess a remarkable capacity for population increase (Sanders et al., 2000).

To prevent the disease, avoid introducing suspicious animals into the herd and, if necessary, implement a four-week quarantine period. Animals and barns should be treated with anti-parasitic agents twice a year. Take strict preventive measures for hygiene and general regulations. Animal nutrition should be good in both quantity and quality. Eliminate predisposing and facilitating factors, and clean and treat barns after removing sick animals.

If disease occurs, isolate and treat sick animals, and educate farm personnel to protect themselves, as this disease is transmissible to humans (Plant & Lewis, 2011; Hamer et al., 2019).

According to existing findings, psoroptic mange, caused by the parasitic mite Psoroptes ovis, is an important disease that can negatively affect animal health, welfare, and productivity. Infestation can cause dermatitis, intense pruritus, wool loss, reduced weight gain, lower reproductive performance, and hide damage, resulting in considerable economic losses for sheep producers (Nixon et al., 2017; Burgess et al., 2024). The disease is highly contagious and can spread between sheep, making its control challenging in affected flocks (Nixon et al., 2017; Burgess et al., 2024). Therefore, assessment of the prevalence, farmers' awareness, management practices, and economic consequences of psoroptic mange is important for developing appropriate disease-control strategies. Accordingly, this study aimed;

- To assess the prevalence, management practices, farmers' awareness, and economic impacts of psoroptic mange among sheep farmers in Maidan Wardak Province, Afghanistan.

MATERIALS AND METHODS

Study Design

A cross-sectional, field-based study was conducted during the winter of 2019 in Maidan Wardak Province, Afghanistan, to assess the occurrence of sheep scab (psoroptic mange), farmers' awareness, management practices, and the perceived economic impacts of the disease on sheep production. The study was conducted in three districts of Maidan Wardak Province, namely Maidan Shahr, Sayed Abad, and Hesa-e-Awal Behsud.

The study used a mixed-methods approach, combining quantitative and qualitative methods. Quantitative information was obtained primarily through structured questionnaires, while qualitative data were collected through face-to-face interviews and direct field observations. These approaches were used to obtain complementary information on disease occurrence, farmers' awareness and management practices, wool production, and the perceived effects of sheep scab on sheep and sheep products. The methodological approach followed established principles of mixed-methods and qualitative research (Creswell & Poth, 2018).

Sampling

A non-probability convenience sampling approach was used to select study participants based on their availability and relevance to the study objectives. The study included 100 participants: 80 sheep farmers and 20 veterinary health personnel. The farmers were selected from the three study districts based on their availability and primary involvement in sheep farming, while veterinary health personnel were selected based on their availability and professional involvement in sheep health and veterinary services in the study areas. The

participating farmers collectively owned 4,996 sheep, predominantly indigenous breeds, particularly Arabi and Ghiljai sheep, which are commonly reared under traditional production systems in Maidan Wardak Province. As convenience sampling was employed, the number of participants recruited from each district was determined by accessibility and willingness to participate rather than by a predetermined proportional allocation.

Instruments

A structured questionnaire served as the primary data-collection instrument. The questionnaire was designed to obtain information from sheep farmers concerning five main areas: (1) awareness and knowledge of sheep scab; (2) wool production and its economic importance; (3) occurrence of sheep scab in sheep flocks; (4) management and control practices; and (5) perceived effects of sheep scab on wool, milk, meat, and skin production.

Information obtained from veterinary health personnel focused on their professional observations and experiences regarding the occurrence, clinical recognition, management, and control of sheep scab.

The questionnaire also collected information on flock size, sheep breed, management practices, annual wool production, previous occurrence of sheep scab, disease-control practices, and perceived economic losses. Wool production was recorded based on farmers' reports of the average amount of wool produced per sheep per year. The participating farmers collectively owned 4,996 sheep, and farmers' reports provided wool production information.

Wool quality was assessed through visual observation and farmers' evaluation of general wool characteristics, including cleanliness, overall appearance, fiber condition, and suitability for use. Direct observation during farm visits also served as a supplementary tool for recording relevant clinical signs and field conditions.

Data Collection Procedure

Data were collected during the winter of 2019 through field visits to Maidan Shahr, Sayed Abad, and Hesa-e-Awal Behsud districts of Maidan Wardak Province. The team obtained information from sheep farmers through structured questionnaires, face-to-face interviews, and direct observations. Literate participants completed the questionnaires independently, while the researcher read and explained the questions to illiterate farmers and recorded their responses.

The study collected information on flock size, sheep breed, sheep scab occurrence, management and control practices, wool production and quality, farmers' awareness, and perceived economic impacts. Experienced local veterinary personnel identified suspected cases of sheep scab based on clinical signs and field observations. Because laboratory diagnostic facilities were unavailable, laboratory confirmation of *Psoroptes ovis* was not possible. Participants provided informed consent, and confidentiality of the collected information was maintained.

Statistical Analysis

The collected data were coded, organized, and analyzed using descriptive statistical methods. Frequencies, percentages, and means were calculated to summarize the occurrence of sheep scab, farmers' awareness, management practices, wool production, and the disease's perceived economic impacts.

Microsoft Excel and IBM SPSS Statistics version 25 were used for data management and statistical analysis. The results were presented in tables and figures to describe the occurrence of sheep scab, wool production characteristics, farmers' awareness and management practices, and the perceived economic impacts of the disease in the study area.

FINDINGS

This study, which was conducted based on observations, interviews, and questionnaires with sheep farmers and veterinary health officials, produced the following results:

Characteristics of the study population

Out of a total of 100 participants included in the study, 80 were sheep farmers, and 20 were veterinary health officials. Among the farmers, 90% were male, and 10% were female. Most farmers were aged 36–50 years, and most were illiterate. In terms of sheep management practices, 90% of the farmers raised their sheep using traditional farming systems, while only 10% used semi-intensive production systems.

Table 1. *Awareness of Livestock Owners about Psoroptic Mange (Scab Disease)*

Awareness indicators	Yes (n, %)	No (n, %)	Don't know (n, %)
Sheep affected by scab in recent years	67 (84%)	7 (9%)	6 (8%)
Effect of scab on sheep sale and price	70 (87.5%)	10(12.5%)	0 (0%)
Improper feeding and management	72 (90%)	5 (6%)	3 (4%)
Transmission of scab from sheep to humans	20 (25%)	40 (50%)	20 (25%)
Self-treatment of sheep scab by farmers			
Access to veterinary services	52 (65%)	28 (35%)	0 (0%)
	28 (35%)	45 (56%)	7 (9%)

Table 1 shows that farmers' awareness of sheep scab varies by indicator. Out of 80 farmers surveyed, 67 (84%) reported that their sheep had been affected by scab in recent years, while 7 (9%) stated that their sheep had not encountered the disease, and 6 (8%) were uncertain. Farmers whose flocks were not affected generally maintained better management practices, had more experience in livestock rearing, and owned fewer sheep. A large proportion of farmers 70 (87.5%) emphasized the significant impact of scab on sheep sale and price; affected sheep were difficult to sell, and when sold, their price often dropped by half. Improper feeding and management were recognized as important factors in disease occurrence, with 72 farmers (90%) indicating that insufficient nutrition during winter and housing in damp shelters weakened animals and facilitated scab outbreaks, whereas only 8 (10%) disagreed. Awareness of zoonotic transmission was limited: only 20 farmers (25%) knew that scab could cause severe itching and skin lesions in humans if proper hygiene was not observed, while 60 farmers (75%) were unaware. Regarding self-treatment of sheep scab, 52 farmers (65%) practiced or were aware of self-treatment methods, whereas 28 (35%) did

not. Access to veterinary services was also limited, with 28 farmers (35%) reporting access, 45 (56%) reporting no access, and 7 (9%) unsure.

Table 2. *Wool Production and Its Econ. In contrast, onlythe Study Area*

Variables / Information	Maximum	Minimum	Mean
Number of sheep	186	8	97
Wool production per sheep (kg)	3.0	0.5	1.75
Total annual wool production (were	325	14	170
Wool fiber length (cm)	20	7	13.5
Price per kilogram of wool in the local market (AFN)	70	30	50
Annual income from wool production (AFN)	16,250	420	8,335

Based on the data in Table 2, the 80 sheep owners included in the study collectively reared 5,086 sheep. The flock size per household ranged from 8 to 186 head, with a mean of 97 sheep. The total gross wool production from these sheep amounted to 8,900 kg. Wool yield per sheep varied between 0.5 and 3.0 kg, with an average of 1.75 kg. Wool fiber length ranged from 7 to 20 cm, with a mean value of 13.5 cm. The market price of wool in the study area ranged from 30 to 70 AFN per kilogram, with an average price of 50 AFN. Wool quality and market price were influenced by breed, age, sex, season, and color. Wool obtained from Ghaljai and Arabi breeds, lamb wool, and wool from male sheep exhibited higher quality and greater economic value. Spring wool, due to its softness and cleanliness, commanded a higher price than winter wool. In terms of color, white wool was valued more highly than colored wool. Annual income derived from wool production varied among farmers depending on flock size and wool quality; the minimum annual income was reported as 420 AFN, the maximum as 16,250 AFN, and the mean annual income as 8,335 AFN. Sheep owners utilized wool for the production of various traditional garments and household items, including sweaters, trousers, jackets, felt products, blankets, ghanj, sacks, rugs (kilam), and carpets. Some of these products, particularly in Hazara-inhabited regions, are sold to domestic and international tourists at relatively high prices.

Prevalence of Psoroptosis (Sheep Scab) in the Study Area

Field observations, interviews, and questionnaire surveys indicated that psoroptosis predominantly occurs during the cold season (winter). About 95% of sheep owners reported disease outbreaks, with 5% reporting cases in spring. The higher winter prevalence is mainly attributed to increased humidity and prolonged confinement of sheep in substandard housing. In many regions of Afghanistan, underdeveloped sheep management systems limit access to open-air grazing during winter. These environmental and management constraints serve as significant risk factors, facilitating the occurrence and transmission of psoroptosis among flocks.

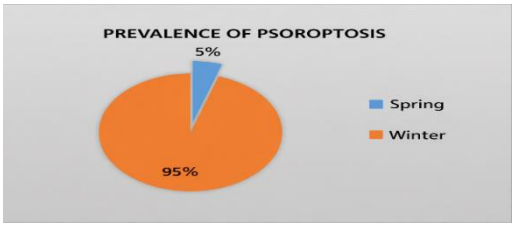


Figure 1. *Prevalence of Psoroptic Mange in the Study Area*

Table 3: *Opinions of Veterinarians and Para-veterinarians on Psoroptic Mange*

Questions About Psoroptic Mange in Sheep	Yes (n, %)	No (n, %)
Is treatment of psoroptic mange possible?	**20(100%)**	**0 (0%)**
Does the type of sheep management affect disease transmission?	**19 (95%)**	**1 (5%)**
Can insects and other small animals transmit the mange agent?	**17 (85%)**	**3 (15%)**
Does keeping an infected animal with healthy sheep contribute to disease spread.	**20 (100%)**	**0 (0%)**
Does maintaining hygiene in the barn play a role in disease spread?	**20 (100%)**	**0 (0%)**
Does the disease cause mortality in newborn lambs?	**10 (50%)**	**10 (50%)**
Can psoroptic mange be transmitted to humans?	**16 (80%)**	**4 (20%)**

Based on the questionnaire distributed among 20 veterinarians (13 with a Bachelor's degree, 4 with a diploma, and 3 para veterinarians), 100% of respondents confirmed that psoroptic mange is treatable. Proper management of sheep was identified as a key factor in disease prevention, with 95% of veterinarians emphasizing that maintaining hygiene and environmental management can reduce disease prevalence. Only one para veterinarian considered the occurrence of the disease as seasonal and beyond control. Between 85% and 100% of respondents highlighted the role of other animals and insects in disease transmission. In particular, keeping an infected dog in proximity to sheep was noted as a significant risk factor for infecting the entire flock. All veterinarians stressed the importance of maintaining barn hygiene, including moisture control, ventilation, waste disposal, and daily cleaning, especially during the winter season, to minimize disease spread. Regarding neonatal lamb mortality, 50% of veterinarians believed that untreated pregnant ewes could result in death of newborn lambs, while the remaining 50% considered that lambs are susceptible but that mortality does not necessarily increase. Psoroptic mange is a highly zoonotic disease that can be transmitted to humans through direct contact with infected sheep or wool products (such as carpets, felt, and rugs), causing severe itching, lesions, and skin dryness. Eighty percent of the veterinarians were aware of the zoonotic potential of the disease, while 20% were not.

Impact of Psoroptic Mange on Sheep Products (Milk, Meat, and Skin)

Data presented in Histogram 2 the (percentages) indicate that psoroptic mange affects not only wool but also key sheep products such as milk and meat, as well as by-products like skin. Infested sheep experience reduced appetite and allocate more energy to survival, leading to significant weight loss and decreased milk production.

According to interviews with farmers, veterinarians, and health officials, affected sheep can lose up to 50% of their body weight, leaving them emaciated. Buyers often refuse such animals or pay significantly less; for instance, a sheep valued at 10,000 AFN may sell for only

5,000 AFN, causing substantial economic losses for the farmer. Similarly, milk production in lactating ewes suffers. Due to reduced feed intake and poor nutrition, infected ewes may experience a 40–50% decline in milk yield. Psoroptic mange also adversely affects skin quality. Lesions are generally localized, often on the flanks or chest, as lice mites of their body weight rebecomingand destroollicles. This damage causes wool loss and reduced skin quality in affected regions, further diminishing the economic value of the animals.

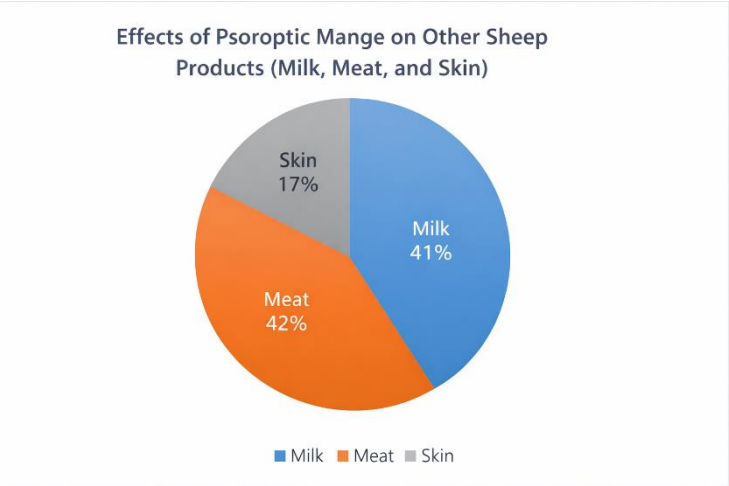


Figure 2. *Effects of Psoroptic Mange on Other Sheep Products (Milk, Meat, and Skin)*

Diagnosis, Treasuffersevention of Psoroptic Mange in Sheep

Based on interviews and questionnaires distributed among veterinary doctors, the following information regarding the diagnosis, treatment, control, and prevention of psoroptic mange in sheep was obtained: Most veterinarians believed that psoroptic mange in sheep can primarily be diagnosed based on clinical signs, as affected animals exhibit distinctive symptoms. Prominent signs include wool loss, intense pruritus, anorexia, emaciation, white patches on the skin, and a higher incidence during humid seasons, particularly winter. All veterinarians stated that clinical diagnosis is sufficiently reliable, making extensive laboratory testing generally unnecessary. Only Dr. Aminullah, head of the laboratory department in Maidan Wardak province, indicated that sampling lesions and microscopic examination could confirm the presence of the mange mite; however, this method is limited in use because clinical diagnosis is so reliable. For the treatment of psoroptic mange, veterinarians recommended a variety of drugs to farmers, including Negavan, Ivermectin, Tigafon, Ditrifon, Kanandex, Betaderm, and OTC sprays. These medications are available as powders, injectables, ointments, and sprays. Most veterinarians emphasized hygiene and preventive care. Key recommendations include using protective clothing such as gloves, masks, coats, and appropriate footwear; regularly cleaning and ventilating sheep pens; properly disposing of manure; and preventing water and urine accumulation within the pen. Additional preventive measures include quarantining newly purchased sheep for one week before introducing them into the flock, washing sheep monthly with anti-parasitic powders such as Negavan and Tigafon, and daily cleaning of wool using brushes. Strict adherence to these practices significantly contributes to effective disease control and prevention of its spread.

DISCUSSION

According to the present study, sheep farming is one of the principal livelihood activities for most households in Maidan Wardak Province and serves as a primary means of meeting daily household expenditures. In addition to major products such as milk and meat, secondary products, including wool and skins, hold substantial economic significance; in certain cases, these by-products surpass primary products and represent the principal source of income for livestock producers. Interviews conducted with livestock farmers revealed that approximately 87.5% of the population is engaged in agricultural and livestock-related activities. The province's livestock production system is predominantly traditional and underdeveloped, leading to low productivity and limiting production largely to subsistence-level household consumption. Only when production exceeds household requirements is a portion of the output marketed. Supporting this observation, Zahir (2024) reported that nearly 80% of Afghanistan's population is involved in agriculture and livestock production; however, because traditional production practices persist, this sector generates limited economic returns. Furthermore, Doyle et al. (2021) and Khan et al. (2012) reported that sheep wool, particularly from wool-type breeds, has in some contexts evolved from a secondary by-product into a primary economic commodity.

The results indicate that livestock farmers in Maidan Wardak Province rear several sheep breeds. Specifically, 23.5% of farmers raise Ghiljai sheep, commonly referred to as Afghani sheep; 21.75% rear Hazargi sheep; 27.5% raise Arabi sheep; 15% rear Turki sheep, while the remaining 12.5% of farmers practice mixed rearing of other breeds, including kandahari, Baluchi, kadik, and Karakul, in combination with the aforementioned breeds. These findings are consistent with those reported by Musavi et al.(2022), who documented the proportional distribution of Afghan sheep breeds, as presented in Table 4.

Table 4. *Percentage distribution of local sheep breeds in Afghanistan*

Breed	Percentage (%)	Breed	Percentage (%)
Arabi	13	Karakul	30
Balochi	5	kaddik	5
Kandahari	1	Turki	8
Ghjlzai	17	Crossbreed	10
Hazargi	7	Total	100

This table represents the relative distribution of different sheep breeds in the study. The highest frequencies were observed for the Karakul breed (30%) and Ghiljai breed (17%), while other breeds such as Arabi, Turki, Hazargi, and Crossbreed had lower percentages.

The "scabies" disease not only harms the health of sheep but also has a severe negative impact on the market, as affected animals are either sold at half price or have no buyers at all. These findings are consistent with studies by Babonazarov et al. (2022), O'Brien et al. (1999), and Shiven et al. (2020). As Babonazarov et al. note, scabies is a parasitic skin disease caused by the small mite *Sarcoptes scabiei* var. *ovis*, which lays eggs beneath the skin and is invisible to the naked eye. This parasite can infect humans in addition to animals and causes significant economic losses due to reduced wool and skin quality. Shiven A. et al. (2020) also

report that scabies is more prevalent during winter, when high humidity, poor nutrition, and close contact between animals in barns favor transmission.

The findings of the study indicate that livestock owners use various traditional methods to treat sheep affected by scabies, including the application of black oil, hot ash, musk combined with salt, oil mixed with resin, boiling pomegranate peel and applying it to the animal's skin, dissolving tobacco in water for washing the sheep, and feeding onions with salt to the animals. According to the owners, these methods can somewhat reduce disease severity and transmission; however, the wool of treated sheep becomes unusable. These findings partially align with observations by O'Brien et al. (1999) regarding the use of musk with salt. These researchers note that scabies has been recognized since ancient times and is mentioned in historical texts and artifacts, where animal fat was traditionally used as a treatment. Nevertheless, the same sources note that other traditional remedies (such as resin, ash, or tobacco) are not only ineffective. However, they may also exacerbate the disease and render the wool completely unusable.

Among 80 livestock owners, a total of 4,996 sheep were raised in the study area. The maximum flock size was 186 sheep, the minimum was 8 sheep, and the average flock size per household was 97 sheep. From this population, a total of 8,743 kilograms of raw wool was produced, with a maximum yield per sheep of 3 kg, a minimum of 0.5 kg, and an average yield of 1.75 kg per sheep. Wool fiber length in the area ranged from 7 to 20 cm, with an average of 13.5 cm. These data are consistent with Demirüren (1960) and Oradi et al. (2022), which reported similar wool production levels for local Afghan sheep, as summarized in Table 5.

Table 5. *Annual Wool Production of Local Afghan Sheep*

Breed	Wool Yield (g)	Breed	Wool Yield (g)
Arabi	1.7–2.1	Karakul	2–2.6
Balochi	1.3–1.8	Kandahari	1.3–1.6
Gaddik	0.4–0.9	Turk	0.8–1
Ghilzai	1.5–2	Hazargi	0.9–1.4

The findings of this study on wool production in local Afghan sheep contrast with the results reported by (oyle et al. (021) nd Kumari et al. (2024). Doyle notes that the American Rambouillet breed is among the finest and globally renowned wool-producing breeds, with an annual wool yield of 10–12 kg, fiber diameter ranging from 19 to 39 microns, and annual fiber growth length between 70 and 80 mm. This production is five to six times higher than that of local Afghan sheep. On the other hand, Aand Kumari report that experts and scientists have developed improved breeds with high-quality, valuable wool. For example, the Lincoln breed produces 6–10 kg of white wool annually with a fiber length of 25–35 cm, while the Askanis breed produces over 30 kg of wool per year. These studies indicate that wool production in local Afghan sheep is considerably lower than in improved and foreign breeds. The primary reasons for this difference include the lack of technical expertise, poor security conditions, and reliance on traditional livestock management systems. Consequently, animal production in Afghanistan remains much lower than in advanced foreign breeds.

The findings indicate that scabies not only affects sheep wool but also impacts other products such as milk, meat, hides, and newborn lambs. Specifically, there is a 40% reduction in milk production, a 42% decline in meat quality and weight, and an 8% reduction in hide quality (including perforations and white spots in affected areas). These results are consistent with reports by O'Brien et al. (1999) and Babonazarov et al. (2022). They emphasize that delayed diagnosis and treatment can lead to severe economic losses, weak lambs at birth, reduced milk yield in infected ewes, and higher neonatal mortality, as these lambs are deprived of antibody-rich colostrum. Scabies can be identified through clinical signs such as wool loss from the shoulder, flank, and legs; intense itching; emaciation; anorexia; superficial wounds; and white patches on the skin. Sampling from lesions and microscopic examination is also effective for diagnosing *Sarcoptes scabiei* var. *ovis*. This scraping test is referenced in O'Brien et al. (1993).

Veterinarians use a variety of drugs to treat scabies, including Ivermectin, Negavan, Tigafon, Ditrifon, Kinandix, Betaderm, and OTC sprays. These findings are consistent with those of O'Brien (1993) and Walker et al. 2017), who recommend the following treatments for this disease:

1. Plunge dipping in organophosphorus sheep dips.
2. Macrocyclic lactone (3-ML) systemic endectocide injections
3. Systemic endectocide (Ivermectin) injections

The present findings, in which 80% of interviewed veterinarians reported the possibility of scabies transmission from sheep to humans, indicate considerable awareness of its potential zoonotic importance among veterinary professionals. This observation is consistent with evidence that zoonotic transmission of *Sarcoptes scabiei* from animals to humans has been documented in different animal hosts, including livestock, particularly in occupational settings involving close animal contact (Moroni et al., 2022). In humans, scabies is characterized by intense pruritus, often worsening at night, and is primarily transmitted through prolonged close skin-to-skin contact (WHO, 2023). However, zoonotic scabies acquired from animals should be distinguished from human scabies caused by *S. scabiei* var. *hominis*, as animal-derived infestations are generally transient and have different epidemiological characteristics (Moroni et al., 2022).

CONCLUSION

Based on field observations, interviews, and questionnaire analyses with livestock owners and veterinarians, scabies is one of the most prevalent and significant skin diseases in sheep in the study area, particularly during winter under conditions of high humidity and poor ventilation. It affects multiple body regions including the head, neck, shoulders, chest, flanks, abdomen, ears, and skin folds. Infected sheep exhibit intense itching, leading to wool loss, skin lesions, reduced appetite, weight loss, decreased milk production, and adverse effects on fetal health in pregnant ewes. Wool from affected animals is fragile, short, non-elastic, and dull, while healthy wool is soft, elastic, and glossy. Annual wool income is highly variable,

and the fibers are used in traditional clothing and handicrafts. Clinical diagnosis is generally straightforward, and treatment involves effective veterinary drugs such as Ivermectin, Ditrifon, Tigafon, and OTC sprays, with antibiotics recommended for secondary infections. To prevent and control scabies, a comprehensive approach is recommended, including implementation of regular winter preventive programs with animal and housing treatment and owner education; quarantine of new or suspected animals and immediate isolation of infected sheep; maintenance of hygiene in housing, reduction of humidity, disinfection, and parasite/insect control; administration of effective veterinary drugs under professional guidance; systematic recording and analysis of disease cases; continuous training of livestock owners regarding disease nature, symptoms, and prevention; and strengthening collaboration among governmental, academic, and private institutions for effective disease management.

Recommendation

Based on the findings of this study, implementing regular scabies control and prevention programs in sheep flocks in Maidan Wardak Province is strongly recommended to mitigate its negative effects on wool quantity and quality. Emphasis should be placed on early diagnosis, timely treatment, and improved hygiene and management practices, particularly during winter. Further studies are recommended to assess the long-term effects of scabies infection on wool characteristics and to evaluate effective control strategies under local conditions.

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Authors' Contributions

All authors contributed significantly to the publication of this article. Abdul Jamil Ghanizada and Abdul Khaliq Sahes contributed to the conceptualization and preparation of the original manuscript draft. Abdul Ghafoor Muradi contributed to the methodology and data analysis. Fiazurahman Rahmani contributed to review and editing. Abdul Salim Jamili contributed to review, editing, and finalization. All authors reviewed and approved the final version of the manuscript.

Conflict of Interest Statement

The authors declare no conflict of interest regarding the publication of this study. No financial, personal, or professional relationships influenced the research, data collection, analysis, interpretation, or conclusions presented in this manuscript.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

References

Babonazarov, G. Y., Omonova, N. R., Orziyeva, Y. M., & Khosilova, G. A. (2022). Economic damage caused by scabies itch mite, *Sarcoptes scabiei* (Acariformes: Sarcoptidae) to the wool production of sheep. *Journal of Pharmaceutical Negative Results, 13*(Special Issue 8), 2433–2436. https://doi.org/10.47750/pnr.2022.13.S08.302

Bates, P. G. (1999). Inter- and intra-specific variation within the genus *Psoroptes* (Acari: Psoroptidae). *Veterinary Parasitology, 83*(3–4), 227–245. https://doi.org/10.1016/S0304-4017(99)00058-8

Burgess, S. T. G., Stubbings, L., & Wall, R. (2024). Hotspot sheep scab management: A community-based regional approach in England. *Veterinary Record, 194*(9), e4090. https://doi.org/10.1002/vetr.4090

Demirüren, A. S. (1960). Afghan wools: The wool production industry of Afghanistan and the types and qualities of Afghan wools. *Journal of the Textile Institute Proceedings, 51*(2), P78–P86. https://doi.org/10.1080/19447016008664379

Doyle, E. K., Preston, J. W. V., McGregor, B. A., & Hynd, P. I. (2021). The science behind the wool industry: The importance and value of wool production from sheep. *Animal Frontiers, 11*(2), 15–23. https://doi.org/10.1093/af/vfab005

Hamer, K., Burgess, S., Busin, V., & Sargison, N. D. (2019). Performance of the *Psoroptes ovis* antibody enzyme-linked immunosorbent assay in the face of low-level mite infestation. *Veterinary Record, 185*(4), 107. https://doi.org/10.1136/vr.105304

Khoobdel, M., Azari-Hamidian, S., Hanafi-Bojd, A. A., Bakhshi, H., Jafari, A., & Moradi, M. (2022). Scabies as a neglected tropical disease in Iran: A systematic review with meta-analysis, during 2000–2022. *Journal of Arthropod-Borne Diseases, 16*(3), 180–195. https://doi.org/10.18502/jad.v16i3.12034

Khan, M. J., Abbas, A., Ayaz, M., Naeem, M., Akhter, M. S., & Soomro, M. H. (2012). Factors affecting wool quality and quantity in sheep. *African Journal of Biotechnology, 11*(73), 13761–13766. https://doi.org/10.5897/AJBX11.064

Kumari, S., Srinivas, S., Siddiqua, Z., Qazi, M. S., Sheikh, M., Rath, S., Khan, M., Jawaid, M. D., Tummala, N., & Mal, M. (2024). Impact of scabies on quality of life and recent advances in management: A systematic review. *medRxiv*. https://doi.org/10.1101/2024.11.25.24317899

Moradi, M. H., Mahmodi, R., Khaltabadi Farahani, A. H., & Karimi, M. O. (2022). Genome-wide evaluation of copy gain and loss variations in three Afghan sheep breeds. *Scientific Reports, 12*, 14286. https://doi.org/10.1038/s41598-022-18571-4

Moroni, B., Rossi, L., Bernigaud, C., & Guillot, J. (2022). Zoonotic episodes of scabies: A global overview. *Pathogens, 11*(2), 213. https://doi.org/10.3390/pathogens11020213

Mullen, G. R., & O'Connor, B. M. (2019). Mites (Acari). In G. R. Mullen & L. A. Durden (Eds.), *Medical and veterinary entomology* (3rd ed., pp. 533–602). Academic Press. https://doi.org/10.1016/B978-0-12-814043-7.00026-1

Musavi, S. A. A., Khadimiyan, A. M., & Azimi, A. M. (2022). Morphological Characterization of Karakul Sheep in North Part of Afghanistan. Voice of the Publisher, 8, 16-25. https://doi.org/10.4236/vp.2022.81003

Nixon, E. J., Brooks-Pollock, E., & Wall, R. (2021). Sheep scab transmission: A spatially explicit dynamic metapopulation model. *Veterinary Research, 52*, 54. https://doi.org/10.1186/s13567-021-00924-y

Nixon, E. J., Vineer, H. R., & Wall, R. (2017). Treatment strategies for sheep scab: An economic model of farmer behaviour. *Preventive Veterinary Medicine, 137*(Pt A), 43–51. https://doi.org/10.1016/j.prevetmed.2016.12.015

Nixon, E. J., Brooks-Pollock, E., & Wall, R. (2022). Assessing the effectiveness of prophylactic treatment strategies for sheep scab. *Veterinary Parasitology, 312*, 109822. https://doi.org/10.1016/j.vetpar.2022.109822

O'Brien, D. J. (1999). Treatment of psoroptic mange with reference to epidemiology and history. *Veterinary Parasitology, 83*(3–4), 177–185. https://doi.org/10.1016/S0304-4017(99)00056-4

O'Brien, D. J., Forbes, A. B., Pitt, S. R., & Baggott, D. G. (1999). Treatment and prophylaxis of psoroptic mange (sheep scab) using an ivermectin intraruminal controlled-release bolus for sheep. *Veterinary Parasitology, 85*(1), 79–85. https://doi.org/10.1016/S0304-4017(99)00109-0

Plant, J. W., & Lewis, C. J. (2011). Treatment and control of ectoparasites in sheep. *Veterinary Clinics of North America: Food Animal Practice, 27*(1), 203–212. https://doi.org/10.1016/j.cvfa.2010.10.012

Rehbein, S., Barth, D., Visser, M., Winter, R., Cramer, L. G., & Langholff, W. K. (2000). Effects of *Psoroptes ovis* infection and its control with an ivermectin controlled-release capsule on growing sheep:1. Evaluation of weight gain, feed consumption and carcass value. *Veterinary Parasitology, 91*(1–2), 107–118. https://doi.org/10.1016/S0304-4017(00)00245-4

Sanders, A., Froggatt, P., Wall, R., & Smith, K. E. (2000). Life-cycle stage morphology of *Psoroptes* mange mites. *Medical and Veterinary Entomology, 14*(2), 131–141. https://doi.org/10.1046/j.1365-2915.2000.00223.x

Shiven, A., Alam, A., & Kapoor, D. N. (2020). Natural and synthetic agents for the treatment of *Sarcoptes scabiei*: A review. *Annals of Parasitology, 66*(4), 467–480. https://doi.org/10.17420/ap6604.287

Walker, S. L., Lebas, E., De Sario, V., Deyasso, Z., Doni, S. N., Marks, M., Roberts, C. H., & Lambert, S. M. (2017). The prevalence and association with health-related quality of life of tungiasis and scabies in schoolchildren in southern Ethiopia. *PLoS Neglected Tropical Diseases, 11*(8), e0005808. https://doi.org/10.1371/journal.pntd.0005808

Walter, D. E., & Proctor, H. C. (1999). *Mites: Ecology, evolution and behaviour*. CABI Publishing. https://doi.org/10.1079/9780851993751.0000

Walter, D. E., & Proctor, H. C. (2013). *Mites: Ecology, evolution and behaviour: Life at a microscale* (2nd ed.). Springer. https://doi.org/10.1007/978-94-007-7164-2

World Health Organization. (2023, May 31). *Scabies*. https://www.who.int/news-room/fact-sheets/detail/scabies

Zahir, A., Nasim, M., Jauhar, S., Naseri, E., Sarwary, A., Noor, A., Amarkhil, R., & Hamdard, E. (2024). The role of livestock resources in sustainable food security and livelihoods in Afghanistan. *Journal of Natural Science Review, 2*(Special Issue), 495–516. https://doi.org/10.62810/jnsr.v2iSpecial.Issue.150