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Infestation of Ectoparasites in Sahelian Goats in the Urban Area of Abéché (Chad)

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Abstract

The objective of this study was to know the infestation of ectoparasites in the Sahelian goat in the urban area of Abéché. The study was carried out between May and July 2023 on thirty-two (32) farms located in the Sika, Kaminé, Goz-Amir, Salamat and Djatinié districts for a sample of two hundred and fifty-nine (259) goats. Of the 259 goats examined, 138 are carriers of ectoparasites with a prevalence of 53.28%. After morphological identification of these ectoparasites, the infestation rate was 39.13% by flies, 28.98% by lice, 20.29% by ticks, 5.8% by scabies and fleas. The results also showed that the most vulnerable attachment sites to ectoparasite infestation are respectively the neck (34.06%), the belly (21.01%), the tail (16.67%), the head (15.22%) and the back (13.04%). For the monthly variation in prevalence, ectoparasites reached their highest rate in July (49.9%). The calculation of the relative abundance (RA) of each group of ectoparasites in the 32 farms visited showed that among the ectoparasites inventoried on goats, lice are the most abundant with a total rate of 33.40%, followed by flies (25.24%), ticks (18.98%), scabies (11.76%) and fleas which represent a low abundance in this area (10.63%). Thus, the results obtained show that goats are exposed to infestation by ectoparasites, especially flies, lice and ticks.

Introduction

Goats play an important role in food production systems in developing countries. They are highly valued animals because they adapt easily to a wide variety of climates (ecological adaptation) and because there are many reasons to breed them [1], they are bred mainly for meat, milk, and hair [2]. In developing countries, goats make an important contribution to the livelihoods of resource-limited farmers, especially in rural areas. The potential of goats for the sustainable supply of milk and meat for human consumption is unquestionable, and their contribution to improving the nutrition of the rural population is likely to increase. In addition to meat and milk, goats also provide hides and skins, manure and wool. They play an important socio-cultural role in many communities. Their use as a gift, for dowry, or for slaughter at traditional festivals or religious ceremonies strengthens family and social ties [3].

Ectoparasites are species that live on the surface or in the seed coat of the host. They include a wide variety of parasitic arthropods belonging to the order of Mites (ticks, demodex, scabies, etc.) or to the class of Insects (fleas, lice, diptera) [4]. They

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play a very important role in the transmission of diseases that are dangerous to public health, as they carry pathogens to hosts during feeding or defecation, thus causing various diseases [5]. A large number of infectious diseases are transmitted from animal to animal by biting arthropods, which are likely to become infected by taking a blood meal from an infected individual and transfer the pathogen to other individuals at subsequent meals [6]. They represent a significant economic scourge for ruminant farming in Africa [7]. The lack of a systematic treatment program for ectoparasites has a negative impact on the health of animals by reducing their production and reproduction performance.

This study mainly aims to contribute to the knowledge of ectoparasite infestation in the Sahelian goat in the urban area of Abéché.

Methodology

Study area

The study was conducted between May and July 2023 in the urban area of the city of Abéché, located in northeastern Chad between the 11th and 16th parallels of northeastern altitude and the 20th and 23rd parallels of east longitude. It covers an area of 30 km² with a population of 178.898 inhabitants.

The climate is of the Sahelian type, characterized by the alternation of a dry and a rainy season. The average temperature is 32.8 °C with extremes of 40.2 °C and 24.9 °C respectively for the hottest (May) and coldest (January) months of the year [8]. The rainy season lasts about two to three months, from July to September, with an annual rainfall of 441.3 mm.

Materials and methods

Animal material

As part of this study, two hundred and fifty-nine (259) Sahelian goats spread over 32 goat farms in 5 districts (Sika, Kaminé, Goz-Amir, Salamat and Djatinié) in the urban area of the city of Abéché were studied.

Determination of the age of goats

The age of the goats was determined by counting the number of pairs of incisors and taking into account the farmers' declarations.

Collection and conservation of ectoparasites

For the research and collection of ectoparasites on goats, we used the following methods:

- Direct visual research on the goat at different parts of the body;
- Each goat was examined for at least 5 minutes;
- Ectoparasites are taken directly from the goat's body and stored in hermetically sealed tubes containing ethanol at 70°.
- The tubes are labelled and contain the following information: Sample order number, study site, date of collection, sex, age of the host and location of the sample from the host.
- The samples were sent to the parasitology laboratory of the Higher National Institute of Sciences and Techniques of Abéché (INSTA) for the identification of ectoparasites.

Identification of ectoparasites

The identification of ectoparasites is done using the identification keys of Walker et al. and Perez-Eid [9,10] based on the observation of morphological characters. The manipulation is carried out in a petri dish using forceps and under a magnifying glass.

Exploitation of the results by parasitic indices

Once ectoparasites were identified, the following parasitic indices were calculated: prevalence (P) and Relative Abundance (RA).

Prevalence (P)

It is the ratio between the number of individuals of a host species infested by a parasitic species and the total number of hosts examined, it is expressed as a percentage.

Relative Abundance (RA)

It corresponds to the ratio between the total number of individuals of a parasitic species (Ni) and the total number of individuals of all species (N).

$$RA\ (\%) = \frac{Ni\ x\ 100}{N}$$

Statistical method

The data collected were analyzed using XTSTAT software (2016.02.28451). Descriptive analysis was used to determine dispersion parameters (mean, standard deviation and frequency) and analysis of variance (ANOVA 1) was used to compare the means ± standard deviation. The chi-2 test was used to compare the means. The materiality limit has been set at the 5% threshold.

Results

Total ectoparasite richness

The total richness of ectoparasites collected in the study area is summarized in Table 1. In this study, we collected five (5) orders of ectoparasites which are: lice, ticks, scabies, flies, and fleas. We have noticed that the distribution of ectoparasites varies from one farm to another. Thus, all the species of ectoparasites collected are present on the animals raised in Sika and Salamat. However, animals raised in Djatinié do not contain scabies and those raised in Kaminé do not contain scabies and fleas. On the other hand, the animals raised in Goz-Amir are infested only by flies and lice.

Table 1: Total Ectoparasite Richness Harvested in the Study Area.

Ectoparasites Breeding	Ticks	Flies	Scabies	Lice	Fleas	Total Wealth
Sika	+	+	+	+	+	5
Kaminé	+	+	-	+	-	3
Goz-Amir	-	+	-	+	-	2
Salamat	+	+	+	+	+	5
Djatinié	+	+	-	+	+	4

(+) = present; (-) = absent

Table 2: Overall Infestation Rate.

Parameters / Breeding	Animals non-infested		Animals infested	
	Number	Percentage (%)	Number	Percentage (%)
Sika	14	5.4	25	9.65
Kaminé	21	8.11	26	10.04
Goz-Amir	20	7.72	41	15.83
Salamat	29	11.2	31	11.97
Djatinié	37	14.29	15	5.79
Total	**121**	**46.72**	**138**	**53.28**

Overall infestation rate

Table 2 shows the overall infestation rate of ectoparasitic attacks on goats in the 32 farms in five neighborhoods in the study area. It appears from this table that out of 259 goats examined, 138 are carriers of ectoparasites with a total infestation rate of 53.28% compared to 46.72% of non-infested goats.

Infestation rate by ectoparasite groups

The infestation rate by ectoparasite group in the 32 farms is summarized in Table 3, which shows that out of 259 Sahelian goats examined, 138 goats are infested with ectoparasites. After morphological identification of these ectoparasites, 39.13% of goats are infested by flies, 28.98% of goats are infested with lice, 20.29% of goats are infested with ticks, only 5.8% of goats are infested with mange and 5.8% others by fleas. These results vary according to the neighborhoods and farms surveyed.

Table 3: Infestation rate by ectoparasite groups.

Ectoparasites / Breeding	Ticks		Flies		Scabies		Lice		Fleas		Total
	Nb	%	Nb	%	Nb	%	Nb	%	Nb	%	
Sika	5	3.62	9	6.52	3	2.17	6	4.35	2	1.45	25
Kaminé	9	6.52	11	7.97	0	0	6	4.35	0	0	26
Goz-Amir	0	0	22	15.94	0	0	19	13.77	0	0	41
Salamat	8	5.8	6	4.35	5	3.62	7	5.07	5	3.62	31
Djatinié	6	4.35	6	4.35	0	0	2	1.45	1	0.72	15
Total	28	20.29	54	39.13	8	5.8	40	28.98	8	5.8	138

Nb = number, % = percentage.

Infestation rate according to the location of ectoparasites

Table 4 highlights the infestation rate of ectoparasites according to their attachment site to the animal, showing that 34.06% of ectoparasites are attached to the neck, followed by 21.01% of ectoparasites on the belly, 16.67% of ectoparasites on the tail, 15.22% of ectoparasites on the head and 13.04% of ectoparasites on the back.

Table 4: Infestation rate by site of ectoparasite attachment.

Localization	Number of animals infested	Frequency (%)
Head	21	15.22
Neck	47	34.06
Back	18	13.04
Belly	29	21.01
Tail	23	16.67
Total	138	100.00

Relative abundance by ectoparasite group

The results of the calculation of the Relative Abundance (RA) of each group of ectoparasites in the 32 farms visited are illustrated in Figure 16. It follows that among the ectoparasites inventoried on goats in the thirty (32) farms, lice are the most abundant with a total rate of 33.40%, followed by flies (25.24%), ticks (18.98%), scabies (11.76%) and fleas which represent a low abundance in this area (10.63%).

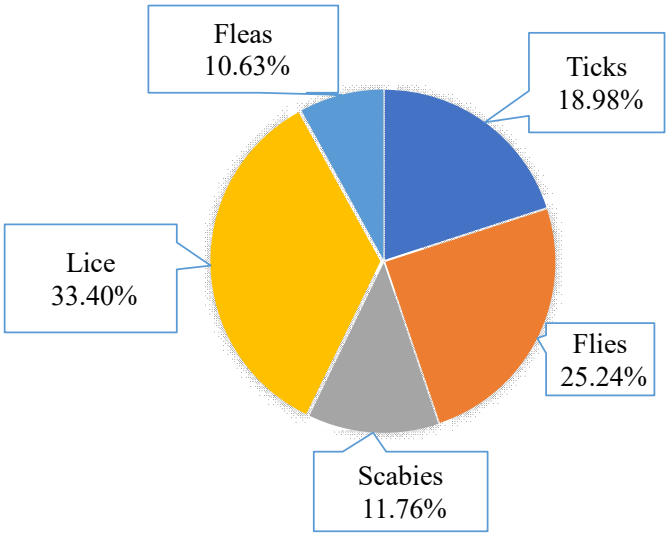

Figure 1: Relative abundance.

Discussion

Of the 259 goats examined in this study, 138 carried ectoparasites with a total infestation rate of 53.28%. These results corroborate those obtained by [11] in the wilaya of Tiaret in Algeria, these authors reported an infestation rate of 52% for lice and 48% for ticks in goats [12] reported an infestation rate of 38.5% in goats in northwestern Ethiopia. On the other hand, Tulu and Urge [13] recorded a higher infestation rate in goats in southwestern Ethiopia (79.9%). In our sampling, we captured five (5) orders of ectoparasites which are: Lice, ticks, scabies, flies and fleas. In addition, we noticed that all five orders of the collected ectoparasites are present on the animals bred in Sika and Salamat. However, animals raised in Djatinié do not contain scabies and those raised in Kaminé do not contain scabies and fleas. On the other hand, the animals raised in Goz-Amir are infested only by flies and lice. Our results contradict those of Oussad and Metahri [14] in the Tizi-Ouzou region of Algeria who identified 3 orders of ectoparasites in Alpine and Saanen goats: ticks, lice and fleas. In addition, [15] identified only two species of ectoparasites in goats from the Chefchaoun region of Morocco: Ticks and lice.

Out of a total of 259 Sahelian goats examined in the study area, 138 are infested, i.e. an infestation rate of 53.28% distributed as follows: 39.13% for flies, 28.98% for lice, 20.29% for ticks, 5.8% for scabies and fleas. These results are different from the results obtained by [16], who recorded a high rate of lice infestations (78%) and a very low rate of tick infestation (2.5%) in sheep slaughtered at the Guelma communal slaughterhouse in Algeria. On the other hand, [17] recorded an infestation rate of 34.9% for ticks, 33.8% for lice and 7.75% for fleas in goats in northern Iraq.

In view of the results obtained in our study, we noticed that 34.06% of ectoparasites are attached to the neck, 21.01% are attached to the belly, 16.67% are attached to the tail, 15.22%

are attached to the head and 13.04% are attached to the back. These results contradict those found by [18] in the North-West Amhara region of Ethiopia, who observed that the most frequent site of lice infestation is the back. The preferred sites of ectoparasites in goats were mostly the ears, neck, back, limbs, abdomen and chest [19].

The results of the calculation of the relative abundance (AR) of each group of ectoparasites in the 32 farms visited show that among the ectoparasites inventoried on goats, lice are the most abundant with a total rate of 33.40%, followed by flies (25.24%), ticks (18.98%), Scabies (11.76%) and fleas which represent a low abundance in this area (10.63%).

Conclusion

This study allowed us to conclude that goat farms in the urban area of Abéché are infested with ectoparasites, mainly flies, lice and ticks. However, the attachment sites most vulnerable to ectoparasitic infestation were the neck, belly, tail, head, and back.

References

1. Jansen C, Burg KV. L'élevage de chèvres dans les zones tropicales, Ed. Agrodok 7, Agromisa, Wageningen, Pays-Bas. 2004; 103.
2. Hafid N. L'influence de l'âge, de la saison et de l'état physiologique des caprins sur certains paramètres sanguins. Mémoire de magister en science vétérinaires. Dép vétérinaires. Univ El-Hadj Lakhdar. BATNA. 2006; 74.
3. Kosgey IS, Okeyo AM. Genetic Improvement of Small Ruminants in Low-Input, Smallholder Production Systems: Technical and Infrastructural Issues. Small Ruminant Research. 2007; 76-88.
4. ESCCAP. Les Aoutats. Guide de recommandation, cinquième Edition Hilversum Pays-Bas. 2016; 2.
5. Omonijo A, Sowemimo O. Prévalence of ectoparasites of dogs and cats, in Ijero and Moba LGA, Ekiti State, Nigeria. Nigérian J. Para. 2017; 38 (2). 278-283p.
6. Hunter A. La santé animale : principale maladie. Ed. Karthala. France. 2006; 2: 303.
7. Ouarti B, Righid S, Tallb ML, Meguinid MN, Ouartie K, et al. Survey of ruminant infestation by lice in north-east Algeria, Revue Algérienne des Sciences A. 2020; 5: 13-18.
8. Mbaindingatoloum FM. Paramètres de reproduction et application de l'insémination artificielle pour l'amélioration de la productivité chez la chèvre sahélienne au Tchad. Thèse de Doctorat Unique. Université de Bobo Dioulasso. 2011; 146.
9. Walker AR. Ticks of domestic animals in Africa: à guide to identification of species. Univ. Edinburg. Ed: ICTTD. 2003; 221.
10. Perez-Eid C. Les tiques (Identification, biologie, importance médicale et vétérinaire. Revue Monographi de Microbiologie. 2009; 316.
11. Kaddi N, Kerakria H, Nour Imene SH. Les ectoparasitoses chez les caprins. Mémoire de Master. Université Ibn Khaldoun-Tiaret. 2020; 58-60.
12. Seyoum Z, Tadesse T, Addisu A. Ectoparasites prevalence in small ruminants and around Sekela, Amhara state, Northwest Ethiopia- J. veter. medic. 2015; 6.
13. Tulu D, Urge B. Prevalence an Associated Rick Factors of Ectoparasite of Sheep and Goat in Yeki district in Southwestern Ethiopia. J. Vet. Med. Res. 2018; 5 (7): 1147-1153.
14. Oussad O, Metahri C. Contribution à l'étude des parasites de deux races caprines Alpine & Saanen dans la région de Tizi-Ouzou. Mémoire de Master. Université de 08 mai 1945-Guelma. 2016; 26-45.
15. Berragi B, Alaout Tahirj Y, Kichou F, Rhalem A, Sahibj H. Parasitoses caprines dans la région de Chefchaouen : Epidémiologie et prophylaxie. Actes Institut. Agronomique. Veto (Maroc). 1996; 16(1): 11-22.
16. Bounab S, Laoud S, Moualkia A. Inventaire des arthropodes parasites des ruminants abattus au niveau de l'abattoir communal de Guelma. Mémoire de Master. Université de 08 mai 1945-Guelma. 2016; 31-36.
17. Zangana IK, Ali AB, Naqid IA. Distribution of ectoparasites infested sheep and goats in Duhok Province, North Iraq. Bas. J. Vet. Res. 2013; 12 (1): 54- 64.
18. Sisay A, Yilkal A, Yacob Hailu T. Ectoparasites of sheep and Goats in North-West Amhara regional State, Ethiopia. Ethiopie. Vet. J. 2013; 17(1): 55- 67.
19. Obi-Zita C, Anyaegbunam Lucy, Orji MaryKate N. Ectoparasitosis, a challenge in sheep and goat production in ULI, Anambra state, Nigeria. ISSN 2347-2677. 2014; IJFBS 1(5): 27-29.