

## Lice Infestation in Small Ruminants in Nono District, West Showa Zone, Oromia Regional State

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**Abstract:** A cross-sectional study on ectoparasites of sheep (n=365) and goats (n=211) was conducted in Nono district west Showa zone Oromia regional state east Ethiopia from November 2017 to April 2018 to determine the prevalence of major lice infestation of sheep and goats and the associated risk factors. Out of the examined animals, 177(48.5%) sheep and 107 (50.7%) goats were infested with one or more of *Damalinia* and *Linognathus* species of lice. Relative to sex, age and body condition score female, young and poor body condition score of sheep was significantly affected. *Linognathus* species in goats significantly infested female and poor body condition score animal than male and medium and good body condition goats ( $P < 0.05$ ). The overall prevalence was generally high which may result in enormous economic losses through decreased production and productivity, damages to the skin and deaths of the animal which requires an immediate professional and governmental attention.

**Key words:** Lice • Nono • Prevalence • Risk Factor • Small Ruminants

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### INTRODUCTION

Small ruminants represent an important segment of the Ethiopian livestock system. They are important sources of income for the agricultural communities and are one of the country major sources of foreign currency through skin and meat export and are among important sources of animal protein, providing 35% of meat and 14% of milk consumption. The national small ruminant population is estimated to be 63 million heads, which are raised in different agroecological regions of the country [1]. The current level of contribution of the livestock sector in Ethiopia is below the expected potential. Export of livestock and livestock by-products have contributed to the economy of the country by providing foreign exchange earnings accounting about 15 and 40% of all export earnings and export from agriculture exports, respectively [2].

According to Yacob Hailu Tolossa [3], Fekadu *et al.* [4] in many parts of the Ethiopia, skin diseases due to ectoparasites have prevented many farmers from keeping sheep and becoming serious threat to sheep production. Lice are among the major disease of small ruminants and cause serious economic loss to farmers through mortality, decreased production and reproduction, down grading and rejection of skins which also affect the tanning industries. Tanneries reported that 35% of sheep skin and 56% of goats' skin are rejected due to external parasites and out of the reject groups of the processed skin, about 80 to 90% defects were believed to be due to external parasites. The estimated economic loss due to drop in quality of sheep and goat skin is around USD 25.8 million per year [3].

Even though the Oromia regional state has started control program against ectoparasites in some selected districts of West showazone, the impact of this control

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program on the status of lice infestation was not yet studied. The objectives of this study were therefore (i) To determine the prevalence of major lice of sheep and goats in Nono districts (ii) Identify and assess the major risk factors associated with the problem.

## MATERIALS AND METHODS

**Study Area:** Nono is one of the woredas in the Oromia regional state in Ethiopia. Nono is bordered on the southwest by the Gibe river which separates it from the Jimma zone, on the northwest by Cheliya, on the northeast by Dire inchini and on the east the southwest Shewa zone. Located about 174 km from Addis Ababa and 60 km Ambo town. Nono district has large ruminants population 166, 942 cattle, 120, 804 sheep and 105, 373 goats [5].

**Study Animals:** The study animals were sheep and goats of both sexes and different age groups (young and adult) in and around Nono district.

**Sample Collection:** The survey of lice was conducted on small ruminants of both sexes and different age groups. Collection of lice was conducted after proper restraining of the animals. The adult lice were manually collected from the body surface by hand and brush or comb. Hair coat was parted and examined for lice both on the right and left sides of these areas and the collected parasites were preserved in properly labeled plastic containers containing 70% ethanol. The collection bottles were labeled with serial numbers while other data was written on specified register format prepared for this particular purpose (date, address, sex, age and species). Sample was then transported to veterinary laboratory for further identification of the lice species. Identification of the collected lice was carried out at veterinary laboratory by the aid of stereo- and compound microscope by appreciation of its mouth part according to the procedure described by Wall and Shearer [6].

**Study Design:** The study was conducted using cross-sectional study design to determine the prevalence of small ruminants' lice. The sample was collected from small ruminants kept under extensive production system. The lice were randomly collected from sheep and goat of different sex, body condition score and age group (young under one year of age and adult above one year

of age for both sheep and goats [7, 8]. Since no studies have been done on the lice of small ruminants in and around Nono district in particular, 50% was taken as approximate expected prevalence. So, the sample size was calculated according to Thrusfield [9] sample size calculation, ninety five percent confidence levels, 5% precision and 50% expected prevalence used for the computation. Though, the required sample size was computed to be 384, a total of 576 (365 sheep and 211 goats) of different species, age and sex group were examined to increase the precision of investigation.

## RESULTS

Among 576 examined small ruminants 177/365 (48.5%) of sheep with *Damalinia* and *Linognathus* species of lice and 107/211 (50.7%) of goats was infested with only *Linognathus* species of lice (Table 1).

High prevalence of *Linognathus* species lice infestation in female than male of in goats ( $P < 0.05$ ) was recorded. Regarding to body condition score of goats *Linognathus* species of lice was higher significant ( $p = 0.031$ ) prevalence in poor body condition (69.2%) than medium (42.6%) and good (48.0%) body condition score (Table 2).

High prevalence of lice infestation female, young and poor body condition score than male, adults and good body condition score in sheep ( $P < 0.05$ ) was recorded. Relative to sex, age and body condition score of animals *Damalinia* species was higher significant ( $p = 0.015$ ) prevalence in female animals (50.9%) than male once (35.7%), in young (62, 2%) than in adult (41.9%) and in poor (75.0%) than in medium (50.0%) and good (35.4%) (Table 3). Table 3: overall prevalence with associated risk factors of lice in sheep (Table 3).

## DISCUSSION

The overall prevalence of lice infestation was 48.5% in sheep and 50.7% in goats. This result was similar to 49.5% in sheep in uncontrolled management in Arsi zone Oromia regional state reported by Hailegebriel *et al.* [10]. But this result is higher than the prevalence recorded in Tigray 1.3% and 6.1% in sheep and goats respectively [11]; 3.8% and 5.3% in sheep and goat respectively in Bahirdar reported by Tesfaye *et al.* [12] and 8.8% and 4.8% in sheep and goats respectively in Banja [11].

Table 1: Overall prevalence of lice in sheep and goats

| Genera of Lice          |               | Damalinia species | Linognathus species | Overall    |
|-------------------------|---------------|-------------------|---------------------|------------|
|                         |               | N (%)             | N (%)               | N (%)      |
| Species of animal       | Goats (n=211) | 0(0.0%)           | 107(50.7%)          | 107(50.7%) |
|                         | Sheep (n=365) | 173(47.4%)        | 14(3.8%)            | 177(48.5%) |
| X <sup>2</sup> /P-value |               | 142.9(.000)       | 177.0(.000)         | 0.26(.608) |

Table 2: Overall prevalence with associated risk factors of lice in Goats

| Genera of Lice |        | Damalinia species |                         | Linognathus species |                         | Overall  |                         |
|----------------|--------|-------------------|-------------------------|---------------------|-------------------------|----------|-------------------------|
|                |        | N (%)             | χ <sup>2</sup> /P-value | N (%)               | χ <sup>2</sup> /P-value | N (%)    | χ <sup>2</sup> /P-value |
| Sex            | Male   | 0(0.0)            |                         | 10(30.3)            | 6.5(.011)               | 10(30.3) | 6.5(.011)               |
|                | Female | 0(0.0)            |                         | 97(54.5)            |                         | 97(54.5) |                         |
| Age            | Young  | 0(0.0)            |                         | 30(55.6)            | 0.68(.409)              | 30(55.6) | 0.68(.409)              |
|                | Adult  | 0(0.0)            |                         | 77(49.0)            |                         | 77(49.0) |                         |
| BCS            | Poor   | 0(0.0)            |                         | 27(69.2)            | 6.97(.031)              | 27(69.2) | 6.97(.031)              |
|                | Medium | 0(0.0)            |                         | 20(42.6)            |                         | 20(42.6) |                         |
|                | Good   | 0(0.0)            |                         | 60(48.0)            |                         | 60(48.0) |                         |

Table 3: Overall prevalence with associated risk factors of lice in Sheep

| Genera of Lice |        | Damalinia species |                         | Linognathus species |                         | Overall   |                         |
|----------------|--------|-------------------|-------------------------|---------------------|-------------------------|-----------|-------------------------|
|                |        | N (%)             | χ <sup>2</sup> /P-value | N (%)               | χ <sup>2</sup> /P-value | N (%)     | χ <sup>2</sup> /P-value |
| Sex            | Male   | 30(35.7)          | 5.9(.015)               | 1(1.2)              | 2.1(.150)               | 30(35.7)  | 7.1 (.008)              |
|                | Female | 143(50.9)         |                         | 13(4.6)             |                         | 147(52.3) |                         |
| Age            | Young  | 61(62.2)          | 11.8(.001)              | 6(6.1)              | 1.9(.168)               | 61(62.2)  | 10.1 (.001)             |
|                | Adult  | 112(41.9)         |                         | 8(3.0)              |                         | 116(43.4) |                         |
| BCS            | Poor   | 54(75.0)          | 33.1(.000)              | 4(5.6)              | 0.8(.670)               | 55(76.4)  | 33.6 (.000)             |
|                | Medium | 52(50.0)          |                         | 4(3.8)              |                         | 53(51.0)  |                         |
|                | Good   | 67(35.4)          |                         | 6(3.2)              |                         | 69(36.5)  |                         |

Present study showed that relative to sex of animals *Linognathus* species was higher significant (p=0.011) prevalence in female goats (54.5%) than male once (30.3%) and poor body condition score small ruminants were higher significant infested by both species of lice (p=0.031) (Table 2) the same trend reported by Amasalu *et al.* [13].

Present study showed that relative to sex of animals *Damalinias* species was higher significant (p=0.015) prevalence in female sheep (50.9%) than male once (35.7%) and poor body condition score small ruminants were higher significant infested by both species of lice (p<0.05) (Table 2) the same trend reported by Amasalu *et al.* [13].

### CONCLUSION

Present study showed that lice are infesting significant proportions of small ruminants in the study area. It was shown that two species of lice were the major small ruminants pests. The study revealed that the infested by two species of lice and *Damalinia*. species of lice of sheep were widely distributed and prevalent in all sex, body condition score and in all age groups of sheep

significantly in the study area. The goats only infested only by *Linognathus* species of lice. The observed overall prevalence is generally high which will result in high economic losses through decreased production and productivity, deaths of the animal and damages of the skin demanding an immediate attention and professional intervention.

**Conflict of Interests:** The authors have no conflict of interest regarding the publication of this paper

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