Major Constraints of Village Poultry Production in Demba Gofa District of Southern Region, Ethiopia

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Abstract: A cross sectional study was conducted from September 2011 to March 2012 to identify and estimate the prevalence of ectoparasites of poultry managed under backyard system in Demba Gofa district of Gamo Gofa zone. A total of 384 chickens of different age groups and both sexes were examined. Overall, 322/384 (83.85%) of chickens were infested with one or more species of ectoparasites that mainly grouped into flea 269 (83.5%), lice 109 (33.85%) and fowl tick 16 (4.97%). Seven species of ectoparasites were identified. Among them, Echinophaga gallinacea (stick tight flea) 269/384 (83.5%) was the most prevalent ectoparasites species followed by lice species Menopon gallinea 49/109 (44.95%), Menacanthus stramineus 22/109 (20.18%), Lipeurus caponis 17/109 (15.6%), Goniocotes gigas 14/109 (12.84%) and Goniocotes gallinea 7/109 (6.42%) while the least identified was fowl tick / Argas persicus / 16/ (4.97%). Mixed infestation 64/322 (19.87%) and single infestation 258/322 (80.12%) of ectoparasites was also recorded. The difference in prevalence rate of ectoparasites in brooder (44.41%) was higher than the adult (13.66%). The finding in age group showed that there was a statistically significant in prevalence of ectoparasites between brooder and adult chicken (p<0.05). The difference in prevalence rate of ectoparasites in female (64.90%) higher than that of the male (35.09%). There was a statistically significant difference (p<0.05) in infestation rate of ectoparasites between two sexes. Generally, the study indicated that the external parasites are highly prevalent in backyard chickens in the study area which is associated with lack of due attention with respect to hygienic system, treatment and control practices. Therefore, control of ectoparasites based on creation of awareness to the community about the overall effect of ectoparasites on productivity of poultry and others are recommended.

Key words: Backyard - Demba Gofa - Ectoparasites - Poultry - Prevalence

INTRODUCTION

Poultry has influenced man civilization in many ways. Eggs and meat of birds are being consumed since prehistoric time. Compared to eggs there is no other single food of animal origin which is eaten relished by so many people in the world and none is served in such a variety ways. Its popularity is justified not only because it’s so easy procured and has so many uses in cooking but also because it is almost unsurpassed product in nutritive excellence. Poultry meat is also used extensively as a delicious food [1].

Rural poultry production is an integral part of a balanced farming system and has a unique position in the rural house hold economy supplying high quality protein to the family. In addition to their contribution to high value of protein, it is a source of easily disposable income for farm households. Rural poultry integrate very well in a sustainable way into other farming activities. Because they require little labor and initial investment compare to other farm activities [2]. It is also reported that rural poultry play a significant role through their contribution to the cultural and social life of rural people [3].

In Ethiopia, rural poultry production represents a significant portion of the rural economy, as a source of income for small holder farmers [4]. The total poultry population of Ethiopia is estimated at 39.6 million [5]. The majority (99%) of these chickens are maintained under traditional system with little or no inputs for housing, feeding or health care. Rural chicken in Ethiopia represents a significant part of the national economy in general and the rural economy in particular. It contributes
Study Population: The chickens kept under backyard extensive management system owned by individual farmers were considered as a study population. Chickens were selected by including both sexes and different age groups were examined for the presence or absence of ectoparasites.

Study Design: A cross sectional study was conducted so as to determine the prevalence rate of ectoparasites infestation rate in the study area.

Sample Size Determination: The number of poultry required for this study was determined using the formula given by Thrusfield [12] for simple random sampling. The size of sample was determining using 95% level of confidence, 50% expected prevalence since there was no previous work in this study area and 0.05% desired absolute precision. Therefore, a total of 384 chickens were examined.

Clinical Examination: Clinical Examination for ectoparasites and any possible abnormalities were carried out for 384 chickens. During clinical examination, ectoparasites were collected by hand picking and preserved in 70% of alcohol in separated bottles for each host for further identification. Both sex and different age groups could also be considered in this study.

Laboratory Examination: The identification of parasites and other relevant activities were done in the parasitology department of Wolyta Soddo regional veterinary laboratory. After collection, the parasites were examined and identified under the microscope by comparing their morphology with identification keys.

Data Management and Analysis: The result obtained from collection and identification of ectoparasites from poultry was coded and then entered into Microsoft excel spreadsheet and was analyzed using STATA version 11.0. The prevalence of ectoparasites in relation to age and sex were analyzed using chi square. In all cases p<0.005 was considered as statistically significant.

RESULTS

A total of 384 chickens belonging to different age groups 1 and sexes which were managed under backyard system were examined for ectoparasites infestation. Of these 322/384 (83.85%) chickens were infested with one or more species of ectoparasites that were mainly grouped...
Table 1: Ectoparasites and their attachment sites in free range chickens

<table>
<thead>
<tr>
<th>Ectoparasites</th>
<th>Species</th>
<th>Attachment sites</th>
<th>Numbers of infested</th>
<th>Infestation rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fleas</td>
<td>Echidnophaga gallinacea</td>
<td>Head, Eyes, Comb, Wattles</td>
<td>269/322</td>
<td>83.5</td>
</tr>
<tr>
<td>Lice</td>
<td>Menopon gallinea</td>
<td>Breast, Thigh</td>
<td>49</td>
<td>44.95</td>
</tr>
<tr>
<td></td>
<td>Menacanthus stramineus</td>
<td>All over the body</td>
<td>22</td>
<td>20.18</td>
</tr>
<tr>
<td></td>
<td>Lipeurus caponis</td>
<td>Head, Feather</td>
<td>17</td>
<td>15.59</td>
</tr>
<tr>
<td></td>
<td>Goniocotes gigas</td>
<td>Feather</td>
<td>14</td>
<td>12.84</td>
</tr>
<tr>
<td></td>
<td>Goniocotes gallinea</td>
<td>Base of Feather</td>
<td>7</td>
<td>6.422</td>
</tr>
<tr>
<td></td>
<td>Total lice number</td>
<td></td>
<td>109/322</td>
<td>33.85</td>
</tr>
<tr>
<td>Tick</td>
<td>Argas persicus</td>
<td>Under the Wing base</td>
<td>16</td>
<td>4.97</td>
</tr>
<tr>
<td></td>
<td>Total tick number</td>
<td></td>
<td>16/322</td>
<td>4.97</td>
</tr>
<tr>
<td></td>
<td>Total of Ectoparasites</td>
<td></td>
<td>322/384</td>
<td>83.85</td>
</tr>
</tbody>
</table>

Table 2: Prevalence association of Ectoparasites with age.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No of examined</th>
<th>No of positive</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brooder</td>
<td>152</td>
<td>143</td>
<td>44.41</td>
</tr>
<tr>
<td>Young</td>
<td>155</td>
<td>135</td>
<td>41.92</td>
</tr>
<tr>
<td>Adult</td>
<td>77</td>
<td>44</td>
<td>13.66</td>
</tr>
<tr>
<td>Total</td>
<td>384</td>
<td>322</td>
<td>83.85</td>
</tr>
</tbody>
</table>

\( \chi^2 \) (Pearson Chi-square) = 53.52, P-value=0.000 It was found that brooders poultry had significantly high (P<0.05) (Table 2) infestation rate (44.41%) compare to the adult age group (13.66%).

Table 3: Prevalence association of Ectoparasites with sexes

<table>
<thead>
<tr>
<th>Variable</th>
<th>No of examined</th>
<th>No of positive</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>233</td>
<td>209</td>
<td>64.90</td>
</tr>
<tr>
<td>Male</td>
<td>151</td>
<td>113</td>
<td>35.09</td>
</tr>
<tr>
<td>Total</td>
<td>384</td>
<td>322</td>
<td></td>
</tr>
</tbody>
</table>

\( \chi^2 \) (Pearson Chi-square) = 14.95, P-value=0.000, Significant There was significance difference in the infestation rate of ectoparasites between two sexes, where, (P<0.05). The infestation rate of ectoparasites in female chickens is significantly higher than the male.

Fig 1: Prevalence distribution of different poultry ectoparasites infestation

into fleas 269/ (83.54%), lice 109/384 (33.85%) and fowl tick 16/ (4.97%). There was also mixed and single infestation accounted for 64/322 (19.87%) and 258/322 (80.12%) respectively (Figure 1).

Seven species of ectoparasites were identified to be common and their respective infestation prevalence and attachment sites are given in Table 1.

Five species of lice (order Mallophagia), one species fleas (order Siphonaptera) and one species of tick (order Acari) were detected from 384 examined chickens in this study. The lice include Menophon gallinea 49/109 (44.95%), Menacanthus stramineus 22/109 (20.18%), Lipeurus caponis 17/109 (15.6%), Goniocotes gigas 14/109 (12.8%) and Goniocotes gallinea 7/109 (6.4%). The fleas were Echidnophaga gallinacean and the tick was Argas persicus. Over all prevalence of ectoparasites of infestation was 83.85%. Fleas had the highest frequency of occurrence with an 83.5% prevalence followed by lice with the prevalence of 33.85%. And the lowest was fowl tick with the prevalence of 4.97%. Infestation rate of ectoparasites were compared among different age groups. The result obtained in related to different age category illustrated in Table 2.

DISCUSSION

In the present study, the overall prevalence of ectoparasites (83.85%) was recorded in the chickens managed under backyard system. This finding is higher than the previous study conducted by Al-Saffar and Al-Mawla [13], Nnadi and George [14], Koroglu et al. [15] and Bersabeh [16], 19.3%, 41%, 56.5% and 78.0% respectively. This difference in prevalence rate could be due to climatic condition, age of study animals and sample
size. Besides, the village poultry are mostly neglected and reared only a little or no extra feed supplement and improper housing that makes them malnourished. The keeping condition is also very unhygienic, often crowded in a small place with little or no ventilation. All these factors either alone or in combination might have important role in the high prevalence of ectoparasites in backyard poultry.

The *Echidnophaga gallinacea* (stick tight flea) has the highest prevalence when compared to other ectoparasites found in the study. Out of 322 positive chickens, 269 (83.5%) was *Echidnophaga gallinacea*. The prevalence of *Echidnophaga gallinacea* in the present study was high when compared to the other studies carried by Solomon and Elsabet [17] (16.5%) in Wolyta Soddo town in southern Ethiopia, Nnadi and George [14] (35.7%) in south-eastern Nigeria and Gedion [18] (14.6%) and in and around Dire Dawa. This might be due to agro-ecological variation of the study area, time of study and management and feeding system of the poultry production. The high prevalence (71.9%) of *Echidnophaga gallinacea* reported by Swai et al. [19] in northern Tanzania was more or less comparable to the present study.

In the present study 33.8% prevalence of lice infestation was recorded. This is more or less similar to the previous study carried out in northern Tanzania by Swai et al. [19] reported 28.5% of prevalence of lice infestation. In contrast to this, lowest prevalence (12.5%) of lice infestation recorded by Al-Saffar and Al-Mawla [13]. The current study is by far lower than different studies conducted in different parts of the world. Saxena et al. [20] reported 60.9% lice infestation of fowls in India and Koroglu et al. [15] 56.5% infestation with one or more species of lice in Turkey. This may be due to different agro-ecological and management system of the production. Among the lice species, the most common found in this study was, *Menopon gallinea* 49 (44.95%). When comparing the prevalence of *Menopon gallinea* in this study (44.95%) was more or less similar to the previous studies carried by Solomon and Elsabet [17] and Shanta et al. [21] 48.94%, 63% respectively.

The lowest prevalence recorded among the Ectoparasites in this study was the fowl tick (*Argas persicus*) which was 16 (4.97%). This was more or less similar when compared with 6.8% recorded by Al-Saffar and Al-Mawla [13] in Mosul, Iraq and also 9.2% recorded by Solomon and Elsabet [17] in Wolyta Soddo town in southern Ethiopia. On contrast to this study, Swai et al. [19] and Khan et al. [22] were recorded 23.9% and 14.7% prevalence of *Argas persicus* respectively.

In the present study there was a significant difference (P<0.005) in prevalence rate of ectoparasites infestation with age. It was found that brooders poultry had high infestation rate than adult age group. This is related to the recent study in southern Ethiopia in Wolyta Soddo town by Solomon and Elsabet [17] and south-east Nigeria by Nnadi and George [14], reported that the young age group were more likely to be infested than adults. Abebe et al. [23] reported in his study conducted in extensive management system where chickens have access to outdoor areas and not confined to have a greater diversity of Ectoparasites. On the contrary, the study done by Shanta et al. [21] in Bangladesh, who reported that adults were found to be more infested. This variation could be due to climatic condition, agro-ecological zone and study period and management system.

There was significant difference (P<0.05) in infestation rate of Ectoparasites between the two sexes. This study was similar to other study done in northern Tanzania by Swai et al. [19]. On contrary to the present study, Helina [24] reported that there was no significant difference in the prevalence rate of Ectoparasites infestation between the two sexes. This difference could be due to climatic condition, age, opportunity of exposure of chickens to the Ectoparasites, management system and sample size.

**CONCLUSION**

Backyard poultry production has been major source of poultry meat and egg production in Ethiopia and yet is still the most neglected in husbandry practice and particular health care. Generally, the study indicated that the external parasites are highly prevalent in poultry in backyard management system which is associated with lack of due attention with respect to hygienic system, treatment and control practices. Among those external parasites, *Echidnophaga gallinacea* was the most prevalent Ectoparasites followed by lice species including: *Menopon gallinea, Menacanthus stramineus, Lipeurus caponis, Goniocotes gigas and Goniocotes gallinea* and the soft tick called *Argas persicus*. In the study area there was no any modern animal health care for these backyard kept poultry that might have attributed for higher distribution of Ectoparasites.
Recommendation:

- Awareness should be created to the community on the overall effect of Ectoparasites on productivity of poultry.
- Farmers and extension staff should be trained regarding on improved housing, feeding, disease control and improved productivity of local chicken.
- Further investigation should be carried to identify and estimate external parasites and their effect on the productivity and health of the poultry.
- The government should take responsibility to provide the control measure to the farmers.

REFERENCES

