

# A new look at ectoparasites affecting indigenous village poultry in Ethiopia



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## Introduction

- Small scale poultry production in Ethiopia is a significant contributor to the livelihoods of poor rural subsistence farmers.
- Research shows that ectoparasites, particularly lice, mites and fleas are common in scavenging flocks in Ethiopia.
- Infestation is perceived by farmers to be a major cause of bird morbidity and mortality, particularly in young stock (Fig.1).

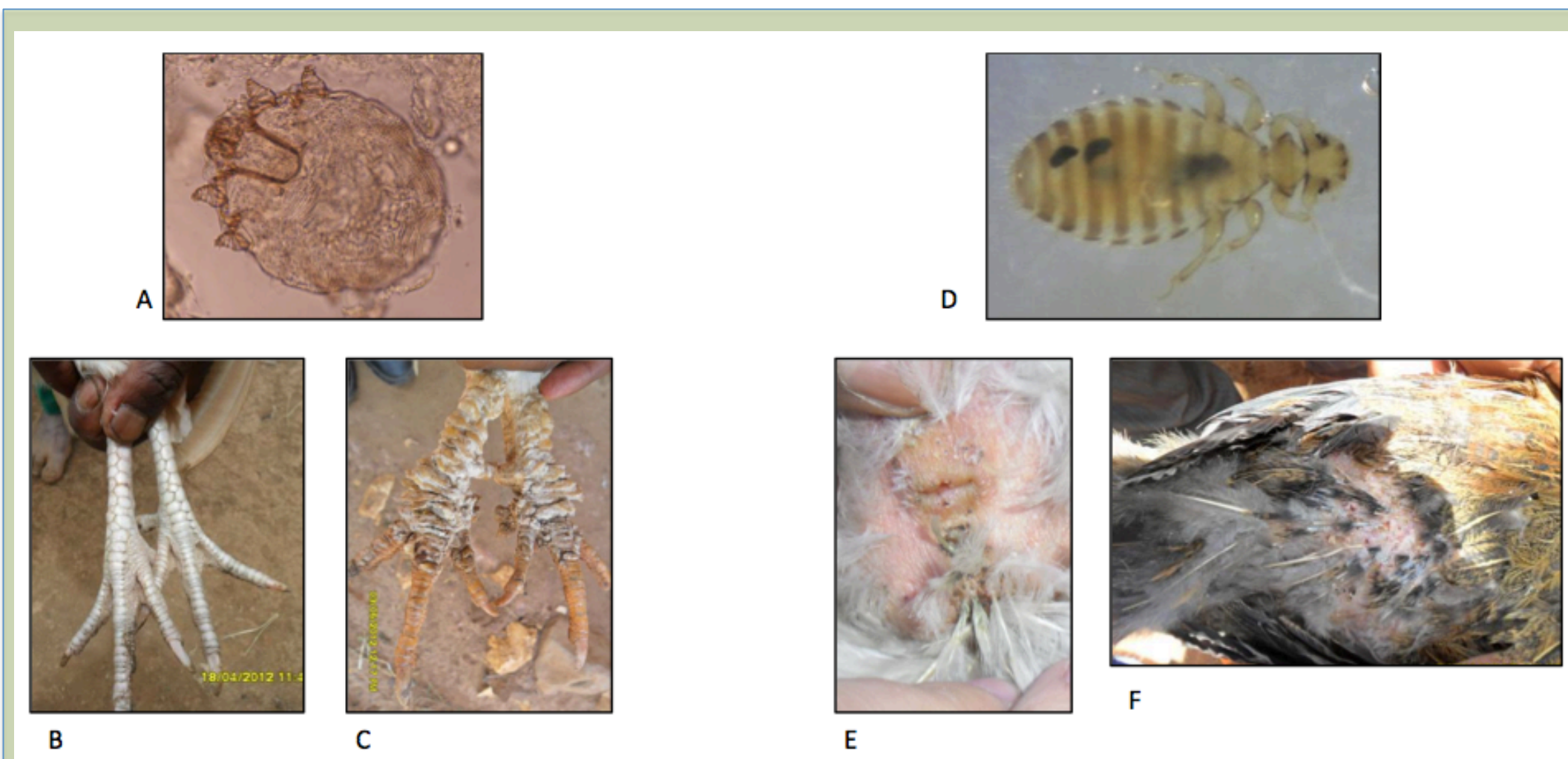


Fig 1. Specimens and clinical signs of two pathogenic ectoparasites found in village poultry. A – *C. mutans*, the scaly leg mite (x400 mag.), B – normal feet in an unaffected bird, C – Scaly Leg (exudative hyperkeratosis) due to severe *C. mutans* infestation, D – *M. cornutus*, the body louse (x100 mag.), E – lice infestation (pediculosis) around the vent of a hen, F – feather loss, inflammation and crusted lesions typical of pediculosis.

- The role of ectoparasites within the wider context of infectious disease constraints in village chicken production remains poorly understood, in part due to the complexity of correctly speciating ectoparasite specimens.
- This study focuses on the identification and prevalence of ectoparasites in scavenging chickens and forms part of a large collaborative project investigating the disease epidemiology, socio-economic dimensions and genetic diversity of indigenous poultry in Ethiopia.

## Results

- One or more species of ectoparasite were identified in 777/1296 (60%) of the birds in the study, with 426/635 (67%) of birds in Horro, 325/631 (52%) in Jarso and 26/30 (87%) in Godino showing infestation with at least one ectoparasite species.
- Within 720 specimens collected, 16 ectoparasite types were identified, all known to be associated with clinical disease (Figs.1,2 and 3), including three species of pathogenic chewing lice, *M. pallidulus*, *M. cornutus* and *G. dissimilis*, not previously reported in Ethiopia.
- Statistically significant differences were found between infestation prevalence at the 3 study sites, with a greater diversity of ectoparasites infesting birds in Horro than in Jarso and Godino. Scaly leg mites (*C. mutans*) and chewing lice species (Fig.4 A-G,L) represented the most commonly identified ectoparasites in both Horro and Jarso, with some species specific to each region (Fig.5). The stick-tight flea (*E. gallinae*), was only found in Godino, where it was the dominant species infesting birds (Fig.6).
- There was an overall 41% prevalence of scaly leg mite infestation, with no statistically significant difference in prevalence between the study regions.
- Low numbers of tick, Red Mite and true bug samples were collected. Poultry-specific tick species, previously reported in Ethiopia, were not found.

Species	Common name	Host species	Geographical Distribution	Previously reported in Ethiopia
<i>Menacanthus cornutus</i>	Yellow body louse	Chicken	Worldwide	No
<i>Menacanthus pallidulus</i>	Body louse	Chicken	Worldwide	No
<i>Menacanthus stramineus</i>	Body louse	Fowl, game and cage birds	Worldwide	Yes
<i>Menacanthus unknown</i>	n/a	n/a	n/a	n/a
<i>Menopon gallinae</i>	Shaft louse	Chicken, turkey, duck	Worldwide	Yes
<i>Goniodes gigas</i>	Large chicken louse	Chicken	Worldwide	Yes
<i>Goniodes dissimilis</i>	Brown chicken louse	Chicken	Worldwide	No
<i>Gonocotes gallinae</i>	Fluff louse	Chicken	Worldwide	Yes
<i>Lipeurus caponis</i>	Wing louse	Chicken	Worldwide	Yes
<i>Cnemidoptes mutans</i>	Scaly leg mite	Chicken, turkey	Worldwide	Yes
<i>Dermanyssus gallinae</i>	Red poultry mite	Domestic fowl, wild birds, occ. mammals inc. humans	Worldwide	Yes
<b>Tick species:</b>				
<i>Amblyomma variegatum</i>	Tropical bont tick	Mammals, mainly cattle	Africa	Yes
<i>Amblyomma</i> spp.	n/a	Mammals and birds	Worldwide	Yes
<i>Haemaphysalis</i> spp.	n/a	Mammals and birds	Worldwide	Yes
<i>Echidnophaga gallinae</i>	Stick-tight flea	Fowl, occ. mammals inc. humans	Tropical areas occ. sub-tropical temperate	Yes
<i>Cimex lectularius</i>	Bed bug	Chickens and humans	Worldwide	Yes

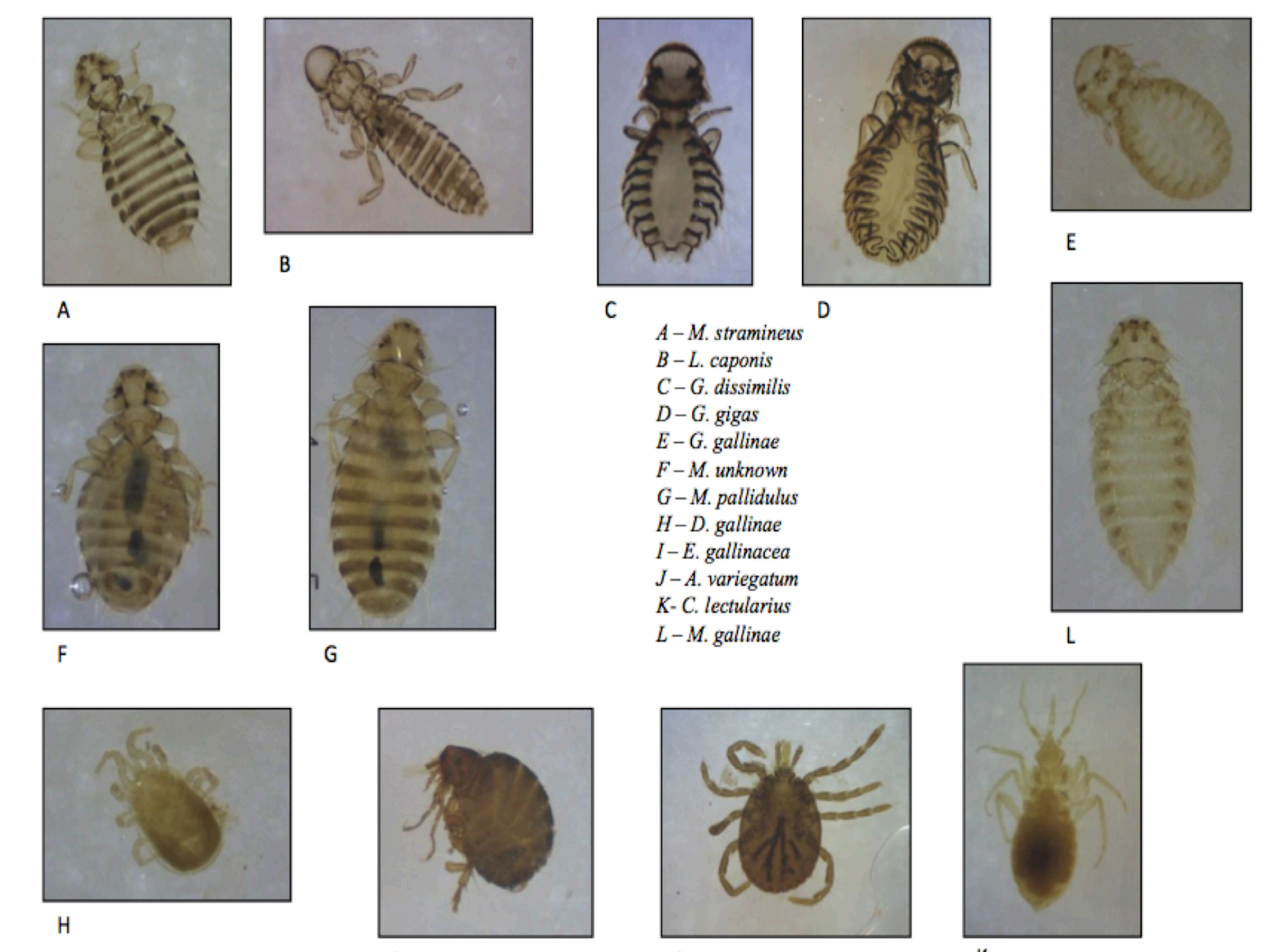


Fig.4. Microscope photographs (x100 magnification) of ectoparasite species isolated from birds in Horro, Jarso and Godino.

Fig.3. List of ectoparasite species identified in the study. Colour denotes species groups: orange – chewing lice, pink – mites, green – ticks, blue – fleas and brown – bugs.

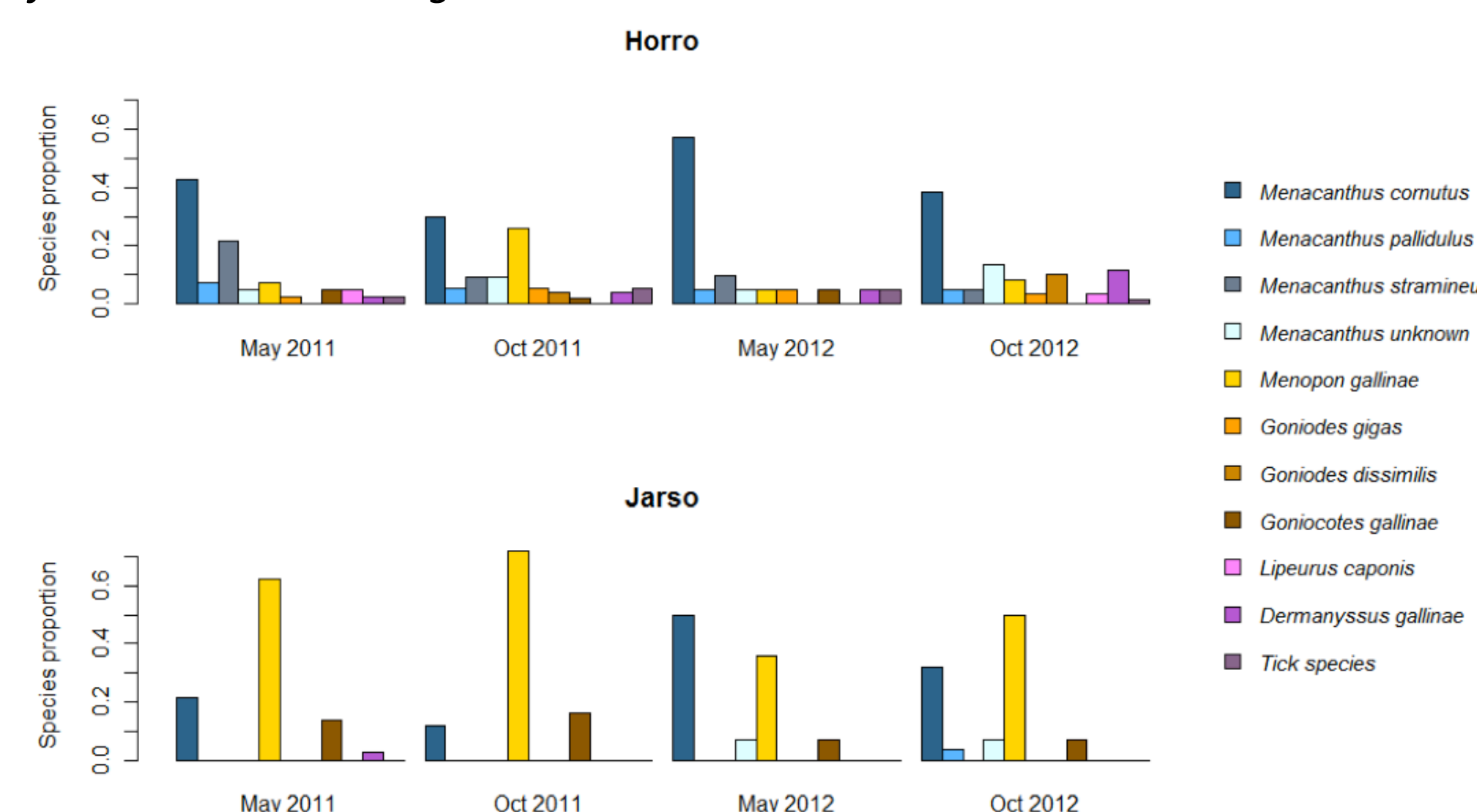


Fig.5. Ectoparasite species found in Horro and Jarso over the four sampling periods of the study. Values represent the proportion of a given species within the overall number of samples collected

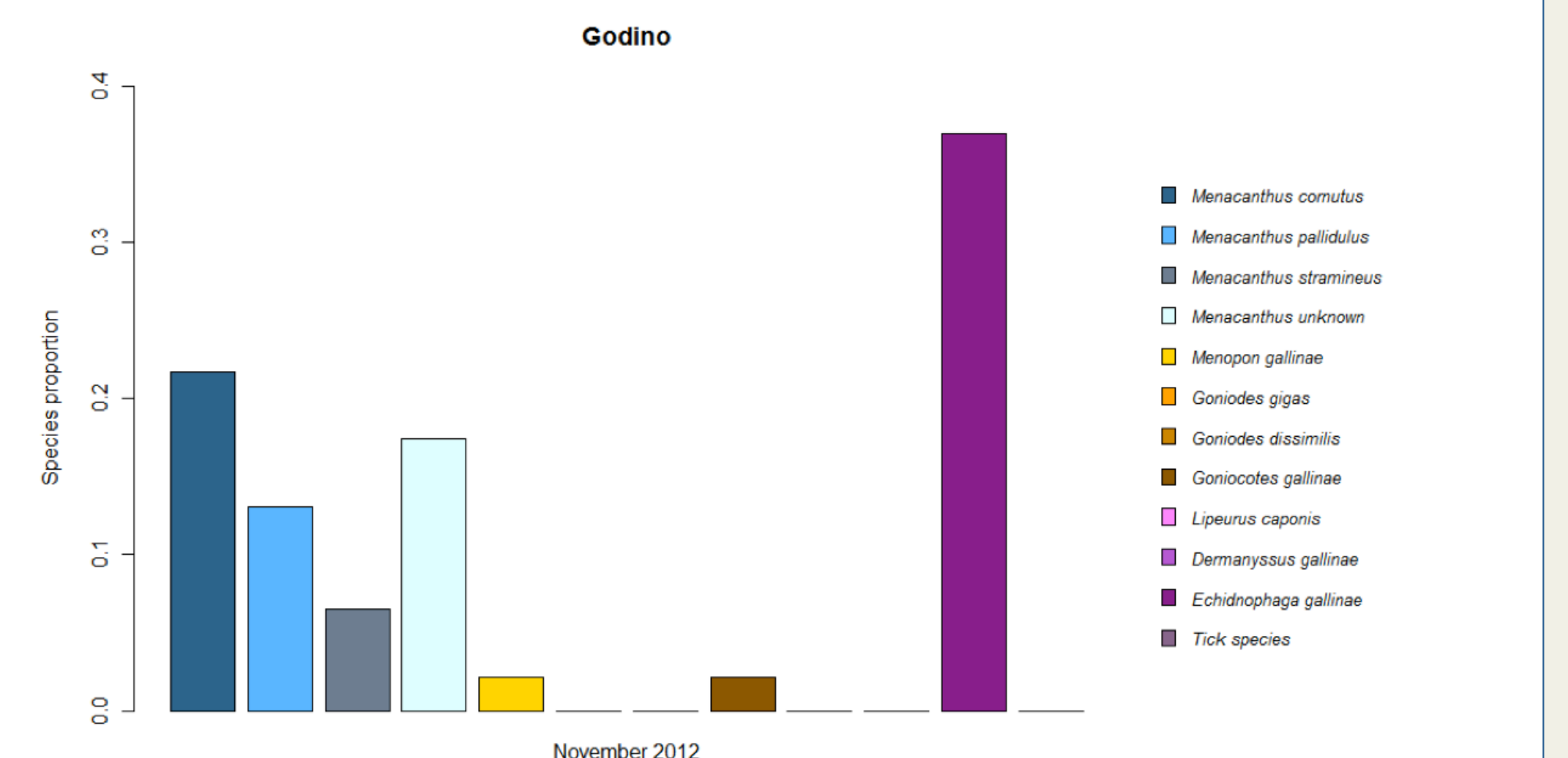


Fig.6. Ectoparasites found in Godino village during the one day sampling in November 2012. Values represent a proportion of a given species within the overall number of samples collected.

## Methodology

- A multi-stage cross-sectional study was conducted over 4 sampling periods between May 2011 and October 2012.
- A total of 1266 healthy adult birds in 640 households were examined in the western region of Horro (n=635) and eastern region of Jarso (n=631), and a further 30 birds in 15 households in the central village of Godino.
- Visual examination and timed counts were conducted at predilection sites for ectoparasites on the bird's body (Fig.2). Specimens were collected and stored in 70% ethanol for identification by light microscopy at x100 and x400 magnification, using 10% potassium hydroxide solution to clarify samples where necessary.

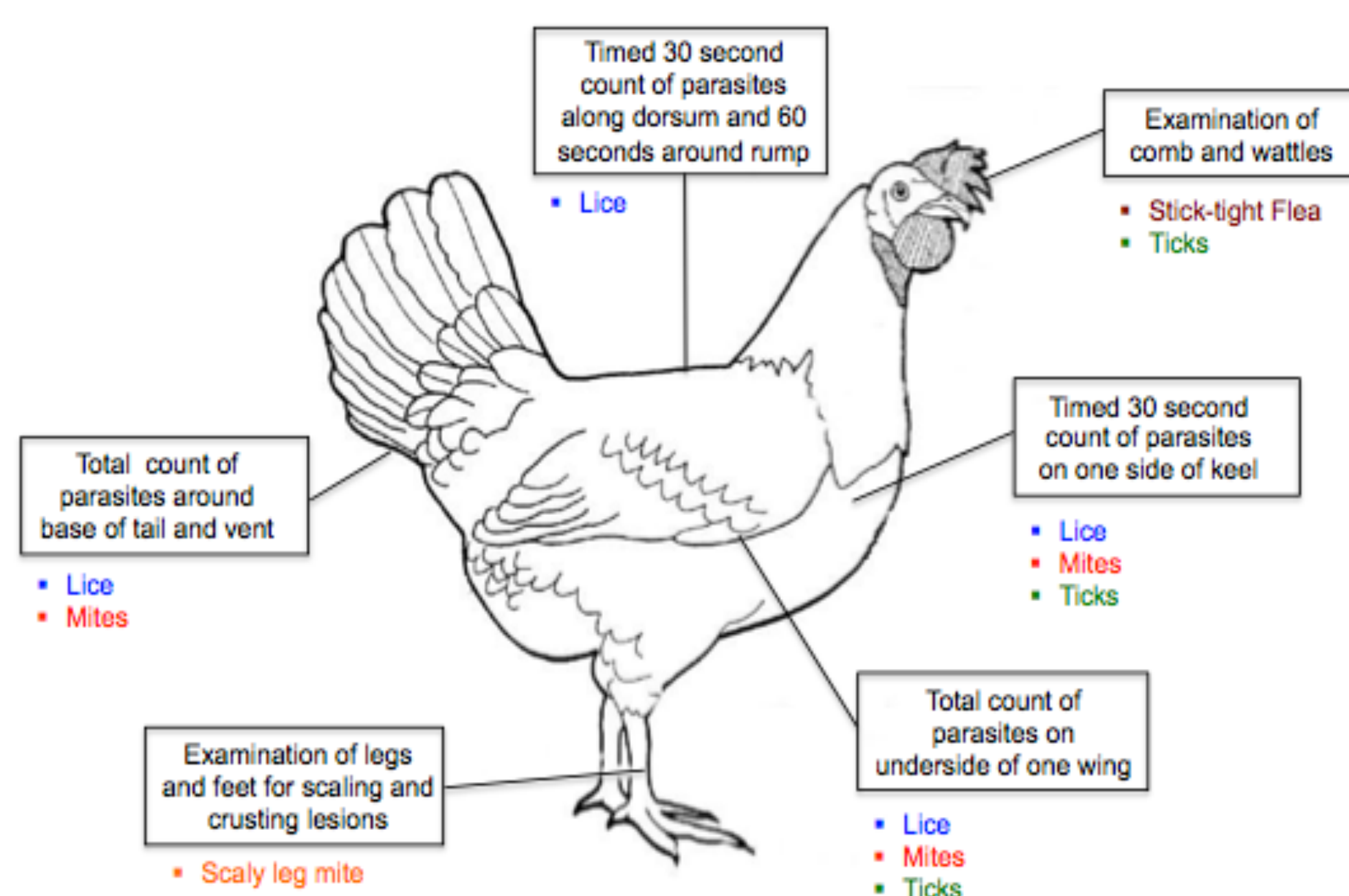


Fig.2. Sites of visual and timed ectoparasite examination and the parasite genera expected to be found at the predilection sites on the body.

## Conclusions

- There is a widespread and diverse range of pathogenic ectoparasite species infesting backyard flocks in these rural communities. However, most adult birds appeared healthy despite high infestation prevalence and ectoparasite burdens.
- The discovery of novel species of lice not previously reported in Ethiopia shows that ectoparasite epidemiology in rural settings is not fully understood and calls for further research in this field.
- Clear differences in species diversity between regions suggest there may be local risk factors associated with infestation, including management, environment or bird-specific factors. Future investigations should include not only young stock, which in the literature and by farmer perception, represent the highest risk group for ectoparasitic disease, but also pathogenic ectoparasites that undergo much of their life cycle away from the host, such as soft ticks (*Argas* species) and blood feeding dermanyssid mites.
- A greater understanding of ectoparasite species infesting flocks can be used to tailor guidelines for farmers and animal health professionals on local ectoparasite control. The provision of practical and culturally sensitive control measures, as part of poultry health management at village level, is currently lacking. Improved housing and management of young birds could offer effective means to minimize and prevent ectoparasite infestation.