

Diversity of Chewing Lice in a Backyard Poultry Farm in Laladon Ciomas, Bogor, West Java, Indonesia

(KEANEKARAGAMAN KUTU PENGGIGIT PADA
PETERNAKAN UNGGAS RAKYAT DI LALADON,
CIOMAS, BOGOR, JAWA BARAT, INDONESIA)

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ABSTRACT

A substantial number of households in Indonesia keep backyard flocks as an alternative to meeting household or village-level demand for animal protein. However, minimal biosecurity and management practices in these systems increase the risk of parasitic infestations, including chewing lice, which can adversely affect poultry health and productivity. This study was aimed to identify the diversity and assess the level of chewing lice infestation on various backyard poultry in a local farm in Bogor Regency, Indonesia. This study was conducted on 25 birds representing five poultry species namely chickens, turkeys, fantail pigeons, swan geese, and Muscovy ducks—at a backyard farm in Laladon Village, Ciomas Subdistrict, Bogor Regency, West Java Province, Indonesia. Representative lice specimens were collected, and eight genera of chewing lice were identified: *Menacanthus*, *Menopon*, *Colpocephalum*, *Holomenopon*, *Lipeurus*, *Anaticola*, *Columbicola*, and *Campanulotes*. Fantail pigeons exhibited the highest infestation severity across all body regions, accompanied by feather damage. Chickens and turkeys shared several lice genera but differed markedly in infestation severity, due to contrasting housing systems. An unusual host association of *Colpocephalum* in swan geese was recorded, potentially reflecting incidental host transfer linked to mixed-species housing. Overall, the findings demonstrate that backyard poultry systems are highly vulnerable to ectoparasite infestations, emphasising the need for improved housing design, biosecurity, and routine ectoparasite control.

Keywords: Backyard poultry; chewing lice on poultry; ectoparasite; infestation severity

ABSTRAK

Sebagian besar masyarakat di Indonesia memelihara unggas sebagai alternatif untuk memenuhi kebutuhan protein hewani di tingkat rumah tangga atau desa. Namun, praktik biosekuriti dan manajemen yang minim dalam sistem ini meningkatkan risiko infestasi parasit, termasuk kutu penggigit, yang dapat berdampak buruk pada kesehatan dan produktivitas unggas. Penelitian ini bertujuan untuk mengidentifikasi keragaman dan menilai tingkat infestasi kutu penggigit pada berbagai unggas yang dipelihara pada peternakan rakyat di Laladon, Ciomas, Bogor, Jawa Barat, Indonesia. Penelitian ini dilakukan pada 25 ekor unggas yang mewakili lima spesies unggas, yaitu: ayam, kalkun, merpati kipas, angsa dan bebek entok di sebuah peternakan unggas rakyat di Desa Laladon, Kecamatan Ciomas, Kabupaten Bogor, Provinsi Jawa Barat, Indonesia. Representatif spesimen kutu dikoleksi, dan delapan genus kutu penggigit diidentifikasi: *Menacanthus*, *Menopon*, *Colpocephalum*, *Holomenopon*, *Lipeurus*, *Anaticola*, *Columbicola* dan *Campanulotes*. Merpati menunjukkan tingkat infestasi tertinggi di seluruh bagian tubuh, disertai dengan kerusakan bulu. Ayam dan kalkun diinfestasi oleh genus kutu yang sama, tetapi berbeda secara signifikan dalam tingkat infestasi, karena sistem kandang mereka yang berbeda. Penemuan *Colpocephalum* pada angsa di penelitian ini mencerminkan potensi perpindahan inang akibat sistem kandang yang dicampur. Secara keseluruhan, penelitian ini menunjukkan bahwa sistem peternakan unggas rakyat sangat rentan terhadap infestasi ektoparasit sehingga diperlukan perbaikan bentuk kandang, penerapan biosekuriti dan pengendalian ektoparasit secara rutin.

Kata-kata kunci: derajat infestasi; ektoparasit; kutu penggigit pada unggas; peternakan unggas rakyat

INTRODUCTION

Around 40% of poultry farming in Indonesia is small- and medium-scale, making backyard poultry farming widely practised. It is estimated that more than one million people in Indonesia keep backyard poultry. They are distributed across different regions, especially rural areas. As the fourth-most populous country in the world, the nation continues to face a steady rise in demand for animal protein (Ferlito and Respatiadi, 2018; Sumiati *et al.*, 2025). Small backyard setups are one strategy to meet this demand, especially at the household and village levels (Das and Samanta, 2021; Sumiati *et al.*, 2025). However, because of their simple management, backyard farms often adopt minimal biosecurity measures, thereby making poultry more prone to disease (Conan *et al.*, 2012; Kurnia and Daspar, 2025; Muñoz-Gómez *et al.*, 2025; Otte *et al.*, 2021), including parasitic diseases (Endale *et al.*, 2023; Murillo and Mullens, 2016; Nahal *et al.*, 2021; Nair *et al.*, 2021; Shanta *et al.*,

1970; Sychra *et al.*, 2008).

Parasitic infestation is the second most significant disease in poultry after infectious diseases. Among various parasites, ectoparasite infestation has detrimental effects on chicken health (Nahal *et al.*, 2026). Poultry ectoparasites are considered a major cause of stunted growth, restlessness, lethargy, dermatitis, and overall poor condition in birds, thereby reducing the value and productivity of backyard poultry (Endale *et al.*, 2023). Additionally, poultry ectoparasites may serve as mechanical or biological vectors of several pathogens (Durden, 2002; Yang *et al.*, 2014).

Some ectoparasites affecting chickens feed on feathers and dermal debris. Chewing lice from the Phthiraptera order are the most common ectoparasites in avian species (Murillo and Mullens, 2016). Some species, such as *Menopon gallinae* (Linnaeus, 1758) and *Menachantus stramineus* (Nitzsch, 1818), even feed on blood drawn from the punctured host's skin or feathers (Nahal *et al.*, 2026; Nair *et al.*,

2021). Lice can be found infesting all over the bird's body, on the skin and feathers. As permanent ectoparasites, lice complete their entire life cycle on a single host bird (Hinkle and Corrigan, 2019), but occasionally close contact between hosts can lead them to move to a new host (Clayton *et al.*, 2009). The constant irritation from the lice bites and movements can trigger stress in birds. Indications of infested birds include appearing agitated, having damaged "lousy" feathers, and generally appearing to be in poor health (Nair *et al.*, 2021).

Currently, there are only a few research and information on poultry lice in Indonesia (Prastowo *et al.*, 2020). This study was carried out to identify the diversity and assess the level of chewing lice infestation on various backyard poultry in a local farm in Bogor Regency, Indonesia. It aims to shed light on the effects of lice infestation on poultry health and productivity. This research will raise awareness among Indonesian backyard poultry farmers about these pests and promote effective management strategies to safeguard the health of their flocks.

RESEARCH METHODS

Ethical Approval

This study did not involve animal experiments; thus, ethical approval was not required.

Poultry Lice Collection

This study was conducted on a local backyard farm in Laladon Village, Ciomas Subdistrict, Bogor Regency, West Java Province, Indonesia (6°35'18.3"S 106°45'16.1"E). Lice samples were taken from a representative of randomly selected 25 birds, with five from each of five different poultry species: domestic chickens (*Gallus gallus domesticus*), turkeys (*Meleagris gallopavo*), Fantail Pigeons (*Columba livia domestica*), Swan Geese (*Anser cygnoides*), and Muscovy Ducks (*Cairina moschata*). The number of chewing lice was counted directly on

the poultry body across five regions: head (H), body (Bo), wings (W), breast (Br), and tail and legs (TL). Lice were counted in each region for two minutes.

Representative lice samples from each poultry individual were collected from the five regions. Lice were immobilised and killed by brushing each louse with a paintbrush soaked in 70% alcohol, then transferred to vials containing 70% alcohol and sent to the Laboratory of Veterinary and Medical Entomology at IPB University for identification. In the laboratory, the representative lice samples were clarified, preserved, and mounted using methods previously described (Yin *et al.*, 2024; Zarith *et al.*, 2017), with a few modifications. Briefly, each specimen was incubated in 10% Potassium Hydroxide (KOH), then gradually dehydrated in alcohol at increasing concentrations (70%, 80%, 90%, 100%). Once dehydrated, the specimens were purified in clove oil and cleared in a xylol solution. Specimens were mounted onto a drop of Entellan and incubated at 50 °C until completely dry. Samples were examined under a light microscope, and genus identification was performed using taxonomic keys (Price, 1971; Hellenthal and Price, 2009).

Data Analysis

The severity of infestation for each poultry species was recorded during the 2-minute observation using the qualitative method. None signified no lice presence; a low level of infestation indicated 1–5 lice; a mild infestation represented 6–10 lice; a high infestation denoted 11–20 lice; and a very high infestation indicated >20 lice (Soviana *et al.*, 2020). Additionally, the most dominant genus of chewing lice on each region of the poultry body was identified during the 2-minute observation. The housing conditions of each poultry species were also observed, including distances between the houses and the poultry density. Data from this study were analysed descriptively and qualitatively only due to the limited time available for data collection.

RESULTS AND DISCUSSION

Identification and Distribution of Chewing Lice on the Host Body

A total of 102 representative samples of chewing lice were collected from five poultry species. Using identification keys (Price, 1971; Hellenthal and Price, 2009), eight lice genera from two families were identified (Figure 1). The distribution of each genus across different host species is shown in Table 1a-e. Four of the eight genera were found parasitising two poultry species simultaneously. The most sampled genus (Table 1f) was *Menacanthus* (26.47%), followed by *Anaticola* (18.63%). The genus *Colpocephalum* was recorded in fantail pigeons (Table 1c) and swan geese (Table 1d). The genus *Anaticola* was observed infesting the Muscovy duck (Table 1b) and swan geese (1d). The remaining genera identified in this study were found exclusively in a single poultry species: *Holomenopon* in swan geese (1d), *Lipeurus* in chickens (Table 1a), and *Columbicola* and *Campanulotes* in fantail pigeons (Table 1c).

Table 1a. Prevalence (%) and distribution of the representative samples of chewing lice on Chickens

Region	Menoponidae		Philo-pteridae
	<i>Mena-canthus</i>	<i>Meno-pon</i>	<i>Campanulotes</i>
H	17.39	44.44	25
Bo	26.09	11.11	50
W	17.39	11.11	
Br	21.74	22.22	
TL	17.39	11.11	25

Note: head (H), body (Bo), wings (W), breast (Br), and tail and legs (TL).

Table 1a-e also shows the distribution of the different genera of the representative chewing lice samples found in this study across the various body regions of each poultry species. In chickens, *Menacanthus* and *Menopon* were present in all five regions, while *Lipeurus* was limited to the

head, body, tail, and legs.

Table 1b. Prevalence (%) and distribution of the representative samples of chewing lice on Muscovy ducks

Region	Philo-pteridae <i>Anaticola</i>
H	48.26
Bo	14.29
W	28.57
Br	14.29
TL	

Note: head (H), body (Bo), wings (W), breast (Br), and tail and legs (TL).

Table 1c. Prevalence (%) and distribution of the representative samples of chewing lice on Fantail pigeons

Region	Philo-pteridae		
	Menopo-nidae <i>Colpocephalum</i>	<i>Colum-bicola</i>	<i>Campanulotes</i>
H		17.65	33.33
Bo	12.5	11.76	
W	50	29.41	
Br		17.65	66.67
TL	37.5	23.53	

Note: head (H), body (Bo), wings (W), breast (Br), and tail and legs (TL).

Table 1d. Prevalence (%) and distribution of the representative samples of chewing lice on Swan geese

Region	Menoponidae		Philo-pteridae
	<i>Colpocephalum</i>	<i>Holome-nopon</i>	<i>Anaticola</i>
H		28.57	
Bo			16.67
W	50	28.57	50
Br		14.29	25
TL	50	28.57	8.33

Note: head (H), body (Bo), wings (W), breast (Br), and tail and legs (TL).

The genus *Anaticola* was recorded in all but the tail and leg regions of Muscovy ducks. Fantail pigeons had *Columbicola* throughout the body, while *Campanulotes* inhabited the head and breast, and *Colpocephalum* was found in the body, wings, tails, and legs. Swan geese (Table 1d) showed infestation by

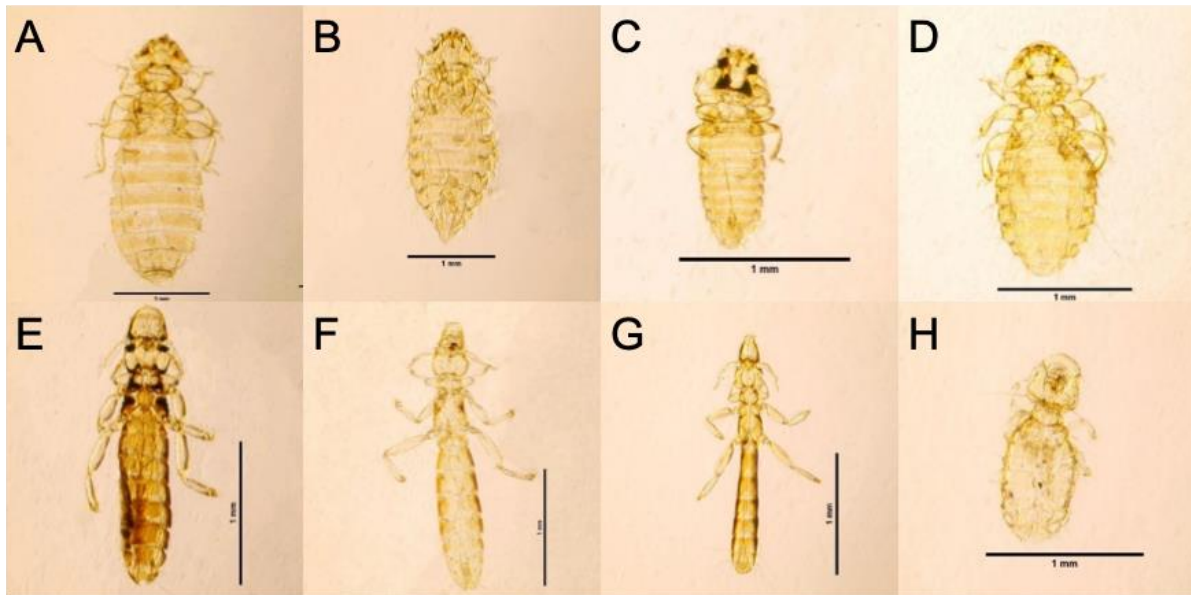


Figure 1. Eight species of poultry's chewing lice documented in this study. (A) *Menacanthus*, (B) *Menopon*, (C) *Colpocephalum*, (D) *Holomenopon*, (E) *Lipeurus*, (F) *Anaticola*, (G) *Columbicola*, and (H) *Campanulotes*.

Table 1e. Prevalence (%) and distribution of the representative samples of chewing lice on Turkeys

Region	Menoponidae	
	<i>Menacanthus</i>	<i>Menopon</i>
H		
Bo	50	16.67
W	25	
Br	25	33.33
TL		50

Note: head (H), body (Bo), wings (W), breast (Br), and tail and legs (TL).

Holomenopon in all regions except the body; *Anaticola* in all regions except the tail and legs; and *Colpocephalum* in the heads, wings, tails, and legs. Turkeys (Table 1e) had *Menacanthus* in all regions except the heads, tails, and legs, and *Menopon* in all but the heads and wings.

The present study identified eight genera (Table 1f) of chewing lice from five species of backyard poultry. *Menacanthus* and *Menopon* were among the most frequently encountered genera and were recorded in both chickens and turkeys.

Table 1f. Prevalence (%) of the representative samples of chewing lice on poultry at Laladon, Ciomas, Bogor

Family	Genus	Prevalence (%)
Menoponidae	<i>Menacanthus</i>	26.47
	<i>Menopon</i>	14.71
	<i>Colpocephalum</i>	9.8
	<i>Holomenopon</i>	6.86
	<i>Lipeurus</i>	3.92
Philopteridae	<i>Anaticola</i>	18.63
	<i>Columbicola</i>	16.67
	<i>Campanulotes</i>	2.94

In Indonesia, these genera have been widely reported, predominantly in chickens (Ardhani, 2013; Asyfa and Mahatma, 2023; Balaira *et al.*, 2019; Hermawati, 2006; Puspasari *et al.*, 2024; Riwidiharso *et al.*, 2020; Selfian-nisa *et al.*, 2018; Setiawan, 2013; Supartini *et al.*, 2021) and occasionally from turkeys (Dinda, 2020; Prastowo *et al.*, 2020; Yustin, 2021).

The presence of *Lipeurus* in chickens observed in this study is consistent with previous reports from backyard chicken populations in Indonesia (Puspasari *et al.*,

2024; Riwidiharso *et al.*, 2020; Selfiannisa *et al.*, 2018; Supartini *et al.*, 2021). Nevertheless, the overall diversity of chewing lice genera identified in chickens was lower than that reported in other studies, which also recorded additional genera such as *Goniocotes* and *Goniodes* (Puspasari *et al.*, 2024; Selfiannisa *et al.*, 2018; Supartini *et al.*, 2021). A similar pattern was observed in turkeys. While only two genera were identified in the present study, previous investigations have reported *Colpocephalum*, *Chelopistes*, *Oxylipeurus*, and *Lipeurus* in turkeys (Dinda, 2020; Prastowo *et al.*, 2020; Yustin, 2021). Comparable findings have been documented in free-range turkeys in Malaysia, where *Menacanthus*, *Menopon*, *Lipeurus*, *Chelopistes* and *Goniocotes* were recorded (Zarith *et al.*, 2017).

The genus *Columbicola* was detected exclusively in fantail pigeons, which aligns with previous studies (Putri *et al.*, 2025; Umar, 2019), though it was unclear whether the pigeons were wild or domesticated. *Columbicola* is widely recognised as the most common genus of chewing lice parasitising pigeons (Radfar *et al.*, 2012; Rezaei *et al.*, 2014). In addition, *Colpocephalum* and *Campanulotes* were identified in fantail pigeons, agreeing with previous reports (Putri *et al.*, 2025; Sari, 2022; Umar, 2019). Other genera previously documented in Indonesian pigeons include *Hohorstiella* (Umar, 2019), *Menachantus*, and *Menopon* (Putri *et al.*, 2025).

Interestingly, *Colpocephalum* was also identified in swan geese. This host association is uncommon, although *Colpocephalum* is known to parasitise a broad range of avian orders. However, despite its wide host distribution, individual lineages within this genus are generally host-order specific (Catanach *et al.*, 2018). Therefore, the presence of *Colpocephalum* in swan geese may reflect very dense poultry populations, or proximity to other species could lead to transmission to other species. The latter may explain this observation, as the swan geese were housed directly beneath the nesting area of fantail pigeons, creating opportunities

for incidental lice transfer between hosts (Ren *et al.*, 2023).

Holomenopon was found solely in swan geese. Unfortunately, updated information regarding *Holomenopon* infestations in swan geese is limited (Lapage, 1961; Price, 1971), especially in Southeast Asia. Thus, the present study represents the first documentation of *Holomenopon* infestation in swan geese in this region. Previous reports have recorded *Holomenopon* in other goose species (Göz *et al.*, 2015; Grossi and Galloway, 2022; Lapage, 1961; Naz and Rizvi, 2012). In addition to *Holomenopon*, *Anaticola* was identified in swan geese. *Anaticola* has previously been reported in swan geese (Choi *et al.*, 2016) and was noted as a novel host association, making the present study the second worldwide report of *Anaticola* in swan geese. In the present study, *Anaticola* was also documented exclusively in Muscovy ducks. Prior investigations of chewing lice in Indonesian ducks have focused only on mallards (Widiastuti, 2024; Rama *et al.*, 2017), with no reports involving Muscovy ducks. In those studies (Widiastuti, 2024; Rama *et al.*, 2017), *Anaticola* was recorded alongside *Menacanthus*, *Menopon*, *Lipeurus*, *Goniocotes*, and *Goniodes*.

Housing Conditions of Each Poultry Species

To provide more context on how shared infestations among the observed host species may occur, the housing conditions and locations of each poultry sample were also recorded in this study. Chickens were kept in cages within a shaded area, with limited exposure to sunlight and no access to the ground (Figure 2A). In contrast, the turkeys were housed in a more open enclosure that allowed them to roam freely and had unrestricted access to sunlight and soil (Figure 2B). The Muscovy duck enclosure was located quite far from the farm, effectively separating the Muscovy ducks from other bird species (Figure 2C). The swan goose pen was situated at the centre of the farm (Figures 2E, F), where the fantail pigeons nested directly above the swan goose

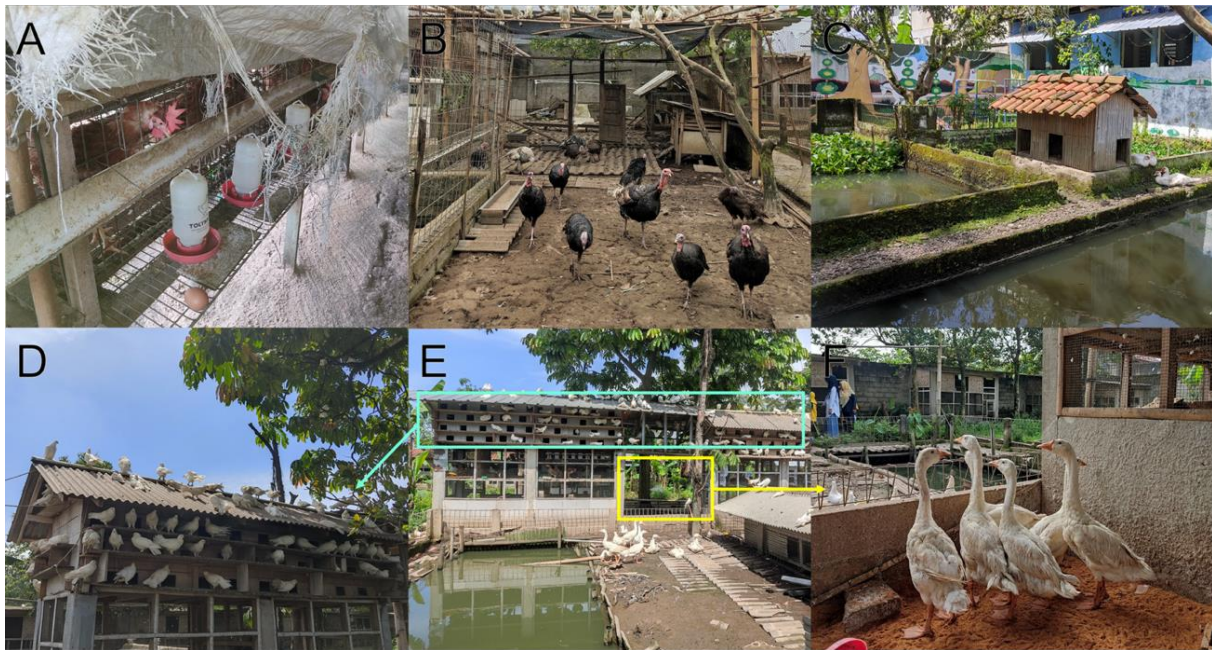


Figure 2. Enclosure conditions of each poultry species: A) chickens, B) turkeys, C) Muscovy ducks, D) fantail pigeons, E) mixed housing of fantail pigeons and swan geese, and F) swan geese.

enclosure. During housing observations, many fantail pigeons were noted to have multiple bald spots and irritated skin (Figure 3).

Despite the presence of the same louse genera in both chickens and turkeys, a marked difference in infestation severity was observed, likely due to differences in housing systems. Chickens were kept in battery cages under shaded conditions, with limited sunlight exposure and no access to soil for dust bathing, whereas turkeys were reared under a free-range system with unrestricted access to sunlight and ground substrates. Galliformes use dust baths to naturally control ectoparasites on their bodies (Martin and Mullens, 2012). Thus, housing conditions influence bird behaviour, including grooming activity, which in turn affects the severity of lice infestation (Lawal *et al.*, 2016).

A comparable pattern was observed among Anseriformes studied here, Muscovy ducks and swan geese. Swan geese were housed at the centre of the farm, surrounded by enclosures of multiple bird species, including fantail pigeons nesting directly

above them. This arrangement likely facilitated increased contact and ectoparasite transmission, resulting in higher infestation levels, including the atypical presence of *Colpocephalum*. In contrast, Muscovy ducks were housed at a considerable distance from other bird enclosures, limiting interspecies contact. Improved sanitation and isolation likely contributed to the substantially lower infestation levels observed in this species (Mlondo *et al.*, 2025).



Figure 3. Feather condition of fantail pigeons on the farm

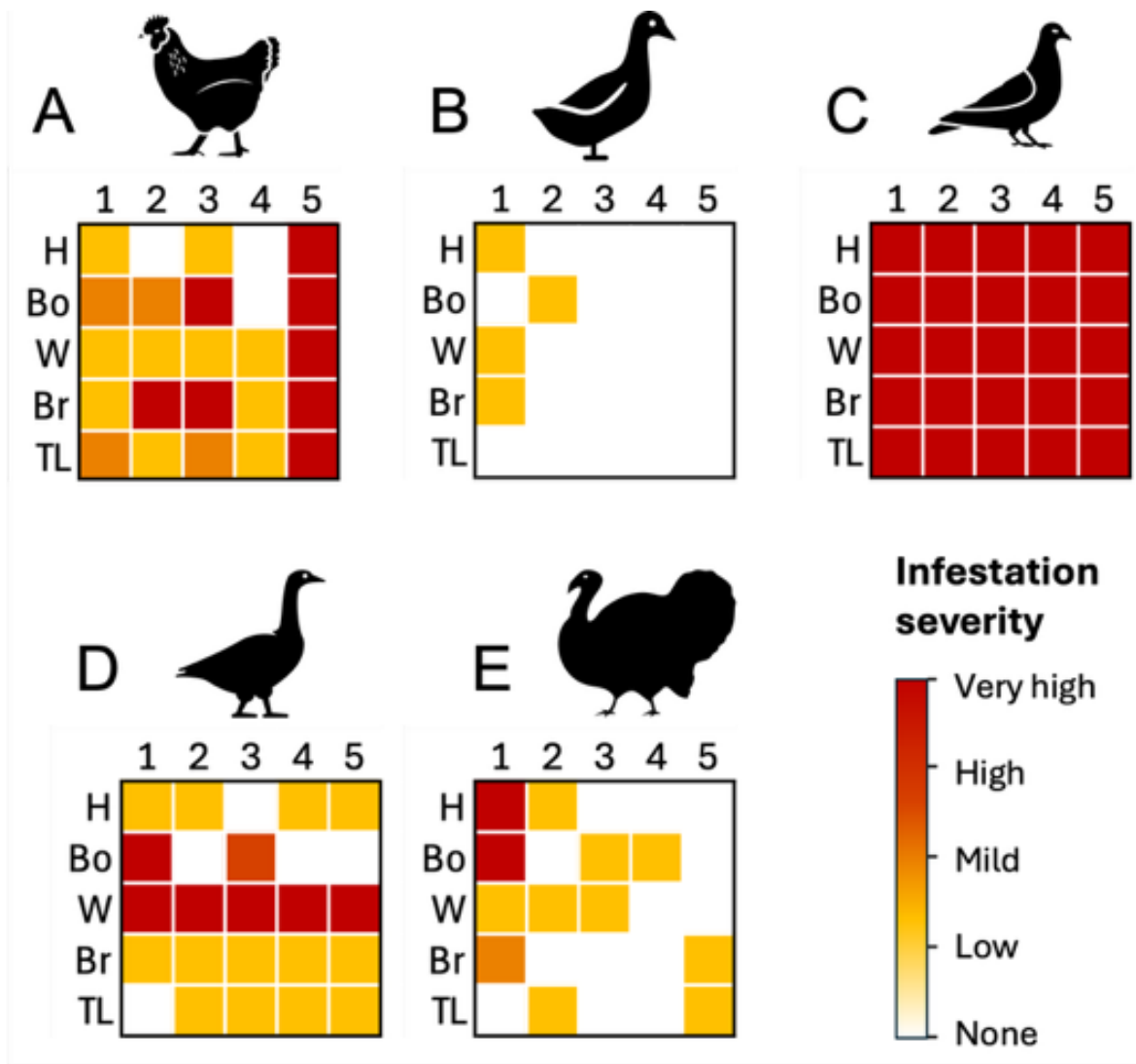


Figure 4. 4. Infestation degree of chewing lice by region in each sampled host: A) chickens, B) Muscovy ducks, C) fantail pigeons, D) swan geese, and E) turkeys.

Infestation Severity

All sampled chickens were infested, with one individual showing a very severe infestation level in all regions, while the other regions generally exhibited low infestation levels (Figure 4A). Only two of the sampled Muscovy ducks were found to be infested with chewing lice, with one individual showing a low infestation across all regions except the body and tail and legs, whilst the other one was infested only in the body (Figure 4B). All sampled fantail pigeons displayed very high infestation levels throughout all regions (Figure 4C). Swan geese showed varying degrees of infestation, with the wings generally

exhibiting very high infestation. Despite fluctuation in infestation levels, all sampled swan geese were infested (Figure 4D). In turkeys, however, varying levels of no-to-low infestation were observed among individuals, with one individual showing very high infestation in the heads and bodies (Figure 4E).

Among all bird species examined, fantail pigeons exhibited the most severe infestations, with feather damage observed within the population. Chewing lice infestation is one of the most common problems reported in free-range pigeons (Mlondo *et al.*, 2025; Semmar *et al.*, 2025). The observed overcrowding in the present study also

worsened the overall housing environment for the fantail pigeons. The high density of pigeons in a confined space makes it difficult to maintain proper hygiene and sanitation. Additionally, overcrowding can subject pigeons to immense stress, leading to a range of behavioural issues, including overpreening or, at times, reduced preening. Preening is one of the behavioural defences in pigeons to combat against ectoparasites (Bush and Clayton, 2023; Waite *et al.*, 2012). Furthermore, free-range systems used for the fantail pigeons studied here may increase lice transmission, particularly during night roosting, when bird density is high and direct contact is frequent (Mukaratirwa and Hove, 2009).

CONCLUSION

Eight genera of chewing lice were identified in the present study: *Menacanthus*, *Menopon*, *Colpocephalum*, *Holomenopon*, *Lipeurus*, *Anaticola*, *Columbicola*, and *Campanulotes*. A varying degree of infestation was recorded, with the fantail pigeons being the most severely infested. Fantail pigeons, chickens, and swan geese experienced higher infestation levels due to confined housing and close proximity to other birds, which restricted natural grooming and increased parasite transmission. Conversely, turkeys and Muscovy ducks maintained lower infestation levels through free-range access to dust baths and isolated housing that limited interspecies contact. These findings demonstrate that traditional backyard poultry systems are potentially at risk of ectoparasite infestation, which may adversely affect the birds' health, welfare, and productivity. The present study provides valuable insights into chewing lice infestations in an Indonesian backyard poultry and underscores the importance of appropriate management systems, including housing design, adequate biosecurity, and regular ectoparasite control measures, to reduce the burden of infestation.

SUGGESTION

Further investigation into the prevalence of chewing lice on backyard poultry farms across several regions of Indonesia is warranted to elucidate the national prevalence of this problem.

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