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Prevalence of Bumble Foot Disease in Backyard Chickens in Qarabagh District of Kabul, Afghanistan

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ABSTRACT

Bumble foot is a condition in which the feet and toes of birds (especially chickens) become inflamed and necrotic. The main causes of the disease are bacteria (*Staphylococcus aureus, Pseudomonas spp, and Escherichia coli*), fungi, or yeasts. Bumble foot disease was first reported in 1980 as a skin disease of broilers. Bumble foot is extremely important due to its high incidence and mortality rate. But in Afghanistan, there are no accurate statistics about the prevalence of bumble foot disease in backyard and broiler chickens, so the purpose of this research is to study the prevalence and identify different grades of bumble foot disease in backyard chickens in Qarabagh district of Kabul province. This research was conducted on 2025 backyard chickens in 18 villages of Qarabagh district. In this research, both a questionnaire and a visual assessment system were used. A 5-point scoring system was used for the visual assessment of Bumble Foot. Skin without lesion (grade 0), superficial lesion ≤ 0.5 cm (grade 1), superficial lesion > 0.5 cm (grade 2), deep lesion > 1.0 cm (grade 3), and one or more deeper lesions on the toe (grade 4). All data was gathered by a veterinarian using a random sampling method, and then analyzed by (MS Excel) and (SPSS statistical software Version 23). As a result of this research, it was found that 128 chickens were affected by bumble foot disease, with a prevalence rate of 6.3%. The results of this research show that the prevalence of bumble foot disease is higher in hens (62.5%) than in roosters (37.5). Among the 128 infected chickens, 5.4% were grade 0, 34.3% were grade 1 32.8% were grade 2, 21.8% were grade 3, and 5.4% were grade 4. The prevalence rate of bumble foot disease in backyard chickens was lower than in broiler chickens. Among the 128 infected chickens, most of them had moderate and severe disease.

Keywords: Backyard, Bumble Foot, Chickens, Kabul, Prevalence, Qarabagh.

INTRODUCTION

Bumble foot is a condition in which the feet and toes of birds, especially chickens, become inflamed and necrotic (Figure 1) (Shepherd & Fairchild, 2010; Jacob et al., 2016). It is also known as footpad dermatitis (FPD), contact dermatitis (CD), pododermatitis (Amer, 2020).

The main causes of the disease are bacteria (*Staphylococcus aureus, Pseudomonas spp and Escherichia coli*), fungi or yeasts. Especially *Staphylococcus aureus*, which is the most isolated cause of this disease (Ashar et al., 2021). The underlying factors of the disease are excessive dryness of feet in waterfowl, excessive obesity or heaviness, unhealthy condition, lack of activity, excessive growth of claws, constant standing on a perch

(Choudhury, 2019) Improper bedding, insufficient nutrition and lack of vitamins (especially vitamin A) and amino acids (Shepherd & Fairchild, 2010).

The incidence of the disease also varies according to gender and weight. It has been investigated that the disease is more common in roosters than in hens, because the weight of roosters is usually higher than that of hens and more weight puts pressure on its legs (Shepherd & Fairchild, 2010).

Bumble foot disease causes high economic losses through mortality rate (0-15%), reduction in bird production, reduction in feed consumption, weight gain disorders (Nazia et al., 2015). In addition, the ache and affliction related with bumble foot changes the behavior of broilers, reduces their activity, altered walking patterns, and increases aggression in farm.

Bumble foot disease can affect the trade of poultry and its products, as importing countries may impose restrictions on products from affected areas to protect poultry from the disease in their regions, as poultry with bumble foot are generally not good for market and human use. They should be useless And with this, broiler farmers suffer great economic losses (Alabi et al., 2023).

Bumble foot disease was reported in 1980 as a skin disease of broilers (Shepherd & Fairchild, 2010). A study conducted in the southeastern of the United States shows that the incidence of bumble foot disease in heavy broiler chickens is almost 50% (Opengart et al., 2018). Also, research has shown that in Europe 58% of commercial broilers had bumble foot (Freeman et al., 2020). Bumble foot is extremely important due to its high incidence and mortality rate**,** But in Afghanistan, there are no accurate statistics about the prevalence of bumble foot disease in backyard and broiler chickens, so the purpose of the present study was to study the prevalence rate of the disease and identify different grades of bumble foot disease in backyard chickens in Qarabagh district, Kabul Province, Afghanistan.

Figure 1. Shows intense lesion of bumble foot in chickens (Researcher).

MATERIALS AND METHODS

Study Area

This research was conducted on 2025 backyard chickens in 18 villages of Qarabagh district (Figure 2) Qarabagh is one of the districts of Kabul province and it is located 50 km north of Kabul city in Afghanistan. The population of this district is nearly 180,000 people. The center of this district is the city of Qarabagh.

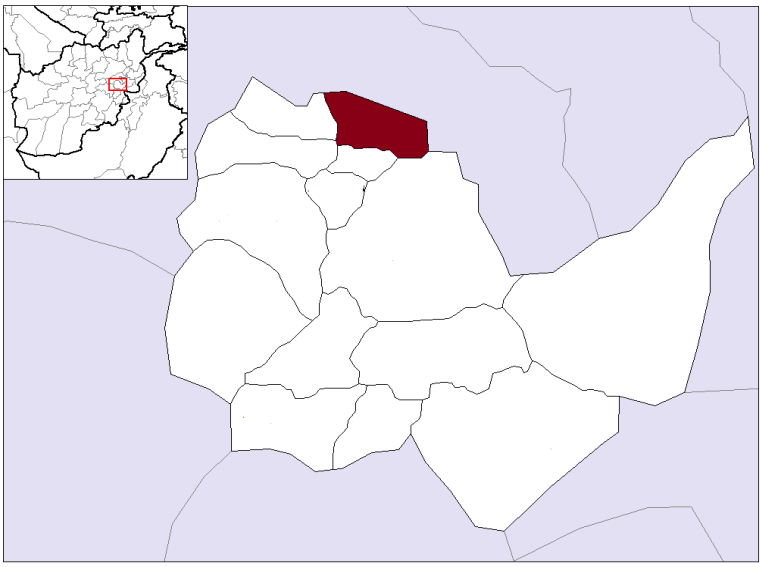


Figure 2 . The location of the Qarabagh district in Kabul Province, Afghanistan (Wikipedia, 2023).

Study design

This research was conducted between 7 October and 22 November 2023. In this research, both questionnaire and visual assessment system were used. A 5-point scoring system was used for the visual assessment of bumble foot. Skin without lesion (grade 0), superficial lesion ≤ 0.5 cm (grade 1), superficial lesion > 0.5 cm (grade 2), deep lesion > 1.0 cm (grade 3) and one or more deeper lesions on the toe (grade 4) (Louton et al., 2022).

Samples Collection

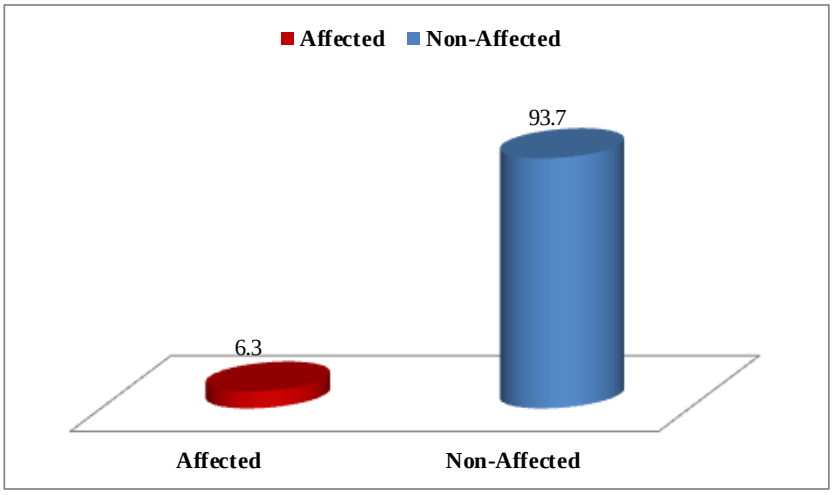
Sample size of 1688 was computed using the Raosoft Sample Size calculator With the 99% confidence level, 3% margin of error, and 50% expected prevalence (Raosoft, 2004) and it was increased to 2025 for better accuracy. The data was collected by a trained veterinarian using a cluster random sampling method.

Statistical Analysis

After collecting, all data were entered into Excel program (MS Excel) and then transferred to the SPSS program (version 23). The data were analyzed by descriptive statistics. Frequency, percentages, tables and graphs were created using the mentioned programs.

RESULTS

As a result of this research, out of 2025 chickens that were examined, 128 chickens were affected by bumble foot disease, including 48 roosters and 80 hens (Graph 1).



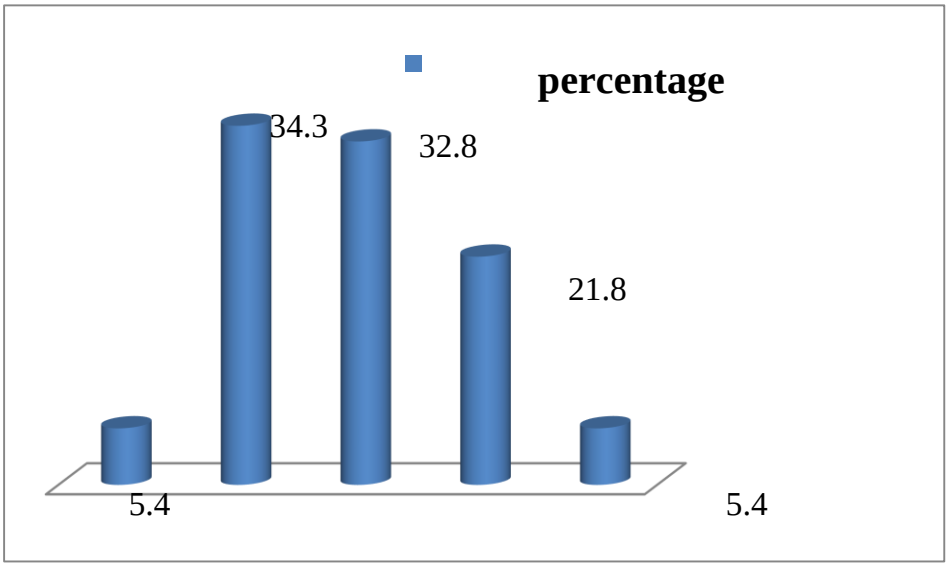
Graph 1. Percentage of bumble foot disease in Qarabagh district.

Among the 128 infected chickens, 7 pieces (5.4%) were grade 0, 44 pieces (34.3%) were grade 1, 42 pieces (32.8%) were grade 2, 28 pieces (21.8%) were grade 3, and 7 pieces (5.4%) were grade 4 (Table 1 & Graph 2).

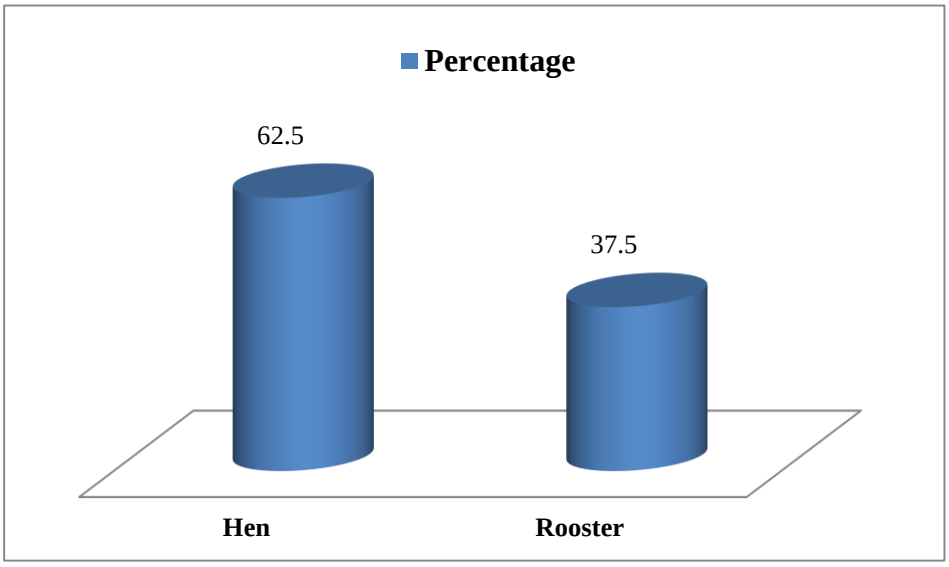
Among the 128 infected chickens, 48 were roosters and 80 were hens (Table 1 & Graph 3).

Table 1. Frequency and percentage of bumble foot grades' in roosters and hens.

Grades of Bumble foot		0	1	2	3	4	Total
Frequency	Rooster	2	12	21	13	0	48
	Hen	5	32	21	15	7	80
Total		7	44	42	28	7	128
Percentage		5.4	34.3	32.8	21.8	5.4	100



Graph 2. Percentage of bumble foot grades' in chickens.



Graph 3. Percentage of bumble foot grades' in roosters and hens.

DISCUSSION

Bumble foot is a general term for the inflammatory or degenerative condition of the bird's foot, which may range from a very mild redness or abrasion to chronic, deep-seated abscesses. This condition is found on the plantar aspect of the feet. It looks like callus, feel hard and occasionally affect both feet (Chung et al., 2015).

The results of this research show that the prevalence of bumble foot disease in backyard chickens in Qarabagh district was 6.3%. This is in contrasts with the findings of a study conducted in the southeastern United States by Opengart et al, 2018. Because results of that study show the prevalence of bumble foot is almost 50%. The reason for the large difference in bumble foot prevalence in the southeastern United States is that the research was conducted on broiler chickens.

Also among the 128 infected chickens in this study 5.4% were grade 0, 34.3% were grade 1, 32.8% were grade 2, 21.8% were grade 3, 5.4% were grade 4. The results of this research also aren't in agreement with above research that conducted in the southeastern United States from the point of bumble foot grades (Opengart et al.,2018). Also, in the present study, in terms of bumble foot grades 5.4% without lesions, 67.1% displayed moderate lesions also 27.2% had intense lesions, are not in accordance with the research conducted on chickens in Switzerland. In that research on mean, 35.5% of the footpads examined without lesions, 26.1% displayed moderate lesions, and 38.4% had intense lesions (De Jong et al., 2012). The reason for the high difference in bumble foot grades is that this research was also done on Switzerland broiler chickens.

Several factors such as limited living space, humidity, poor management, (Hassan et al., 2012) excessive obesity or heaviness, type of floor and litter materials can increase bumble foot in broiler chickens (Agapito & Malvar, 2019; Bassler et al., 2013).

It has also been investigated that the bumble foot disease is more common in roosters than hens, because the weight of roosters is usually higher than hens and more weight puts pressure on rooster's legs (Shepherd & Fairchild, 2010). But on the contrary, the results of this research show (Graph 3) that the prevalence of bumble foot disease is higher in hens than roosters.

CONCLUSION

As a result of this research, which was conducted on 2025 chickens in 18 villages of Qarabagh district, it was found that the prevalence rate of bumble foot disease in backyard chickens was lower than broiler chickens. Among the 128 infected chickens, most of them had moderate and severe disease. Also the results of this research show that the prevalence of bumble foot disease is higher in hens than roosters.

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Conflict of Interest: The authors of this article do not declare any conflict of interest in any part of this research.

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