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Research Article

INFLUENCE OF TRIMMING ON THE REDUCTION IN FLEDGING POWER OF GUINEA FOWL (NUMIDA MELEAGRIS) ON TRADITIONAL FARMS IN THE COMMUNE OF KAR-HAY (FAR NORTH, CAMEROON)

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Abstract

Lack of control over fledging power and poor husbandry practices have resulted in poor production and reproductive performance of guinea fowl on traditional farms in North Cameroon. With a view to controlling the fledging power of guinea fowl and improving this breeding method, a trial was carried out in the commune of Kar-Hay with the aim of evaluating the influence of wing trimming on the reduction in fledging power. To do this, the wings of 4-week-old local breed guinea fowl were clipped by cauterising and shearing the wings. After 210 days of monitoring, six parameters were studied: healing, average live weight, mortality rate, fledging height, laying period and wingspan. The results showed that the mortality rate was significantly ($p<0.001$) higher in the control subjects than in the subjects who had undergone wing clipping. The mortality rate was 0.55 ± 0.78% for shearing, 0.62 ± 0.78% for cauterisation and 0.93 ± 0.74% for control subjects. The healing rate was significantly ($p<0.001$) higher in subjects S1 to S5 who had undergone cauterisation (0.857 ± 0.832; 2.142 ± 0.989; 2.857 ± 0.832; 2 ± 0.755; 0.285 ± 0.451 and 0.142 ± 0.349) than those subjected to shearing, with the exception of S1 (0.00 ± 0.00 with a plus-value of 0.008). The average live weight was lower in the controls (1770 ± 110.32 g) than in the cauterised (1775.5 ± 112.01 g) and sheared (1785.5 ± 122.21 g) birds. The wingspan was also greater in the control subjects (40.26 ± 18.21 cm) than in the cauterised (39.66 ± 23.33 cm) and sheared (37.45 ± 2.48 cm) subjects. Flight height was lower in sheared (153.05 ± 5.93 cm) and cauterised (154.15 ± 8.18 cm) birds than in control birds (280.8 ± 47.215 cm). Consequently, wing trimming by shearing or cauterising the wings reduces the fledging power of guinea fowl on traditional farms. It would be interesting to use this technique in traditional guinea fowl rearing systems to set up a controlled rearing system.

Keywords: Sparrowing, guinea fowl, cauterisation, shearing, flight power, Kar-Hay.

INTRODUCTION

To cope with the ever-increasing demographic explosion, people's demand for proteins of animal origin is steadily growing (Leng *et al.,* 2022). With an estimated annual growth rate of 4%, demand for poultry products worldwide is set to increase by more than 16% between now and 2033 (OECD/FAO, 2024), while the growth rate for animal protein supply is around 2% (OECD/FAO, 2024). To counter this problem, the emphasis has been placed on intensifying the farming of short-cycle species (Leng *et al.,* 2022). Nowadays, poultry farming is one of the sectors that not only helps to meet the ever-increasing needs of populations for animal protein, but also provides savings that can be mobilised at any time to meet family needs and contingencies (Mopaté, 2009). The importance of family guinea fowl farming is linked to its socio-economic and nutritional impact on rural households (Tellah *et al.,* 2019; Leng *et al.,* 2022). The guinea fowl (Numida meleagris) is a species that adapts to the climatic conditions and food constraints of low-rainfall areas (MRA, 2007). It is a dual-purpose poultry species (eggs and meat). It is also remarkably hardy (Sanfo *et al.,* 2015). Guinea fowl are highly prolific and have a short reproductive cycle. Compared with local chickens, guinea fowl have a low production cost, better meat quality, a high feeding capacity and a very high ability to protect themselves against predators (Sanfo *et al.,* 2015). Unlike traditional chicken farming, guinea fowl farming is more difficult (Daouda *et al.,* 2007; Boko *et al.,* 2012).It faces a number of constraints in terms of feed, zootechnics and health (Lombo *et al.,* 2018). However, the zootechnical constraint remains the most important, as this poultry is reared in a low-productivity rambling system. In most cases, these birds end up flying away and disappearing. Mastering the power of flight is therefore a prerequisite for setting up an improved breeding system. The aim of this study is to contribute to reducing the flight power of guinea fowl by wing trimming on traditional farms in the Kar-Hay commune (Far North, Cameroon).

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MATERIALS AND METHODS

Location of the Kar-Hay commune

The experimental work was carried out in the Commune of Kar-Hay located in the southern part of the Department of Mayo-Danay, Far North Region. Covering an area of 232 km², it lies between 10 and 13 degrees north latitude and 15 and 16 degrees east longitude (Figure 1). With a Sudanese-Sahelian type of climate, it has 04 months of rainfall, generally from June to September. This commune ranks among the best guinea fowl production areas in Cameroon. The main economic activities are farming, livestock rearing and commerce.

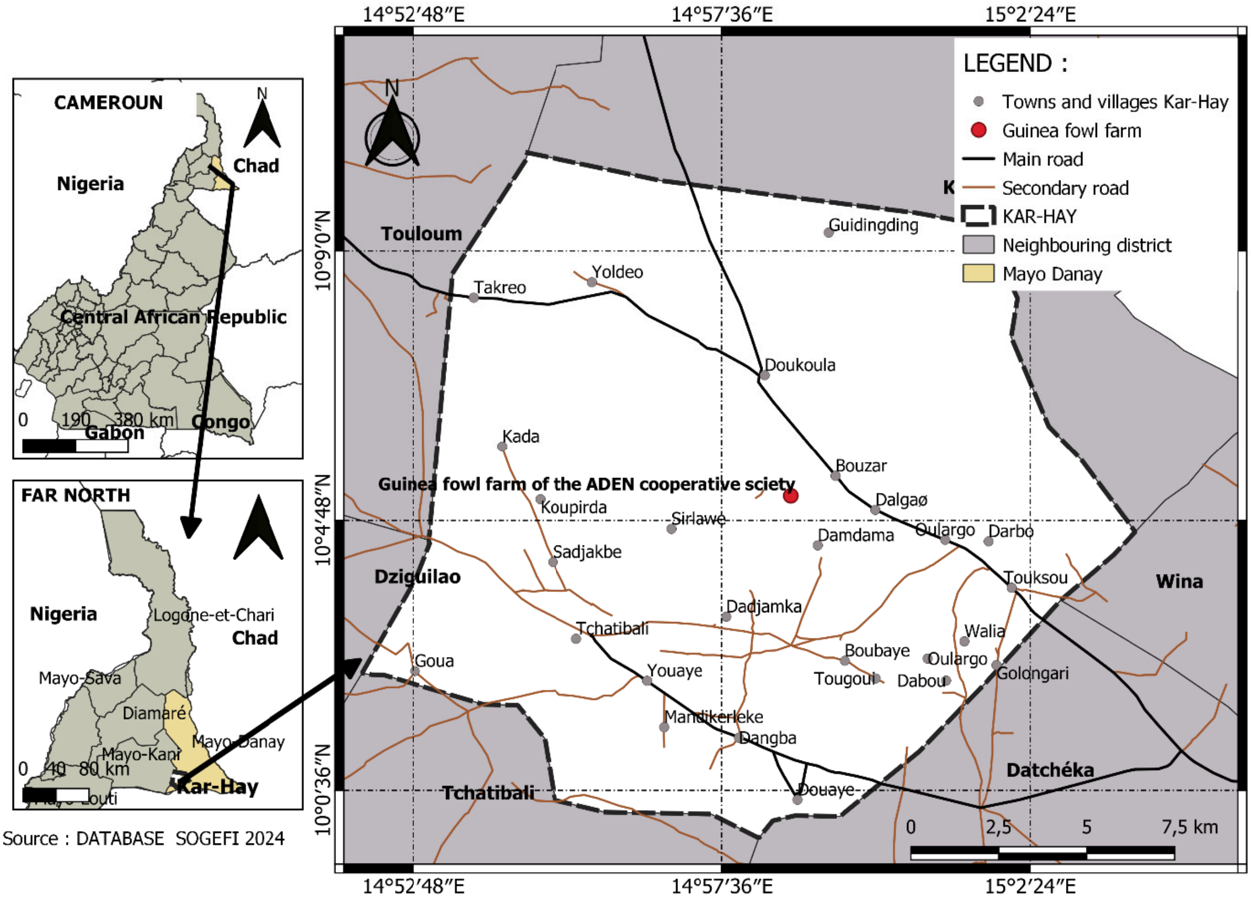


Figure 1. Map showing the location of the study area

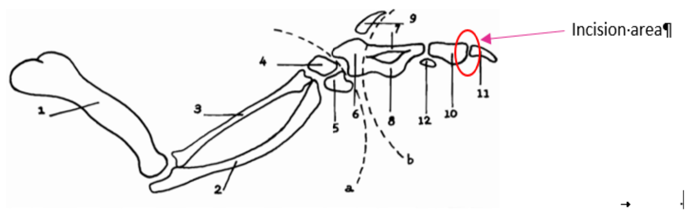
Conduct of the trial

The trial was conducted at a station in the Commune of Kar-Hay, more specifically at the farm of the Société Coopérative Simplifiée des Acteurs de Développement l'Extrême-Nord, from November 2022 to June 2023. It involved 180 naturally hatched guinea fowl of the local breed, aged between 2 and 6 weeks, with an average weight of around 140 g. The experimental set-up consisted of a block made up of 3 batches completely randomised into three sub-groups of 20 subjects each. The first batch consisted of 60 normal guinea fowl (control batch); the second batch also consisted of 60 guinea fowl that had undergone wing cauterisation and the third batch also consisted of 60 guinea fowl that had undergone wing shearing.

Principle

The principle consisted in cutting off part of the terminal end of the left or right wing in order to create an imbalance when the animal wanted to fly away (Horlait, 1987). Cauterisation of the wings consisted of making a single section with a well-heated knife between the carpo-phalangeal bones and the carpal bone. Wing shearing, on the other hand, consisted of making a single section with a pair of chisels between the carpo-phalangeal bones and the carpal bone using the method described by P. Hurlait (1987). In both methods, the wound was then dressed with a 90% sodium permanganate solution to prevent infection. Subjects from each batch were marked with a ring indicating the batch, the subject number and the type of wing trimming. All the birds were left to grow in a daytime roaming system with a henhouse set up for overnight accommodation.

A cereal-based feed supplement (SS sorghum, kitchen scraps (couscous) was served occasionally). Water was served ad libitum to the guinea fowl. All the guinea fowl received no prophylaxis programme and no heating. After 4 months of hatching, perches were installed in the henhouse to make them more comfortable.



1 : humerus; 2: Ulna; 3: Radius; 4: Radial carpal bone; 5: Ulnar carpal bone; 6: carpo-metacarpal bone 1; 7:carpo-metacarpal bone 2; 8 carpo-metacarpal bone 3; 9:thumb; 10: finger 1 (phalanx 1); 11: finger 2 (phalanx 2); 12: finger 3.

Figure 2. Medical view of the left wing of a guinea fowl

Data collection and parameters studied

After 210 days of follow-up, six parameters were assessed (Bouba. 2017):

- the degree of healing was determined by direct observation of the wound on the subjects from Day 1 to D30 (maximum period of end of healing);
- the average live weight of the subjects, measured using a SONY 5kg electronic scale with an accuracy of 5g;
- the mortality rate: this is the number of dead subjects out of the total number of starting subjects; it is expressed as a percentage. The formula is as follows:

- TMx=NM/NS with NM =number of deaths and NS=total number of subjects
- The flight height corresponds to the highest level of the bird's flight. To measure this, we first set up an open-air henhouse divided diametrically in two by a plywood wall 3 m high, graduated at 20 cm each;
- The egg-laying period is the week in which the subject first lays eggs. It was determined by observation of the females from the different batches.
- The wingspan of the guinea fowl, measured in centimetres (cm) using a ruler graduated in 1 cm units.

A dummy in the form of an eagle was placed on the side of the isolated subject to stimulate it to take flight. The movements and flight of the subject were recorded by a CANON camera in order to determine the height of its flight.

Statistical analysis

The data were recorded in Excel 2016 and analysed using Graphpad Sprint 8 software. When the variance (ANOVA) revealed significant differences, the Tukey test was used to judge the difference between the means of the different parameters at the 5% threshold. The results of the quantitative data are presented as Mean ± Standard Deviation.

RESULTS AND DISCUSSION

RESULTS

a) Influence of dehairing on the degree of healing

Table 1 shows the variation in the degree of healing of guinea fowl as a function of the dehairing method. The analysis of variance indicates that there is a significant variation ($p < 0.001$) in the degree of scarring of guinea fowl according to the method of jointing.

Table 1. Variation in the healing rate according to the spalling method

Weeks	Batch 2: Cauterised	Batch 3: Sciseled	P Value
Week 1	0,857 ± 0,832	0,00±0,00	0,008
Week 2	2,142±0,989	1,142±0,349	0,001
Week 3	2,857±0,832	2,142 ± 0,638	0,209
Week 4	2 ±0,755	3,571±1,399	0,021
Week 5	0,285 ±0,451	0,857 ±0,638	0,119
Week 6	0,142 ±0,349	0,285 ±0,451	0,764

We note that the results obtained with cauterisation were significantly ($p < 0.001$) more satisfactory in subjects from S1 to S5 (0.857 ± 0.832; 2.142 ± 0.989; 2.857 ± 0.832; 2 ± 0.755; 0.285 ± 0.451 and 0.142 ± 0.349) than those obtained with shearing, with the exception of S1 (0.00 ± 0.00) where healing had not yet occurred.

b) Influence of dehairing on the average live weight of the birds

Figure 3 shows the variation in live weight of the guinea fowl as a function of the dehairing method compared with the control batch. The analysis of variance indicated that there was a significant variation ($p < 0.001$) in the average live weight of the guinea fowl according to the method of trimming. The average weight of the guinea fowl ranged from 1770 to 1785.5 grams. It was found that the average live weight of the guinea fowl in the control batch (1770 ± 110.32 g) was lower than that of the guinea fowl in the batches that had undergone cauterisation (1775.5 ± 112.01 g) and shearing (1785.5 ± 122.21 g).

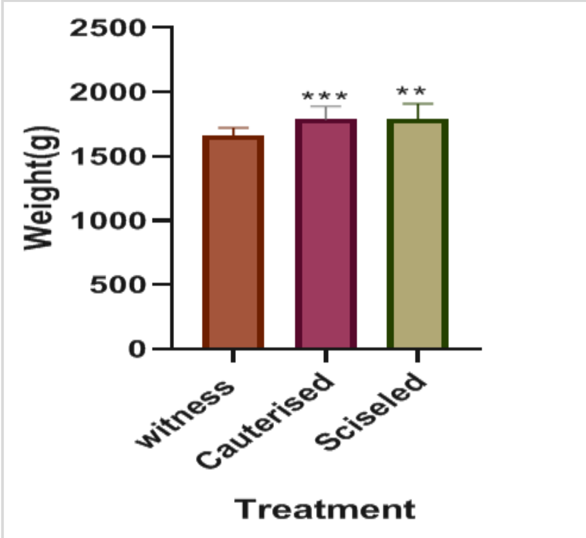


Figure 3. Variation in subject weight according to batch

c) Influence of dehairing on mortality rate

Figure 4 shows the variation in the mortality rate of guinea fowl as a function of the dehairing method. The analysis of variance indicates that there was a significant variation ($p < 0.001$) in the mortality of guinea fowl according to the method of filleting. The figure shows that the control batch (11.66%) had a higher mortality rate than those treated with shearing (6.66%) and cauterisation (3.33%).

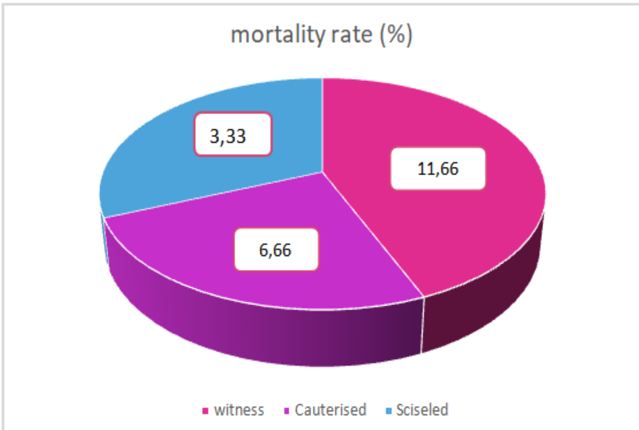


Figure 4. Variation in mortality according to the method of spacing (%)

d) Influence of dehairing on fledging height

Figure 5 shows the variation in the fledging height of the guinea fowl as a function of the dehairing method compared with the control batch. The results indicate that there was a significant variation ($p < 0.001$) in the flight height of the guinea fowl as a function of the dehusking method. The figure shows that the flight height of guinea fowl from the control batch (280.8 ± 47.25 cm) was greater than that of guinea fowl from batches that had undergone cauterisation (154.15 ± 8.18 cm) and shearing (153.05 ± 5.93 cm)

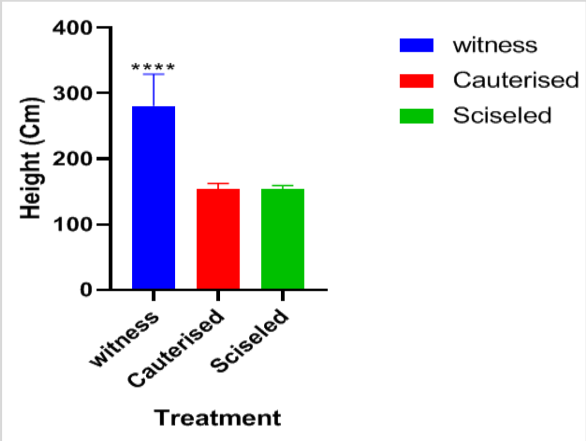


Figure 5. Influence of trimming on the flight height of guinea fowl

e) Influence of trimming on the laying period

Table 2 shows the variation in the laying period of the guinea fowl according to the treatment method. The analysis of variance showed that there was no significant difference between the three batches in terms of their laying entry period.

Table 2. Variation in egg-laying period according to treatment method

Weeks	Batch 1: witness	Batch 2: Cauterised	Batch 3: Sciseled	P Value
Week 27	0,285 ± 0,451	0,428 ± 0,494	0,428 ±0,494	0,839
Week 28	0,571 ± 0,728	0,714 ± 0,451	0,714 ± 0,451	0,878
Week 29	0,857 ± 0,638	0,857 ± 0,638	0,857 ±0,832	0,387
Week 30	0,857 ± 0,638	1 ±0,534	1,142 ± 0,638	0,614

f) Influence of jointing on guinea fowl wingspan

Table 3 shows the variation in the wingspan of guinea fowl according to the method of trimming. The analysis of variance showed that there was a significant variation ($p < 0.001$) in the wingspan of the guinea fowl as a function of the spacing method.

Table 3. Variation in wingspan of guinea fowl

Treatment	: Cauterised	Sciseled	Witness
Wingspan(Cm)	$39{,}66\pm23{,}33^{b}$	$37{,}45\pm2{,}48^{a}$	$40{,}26\pm18{,}21^{c}$

We observed that the wingspan of guinea fowl in the control batch was 40.26 ± 18.21 cm, compared with guinea fowl in batches that had undergone cauterisation (39.66 ± 23.33 cm) and shearing (40.26 ± 18.21 cm).

DISCUSSION

The rate of healing was also influenced by this wing surgery. Cauterisation of the wings resulted in faster healing than shearing of the wings. This could be explained by the fact that the material used in this surgery was more free of infectious agents because it was heated to over 100°C. This manoeuvre prevented haemorrhaging due to the heating, which would tend to dress the wound. The results on the average live weight of the guinea fowl that had undergone trimming were greater than those of the control batches. These results are justified by the fact that the subjects in the control batch spent most of their time running in search of food and expended more energy. These results are higher than those of DAOUDA et al (2007), with an average weight of 1121.3 ± 100.2 g at adulthood. However, they are lower than those of BOKO et al (2012) who found 2.5kg for large guinea fowl. This result can also be explained by the fact that dehairing keeps the animal at home, close to humans, and as a result it benefits from additional food than those that roam far away. The mortality rate parameter was influenced in the control batch compared with the subjects that had undergone cauterisation and wing shearing. Our results are similar to those of Bessin *et al.* (1999) who obtained a mortality rate in Benin of 9.80% in traditional rearing. This mortality rate could be explained on the one hand by anaphylactic shock (respiratory arrest) in the young guinea fowl and on the other hand by an infection which caused the death of the various subjects by septicaemia. The flight height was higher for the control subjects who had not undergone any wing trimming. This result could be explained by the fact that these subjects still had all their limbs. These limbs, particularly the remiges, are responsible for flight at greater heights. The average age at which females started laying was 06.75 months. This period (start of egg laying) is earlier than that of Sanfo et al (2007) found in Burkina Faso (7.1 months age of start of egg laying in guinea fowl). It was also earlier than that found by Dongmo et al 2016 (at 7 months) and Dahouda *et al,* (2007) between the 7th and 9th month of age. This difference could be justified by the variation in rainfall recorded in the two research areas and by the influence of spraying, which reduces the distance travelled by the animals. The results on the wingspan of the control batches were greater than those of the batches that had undergone wing trimming. These results could be justified by the presence in the latter of phalanges 2 on which the remiges are grafted. However, these results are inferior to those found by Dongmo *et al.* (2016) showing that the reduction in remiges following surgery on the carpo-phalangeal bone has an influence on the wingspan.

Conclusion

At the end of this trial, the aim of which was to help reduce the fledging power of guinea fowl by wing clipping on traditional farms in the Commune of Kar-Hay (Far North, Cameroon), it was found that wing clipping by cauterisation and shearing reduced fledging power. However, this manoeuvre had a significant impact on mortality and healing, but had no effect on average live weight, wing length or wingspan. Shearing results in a lower flight height than cauterisation. In order to improve the guinea fowl rearing system, it would be interesting to cauterise or shear the wings of young guinea fowl in order to control their flight power as they grow.

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