ISSN 1682-8356
ansinet.com/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

Science Alert
scialert.net

ANSInet
an open access publisher
http://ansinet.com

OPEN ACCESS International Journal of Poultry Science

ISSN 1682-8356
DOI: 10.3923/ijps.2023.24.30

Research Article
Guinea Fowl Farming and its Egg Production in the Western Tandjile Department, Chad

[1,2]Brice Lengthang, [3]Madjina Tellah, [3]Dassidi Nideou, [2]Michel Assadi, [2,4]Nestor Odjigue and [2]Youssouf Mopate Logtene

[1]Faculty of Veterinary Medicine and Agronomy, University of N'Djamena, Alexandria Branch, BP: 1117, N'Djamena, Chad
[2]Livestock Research Institute for Development (IRED), Zootechnics and Animal Production Laboratory, BP: 433, N'Djamena, Chad
[3]National Higher Institute of Sciences and Techniques of Abeche (INSTA), BP: 130, Abeche, Chad
[4]National School of Breeding Techniques (ENATE), BP: 750, N'Djamena, Chad

Abstract

Background and Objective: Guinea fowl originates from Africa where it has a cultural significance and its raising is considered as an important traditional activity and food source. The purpose of this study was to evaluate the production of guinea fowls and guinea fowl eggs in the Western Tandjilé Department. **Materials and Methods:** Four sub-prefectures were chosen for the potential production of guinea fowl. A total of 320 guinea fowl farmers were the subject of this cross-sectional and retrospective survey. **Results:** The average number of laying females was 18 heads per backyard. Guinea fowl with dark gray plumage were dominant. Puberty occurs at 7 months (28 weeks) in males and at 8 months (32 weeks) in females. The hen was the most solicited (93%) for the brooding of 17 eggs on average. The hatching rate was 90% and the survival rate of guinea fowl at weaning at 2 months was 81.1%. Almost all farms (98%) were individual. Cereals alone or mixed with oilseeds have been the main feeds of guinea fowl, produced or purchased by producers. An average of 110 eggs laid per female during the five months of laying was observed. Diseases, losses due to predation, theft and lack of supervision were the constraints mentioned. **Conclusion:** The production of guinea fowl and guinea fowl eggs in the Western Tandjile Department requires special attention and adequate supervision to get rid of the constraints related to this breed and improve its productivity.

Key words: Eggs, guinea fowl, guinea fowl breeding, production, Tchad, west Tandjile

Citation: Lengthang, B., M. Tellah, D. Nideou, M. Assadi, N. Odjigue and Y.M. Logtene, 2023. Guinea fowl farming and its egg production in the western Tandjile department, Chad. Int. J. Poult. Sci., 22: 24-30.

Corresponding Author: Brice Leng Tchang, Faculty of Veterinary Medicine and Agronomy, University of N'Djamena, Alexandria Branch, BP: 1117, N'Djamena, Chad. Tel: +23566999416/98905703

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Western Tandjilé Department in Chad has shown great interest in mélé agriculture due to a lot of benefits[1]. Guinea fowls are raised in an extensive divagate system in most of the parts[2]. Compared to chicken, guinea fowl is hardier and therefore better adapts to traditional breeding[3]. It fits easily in difficult breeding conditions, unlike exotic chickens. This short-cycle farming is almost everywhere due to availability of products in low price and within the reach of the most buyers[4,5]. It makes it possible to diversify the producer incomes in this Department and cope with un unforeseen one-off expenses[2,6].

The guinea fowl (*Numida meleagris*) represents an important component of the farmyard in the department of west Tandjile[6]. Apart from its use as a source of income and protein, it also plays a socio-economic role in this Department[7]. However, guinea fowl remains undervalued, a situation illustrated by the limited number of scientific works devoted to it[7]. Existing work has focused on the characteristics[6] and socio-economic study of guinea fowl[2]. Investigations into the production of guinea fowl in the province of Tandjilé are infrequent. However, it is well known that guinea fowl breeding offers several advantages and represents a very important asset for rural and peri-urban producers. Thus, the promotion of its breeding remains highly timely in the Province of Tandjilé. The objective of this study was to evaluate the production of guinea fowl breeding in the Department of West Tandjilé to increase the level of guinea fowl and guinea fowl egg production to meet the basic needs of the population.

MATERIALS AND METHODS

Description of the study area: The study was carried out in the Department of West Tandjilé, Kelo, Sudanese zone of Chad. This Department is located at 9.3995° North Latitude, at 15.8038° East Longitude. The climate is humid tropical. A part from commercial activities, the population of this locality practice agro-silvo pastoral farming system. Rainfall varies between 500 and 1200 mm per year. The average annual temperature is around 35°C. The rainy season corresponds to the growing season and runs from mid-April to the end of October. March and April are generally the hottest, July and August are the wettest months. The vegetation of the region is a shrub savannah in gallery forests.

The study was conducted from August to October 2021 in the Department of West Tandjilé. A total of 320 guinea fowl and guinea fowl egg producers participated in this study and 80 producers per sub-prefecture were selected randomly from 4 sub-prefectures (Baktchoro, Bologo, Kolon and Kelo). The data collected covered the structure of backyards, the plumage color of guinea fowl, breeding practices (ownership of breeding, reproduction, feeding, housing, etc.), egg production and production constraints.

Statistical analysis: The data collected were analyzed using XLSTAT software (6.1.9) to compute descriptive statistics (frequencies, averages, standard deviations, minimum, maximum and percentage). Analysis of variance (ANOVA) was performed to compare the means. The Newman Keuls multiple comparison tests were applied to determine the significant differences in means at the 5% level of significance.

RESULTS

Guinea fowl structure in households and plumage color

Structure of guinea fowl farmyards in households: Table 1 shows that the number of female guinea fowls was higher than that of males (Table 1). Based on the number of households enquired in the department of the west Tandjile, female breeders were 40.58% of flock (n = 5,837 heads), young males were 7.80% (n = 1,121), young females were 42.08% (n = 6,053) and male breeders were 9.53% (n = 1,372).

Plumage of guinea fowl: Of the three plumage colors of guinea fowl observed in the Department of West Tandjile (Fig. 1), the proportion of guinea fowl with dark grey plumage was the highest followed by those with grey plumage. Those with white plumage were in small proportion ($p<0.05$).

Reproduction of guinea fowl: The reproductive parameters of guinea fowl in the Western Tandjilé have shown that young guinea fowl reach puberty between 7-8 months or 28-32 weeks of age. The average number of hatched eggs was 17 units for all poultry species that were being used to incubate eggs. Hatching and survival rates were improved (Table 2). Among all the species used for eggs incubation in study area, the hen was the most solicited (93%), followed by the duck (6%) and the hen or duck (1%) in households.

Guinea fowl rearing practices

Properties of guinea fowl: Individual ownership of guinea fowl backyards in households was the largest (98%, n = 312) compared to the collective ownership which is very low (2%, n = 8).

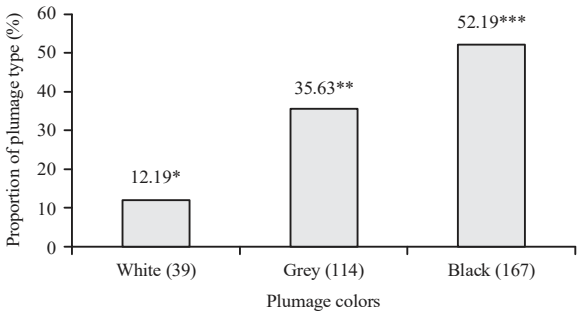

Fig. 1: Different plumage colors of guinea fowl encountered in the Western Tandjile Department, Chad
Label bars with a different number of asterisks (*) vary significantly (p<0.05)

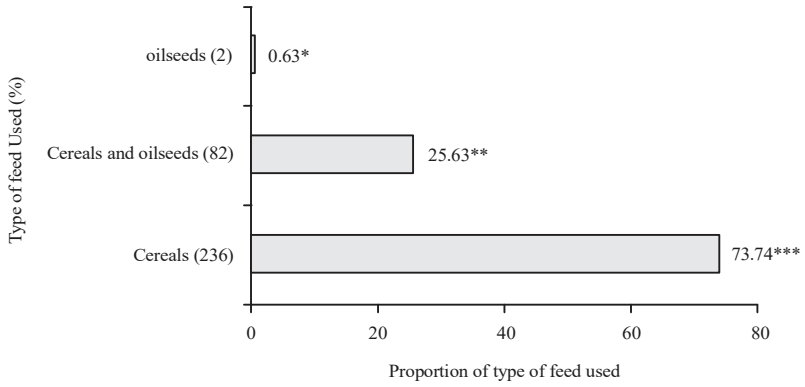

Fig. 2: Different types of feed used in guinea fowl feeding in the Western Tandjile Department, Chad
Label bars with the different number of asterisks (*) vary significantly (p<0.05)

Table 1: Structure of the guinea fowl herd (n) in a household in the Western Tandjile Department, Chad

	Guinea fowl/household	Female young guinea fowls	Male young guinea fowls	Male breeders	Female breeders
Minimum	1.00	1.00	1.00	1.00	1.00
Maximum	122.00	100.00	22.00	17.00	100.00
Mean±SD	22.90±0.99	18.95±0.78	4.29±0.20	3.50±0.16	18.28±13.72

Feeding guinea fowl: All producers fed their guinea fowl with grains, oilseeds, or a combination of two (Fig. 2). Cereals (millet, maize, sorghum, Penicillary millet and rice) formed the basis of the guinea fowl diet followed by the mixture of cereals and oilseeds (groundnuts, cucumbers and sesame). The use of oilseeds in the diet of guinea fowl was the least. These feeds were either purchased [19% (n = 60)] or produced by the breeders themselves [30%, n = 96)]. Majority of the breeders [51%, n = 163)] purchased or produced the feed at the same time.

Guinea fowl habitats: In Western Tandjilé Department different types of housing (Fig. 3) were used for guinea fowl farming. Tree branches have been the main type of housing where guinea fowl spend their night.

Constraints on guinea fowl breeding: The main constraints to guinea fowl breeding included diseases (57%), followed by predation and theft. Many other obstacles to guinea fowl breeding in the Western Tandjilé Department have also been reported by breeders including lack of technical supervision and labor (Fig. 4).

Guinea fowl egg production: Table 1 shows the average number of female guinea fowls (18.28±13.72) per breeder in one production season. It was also observed that average number of eggs were 110.16±17.89 in 5.15±0.86 months. On an average, guinea fowls produce eggs for 3.53±1.55 years. These parameters varied according to the sub-prefectures (Table 3). The estimated total eggs laid during the season was 633,600 units. Breeders prefer guinea fowl farming due to

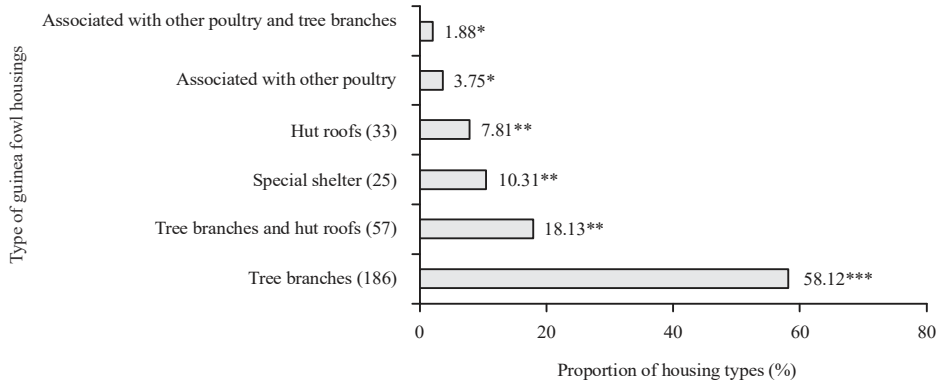

Fig. 3: Main guinea fowl housings in the Western Tandjile Department
Label bars with the different number of asterisks (*) vary significantly (p<0.05)

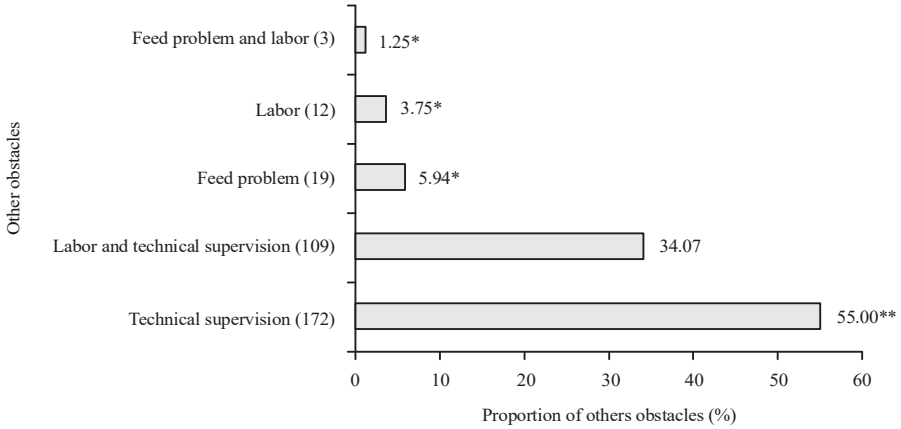

Fig. 4: Other obstacles to guinea fowl breeding in the Western Tandjilé Department
Label bars with the different number of asterisks (*) vary significantly (p<0.05)

Table 2: Reproduction parameters of guinea fowl in the Western Tandjile Department

	1st laying (month)	1st mating of male (month)	Brooded eggs (n)	Hatching rate (%) (Hatched eggs)	Weaning survival rate (%)
Minimum	5.00	5.00	10.00	80 (8.00)	0.00
Maximum	10.00	10.00	28.00	92.86% (26)	92.86 (24.00)
Mean±SD	7.68±0.05	7.25±0.05	17.2±0.17	90.23±1 (15.52±0.17)	80.73±1 (12.53±0.19)

Table 3: Production of guinea fowl eggs by household by sub-prefecture in the Western Tandjile Department, Chad

Sub-prefecture	Guinea fowl in production (n)	Eggs/guinea fowl/saison (n)	Eggs/household (n)	Duration of laying (month)	Exploitation of Guinea fowl (year)
Kelo	13.89^{a}	116.14^{b}	1613.05^{a}	5.43^{b}	3.23^{a}
Bologo	14.33^{a}	117.37^{b}	1681.77^{a}	4.86^{a}	2.97^{a}
Kolon	18.86^{b}	114.81^{b}	2165.32^{b}	5.20^{b}	3.36^{a}
Baktchoro	26.05^{c}	92.34^{a}	2405.20^{b}	5.15^{b}	4.56^{b}
Western Tandjile	18.28	110.16	1966.33	5.16	3.53

Identical letters on the means of the same column indicate that there is no significant difference and different letters indicate that there is a significant difference at the 5% threshold

higher production performance as compared to other poultry (Fig. 5). The breeding of guinea fowl is the most productive compared to other poultry (chickens, ducks and pigeons).

DISCUSSION

Guinea fowl structure in households and plumage color: The study showed that the breeding of female guinea fowl is more

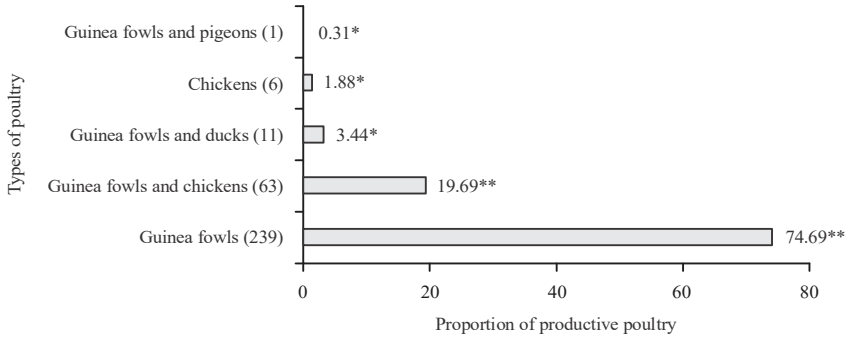

Fig. 5: Appreciation of guinea fowl productivity relative to poultry in the Western Tandjile Department, Chad
Label bars with the different number of asterisks (*) vary significantly (p<0.05)

Table 4: Comparison of reproduction performance with different bibliographic sources

Authors country	1st egg-laying (month)	1st mating (month)	Hatched eggs (n)	Hatching rate (%)	Weaning survival rate (%)
Leng Tchang Brice (Results West Tandjile), Chad	7.68±0.05	7.25±0.05	17.2±0.17	90.23±1	80.73±1
Coz-Douin[19], Benin	9	-	-	70	-
Halbouche *et al.*[2] in Algeria	8.5	-	-	53.8	-
Sanfo *et al.*[8] Burkina Faso	7.1±1.8	6.2±0.6	25±30	75.0	
Dahouda *et al.*[11] Benin	7-9	-	14±4	70	-
Hien *et al.*[12] Burkina Faso	6-6.5	-	-	-	-
Sanfo *et al*[13] Burkina Faso	5.7	-	-	-	-
Tellah *et al.*[6] Chad	8	-	-	92.76	89.69
Coz-Douin[19], Benin	-	-	-	86-88	-
Saina *et al*[20] Zimbabwe	-	-	-	64	-
Ndrodza *et al.*[21] RD Congo	8	-	-	95	-
Djiotsa *et al.*[7] Cameroon	7	-	12±15	90	-
Moussa *et al.*[18] Niger	8	-	12	81-93	-
Dahouda *et al.*[3] Benin	7-9	-	-	72.9	-
Comla *et al.*[22] Togo	5.5				

practiced than that of males in West Guinea. Indeed, in all breeding activities, the high number of females ensures the sustainability of the objectives of the farm. The objective of the guinea fowl breeding is the production of egg for consumption. This requires having several females to have more eggs. The same observations have been made in Chad[6], Burkina Faso[8] and Nigeria[9] in the same area. The number of laying females varied according to the sub-prefectures with a larger number in the Sub-prefecture of Baktchoro. This observation confirms the fact that Baktchoro is more involved in this breeding than the others. The number of guinea fowl with dark grey plumage were the highest in the Department of the Western Tandjilé followed by grey and white plumage. The result of this study is different from those of Meutchieye *et al.*[10]. who reported more white-plumaged guinea fowl.

Reproduction of guinea fowl: Puberty occurs at 7 months in male and 8 months in female guinea fowl. Similar results were obtained by Sanfo *et al.*[8] and Dahouda *et al.*[11] but different results were reported by Hien *et al.*[12] and Sanfo *et al.*[13]. The hen was the best incubator of the eggs of the guinea fowls in the department of the west Tandjile. It has the best hatching rate and survival of guinea fowl at weaning. In the study area guinea fowl laid their first egg around 8 months or 32 weeks of age. Most authors observed that the guinea fowls laid their first egg in the age range of 7-9 months (Table 4). The 90% hatching rate was also between the range of 80 and 95% recorded by previous studies. In contrast, Table 4 shows that the survival rate of guinea fowl at weaning was lower than that reported for the same area.

Guinea fowl rearing practices: In the study area, the ownership of guinea fowl backyards is individual. Similar results were made by Tellah *et al.*[6] in the sub-prefecture of Baktchoro in the same Department of West Tandjile. In terms of feed, cereals (millet, maize, sorghum, penicillary and rice) were the main sources of food for guinea fowl followed by

oilseeds (groundnuts, cucumber seeds and sesame). These foods have also been reported in several previous studies conducted in Senegal[3], Chad[6], Benin[14] and Burkina Faso[15]. The feed served to guinea fowl is produced or purchased by producers. Regarding the housing, guinea fowl perch mainly on tree branches to spend the night. It may be due to the fact that the guinea fowl has a wild character and being a bird, it feels comfort to stay on tree branches. In addition, the breeders use guinea fowl as sentinels because being perched on a tree in the courtyard, as they stay alert due to crying of guinea fowls in case of any presence. Similar results were reported by Hien *et al.*[12] and Sanfo *et al.*[13] in Burkina Faso and by Tellah *et al.*[6] in Chad. On the other hand, different results were reported by Hien *et al.*[16] in Burkina Faso and Senegal, where 58.21% breeders used wood and zinc and 11.94% used hard chicken coops for housing. The disease is one of the major constraints to guinea fowl farming. This result agree with previous studies conducted by Fall *et al.*[17] and Hien *et al.*[18]. To these are added many other obstacles due to technical supervision. According to Hien *et al.*[16] lack of technical knowledge of guinea fowl management is the major obstacle in its production and productivity.

Guinea fowl egg production: The average number of eggs (110) per breeder in the study area during the laying season is greater than that observed in Burkina Faso[8] (103), Niger[18] (97 eggs), Cameroon[7] (80-100 eggs) and Algeria[2] (107 eggs). This difference in the number of eggs is related to feeding practices and the types of feed. The regular distribution of grains and oilseeds to guinea fowl could explain this high number of eggs in study area.

The present study showed that the laying period of the guinea fowl is between June and October. This indicates that the production cycle of guinea fowl is seasonal. This result is different from those of Moussa *et al.*[18]. who reported that the laying period is between May and September. This difference is due to the fact that the arrival and end of the rainy season in different areas is different.

The breeding duration of the guinea fowl in the western Tandjilé department is higher (3.0±0.6 years) than that of Burkina Faso[8]. The breeding of guinea fowl is more profitable than that of other poultry in the western Tandjilé department.

CONCLUSION

The study made it possible to analyze the structure of guinea fowl backyards in households, breeding practices, guinea fowl egg production and reproductive parameters. This study shows that farming of female guinea fowls is preferred for egg production. The hen is used as the best incubator of the guinea fowl eggs in this area with high rates of hatching and survival at weaning. The breeding of guinea fowl is more profitable than that of other poultry and plays a very important role in the lives of breeders. Improved husbandry practices and good control of diseases and driving constraints will allow an increase in numbers (guinea fowl and eggs), consequently additional recipes and consumption of animal proteins (meat and eggs).

ACKNOWLEDGMENTS

The authors would like to thank the French Cooperation for funding this research, the breeders for their consent to participate in the realization of this study and the administrative and traditional authorities for their collaboration.

REFERENCES

1. Leng, T.B., M. Tellah, D. Nideou and Y.M. Logténé, 2022. Socio-économie de l'élevage de la pintade dans le Département de la Tandjilé-Ouest, Tchad. J. Applied Biosci. (In French), 173: 17977-17989.
2. Halbouche, M., M. Didi, N. Bourezak and S. Lamari, 2010. Performances de ponte, de reproduction et de croissance de la pintade locale Numida meleagris en Algérie. Eur. J. Sci. Res., 47: 320-333.
3. Dahouda, M., S.S. Toleba, A.K.I. Youssao, S.B. Kogui, S.Y. Aboubakari and J.-L. Hornick, 2007. Contraintes à l'élevage des pintades et composition des cheptels dans les élevagestraditionnels du Borgou au Bénin. Aviculture Familiale, 17: 3-14.
4. MopatéL.Y. and O.A. Idriss, 2002. Etat de l'aviculture familiale au Tchad et perspectives de son developpement. Études recherches sahéliennes, Insah, 6-7: 7-15.
5. Yao, L., D.B. Balabadi and E.K. Sodjinin, 2011. Elaboration d'un itineraire technique d'elevage de pintadeauxadapte en elevage familial au togo. Neuvieme Journees Recherche Avicole (In French)
6. Tellah, M., D.A. Khalil, A.B. Tina D, L.T. Brice and M.L. Youssouf, 2019. Characteristics of rural guinea fowl (*Numida meleagris*) breeding system in the sub-prefecture of Baktchoro, Chad. Int. J. Livest. Res., 9: 8-17.
7. Djiotsa, F.D., F. Meutchieye and Y. Manjeli, 2016. Caractéristiques de production de la pintade locale (*Numida meleagris*) dans la zone soudano-sahélienne du Cameroun. Sci. Nat. Appl. (In French), 2: 221-232.
8. Sanfo, R., H. Boly, L. Sawadogo and B. Ogle, 2007. Caractéristiques de l'élevage villageois de la pintade locale *Numida meleagris* au centre de Burkina Faso. Tropicultura (In French), 25: 31-36.

9. Rotimi, E.A., J.O. Egahi and A.A. Adeoye, 2016. Phenotypic characterization of indigenous chicken population in Gwer-West, Benue State, Nigeria. World Sci. News, 53: 343-353.
10. Meutchieye, F., F.D. Djiotsa, A.T. Sindze and Y. Manjeli, 2017. Polymorphisme visible chez la pintade locale (*Numida meleagris*) en zone soudano-sahélienne du Cameroun. Communications en Aviculture Familiale, 26: 5-14.
11. Dahouda, M., M. Sènou, S.S. Toléba, C.K. Boko, J.C. Adandédjan and J.L. Hornick, 2008. Comparaison des caractéristiques de production de la pintade locale (*Meleagris numida*) en station et dans le milieu villageois en zone soudano-guinéenne du Bénin. Livest. Res. Rural Develop., Vol. 20,
12. Hien, O.C., C.L. Ouedraogo, B. Diarra and B. Traoré, 2009. Effet du parasitisme interne sur la productivité des pintades locales au Burkina Faso. Tropicultura (In French), 27: 184-190.
13. Sanfo, R., H. Boly, L. Sawadogo and O. Brian, 2012. Performances de ponte et caractéristiques des oeufs de la pintade locale (*Numida meleagris*) en système de conduite améliorée dans la région centre du Burkina Faso. Revue Élev. Méd. Vét. Pays Trop., 65: 25-29.
14. Houndonougbo, V.P., 2017. Caractérisations Phénotypiques des Populations de Pintades (*Numida meleagris*) Ocales Élevées Au Bénin. Gembloux Agro-Bio Tech, Belgique, Page: 153.
15. Ouedraogo, B., J.S. Zoundi and L. Sawadogo, 2017. Caractéristiques de l'élevage avicole en zone sahélienne du Burkina Faso. Rev. Ivoir. Sci. Technol. (In French), 30: 263-280.
16. Pratiques de l'aviculture traditionnelle par les différents groupes ethniques de la région des cascades au Burkina Faso. Agron. Afr., 17: 227-239.
17. Fall, A.K., A. Dieng, A.N.S. Samba and A. Diallo, 2016. L'aviculture urbaine familiale au Sénégal: caractérisation et rôle socio-économique dans la commune de Thiès. REV. CAMES, 4: 6-11.
18. Moussa, A.B., A. Idi and K. Benabdeljelil, 2010. Aviculture familiale rurale au Niger: Alimentation et performances zootechniques. Aviculture Familiale, 19: 3-10.
19. Coz-Douin, J.L., 1993. L'élevage de la pintade. Bull. Acad. Vet. Fr., 146: 179-180.
20. Saina, H., N.T. Kusina, J.F. Kusina, E. Bhebhe and S. Lebel, 2005. Guinea fowl production by indigenous farmers in Zimbabwe. Livestock Res. Rural Dev., Vol. 17,
21. Ndrodza, F.N., C.K. Tshimuanga and N.B. Rutakaza, 2022. Etat des lieux du mélagriculture dans la ville de Kisangani et ses environs, RD Congo. Afr. Sci., 20: 15-27.
22. Comla, S., Pitala1, W. Lare, L. Lombo and Yao, 2022. Effect of the season and the sex ratio on the laying performance and on the reproduction performance of indigenous guinea fowl (*Numida meleagris*) in South Togo. J. Anim. Plant Sci., 52: 9503-9511.