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Feeding Practices and Use of Lysine and Methionine in the Rationing of Poultry on Intensive Breeding in the West-Center and Hauts-Bassins Regions of Burkina Faso

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Abstract

The aim of the study was to take stock of poultry breeding practices, knowledge and use of synthetic lysine and methionine in intensive poultry breeding in the cities of Koudougou and Bobo-Dioulasso in Burkina Faso. To achieve this, a cross-sectional and retrospective survey targeting all intensive poultry breeding in the 2 localities was administered to breeding. A Discriminant Factorial Analysis (DFA) was used to confirm a k-means classification of the data collected, and resulted in the selection of 52 breeding divided into three breeding classes designated A, B and C. The results show that poultry breeding was practiced by young men (93.3% of respondents) and women (6.7%). Average flock sizes were 1271 ± 424 head, 2980 ± 1273 head and 13,250 ± 2013 head for Classes A, B and C respectively. Breeders produced broilers, eggs or broiler + eggs for Class A, and eggs exclusively for Classes B and C. Synthetic lysine and methionine were known to Class A (13.3%) and C (100%) breeders, and unknown to Class B breeders. Only Class A breeders used lysine and methionine in their formulas, in proportions of 0.22% and 0.25% respectively. All breeding classes practiced intensive breeding with stratification evolving from Class A to Class C. Knowledge and use of lysine and methionine, two essentials but limiting amino acids for monogastric pigs and poultry, were low in the study area. Concentrates used by Class A and B breeders appear to be palliatives to the non-use of synthetic lysine and methionine. The development and use of lysineand methioninerich concentrates based on local ingredients is necessary to meet the needs of poultry and breeders for these limiting amino acids. Further work will be devoted to this perspective.

Subject Areas

Agricultural Sciences, Animal Nutrition

Keywords

Feeding Practices, Lysine, Methionine, Intensive Poultry Breeding, Burkina Faso

1. Introduction

In Burkina Faso, poultry breeding represents a major economic challenge, contributing an estimated 6% to GDP [1]. Poultry breeding plays an important role in people's lives, ensuring food security through the production of meat and eggs, and generating income for rural families [2]. It also plays an important socio-cultural role [3]. Over time, this activity, which was once practiced extensively in rural areas, has spread to urban and peri-urban areas to satisfy the ever-increasing demand for meat and eggs from urban populations. However, it faces a number of difficulties, including those linked to the food supply, which is holding back its development. Several studies have been carried out to find alternatives to the problems associated with poultry feed in Burkina Faso [4]-[11]. The results of this work have provided technicians and breeders with local solutions to the problem of energy and protein deficiencies in feed. However, very little work has focused on finding alternatives using local ingredients to solve the problem of certain limiting amino acids, such as lysine and methionine. These two essential and synthetic amino acids are imported, sold on the local market and used in feed formulations for monogastric pigs and poultry [12]. Not only are these amino acids expensive [13], they are also subject to frequent supply shortages. Their deficiency in feed for hens and poultry leads to reduced growth and health problems [14] [15] [16]. Given the vital importance of lysine and methionine in poultry feed and rationing, the present prospective study was initiated. The objectives of the study were to take stock of feeding practices and the use of lysine and methionine in intensified chicken breeding in the peri-urban areas of Bobo-Dioulasso and Koudougou in Burkina Faso.

2. Methodology

2.1. Study Areas

The study was carried out in Burkina Faso in the urban and peri-urban areas of the cities of Bobo-Dioulasso and Koudougou. The town of Bobo-Dioulasso, capital of the Houet province and Hauts-Bassins region, is located between 11˚ 10’ N latitude and 4˚ 16’ W longitude. Its population was 860,426 in 2019, made up mainly of Dioulas, Mossi and Bobos [17], [18]. The climate is South Sudanese, with a long dry season (October to April) and a 5-month rainy season (May to September). A wide range of urban agricultural activities (livestock and market gardening) are practiced here. This crossroads city is home to agri-food industries that supply by-products for animal feed, particularly for urban livestock. The town of Koudougou is the capital of both the Boulkiemdé province and the West-Center region. It is located between 12˚15'N latitude and 2˚22'W longitude. Its population was 193,409 in 2019, made up mainly of Gourounsi and Mossi [17]. The climate is Sudano-Sahelian. Poultry breeding is a developed activity in the Hauts-Bassins and West-Center regions. With a national poultry population of 50,413,102 head, the West-Center and Hauts-Bassins regions had 8,380,535 and 6,115,920 head respectively, representing a total of 22.33% of Burkina Faso’s hen population [19].

2.2. Data Collection Methodology

The aim of the study was to assess feeding practices on poultry breeding, and specifically the state of knowledge and use of lysine and methionine on intensified poultry breeding in the cities of Bobo-Dioulasso and Koudougou. To achieve this, a cross-sectional, retrospective, single-pass survey was conducted among poultry breeders in the two areas. An estimate of the potential number of breeding to be surveyed was first established through preliminary interviews with the heads of the Regional and Provincial Directorates of Animal Resources in the two localities. These interviews enabled us to draw up a list and obtain telephone contacts for the poultry breeders to be surveyed. The breeders were then contacted individually to administer a questionnaire. A survey form was drawn up for actual data collection in the field. The data collected covered breeders’ socio-demographic data, the value of the building, infrastructure and equipment, poultry numbers, types of production and breeds reared, hen feeding practices, knowledge and use of the lysine and methionine in hen rations, breeding’s performance parameters and constraints encountered on the breeding surveyed.

2.3. Data Analysis

The data collected was entered into an Excel spreadsheet. After processing, they were analyzed using XLSTAT software Version 2016.02.2845. XLSTAT is based on Microsoft Excel for data entry and publication of results. However, calculations are performed entirely in stand-alone programs. The results of the descriptive analyses of the quantitative variables collected led to the need for a classification analysis in order to obtain homogeneous groupings of the poultry breeding surveyed, considering the levels of intensification of the breeding surveyed. For the classification, variables were first selected by means of a principal component analysis. It is accepted that a cumulative variance of 75% achieved considering the first three factorial axes is sufficient to validate the selected variables. The variables with the least or no correlation between them were selected. A correlation analysis was then performed to select the classification variables. The selected variables were then used to perform a dynamic cluster analysis (K-means). The breeding classes obtained from this analysis were then confirmed by a discriminant factorial analysis. This approach has been used by several authors [20] [21] to establish typologies for poultry breeding in Senegal and pig breeding in Burkina Faso.

3. Results

3.1. Survey Sample

In total, out of 122 poultry breeding visited, 67 breeders were surveyed, representing a completion rate of 54.9%. Of the 55 breeding that could not be surveyed, twenty-nine (29) (23.8%) were non-functional and twenty-six (26) (21.3%) refused to be surveyed. Data processing enabled 52/67 records (77.6%) to be retained for analysis.

3.2. Classification of Poultry Breeding

3.2.1. Descriptive Statistics of Variables Used to Validate Poultry Breeding Classification

Breeding classification considered 7 variables whose descriptive statistics are presented in **Table 1**. The results show that the deviations were strictly greater than the mean of 3 variables (42.85% of the variables), equal to the mean of one variable (14.3%), greater than or equal to 50% of the mean of 2 variables (28.6% of the variables) and strictly less than 50% of the mean of one variable (14.3% of the variables).

3.2.2. Classification of Poultry Breeding

Correlation analysis enabled us to retain 3 variables as k-means classification variables for poultry breeding's. These were total number of birds (EFFECT_TOT), producer income (REV_PROD) and number of birds dying per year (NMORT_AN). The k-means analysis was used to select 03 poultry breeding classes named A, B and C, which were then confirmed at 100% for each class by Discriminant Factor Analysis (DFA). The one-way test for equality of class means (**Table 2**) shows that the means of the poultry breeding classes were not significantly different for 4/7 of the variables, significantly different for 1/7 and highly significantly different for the variables of total numbers (EFFECT_TOT) and producer income (REV_PROD) ($p < 0.0001$).

Table 1. Descriptive statistics for classification variables.

Variables	N	Minimum	Maximum	Average	Standard deviation
EFFECT_TOT	52	40	20,300	1893	3649
GAM_ALIM	52	0	18	4	4
HBT_FAM	52	1	19	5	3
REV_PROD	52	300,000	185,760,000	25,688,792	38,437,048
NMORT_AN	52	2	28,400	708	3,923
AGE	52	17	65	34	10
NINST	52	0	4	2	1

EFFECT_TOT = Total headcount, GAM_ALIM = Food range, HBT_FAM = Number of inhabitants in family, REV_PROD = Producer income, NMORT_AN = Number of subjects dying per year, AGE = age; NINST = level of education.

Table 2. Unidimensional test for equality of class means.

Variables	Lambda	F	DDL1	DDL2	p-value
EFFECT_TOT	0.585	17.351	2	49	<0.0001
GAM_ALIM			2	49	
HBT_FAM			2	49	
REV_PROD	0.465	28.157	2	49	<0.0001
NMORT_AN	0.998	0.058	2	49	0.944
AGE			2	49	
NINST			2	49	

EFFECT_TOT = Total headcount, GAM_ALIM = Food range, HBT_FAM = Number of inhabitants in family, REV_PROD = Producer income, NMORT_AN = Number of subjects dying per year, AGE = age; NINST = level of education.

3.2.3. Main Characteristics of Breeding Classes

Two factorial axes with a cumulative variance of 100% were validated. The contribution per axis was 99.77% and 0.23% for axes F1 and F2 respectively: (i) The F1 factorial axis was determined by the main variables EFFECT_TOT and REV_PROD, whose correlation indices were 0.661 and 0.753 respectively (Table 3, Figure 1). This axis was weakly and positively correlated with the variables GAM_ALIM, HBT_FAM, and AGE and negatively with the variables NMORT_AN and NINST. (ii) The F2 factorial axis was weakly and positively correlated with 4 variables (GAM_ALIM, HBT_FAM, REV_PROD and AGE) and negatively with 3 variables (EFFECT_TOT, NMORT_AN and NINST) (Table 3 and Figure 1).The projection of poultry breeding's and breeding classes in factorial space is shown in Figure 2. The coordinates of the class barycenter's along the abscissa (F1) and ordinate (F2) were (−1.14; −0.05), (3.18; −1.17) and (20.84; 0.59) for classes A, B and C respectively. The frequency of breeding was 86.5%

(45/52), 9.6% (5/52) and 3.9% (2/52) for classes A, B and C respectively (Table 3). Class A breeding was located in Bobo-Dioulasso (91.1%) and Koudougou (8.9%). All Class B and C breeding were located in Bobo-Dioulasso.

3.3. Socio-Demographic Characterization of Poultry Breeding Classes

Breeders were all male in Classes B and C, and male (93.3%) and female (6.7%) in Class A. The average age of the breeders was 34 ± 10; 31 ± 13 and 43 ± 4 years for Classes A, B and C respectively. Table 4 shows the socio-demographic characteristics of the poultry breeding classes. Farming and breeding were the main activities practiced by poultry breeders in all classes. The educational level of poultry breeders was high in Class A, slightly lower in Class B. Class C breeders were uneducated. Only 15.6% of Class A poultry breeders were affiliated to a poultry association. The number of inhabitants in the family was higher in class C. Labor was employed by the majority of poultry breeders in the poultry breeding classes. Class C employed more labor.

3.4. Poultry Habitat, Infrastructure, Equipment and Production Materials

The value of the habitat was very low in all classes. No information was provided by Class C breeders. Table 5 presents the results on the characteristics of the habitat, infrastructure, equipment and materials owned by poultry breeders. The average value of housing in Class B is 18.9 times higher than in Class A. breeders' own infrastructure, equipment and materials for production. All Class B and C breeders had a borehole, compared with 44.4% of those in Class A who did. Means of transport were exclusively vehicles in Class C. Class B breeders (20%) owned tricycles in addition to vehicles.

Table 3. Correlations between classification variables and factor axes and indices of discrimination functions as a function of factor axes.

Variables	Correlation Indices between variables and factorial axes		Canonical fonctions indices discrimination	
	F1	F2	F1	F2
EFFECT_TOT	0.661	−0.256	3.506	−2.464
GAM_ALIM	0.073	0.103	0.000	0.000
HBT_FAM	0.158	0.155	0.000	0.000
REV_PROD	0.753	0.105	0.971	1.936
NMORT_AN	−0.016	−0.239	−4.275	0.439
AGE	0.204	0.144	0.000	0.000
NINST	−0.294	−0.117	0.000	0.000

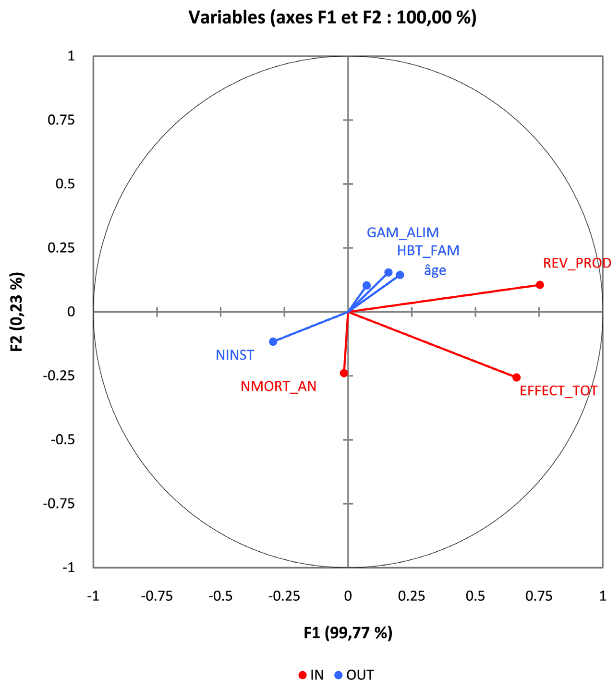

Figure 1. Correlations between variables and factorial axes.

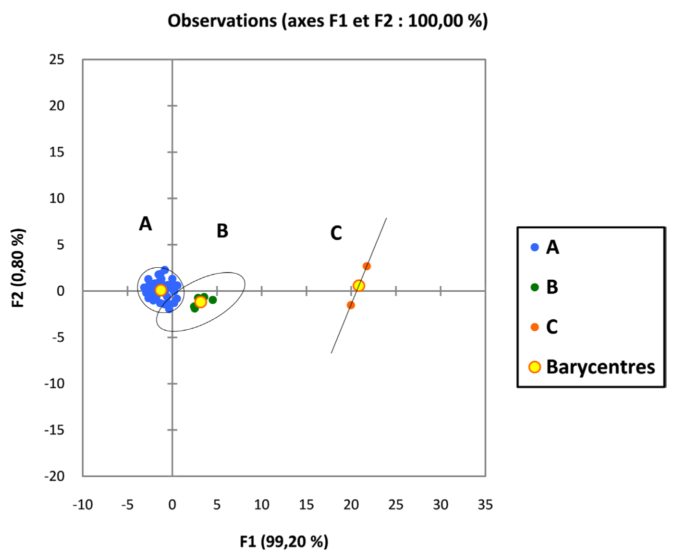

Figure 2. Projection of breeding and breeding classes in factorial space.

Table 4. Socio-demographic characteristics of different poultry breeding classes.

Parameters	Variables	Breeding classes		
		A (n = 45)	B (n = 5)	C (n = 2)
Main activity (%)	Farmers	35.5	0	50
	Breeders	44.5	100	50
	Employee	4.5	0	0
	Other functions	15.5	0	0

Continued

	Uninstructed	35.5	60	100
Level of education (%)	Literate	4.5	0	0
	Primary	11.1	0	0
	Secondary	31.1	20	0
	Superior	11.1	20	0
	Franco-arab	6.7	0	0
Member of association (%)		15.6	0	0
Number of family members (n)		5.13	2.6	8.5
Employing a workforce (%)		82.2	80	100
Number of workers (n)		0.75	1.4	8.5

Table 5. Characteristics of poultry habitat, and infrastructure, equipment and production materials owned by breeders.

Habitat, infrastructure, equipment and production materials		Breeding classes		
		A (n = 45)	B (n = 5)	C (n = 2)
Habitat features	Habitat Value (FCFA)	1,073,859	20,000; 000	-
	Habitat in sustainable materials (%)	91.11	100	100
	Raw earth habitat (%)	8.89	0	0
	East-west habitat orientation (%)	42.2	80	100
Infrastructure, equipment and production materials (%)	Drilling	44.4	100	100
	Cart	11.1	40	0
	Tricycle	15.6	40	0
	ONEA* water supply	11.1	0	0
	Fountain water supply	8.9	20	0
	Vehicle	4.4	20	100
	Automatic drinkers	6.2	25	100
	Siphoid drinkers	93.8	75	0
	Automatic feeders	2.4	0	0
	Siphoid feeders	92.8	100	100
	Linear feeders	4.8	0	0

*National office for water and sanitation.

3.5. Poultry Numbers, Production Types and Breeds of Poultry Reared

Average numbers of poultry reared, production types and breeds of poultry reared by breeding Class are shown in Table 6. Class C breeding raised 9 times and 3 times as many poultry as Class A and B respectively. All Class B and C poultry breeders raised layers exclusively for egg production. Class A breeder's produced broilers and eggs, and combined these two types of production to a derisory degree. Eight (08) breeds/varieties of hens were bred on the breeding. The majority of breeders in all classes bred Isa Brown and Leghorn. Breeders in classes B and C exclusively raised these 2 breeds. Other breeds/varieties were derisively reared in Class A, where all eight breeds/varieties were found.

3.6. Feeding Practices on Breeding in the Study Area

All breeders in all classes feed in permanent confinement. They prepared feed using their own formulas in Classes A (68.9% of them), B (60%) and C (100%). In the first case, they used the ingredients shown in **Figure 3**. Class C breeders used maize, wheat bran, soya and cotton cakes, soya beans, phosphates, fishmeal, iron, synthetic lysine and synthetic methionine. Class B breeders used maize, wheat bran, soya and cotton cakes, soya beans, Koudijs Layer Concentrate (KLC), salt, vegetable oil, various concentrates, vitamins and sesame. They did not use phosphates, iron, Koudijs Broiler Concentrate (KBC), premix, sorghum or cowpeas. Those in Class A used the full range of ingredients shown in **Figure 3**, with the exception of sesame. Across all classes, Voandzou, cowpea, sorghum, premix, sesame, vitamins, various concentrates, vegetable oil and salt were used by between 0 and 20% of breeders; KBC, KLC, iron and phosphates by between 20 and 50% of breeders; other ingredients by over 50% of breeders. Corn was used by all breeders in all classes in their own formulations. Class A (31.1%) and B (40%) breeders used commercial complete feeds.

Table 6. Poultry numbers, production types and breeds/varieties reared, by breeding class.

Characteristic parameters		Breeding classes		
		A (n = 45)	B (n = 5)	C (n = 2)
Average number		1271 ± 424	2980 ± 1273	13,250 ± 2013
Types of production (%)	Broilers	42.2	0	0
	chicks	2.2	0	0
	Eggs	37.8	100	100
	Broilers + eggs	6.7	0	0
	Broilers + chicks	11.1	0	0
Poultry breeds (%)	Kuroiler	2.2	0	
	Leghorn	11.1	20	50
	Isa Brown	46.7	80	50
	Improved local breed	11.1	0	0
	Local breed	15.6	0	0

Continued

Poultry breeds (%)	Dutch blue	8.9	0	0
	Sasso	2.2	0	0
	Cob 500	2.2	0	0

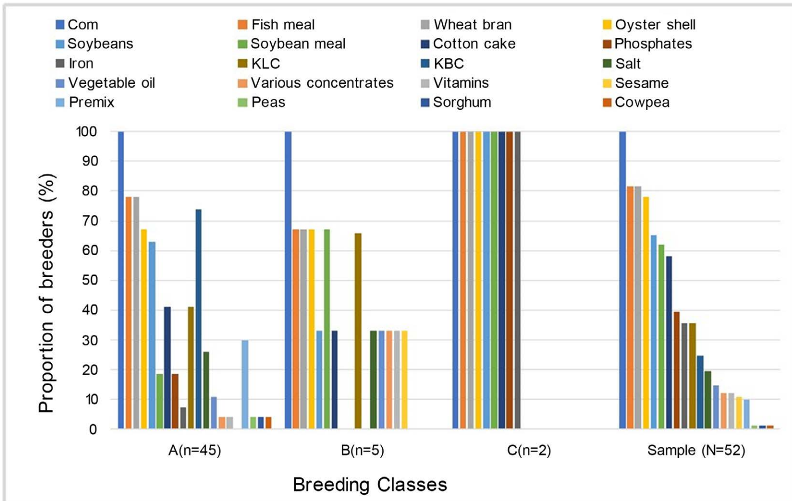

Figure 3. Proportion (%) of breeders using an ingredient in their formulations by breeding class.

3.7. Knowledge and Use of Synthetic Lysine and Methionine in Poultry Rationing

The results in Table 7 show that synthetic lysine and methionine were known by all Class C breeders and a small proportion of Class A breeders. No breeder in Class B was aware of these amino acids. Class C breeders did not use lysine or methionine. The incorporation rates for lysine and methionine were 0.215% and 0.25% respectively in Class A. The latter found the cost of acquiring lysine and methionine high and had a good appreciation of its effect on production.

3.8. Performance Parameters by Breeding Class

The results presented in Table 8 show no significant differences in age at laying, laying rate and age at culling of layers between breeding classes ($p > 0.05$). Laying rate decreased from class A to class C, with class C breeding recording the lowest laying rate (26.2%). In terms of broiler production, there was no significant difference in age at sale between breeding classes ($p = 0.767$). Average mortality rates were homogeneous between classes ($p = 0.785$).

3.9. Poultry Breeding Constraints

The results show that Class C breeding expressed no constraints. The results in Figure 4 show that feed, health, financial unavailability and land were, in descending order, cited as constraints encountered. In Classes A and B, food and health were respectively the most cited constraints.

Table 7. Proportion (%) of breeders with knowledge of lysine and methionine, in corporation rate and cost per kg of lysine, by breeding class.

Variables	Breeding classes		
	A (n = 45)	B (n = 5)	C (n = 2)
Breeders with knowledge of Lysine and Methionine (%)	13.3	0	100
Lysine incorporation rate (%)	0.22	0	-
Methionine incorporation rate (%)	0.25	0	-
Cost per kg of Lysine (FCFA)	2,500	-	-
Cost per kg Methionine (FCFA)	5,000	-	
High cost (%)	50	-	
Good appreciation (%)	100	-	

Table 8. Poultry breeding performance parameters by breeding class.

Parameters		Breeding classes			Pr > F	Sig.
		A (n = 45)	B (n = 5)	C (n = 2)		
Layer	Age at laying (months)	4.8[a]	4.0[b]	4.5[ab]	0.101	Non
	Laying rate (%)	69.6[a]	48.6[ab]	26.2[b]	0.083	Non
	Age at culling (months)	18.8[a]	18.7[a]	19[a]	0.992	Non
Broiler	Age at sale (days)	35[a]	50[a]	45[a]	0.767	Non
Layer + Broilers	Income from sales* (%)	13,161,600[c]	51,312,000[b]	157,680,000[a]	0.000	Oui
	Mortality rate(%)	3.7[a]	4.6[a]	5.4[a]	0.785	Non

*Poultry and egg sales.

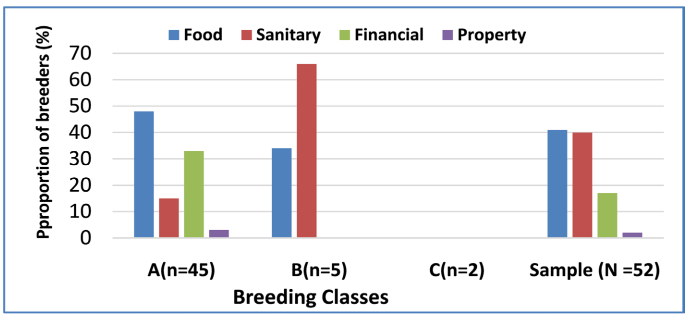

Figure 4. Constraints (%) on surveyed breeding by class.

4. Discussion

4.1. Classification of Breeding Surveyed in Bobo-Dioulasso and Koudougou

The descriptive statistics for the quantitative classification variables show a wide dispersion of breeding in terms of the deviations of the calculated means. In fact, of the seven (07) variables considered, only one has a standard deviation strictly below its mean. This shows the dispersion or, in other words, the different levels of breeding within the sample considered as grouping together the intensive poultry breeding of the two zones. The separation of breeding into 3 significantly distinct classes A, B and C justifies the need to have homogeneous groups, with characteristics that are distinct in places, which can be compared with each other. With regard to these indices and the characteristic features of the breeding classes, the following distinctive elements can be noted: (i) Large numbers of poultry in each class, (ii) The use of salaried labor crossing from class A to C, (iii) The massive use of feed inputs, (iv) The specialization of breeding from class A (four types of production) to classes B and C (egg production only) and (v) The use of specialized breeds Leghorn and Isa Brown for laying and several other breeds specialized in meat production in class A. The presence of all these factors in addition to the permanent confinement of the poultry proves that we are in the presence of intensive breeding at different gradients represented by the three classes. Our results corroborate the characterization of intensive breeding in reference to these elements reported by other authors [22], [23]. Dongmo et al. (2005) state that poultry breeding with an average number of birds exceeding 1,500, coupled with a massive purchase of inputs and an increase in labor, can be considered intensive. In addition, the average breeding size in all classes exceeds the 500-head limit for which a breeding is classified as large-scale and therefore intensive in the second national survey of livestock numbers [24]. Considering the coordinates of the barycenter's of the established breeding classes and their projection in space, and the fact that the factorial axis concentrates almost all the cumulative variance, we can conclude that not only are the breeding not at the same level, but they are also on an intensification trajectory from Class A to Class C.A typology of pig breeding in Burkina Faso revealed this trend, which is characteristic of the dynamics of intensification on breeding in the peri-urban areas of certain towns in Burkina Faso [25]. We can therefore conclude this chapter by affirming that the classification of breeding was justified a posteriori, and that the breeding Classes retained represent groups of intensive breeding with an ascending gradient from Class A, B to Class C.

4.2. Main Characteristics of Poultry Breeding Classes

Our results show that, overall, women are very much in the minority in charge of poultry breeding in Class A alone. However, their presence in the intensive poultry breeding system, albeit small, is recognized [26]. In fact, according to the latter source, women are involved in the intensive poultry sector, where they own breeding with flocks ranging from 200 to 7,000 layers, which is consistent with our results showing that women are in Class A, where the average flock size is 1271 ± 424 head. This male/female ratio is reversed in rural areas, where traditional extensive breeding dominates. It has been reported that women, with a proportion of 56.6%, are in the majority on poultry breeding in the Sahelian zone of Burkina Faso [27]. The breeders in all classes were young people in the 30-35 age bracket for classes A and B, and over the age bracket for class C.

4.3. Feeding and Use of Lysine and Methionine on Poultry Breeding's

For all classes of poultry breeding, feed is mainly based on rations prepared from the breeder's own formulas or, failing that, with commercial feed purchased from feed suppliers. This is evidence of intensification. We can draw a correlation between the number of poultry per Class and the daily feed requirement to feed them, as the weight of the feed cost differs according to Class. If, for example, we base our calculation on an average consumption of 80g/day for the Leghorn, the Isa Brown hen, the annual quantitative requirement for balanced feed would be 37.1 tons for Class A, 87 tons for Class B and 386.9 tons for Class C. In financial terms, at the current price of a 50kg bag of layer feed sold at 17,500 FCFA at feed mills in Bobo-Dioulasso, this would mean an annual financial burden per breeding of 12,2896,620 FCFA (or 98.7% of poultry and egg sales revenues), 30,455,600 FCFA (59.4%) and 135,415,000 FCFA (85.9%) for Classes A, B and C respectively. These values confirm the weight of feed in poultry production reported by other authors [28]. In terms of breeders' knowledge and use of synthetic lysine and methionine in poultry feed, Class B breeders were unaware of and did not use these amino acids, Class C breeders admitted to knowing them but did not use them, while some Class A breeders claimed to know and use them. This is a crucial question by virtue of the limiting factor of these amino acids for animal health and performance in meat and egg production. In the case of self-prepared feeds, we note the use of ingredients known to be rich in Lysine and Methionine, such as peas [29], and in the protein of commercial concentrates Koudijs Broiler Concentrate (KBC) and Koudijs Layer Concentrate (KLC) sold on the local market, for which the recommendations for use only require supplementation with an energy source, in this case maize. The use of KBC by class A breeders can be explained by the fact that the majority of breeders in this class produce broilers. KBC is recommended for incorporation into broiler feed. We also note that Class B breeders use KLC in feed preparation. In fact, KLC is a concentrate recommended for laying hens. This would explain its high use in Class B, where layers are bred. By contrast, Class C breeders use neither of these concentrates, nor lysine and methionine. This could explain why, in absolute terms, this class has the poorest egg-laying performance, the lowest survival rate and the highest mortality. The knowledge and use of these amino acids and KBC by Class A breeders seems to justify the better technical performance achieved by the latter compared with Classes B and C, insofar as their deficiency in monogastric feeds has a negative impact on growth and laying performance [30]. In fact, we can note that the lower age at sale, higher average laying rate and lower mortality rate in Class A would be justified by the use of concentrates and limiting amino acids. Our results concerning the age at sale of broilers are very close to those of a study on the technical-economic parameters of intensive broiler breeding of exotic breeds in the Commune of Bobo-Dioulasso, which ranged from 35 to 42 days [31], which is lower than the age at sale in Classes B (50 days) and C (45 days).The same is true of the low laying rates for all classes, and even more so for Class C (26.2%), compared with rates of 72.47% and 75.74% reported in a study on the laying performance and egg quality of laying hens fed a diet based on different varieties of maize grain in Benin [32]. Refusal or neglect to meet lysine and methionine requirements in poultry rations, leading to deficiencies in these elements, may explain the poor performance shown by our results. Indeed, it is well known that lysine and methionine are not only two essential amino acids, but even worse, they are the first 2 limiting amino acids whose deficiency can lead to poor growth performance and even weight loss, a drop in egg laying and many other poor performances [33]. The constraints encountered by Class A and B breeders, including feed and health, further explain the poor performance recorded there.

5. Conclusion

The study of feeding practices on poultry breeding in Bobo-Dioulasso and Koudougou enabled us to classify breeding into 3 distinct classes, based on average number of birds, producer income and number of birds dying per year. It also revealed discrepancies in the protein-rich ingredients and essential amino acids used in feed formulation between the different classes of breeding. These are mainly lysine, methionine, KBC and KLC concentrates. This situation is linked to the types of production that predominate in each breeding class. As for the knowledge and use of lysine and methionine, they were little known or unknown in the classes, and very little used in the preparation of feed by breeders, thus impacting on breeding performance. Constraints related to feed, health, financial unavailability and land were, in descending order, cited as constraints encountered by poultry breeders. The high use of imported concentrates such as KLC and KBC and the high cost of synthetic lysine and methionine are thought to be the reasons why poultry breeders do not use lysine and methionine. The development of technologies to improve the nutritional values of local ingredients potentially rich in lysine and methionine can help reduce lysine and methionine deficiencies in rations and poultry feed costs.

Conflicts of Interest

The authors declare no conflicts of interest.

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