International Invention of Scientific Journal

Available Online at http://www.iisj.in

eISSN: 2457-0958

Volume 05|Issue 09|September, 2021|

Original Article-Agriculture

Comparative study of the hatching rate, and the weight performance of IF from the Brahma rooster cross crossed with the local hens, Isa Brown and Dekalb

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Article Received 27-07-2021 /Article Accepted 01-09-2021 / Article Published 05-09-2021

ABSTRACT

The objective of this work is not only to verify the hatching rates of eggs from the 3 breeds but also the weight performance of F1 from crosses and the physical appearance of the offspring through the plumage. The chick mortality rate was taken into account to assess adaptation to climate change. The goal is to offer farmers efficient and acclimatized subjects. The study was carried out in the Urban Commune of Tillabery which is located between the coordinates 1 ° and 2 ° East longitude; 14 ° and 16 ° North latitude. During this study, nineteen (19) hens and three (3) roosters were used. The work focused on 5 outbreaks. Out of 351 eggs the total hatching rate is 41.88%. This rate varied according to the races: 56.33% for local breeds and 40.44%, 36.45% and 35.41% respectively for Isa Brown, Brahma and Dekalb. On the other hand, the mortality rate is high in the Laying breed (Isa Brown) with 39.62% against 28.30% at the level of Brahma, clearly lower at the level of the local breeds 15.09% and Dekalb 16.98%. For weight growth 119 chicks were monitored. The mean hatching weight is 34.7 ± 0.5 g (N = 119). Growths vary depending on the sex and the breeds and females used for the crossbreed.

Keywords: hatch rate, death rate, weight growth, breeds, physical appearance

How to Cite:

HAROUNA 1B. K., SIDIKOU2,D. I., ISSOUFOU AMADOU Ramatou1N. H., & MOUSSA Oumar1Marichatou Hamani4S. (2021). Comparative study of the hatching rate, and the weight performance of IF from the Brahma rooster cross crossed with local hens, Isa Brown and Dekalb. *International Invention of Scientific Journal*, *5*(09).Page: 1-20. Retrieved from https://iisj.in/index.php/iisj/article/view/343

Introduction

Niger, a Sahelian country with an essentially agro-pastoral vocation, livestock farming employs more than 87% of the population. This secular activity has always occupied a prominent place in the national economy as well as in the home economy. Indeed, livestock for which Niger has an undeniable comparative advantage in the West African sub-region. It contributes more than 11% in the constitution of the national GDP and more than 25% of the household budget (SDDEL, 2013). The livestock sector has known for four (4) decades periods of cumulative and periodic droughts, often leading to chronic fodder deficits to which was added the pastoral crisis in 2010. Analysis of the pastoral crisis of 2010 shows that large ruminants suffered the most from floods (84% of mortalities) than small ruminants (10%) and donkeys (6%) (Hassan, 2012). species a little more resistant and easy to replenish in the event of a disaster.

Many farmers fall back on poultry farming as a source of food (meat, eggs) and income for producers, it effectively contributes to ensuring sustainable food security and poverty reduction. However, the problems linked to food, poultry health, the high cost of production, habitat hygiene, processing conditions, lack of mastery of technical standards and management of business by poultry farmers are the major constraints affecting the poultry sector in Niger (PPAAO / WAAPP, 2016). Raising poultry is a primary activity for earning income through the sale of eggs and birds. The occasional consumption of these products acts as a valuable source of protein in the food ration. Poultry also plays an important socio-cultural role in many societies (FAO, 2004). The objective of this work is to find efficient and acclimatized breeds to make available to farmers.

2. MATERIAL AND METHOD

2.1. STUDY ZONE

The Tillaberi region (Figure 1) is located in the extreme west of Nigerien territory between 11 ° 50 and 15 ° 45 North latitudes and 0 ° 10 and 4 ° 20 East longitude (INS, 2011). It covers an area of 97,251 km², or approximately 7.7% of the national territory. The urban commune of Tillaberi is located 115 km from Niamey the capital in the western part of the country between coordinates 1 ° and 2 ° East longitude; 14 ° and 16 ° North latitude.

The Niger River and its tributaries make Tillaberi a suitable region for agriculture in the southwestern part. The Tillaberi region produces 75% of the country's rice, 18% of millet, sorghum, market garden crops and raises 21% of the country's cattle, 19% of donkeys, 14% of sheep and 13% of goats (INS, 2011). Figure 1 below gives the location of the study area.

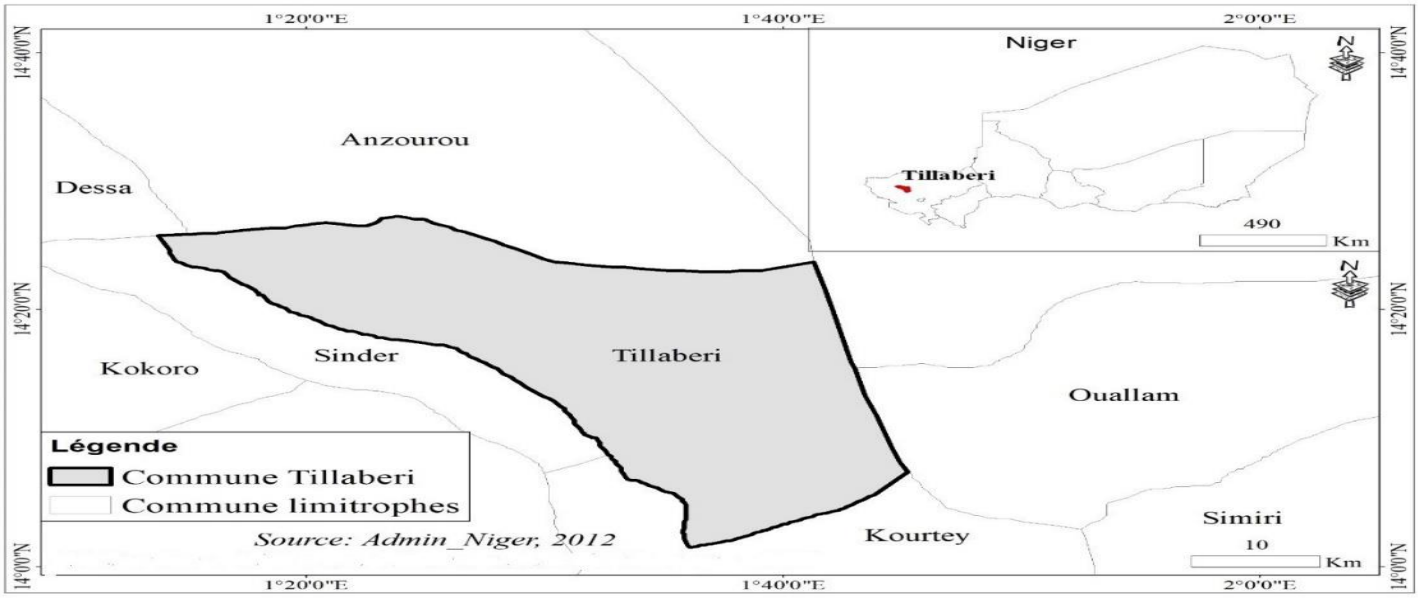

Figure 1: Location map of the Urban Municipality of Tillaberi

2.2. Material 2.2.1 Biological material

The work involved 9 laying hens (Isa Brown), 4 local hens, 2 Brahma hens, 3 Dekalb hens and 3 Brahma roosters to ensure the fertilization of the eggs. 119 hatching chicks were categorized and tracked.

2.2.2. Technical material:

The incubator: It is placed in one of the rooms of the technician's accommodation (photo1)

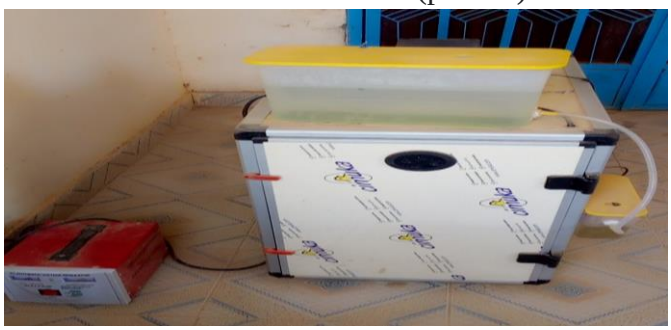

Photo 1: Incubator / incubator with 120 places

Egg collection cells: the eggs of different breeds are placed in cells of different colors to differentiate them and then arrange in batches.

Information sheets for the various collection operations: hatching rates, chick mortality and prophylaxis dates are regularly provided on this sheet.

Hatcher: For the hatch.

Chickens: two types of chickens, modern chickens (Photo 2) and the traditional chickens (Photo3).

Photo 3: traditional broiler

Drinkers:

Two kinds of drinkers were used: modern (siphoids) and traditional ones.

Siphoids: are made of plastic, and used according to the age of the poultry Traditional drinkers: these are

2.2.3. Infrastructure

The hens are housed in henhouses built with local equipment. Everything is fenced off with wire netting to secure the birds and allow them freedom of movement. The hen house is divided into four compartments for the management of the operation.

cups that are well washed and filled with water with a stone to avoid wastage by poultry For the chicks, for the first four weeks the 1st age drinkers were used (Photo 4), and For those of eight weeks old, traditional drinkers were used (Photo 5).

Photo 4: Modern 1st age drinking trough

Photo 5: Traditional 2nd age drinking trough

Feeders: Feeders were used based on the age of the birds. 1st and 2nd age feeders were used. (Photo 6 and Photo 7).

Photos 6 and 7 illustrate the feeders

Photo 7: 2nd age feeder

For weight monitoring an electronic scale was used. Weekly weighing sheet established

PO	
P1	
P2	
P3	
P4	
P5	
PN = Weight at age N	

Methodology

The work was carried out on five (5) incubations. The different breeds of chickens are housed in different compartments in order to collect the eggs by breeds. The eggs are collected in cells of different colors, so they are placed in the incubator by category. Those of the local hens on the first shelf, the second, third and fourth shelf respectively carry the eggs of Brahma, IsaBrown and Dekalb (photo 8). After the 18 days in the incubator the eggs are placed by categories in hermetically sealed baskets for hatching.

Photo 8 illustrates the positioning of the eggs within the incubator.

Photo 8: the eggs in the incubator

2.3.1. Calculation of the different hatching parameters

The different hatching parameters were calculated according to the following formulas:

Actual hatch rate = [Number of chicks hatched / Number of fertile eggs] x 100.

Rate of live chicks = [Number of live chicks / Number of hatched chicks] x 100.

Rate of dead chicks = [Number of dead chicks / Number of hatched chicks] x 100.

2.3.2. Prophylaxis

To prevent and treat certain pathologies, a prophylaxis program has been established (Table I).

Table I: Prophylaxis plan

Day	Illness/Stress	Product /vaccine	Route of administration
1st to 3rd	Stress	vitamine C	Drinking water
4th	Stress	Amin total	Drinking water
5th	New Castle	CEVAC NEW L	Drinking water
6th to 7th	Stress Vaccinal	Amin total	Drinking water
10th	Gumboro	CEVAC IBDL	Drinking water
11th to 12th	Stress Vaccinal	Amin total	Drinking water
13th to 18th	Anticoccidien	VETA COX	Drinking water
19th to 20th	Stress Vaccinal	Amin total	Drinking water

21st	New Castle	CEVAC NEW L	Drinking water
22nd to 23rd	Stress Vaccinal	Amin total	Drinking water
24th to 25th	Déparasitage	Diuretics	Drinking water
27th	Stress Vaccinal	Amin total	Drinking water
28th	Gumboro	CEVAC IBDL	Drinking water
29th to 30th	Stress Vaccinal	Amin total	Drinking water

On days without special treatment, the water is distributed al bitum.

2.3.1. FOOD

2.3.2. CHICKS:

The chicks are kept in the chickens. For feeding, the feeder in the chickens is filled with a pre-made feed (photo 9). Once completed, access is free at any time. The same is true for water.

2. Photo 9: Complete food for 1st age chicks

2.3.1. LES POULES

The feed is prepared in the following proportions (Table II) and is distributed in the feeders.

Table II: composition of the diet

Components	Proportions
Concentrate 30%	25%
But crushed	50%
Bran	25%

2.3.2. WEIGHT MONITORING

Weighings are weekly. At first age a cylinder is placed on the scale and then tared. The chicks are put inside and the weight is given by the Electric dial. As soon as they hatch, the birds are provided with an identification ring for each breed. Up to 7 weeks, weighings are carried out without distinction of breed. At 8 weeks, in order to assess the weight growth per breed, the birds are differentiated and weighed from their identification ring by breed. The weights are reported on the weight collection sheet. The data was analyzed on SPSS.16

3. RESULTS

3.1. Chick hatch rate

Table III shows the total hatched and unhatched eggs of the four breeds during the five incubations.

Table III: Presentation of all hatched and unhatched eggs

Distribution of eggs		Local breed	Laying breed (Isa brown)	Brahma breed	Dekalb breed	**Total**
1st Incubation	Hatched	7	18	9	3	37
	Not hatched	4	24	6	6	40
2nd Incubation	Hatched	4	8	6	3	21
	Not hatch	9	26	13	7	55
3rd Incubation	Hatched	8	15	9	4	37
	Not hatched	10	13	13	4	40
4th Incubation	Hatched	10	8	6	4	28
	Not hatched	15	10	16	8	49
5th Incubation	Hatched	11	6	5	3	25
	Not hatched	8	8	13	6	35
TOTAL	Hatched	40	55	35	17	147
	Not hatched	31	81	61	31	204

Figure 2 dealing with the hatching rate shows that the result obtained varies depending on the breed. If A is this rate obtained at the local, it will be A + 4 at lsabrown and A + 10 respectively at the level of Brahma and Delkab.

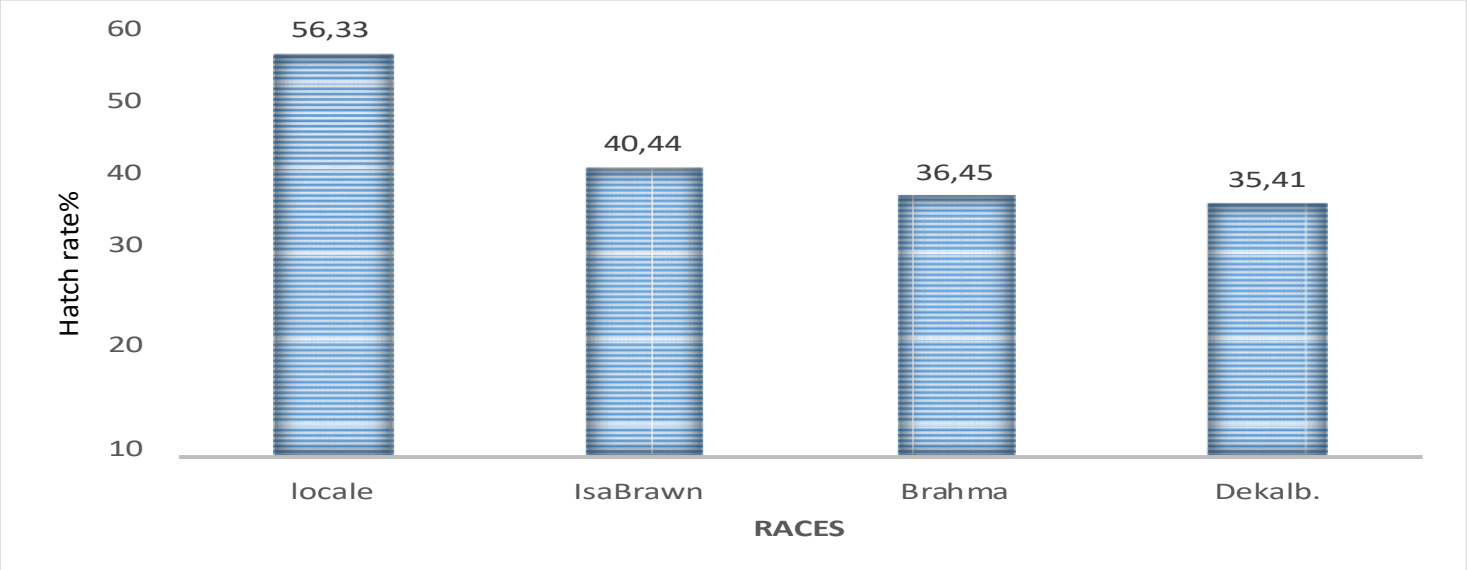

Figure 2: Hatch rate

Table IV and Figure 3 plot the viability of the chicks obtained facing the surrounding environment

Table IV: Viability and mortality of chicks

Distribution of Chicks		Race Locale	Race Isa Brawn	Race Brahma	Race Dekalb	**Total**
1st Incubation	Living	7	14	7	4	32
	Dead	0	4	2	2	8
2nd Incubation	Living	4	6	4	3	17
	Dead	0	2	2	0	4
3rd Incubation	Living	2	5	1	0	8
	Dead	6	10	8	4	28
4th Incubation	Living	8	5	4	2	19
	Dead	2	3	2	2	9
5th Incubation	Living	11	4	4	2	21
	Dead	0	2	1	1	4
TOTAL	Living	31	33	20	11	95
	Dead	8	21	15	9	52

The mortality rate is much higher in Dekab 53%. If B is this rate it will be B- 10 for Brahma and respectively B - 14 and B -23 for Isa Brawn and the local hen

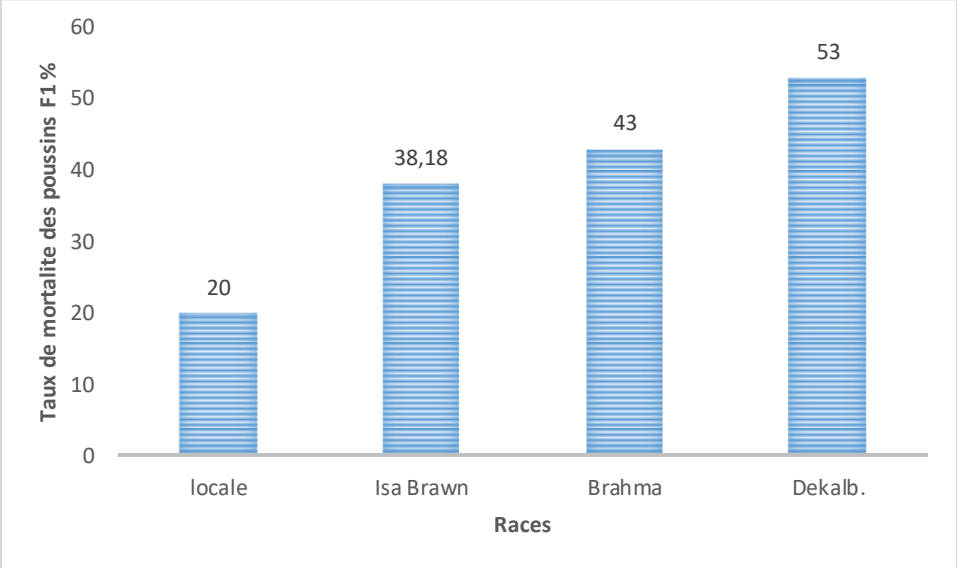

Figure 3: Chick mortality rate

3.2. Weight monitoring

WEIGHT CHARACTERISTICS

The Maximum, Minimum and Average Hatch Weight at 7 weeks regardless of sex are listed in **Table V.**

Table V: Maximum, Minimum and Average Hatch Weight at 7 weeks regardless of sex

	Hatching weight (g) N = 119	Weight at 1 week (g) N = 119	Weight at 2 weeks (g) N = 117	Weight at 2 weeks (g) N = 115	Weight at 4 weeks (g) N =
minimum	21	31	48	57	108
maximum	54	82	138	240	368
mean	34 ,7 ± 0.5	55 ± 0.9	90,16 ± 1.8	154,4± 3.2	209,3± 4.9

	Weight at 5 weeks (g) N = 98	Weight at 6 weeks (g) N = 47	Weight at 6 weeks (g) N = 47
minimum	142	192	258
maximum	436	500	735
mean	264,3 ± 5.6	315,9 ± 5.9	420± 14.7

From 8 weeks the breeds are separated, the weight characteristics are mentioned in table VI

Table VI: Maximum, Minimum and Average Weight from 8 to 9 weeks according to sex and crossbreeding

Age of Birds	Weight characteristics (g)	Race Locale male	Race Exotique Male	Race Locale female	Race Exotique Female
8 weeks	Minimum	523	294	364	394
	Maximum	612	973	507	700
	Mean	575 ± 26.7	594,6 ± 31.3	440 ± 17.5	470,4 ± 23.2
	Effective	3	20	7	19
9 weeks	Minimum	640	374	434	420
	Maximum	780	**1153**	634	801
	Mean	**722,16 ± 42.1**	**710,2 ± 41.5**	**556 ± 23.4.1**	**557,3 ± 27.3**
	Effective	3	18	7	18

The maximum, average weight at 8 and 9 weeks are shown in Figures 4, 5 and 6

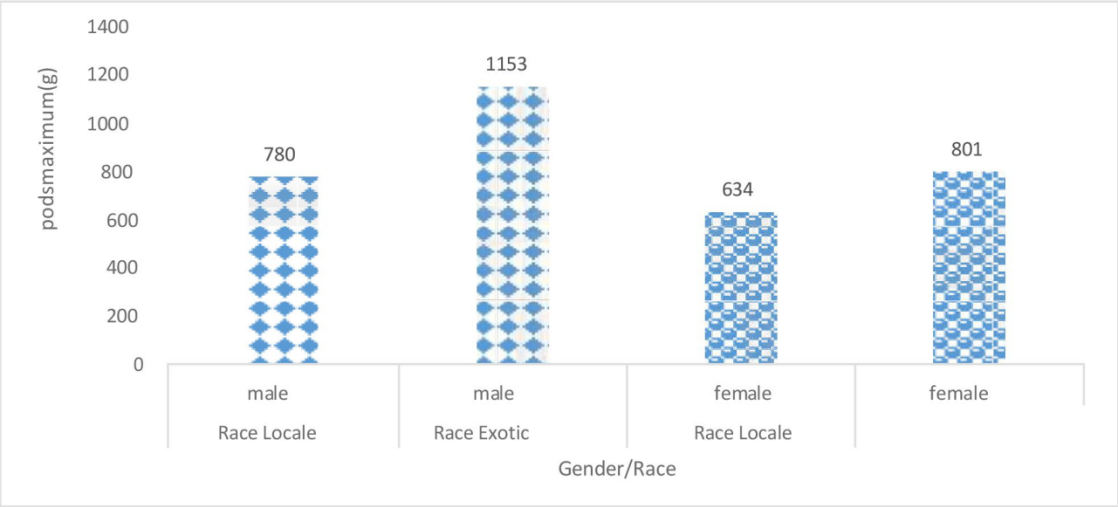

Figure4: Maximum weightAt 8 weeks

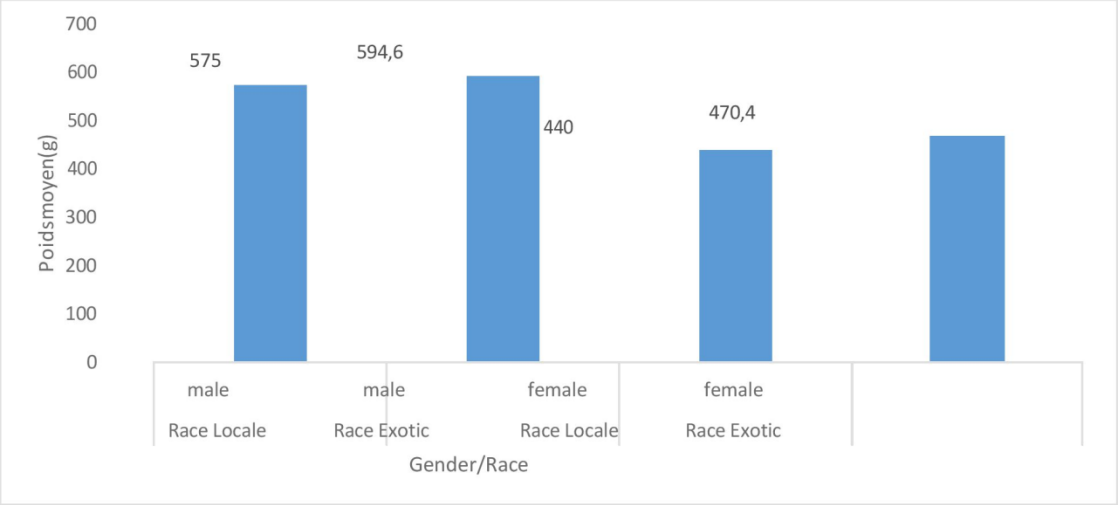

Figure5: Average weight

Figure 6: Average weight at 9 weeks

From 9 weeks, the difference in growth between F1 local hen X Brahma and exotic F1 is marked at the level of the maximum weight of certain subjects. Male exotic F1s have + 373g than F1s (local X Brahma). At the level of females the exotic are + 167g than the F1 (local X Brahma) (figure 4).

The differences in average weights are not significant (Figures 5 and 6)

B. Discussions

3.2.1. Egg hatch rate

Incubation of eggs of the local, layer (Isa brown), Brahma, and Dekalb breeds in the incubator revealed that the average number of eggs hatched over the five incubations of the local breed is 56.33%, higher than the rates obtained. by 40.44%, 36.45% and 35.45% respectively in Isa Brown, Brahma and Delkab. The results for the local breed and Isa Brown are superior to those of Ali (2017) in his study on the incubation of eggs in a BOUINANE farm using an automatic incubator where he found an average of 37% of hatched eggs. On the other hand, the rates obtained at the level of two other races corroborate its results.

Our results are lower than those of Khalid (2018) who reported an outbreak rate in the range of 72% to 81%. The same is true of the results of de Pelé, (2003) where he found an average rate in a range of 70 to 90%. The rates obtained at the level of the three races are lower than the results of Missohou et al (2002) in Senegal, Halima (2007) in Ethiopia and Fotsa (2008) in Cameroon who found respectively 77%, from 83 to 88 and 80-90 %.

3.2.2. Chick mortality rate

Of the chicks obtained, the mortality rate at the level of those from the local breed is 20% and the lowest gives them a high viability rate (80%) compared to chicks from other breeds. The highest mortality comes from chicks from the Delkab breed 53%, followed by Brahma 43% and Isa Brown 38.18%. The rates obtained at the level of F1 of the local race and Isa Brawn are lower than the results of Missohou et al (2002) who reported a rate of 43-59% in Senegal. On the other hand, the results corroborate those obtained at the level of Brahma and Delkab. The rates obtained for all the races in our experiment are higher than the results of Kitalyi and Mayer (1998) who reported 19% in Gambia and

Yaméogo (2003) who found 10.70% in Burkina-Faso.

4. Weight growth

Our results for the age of one day to 4 weeks are better than those found by the authors cited in Table VII above. At 8 weeks, they corroborate those of Buldgen et al (1992) and Ali (2001) in Senegal. According to FOTSA and MANJELI, 2001. The comparative study of the performance gap between the parents and the hybrids shows that the expression of the hybridized forcefulness depends on the local combination of etherosonnetic,% dexteration, and the two races.

Table VII: Comparative study of growth performance

Bird Weight at typical age	Experimentation in Niger station (Tillaberi 2021)			In a Village Invronment			In Resort				
	Local F1 X Brahma and exotic	F1 Locale X Brahma	Exotic F1	Senegal Buldgenet et al. (1992)	Ethiopia Halima (2007)	Nigeria Adedokunet Sonaiya (2001)	**Senegal** Ali(2001)	**Tanzanie** Msoffe*etal*. (2004)	**Congo** Akouango *etal*.(2010)	**Cameroon** Fotsa(2008)	**Ethiopian** Halima *et al*.(2007b)
Day weight (g)	34,7 ± 0.5			34±5	28,3±2,9	23,0-25,6 (24-29)	26-30,58	25,7±0,3 (29,9±0,3)	28,38± 2,3	26,37-28,0 (26,3-27,06)	28,3±2,9
Weight at 4 weeks (g)	209,3± 4.9			205	-	104(99-124)	158,61-185,08	89±1,6 (136,6±3,2)	119,3±10	160-198,2 (165-212,3)	118-146
Weight at 8 weeks (g)		575 ± 26.7 (males) 440 ± 17.5 (females)	470,4 ± 23.2 (males) 440 ± 17.5 (females)	470-490	218,3±36	242-262 (255 311)	524,92-613,77	242±7,1 (358±4,2)	406,60	384-479,4 (425-510,75)	247-322

Conclusion.

Regarding the above, for a better poultry operation, it is advisable to improve the local breeds than to import the exotic ones which have a high mortality rate.

ACKNOWLEDGMENTS

The authors thank Tillaberi University for their availability and the facilities for carrying out the study.

CONTRIBUTION OF THE AUTHORS

BKH: study design and planning, data analysis and interpretation, drafting of the first version of the manuscript; DIS and NH: analysis and interpretation of data, critical review of the manuscript, formatting of the document; IAR and SMO: Data collection; HM: study planning.

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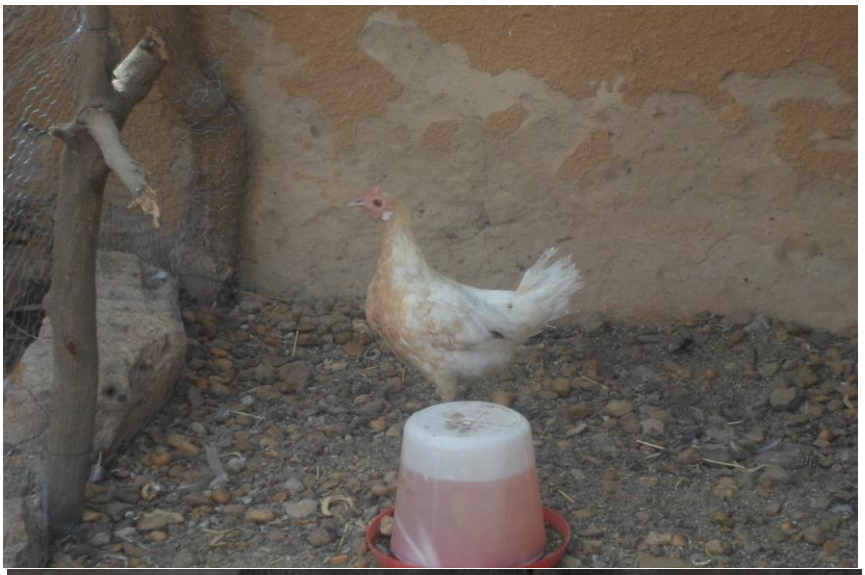
Physical Aspects

F1 HENS FROM THE CROSSING



LOCAL HENS USED IN BREEDING

LOCAL HENS USED IN BREEDING


NET WT 25Kg
Batch No
STORE IN COOL DRY PLACE

Exotic females used for crossbreeding

Exotic females used for crossbreeding