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Research Article

Performance Evaluation of Lohman Brown Commercial Layer Chicken Breeds Under On-Station Management at Pawe, Benishangul Gumuz, Ethiopia

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Abstract

This study was undertaken to evaluate the performance of Lohman Brown under on-station conditions at Pawe Agricultural Research Center. To evaluate the breed production performance and to generate information for private commercial farms and multiplication centers. A total of 100 (sixty-day-old) chicks and commercial layer feed were purchased from Alema poultry farm in Bishoftu. Vaccinations were administered to the chicks while bio-security measures were employed throughout the experimental period (83 weeks). Daily feed intake, body weight, feed conversion rate, egg production, egg weight, egg mass, and mortality, were recorded. Data were analyzed using descriptive statistics free R-4.0.4 software. Average feed intake during the growing period (10-20 weeks) 59.29g/head and in the layer period (21-72weeks) 117.26g/head/day. The average feed conversion rate at12, 16 and 20weeks of age was 8.85, 8.23 and 7.35 respectively. Average body weight at age at first egg lay and peak egg production were 1368.6 and 1553.9g/head respectively. Average daily weight gain at 10-12, 12-16, and 16- 20 weeks of age was 5.43, 7.22 and 11.09g/bird respectively. Age at first and 5% egg-laying were recorded at the beginning of 21weeks (141days). Age at 50% and peak egg production were recorded at 22 weeks (151 days) and 36weeks. The average HHEP (90.71) and HDEP (92.03) were recorded at peak production, while the overall percentage of lay from 21-72(52) weeks of age were HHEP (74.77%) and HDEP (78.28%). The total amount of egg production from 21-72(52) weeks of age in terms of HHEP and HDEP was 272.2 and 284.93egg/hen/year. Average egg weight at age at first egg lay, 50% egg lay and peak egg production were 47.43, 51.5 and 57.03g. Overall mean egg weight from 21-72(52) weeks of age was 57.81g. The average daily egg mass at the age of first egg lay, 50% egg lay and peak egg production were 7.59, 25.68, and 52.48g. On the other hand, the overall mean daily egg mass from 21-72(52) weeks of age was 45.38g. The average feed conversion rate and feed conversion efficiency for egg mass from 21-72 weeks were 2.64 and 0.387. There was no mortality record up to 28 weeks but, the overall mortality rate was 10% up to 83 weeks. The higher egg production and lower mortality record showed that the breed is adapted in the study area. Lohman Brown is recommended for users with basic input packages and on-farm evaluation of chickens should be done.

Keywords

Performance Evaluation, Lohman Brown, On-Station Management, Feed Conversion Ratio, Mortality

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1. Introduction

Reduced availability of protein-rich foods for humans is a common problem in Africa. Poultry is by far the largest group of species [5] contributing about 30% of all animal protein consumed in the world. Poultry meat represents about 33% of the total global meat production. According to [1], the total poultry population in Ethiopia was estimated to be about 59.42 million, of which 85.68%, 7.32%, and 7% are indigenous, hybrid, and exotic breeds, respectively.

Increasing the production potential of chickens is important for contributing to reducing poverty and malnutrition among rural and urban people. The annual per capita poultry egg consumption of Ethiopia in 2013 was estimated to be 0.36 kg, while the estimates for East Africa and Africa during the same year were about 1.03 and 2.65 kg, respectively in the poultry sector Ethiopia [6] However, meeting the current chicken meat and egg demand for the growing population cannot be achieved by indigenous chickens alone due to their low productivity among other factors [14].

Benishangul Gumuz region specifically the Metekel zone is one of the rapidly growing areas in Ethiopia in terms of the human population, urbanization, demand for animal products, and market opportunities. On the other hand, protein deficiency is a well-known problem, especially for children and mothers. The chicken production system of the zone is traditional scavenging and based on indigenous chickens, which produce less than 52egg/hen/year [15].

The production of commercial broilers under intensive management is flourishing in and around main cities and towns, mostly Addis Ababa and its surrounding. However, there is a steadily increasing demand for poultry products in other cities like Pawe, due to the increasing human population and growing economy. Pawe is becoming one of the major investment destinations in the country in association with its proximity to Grand Ethiopian Renaissance Dam and the newly established sugar factory. Besides, there are huge demands from farmers, investors, organizations, and regional poultry multiplication centers for improved chicken breeds. Thus, the introduction of the Lohman Brown commercial layer to the area is believed to bridge the gap between demand and supply for the chicken eggs. It is, therefore important to evaluate the breed production performance and to generate information for private commercial farms and multiplication centers in Pawe before recommending it for its wider use.

2. Materials and Methods

2.1. Description of the Study Area

The experiment was conducted at Pawe Agricultural Research Center, Metekel Zone, Benishangul Gumuz Region from 2019-2020. Pawe Agricultural Research Center is located at a latitude of 11° 19’ North and longitude of 36° 24’ East at an altitude of 1120 m above sea level. It is found 572 km North West of Addis Ababa. The mean minimum and maximum temperatures of the study area are 17.2 and t32.8°C, respectively. The mean annual rainfall is 1574.7 mm with the main wet season from June to September, which can be extended up to November [11].

The mean monthly rainfall, minimum and maximum temperature, and humidity of the study area during the experimental period are presented in Figure 1. The lower humidity was recorded from February to May. [13]

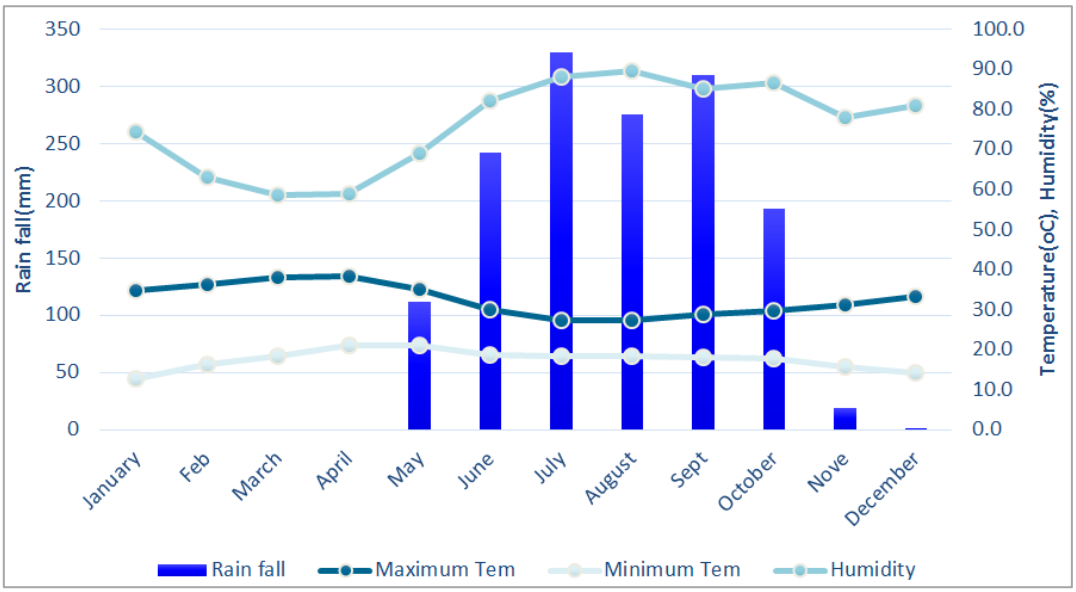

Figure 1. *Climatic data of the study area in 2019 to 2020.*

2.2. Chicken Management

The poultry house construction and material preparations were done before commencing the study. The house was well ventilated and had a concrete floor to protect against rodents and ease cleaning. The floor was covered with chopped rice straw litter at a depth of 7-10cm. The house was equipped with cleaned and disinfected feeders and drinkers before the arrival of the chicken. A total of one hundred (sixty-day-old) growers Lohman Brown chickens were purchased from Alema Farm in Bishoftu town and transported to Pawe Agricultural Research Center. The light was provided for 16h at the layer stage until the end of the study. The birds were given commercial feeds based on daily requirements according to Lohman Brown company management guide [9]. Water was provided *ad-libitum*. Birds were vaccinated against viral diseases based on the guideline of the Ethiopian National Veterinary Institute (NVI). Sick birds were isolated, and dead birds were disposed of properly. Mortality and disease conditions were recorded as occurred. All biosecurity measures were employed throughout the experimental period based on the breed production manual.

2.3. Data Collection

2.3.1. Feed Intake

The hens in each pen were group fed, feeding being given based on [9] for the entire period of the experiment. A weighed amount of feed was offered twice a day. The refusal was collected daily before offering fresh feed and weighed after removing external contaminants by visual inspection and handpicking. The feed offered and refused were recorded for each pen and multiplied by respective dry matter contents. The amounts of feed consumed were determined as the difference between the feed offered and refused on a dry matter basis.

2.3.2. Bodyweight Measurement

The experimental hens were weighed individually on the first day of the commencement of the experiment and at the end of the experiment using sensitive balance. Bodyweight was taken from 24% of the total population at two weeks intervals. Average body weight gain for each pen was computed by subtracting the initial weight from the final weight and dividing it by the number of experimental days. The pen means were used for data analysis. The mean FCR was measured as the amount of feed consumed per unit of daily body weight gain.

2.3.3. Daily Weight Gain

$$\text{DWG} = \frac{\text{Difference in weight between hatching and fixed age}}{\text{Number of days up to that time}}$$

2.3.4. Egg production

The egg production traits were including egg weight, egg mass and egg-laying rate per day and egg number. The egg weight was measured using sensitive balance by collecting eggs daily and weighted in-group immediately after collection for each pen and average egg weight was computed by dividing the total egg weight by the total number of eggs. The egg weight focused at 5%, 50% and peak laying stage. After the mean weight has been determined, the egg mass per pen on daily basis was computed according to [12].

Average egg mass = % Hen-day egg production * Average Egg weight in gram

Egg number and egg weight were recorded daily to calculate percent egg production and egg mass. The sum of the collections was recorded as egg production for that day. The number of birds alive per pen on each day was also recorded. The rate of lay for each pen was expressed as the average percentage of hen-day egg production (HDEP) and hen-housed egg production (HHEP) following the method developed by [8].

$$\%\ \text{HDEP} = \frac{\text{Total number of eggs laid}}{\text{Number of hens alive at end of experiment} * \text{number of days inlay}} * 100$$

$$\%\ \text{HHEP} = \frac{\text{Total number of eggs laid}}{\text{Number of hens housed initialy} * \text{number of days inlay}} * 100$$

Feed conversion ratio: The feed conversion ratio was determined as a ratio of the total weight of feed consumed on a dry matter basis and egg mass according to the following formula.

$$\text{FCR} = \frac{\text{Mean dry matter intake (g/hen/d)}}{\text{Average egg mass (g/hen/d)}}$$

The mean feed efficiency for egg production was determined as the ratio of gram egg mass from gram dry matter consumed [4].

Reproduction performance: The age at first laying and peak egg production was recorded, while body weight at the age at first and peak stage was also recorded.

Mortality: The survival and mortality data were recorded up to the end of the experiment.

$$\text{Mortality (\%)} = \frac{\text{Number of birds died}}{\text{Total number of birds}} * 100$$

2.4. Data Analysis

Data on body weight, feed intake, egg production, feed conversion rate and efficiency, egg mass and mortality were entered into MS-Excel 2016 sheet and subjected to analyzed using free R- 4.0.4 software.

3. Results

3.1. Feed Intake

The mean daily feed intake of the Lohman Brown layer is presented in Table 1. Feed intake increased when an increase in the age of the chickens. Lohman Brown pullet's average daily feed intake during the growing period (10-20 weeks) was 59.29g/head, while in the layer period (21-72weeks) was 117.26 g/head and when the age from 73-83weeks was 127.14g/head.

Table 1. *Mean daily feed intake (g/bird) of Lohman Brown maintained at Pawe Agricultural Research Center.*

Age in weeks	Number of birds	Feed offered g/bird	Actual intake g/bird	Average refusal g/bird
10	100	50	46.94	3.06
11-12	100	60	49.24	10.76
13-16	100	69.5	59.48	10.02
17-20	100	85.82	81.52	4.3
10-20	100	66.33	59.29	7.03
21-24	100	108.39	102.49	5.91
25-28	100	113.96	107.84	6.12
29-32	99.93	116.36	113.02	3.34
33-36	98.89	118.71	115.64	3.07
37-40	95.93	120	115.38	4.62
41-44	95	120	113.19	6.81
45-48	95	120.96	112.85	8.11
49-52	94.36	120.39	111.07	9.32
53-56	93.14	126.75	123.35	3.4
57-60	93	130	128.03	1.97
61-64	93	130	127.47	2.53
65-68	92.04	130	127.55	2.45
69-72	92	130	126.52	3.48
21-72	95.56	121.96	117.26	4.70
73-76	92	130	127.06	2.94
77-80	91.54	130	127.41	2.59
81-83	90.38	130	126.95	3.05
73-83	91.31	130	127.14	2.86

3.2. Growth Performance

The average body weight of Lohman Brown from 10-82weeks, daily weight gain and feed conversion ratio during the growing period (10-20weeks) were shown in Table 2 and Figure 2. Average body weight gain was increased from 10-80weeks and then drop at 82weeks of age. The age at first egg lay and peak egg production average body weight at 21 and 36 weeks of age were 1368.6 and 1553.9g/head respectively. The average daily weight gain in the growing period of 10-12, 12-16 and 16-20weeks of age was 5.43, 7.22 and 11.09g/bird respectively. The average feed conversion rate in the growing period of 12, 16 and 20weeks of age was 8.85, 8.23 and 7.35 respectively.

Table 2. Average body weight, daily weight gain and feed conversion ratio of Lohman Brown maintained at Pawe Agricultural Research Center.

Age in week	N	ABW g/bird	DWG g/bird	FCR	Age in week	ABW g/bird
10	24	646.49	-	-	48	1570.03
12	24	760.48	5.43	8.85	52	1561.75
16	24	962.75	7.22	8.23	56	1748.33
20	24	1273.25	11.09	7.35	60	1759.28
24	24	1464.08			64	1832.215
28	24	1513.04			68	1843.2
32	24	1522.44			72	1841.5
36	24	1553.9			76	1860.41
40	24	1647.85			80	1884.75
44	24	1603.49			82	1880

ABW=Average body weight, DWG= daily weight gain, FCR= feed conversion rate

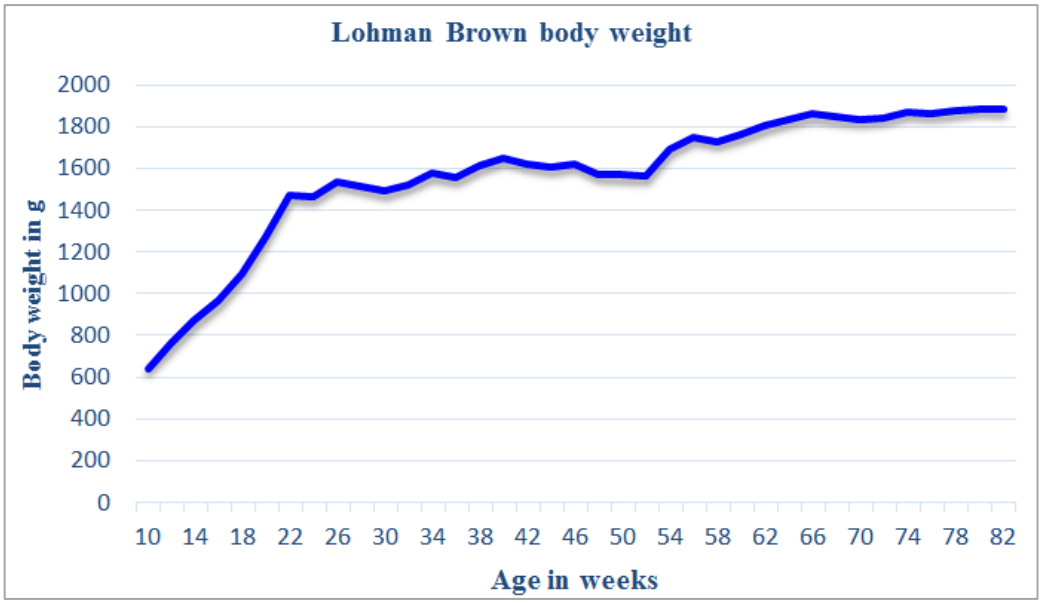

Figure 2. Bodyweight performance in different age.

3.3. Egg Production Performance

Age at first, 5%, 50% and the peak of egg lay, egg weight, egg mass, weekly egg production and average egg production performances (% in weeks) during laying phase (21 to 83 weeks of age) for Lohman Brown breed are shown in Table 3 and Figure 3. Age at first and 5% egg-laying in the study period were recorded in the beginning of 21weeks (141days) of age. Whereas, age at 50% and peak egg production were recorded in the age of 22weeks (151days) and 36weeks of age respectively.

The laying rate in both HHEP and HDEP continues to increase during the 21-36 weeks, ranging from 16% to 90.71% and 92.03 respectively. The later percent of lay continued to slightly decrease during the 37- 72 weeks ranging from 81.66 and 85.54% to 66.19 and 71.95 and already declined from 73-83weeks ranging from 57.32 and 62.46% to 51.33 and 56.80% % in respective order (Figure 3). The average Percent of egg lay at peak production was HHEP (90.71) and HDEP (92.03), while the overall percentage of lay from 21-72(52) weeks of age were HHEP (74.77%) and HDEP (78.28%), on the other hand from 21-83(63) weeks of age were HHEP (71.44%) and HDEP (75.25%).

The total amount of egg production from 21-72(52) weeks of age in terms of HHEP and HDEP was 272.2 and 284.93egg/hen/year in respective order. Whereas, from 21-83(63) weeks of age were 315.05 and 331.84 egg/hen/63 weeks age. The overall average weekly egg production was 6.44 and 5.48 egg/hen at peak of lay and from 21-72(52) weeks of age.

The overall average egg weight at an age at first egg lay, 50% egg lay and peak egg production were 47.43, 51.5 and 57.03g in respective order. On the other hand, the overall mean egg weight was from 21-72(52) weeks of age was 57.81g, while 58.54g from 21-83(63) weeks of age.

The overall average egg mass at an age at first egg lay, 50% egg lay and peak egg production were 7.59, 25.68 and 52.48g in respective order. On the other hand, the overall mean egg mass from 21-72(52) weeks of age was 45.38g, while 44.04g was from 21-83(63) weeks of age.

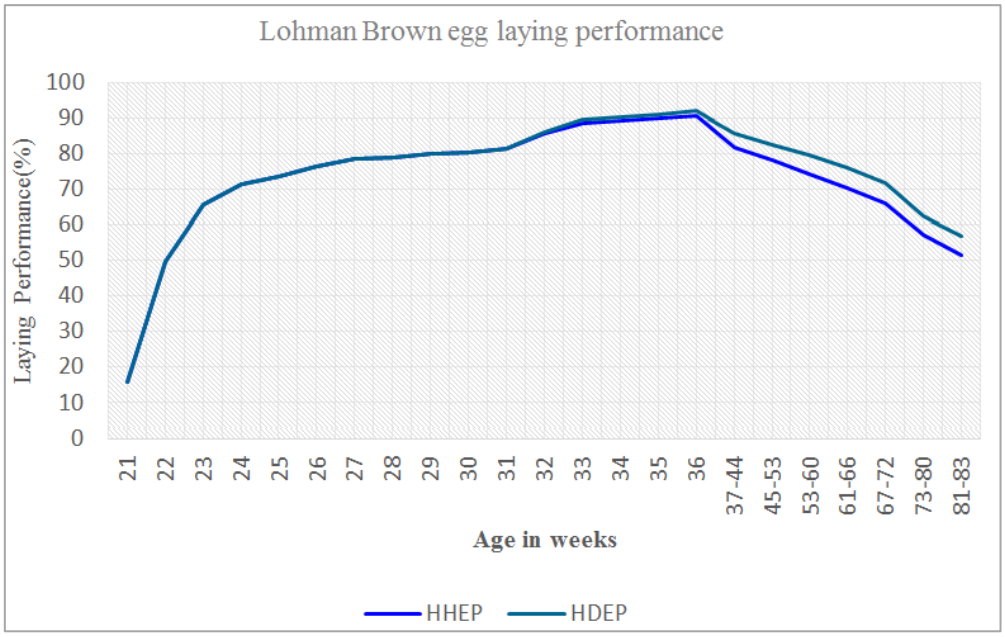

Figure 3. *Egg-laying performance in different age.*

Table 3. *Different egg performance parameters of Lohman Brown maintained at Pawe Agricultural Research Center.*

Age in week	Hens	EN (N)	TEW (N)	AEW g/hen	HHEP (%)	HDEP (%)	EM g/hen	WEP (N)	CEN/HD
21	100	112	5312	47.43	16.00	16.00	7.59	1.12	1.12
22	100	349	17974	51.5	49.86	49.86	25.68	3.49	4.61
23	100	460	23920	52	65.71	65.71	34.17	4.6	9.21
24	100	500	26250	52.5	71.43	71.43	37.50	5	14.21
25	100	515	27192	52.8	73.57	73.57	38.85	5.15	19.36
26	100	535	28355	53	76.43	76.43	40.51	5.35	24.71
27	100	551	29479	53.5	78.71	78.71	42.11	5.51	30.22
28	100	553	29834	53.95	79.00	79.00	42.62	5.53	35.75
29	100	560	31550	56.34	80.00	80.00	45.07	5.6	41.35
30	100	562	30831	54.86	80.29	80.29	44.04	5.62	46.97
31	100	570	31584	55.41	81.43	81.43	45.12	5.7	52.67
32	99.57	600	33132	55.22	85.71	86.08	47.54	6.03	58.7
33	99	620	34714	55.99	88.57	89.47	50.09	6.26	64.96

Age in week	Hens	EN (N)	TEW (N)	AEW g/hen	HHEP (%)	HDEP (%)	EM g/hen	WEP (N)	CEN/HD
34	99	625	34913	55.86	89.29	90.19	50.38	6.31	71.27
35	99	630	35677	56.63	90.00	90.91	51.48	6.36	77.64
36	98.57	635	36214	57.03	90.71	92.03	52.48	6.44	84.08
37-44	95.46	4573	261519	57.19	81.66	85.54	48.92	5.99	131.98
45-53	94.68	4374	251994	57.61	78.11	82.50	47.53	5.78	178.18
53-60	93.1	4154	250957	60.45	74.18	79.69	48.17	5.58	222.8
61-66	92.69	2958	182918	61.84	70.43	75.98	46.99	5.32	254.72
67-72	92	2780	171074	61.53	66.19	71.95	44.27	5.04	284.93
21-72(52)	95.56	523.38	30296	57.81	74.77	78.28	45.38	5.48	284.93
73-80	91.77	3210	198618	61.899	57.32	62.46	38.66	4.37	319.91
81-83	90.38	1078	67117	62.26	51.33	56.80	35.36	3.98	331.84
21-83(63)		500.06	29224.26	58.54	71.44	75.25	44.04	5.27	331.84

EN=egg number, TEW=total egg weight, AEW=average egg weight, HHEP= hen housed egg production, HDEP=hen day egg production, EM=egg mass, WEP=weekly egg production, CEN/HD=cumulative egg number in terms of hen day

3.4. Feed Conversion Ratio and Efficiency in Terms of Egg Mass

The average feed conversion rate and feed conversion efficiency are shown in Table 4. The overall average feed conversion rate and feed conversion efficiency in terms of egg mass of Lohman Brown hen in the period of 21-72 and 21-83-weeks were 2.64, 2.79 and 0.387, 0.367 respectively. Higher feed conversion efficiency (0.44) was recorded at 33-36weeks of age as compared to others; this could be birds reach peak egg production.

Table 4. *Layer stage feed conversion rate and feed conversion efficiency Lohman Brown layer maintained at Pawe Agricultural Research Center.*

Age in weeks	No of hens	Feed offered g/hen	Actual feed intake g/hen	Egg mass g/hen	FCR	FCE
21-24	100	108.39	102.49	26.24	3.91	0.256
25-28	100	113.96	107.84	41.02	2.63	0.38
29-32	99.93	116.36	113.02	45.44	2.49	0.402
33-36	98.89	118.71	115.64	51.11	2.26	0.442
37-40	95.93	120	115.38	49.15	2.35	0.426
41-44	95	120	113.19	48.69	2.32	0.43
45-48	95	120.96	112.85	47.59	2.37	0.422
49-52	94.36	120.39	111.07	47.47	2.34	0.427
53-56	93.14	126.75	123.35	48.07	2.57	0.39
57-60	93	130	128.03	48.22	2.66	0.377
61-64	93	130	127.47	46.89	2.72	0.368
65-68	92.04	130	127.55	46.89	2.72	0.368
69-72	92	130	126.52	43.11	2.93	0.341
21-72					2.64	0.387

Age in weeks	No of hens	Feed offered g/hen	Actual feed intake g/hen	Egg mass g/hen	FCR	FCE
73-76	92	130	127.06	39.63	3.21	0.312
77-80	91.54	130	127.41	37.66	3.38	0.296
81-83	90.38	130	126.95	35.36	3.59	0.279
21-83					2.79	0.367

3.5. Mortality and Survival

Mortality and survival rates of Lohman Brown chickens are presented in Table 5. There was no mortality record up to 28 weeks. Only 8 chickens were lost due to disease and accidents up to 72 weeks of age. The overall mortality rate was (10%) up to 83weeks.

Table 5. Survival and mortality of Lohman Brown chickens maintained at Pawe Agricultural Research Center.

Age in weeks	Initial bird	survive bird	Mortality	Cumulative Mortality (%)
10-20	100	100	0	0
21-28	100	100	0	0
29-36	100	97	3	3
37-45	100	95	2	5
46-52	100	94	1	6
53-65	100	92	2	8
66-72	100	92	0	8
73-83	100	90	2	10
Total	N=100	N=90	N=10	10%

4. Discussion

The current result feed intake from 21-72weeks of age is comparable with [2] reported the feed intake of Lohmann-Brown Classic, Novo-Brown, Dominant-Sussex and Koekoek are 116.9, 110.3, 121.9, and 119.4g/hen at 16-60weeks of age respectively. The mean feed intake of the Lohman breeds at 21-72 weeks agreed with those recommended in their Company Management Guide, which is about 42 kg/hen [9].

The current result of body weight gain at 20 weeks of age is comparable with [16] reported the mean body weight gain during the growing period at 20 weeks were, 1.3 and 1.2 kg/head Dominant Sussex and Lohman Brown pullets respectively but lower than 1.4kg/head in Novo Brown. The current result of mean body weight gain in the Lohman breeds at 16weeks lower than 1286.3, 1233.5, 1244.1, and 1196.7g/head Dominant-Sussex, Koekoek, Lohmann-Brown Classic and Novo-Brown respectively. However, at 60weeks was comparable with 1798.3 and 1753.8g/head and higher than 1620 and 1599g/head Dominant-Sussex, Koekoek, Lohmann-Brown Classic and Novo-Brown respectively [2]. The current result of mean body weight gain in the Lohman breeds at 20 and 72weeks has met the range between those recommended in the Company Management Guide, which is about 1.2-1.4 and 1.6-1.8kg/hen respectively [9]. The current result average daily weight gain at 10-12weeks is higher than [16] the feed conversion rate at 9-12weeks is 6.4, 6.8 and 7.12 Novo Brown, Dominant Sussex and Lohman Brown respectively.

The egg production performance of this result is better than [3] reported 160.5, 165.6 and 153.3 days for Isa Brown, Bovans Brown and Potchefstroom Koekoek respectively under the village production system in East Shoa, Ethiopia. The current result is comparable for 140, 137, and 140days age at first egg lay of Dominant Sussex, Novo Brown and Lohman Brown respectively [16], while the same result also reported 138.2 and 138.3 in Dominant Sussex and Novo Brown. However, the current result was lower than Koekoek (152.3days) and higher than Lohmann Brown (131.4 days)

[2]. Age at peak production is in line with the report Dominant Sussex (247.9) and Lohmann Brown (247.3), whereas higher than Koekoek (244.3) and Novo Brown (232.5) [2]. The current age at 50% egg-lay inlined in the range of the Company Management Guide, which is about 21-22 weeks. Whereas, peak egg production is reached earlier 26-30 weeks [9]. The variation of age at Peak egg production could be due to management and environmental effect.

The average Percent of egg lay at peak production was HHEP (90.71) and HDEP (92.03), while the overall percentage of lay from 21-72(52) weeks of age were HHEP (74.77%) and HDEP (78.28%), on the other hand from 21-83(63) weeks of age were HHEP (71.44%) and HDEP (75.25%). The current result is inlined with Lohmann Brown (91%) and higher than Dominant Sussex (72.7%), Koekoek (75%), and Novo Brown (68.1%). The total amount of egg production from 21-72(52) weeks of age in terms of HHEP and HDEP was 272.2 and 284.93egg/hen/year in respective order. The current result is higher than Dominant Sussex (135.8), Koekoek (149.9), Lohmann Brown (173.5) and Novo Brown (144.9egg/hen) at 44 weeks of lay [2]. This result is higher than [7] reported 279.5 White leghorns in South Africa and [3] also reported 276 and 266 eggs per hen per year for Isa Brown and Bovans brown respectively under farmer's management conditions in East Shoa. However, the current result from 21-72(52) weeks of age is lower than 316.6eggs/bird/year [10].

Egg weight at peak production grouped under large classification according to the United States Department of Agriculture the egg was graded into peewee (35.4), small (42.5), medium (49.6), large (56.7), extra-large (63.8) and jumbo (70.9 g). The current result is comparable with 59.4, 57.1 and 57.3g Dominant Sussex, Novo Brown and Lohman Brown in respective order [16]. However, the current result from 21-72(52) weeks of age is lower than 63.2eggs/bird/year Lohman Brown management guide [10]. The average egg mass at an age peak egg production is higher than 40.5, 38.1 and 35.9g Dominant Sussex Novo Brown and Lohman Brown respectively [16].

Higher feed conversion efficiency (0.44) was recorded at 33-36weeks of age as compared to others; this could be birds reach peak egg production. The current result of feed conversion rate is lower than 2.93, 2.93 and 3.7 for Dominant Sussex, Novo Brown, and Lohman Brown respectively reported for final hybrid three layers on-station conditions at Jimma [16]. This indicated that the utilized feed converted to egg performance of Lohman Brown at Pawe condition is better. The current feed conversion rate in terms of egg mass was met in the range recommended in the Company Management Guide, which is about 2-2.1kg [9].

Only 8 chickens were lost due to disease and accidents up to 72 weeks of age. The overall mortality rate was (10%) up to 83weeks. The current mortality results are up to 28weeks lower than recommended in the Company Management Guide, which is about 1.4% [9, 16] reported the mortality in growing stage 3.5, 5 and 8.1% Dominant Sussex, Novo Brown and Lohman Brown respectively. Whereas, the mortality of Lohman Brown up to 72 and 83weeks of age was comparable with Company Management Guide [9] reported 8 and 9.6% mortality respectively. This indicating that proper management practices (feeding, housing, and health care) were applied and animals were adapted to the environment. The current layer stage mortality rates are by far higher 2.63, 2.83 and 3.58 % Dominant Sussex Novo Brown and Lohman Brown respectively reported for the final hybrid three layers on-station conditions at Jimma [16]. This difference might be environmental and managemental variation.

5. Conclusion and Recommendations

Lohman Brown showed a remarkable performance in egg production, age at first egg lay, egg weight, egg mass, feed efficiency, and adaptation under on-station management in Pawe. The lower mortality of birds indicated that proper management practices were applied, and the chickens were adapted to Pawe's environment. The study indicated that layer production at Pawe is worthwhile given the appropriate management is followed. Based on the results of the current study thus can be recommended that Lohman Brown along with another basic input setup could be included into technical poultry extension packages. Furthermore, on-farm evaluation of these breeds of chickens in different areas should be done recommend them for wider areas of the country.

Abbreviations

ABW: Average Body Weight
AEW: Average Egg Weight
CEN/HD: Cumulative Egg Number in Terms of Hen Day
DWG: Daily Weight Gain
EM: Egg Mass
EN: Egg Number
FCE: Feed Conversion Efficiency
FCR: Feed Conversion Ratio
HDEP: Hen Day Egg Production
HHEP: Hen Housed Egg Production
TEW: Total Egg Weight
WEP: Weekly Egg Production

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Conflicts of Interest

The authors declare no conflicts of interest.

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