

**PRODUCTIVE PARAMETERS ACHIEVED
BY THE LAYING HYBRID LOHMANN BROWN,
BRED ON PERMANENT LAYER**

M.G. USTUROI^{}, I. VACARU-OPRIȘ¹, I. CIOCAN²*

¹University of Agricultural Sciences and Veterinary Medicine of Iași

²Agricola International Trade Company

***ABSTRACT** - The body weight of young hens was within the standard curve of the hybrid, but at its lower limit, because the poultries had a great movement freedom, and the standard was allowable for battery breeding. The peak of eggs yield was reached in week 28, but the level of egg-laying intensity did not correspond to the potential of the hybrid (92-94%), being only of 78.11%, due to objective factors. The egg yield/hen reached the level of only 283.48 eggs. The specific fodder consumption was correlated to the low egg yield (190.69 g/egg), while the average daily consumption was higher than the normal one (110-120 g/head), being of 125.50 g/head. The rate of stock losses was influenced by the breeding system, on permanent layer, being of 11.61%, in comparison with the value of 94-96%, normal for the rate of stock preservation. We recommend this hybrid breeding on permanent layer, observing the following conditions: the use of young replacement hens, bred under the same system as adult poultries; breeding the biological material, from the age of a day until the end of the series; the increase in poultry denseness /surface unit, at 7-8 heads/m² and the selection of young replacement hens at the moment of acquisition.*

Key words: laying hens, eggs, performance, layer

INTRODUCTION

For laying hybrids, the present tendency is the management of the “alternative systems”, among which, there is breeding on permanent layer. (Usturoi, 2004; Vacaru-Opriș, 2002; Van *et al.*, 1999). This layer gives to poultry a greater movement opportunity, and implicitly, a better health condition and high productive performances (Lindberg, 1996).

^{*} E-mail: musturoi@email.ro

MATERIALS AND METHODS

The studied poultries belong to the laying hybrid Lohmann Brown and were kept in a 18 x 14 m shelter, with a total sheltering area of 252 m² (the shelter has a buffer room, used for stocking materials and for access).

The entire surface was covered with a chopped straw layer, thick of 15 cm. In the centre, metallic nests were laid on two levels, of the following sizes: 0.30 cm-length; 0.35 cm-width and 0.35 cm-height. The nests, one for five hens, had a straw layer and were situated on two rows. In the layer area, lines of troughs for fodder were placed. Parallel to them, sprinkler - type water troughs were added. The feeding front was of 10 cm/hen and the watering one, of 3 cm/hen.

Feeding was done according to the suggestions of the *Lohmann Firm* (***) Layer management program Lohmann Brown, 2000) in four stages, with changes at protean level, according to the intensity of egg-laying time:

- in the week when egg-laying began (week 19), the energetic value of fodder was of 2757 kcal metabolizing energy kg / combined fodder and the protean value of 17.48% raw protein;

- during the interval of 20-45 weeks, mixed forage was administered, having an energetic content of 2761 kcal metabolizing energy /kg mixed fodder and a protean level of 18.73% raw protein;

- during the interval of 46-65 weeks, the content of metabolized energy was of 2743 kcal/kg mixed fodder and the protean level, of 16.71%;

- after the age of 65 weeks of poultries, we administered a more economic mixed fodder, at which the protean content was of only 15.75% raw protein, but with an energetic level similar to the one used at previous age stages, of 2757 kcal metabolizing energy /kg mixed fodder.

RESULTS AND DISCUSSION

1. The dynamics of weight increase. The body weight was a factor conditioning greatly the number of eggs obtained from one hen (Vacaru-Opriş, 2002)

In our case, the average weight of young hens in the moment of populating (age of 19 weeks) was of 1518.88±12.94 g, while the limits of standard weight for this age were of 1503-1612 g. In the week when maximum laying intensity was reached (week 28), the weight of young hens was of 1824.28±25.08 g, and at the end of egg-laying curve (week 38), of 1854.22±30.48 g. The standard weights for the two ages are of 1815-2006 g and, respectively, 1843-2037 g. When poultries were 80 weeks old, their body weight has registered average values of 1953.89±47.22 g, compared to the standard of 1943-2147 g (*Table 1*).

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Table 1

Dynamics of body weight (g) in studied poultry

n=100

Age of poultries (weeks)	Body weight (g):		
	Standard	Achieved	
		$\bar{X} \pm s_{\bar{X}}$ (g)	V%
19	1503-1612	1518.88 ± 12.94	8.52
20	1583-1679	1603.04 ± 15.61	9.74
22	1727-1853	1734.88 ± 18.18	10.48
24	1786-1954	1793.02 ± 22.31	12.44
26	1805-1995	1814.06 ± 25.23	13.91
28	1815-2006	1824.28 ± 25.08	13.75
30	1824-2016	1832.57 ± 29.17	15.92
32	1829-2021	1837.79 ± 29.61	16.11
34	1834-2027	1843.12 ± 30.19	16.38
36	1838-2032	1850.18 ± 30.36	16.41
38	1843-2037	1854.22 ± 30.48	16.44
40	1848-2042	1857.17 ± 30.79	16.58
42	1853-2048	1862.93 ± 31.43	16.87
44	1857-2053	1867.34 ± 34.00	18.21
46	1862-2058	1871.89 ± 37.47	20.02
48	1867-2063	1875.91 ± 39.60	21.11
50	1872-2069	1882.74 ± 40.44	21.48
52	1876-2074	1886.11 ± 41.00	21.74
54	1881-2079	1889.74 ± 41.23	21.82
56	1886-2084	1893.84 ± 42.19	22.28
58	1891-2090	1899.17 ± 42.37	22.31
60	1895-2095	1906.86 ± 43.02	22.56
62	1900-2100	1909.41 ± 43.17	22.61
64	1905-2105	1912.32 ± 43.18	22.58
66	1910-2111	1916.02 ± 44.39	23.17
68	1914-2116	1921.43 ± 45.13	23.49
70	1919-2121	1925.33 ± 45.40	23.58
72	1924-2126	1933.33 ± 45.84	23.71
74	1929-2132	1935.48 ± 46.06	23.80
76	1933-2137	1941.25 ± 46.30	23.85
78	1938-2142	1946.38 ± 46.54	23.91
80	1943-2147	1953.89 ± 47.22	24.17

As concerns the homogeneity of the studied trait, except the period of beginning of egg-laying time, when variability was low, the values found for V% were the ones typical of average and great variability.

2. Eggs yield and egg-laying intensity. Until the age of 80 weeks, the Lohmann Brown hybrid was able to lay 337.5 eggs/hen, under conditions of intensive-industrial farm type, in batteries, ensuring an optimized management. (***) Layer management program Lohmann Brown, 2000).

The results obtained have shown a diminution by 16.01% in the productive level, because of the used technology. The poultry movement was higher than in case of their keeping in box batteries. The food was not revaluated at the best parameters at the base yield. Under these conditions, the average eggs yield was of 283.48 eggs/poultry (*Table 2*).

Table 2**Eggs yield and egg-laying intensity in studied poultries**

Age	Theoretical egg-laying curve	Average stock (heads)	Total yield	% egg-laying	Eggs /hen	
					By week	Cumulated
19	15.0	1508	1346	12.75	0.89	0.89
20	40.0	1500.5	3529	33.60	2.35	3.24
21	60.0	1495	5275	50.41	3.53	6.77
22	75.0	1491.5	6580	63.02	4.41	11.18
23	85.0	1489.5	7449	71.44	5.00	16.18
24	90.0	1488	7878	75.63	5.29	21.47
25	92.0	1486.5	8041	77.28	5.41	26.88
26	92.6	1485	8085	77.78	5.44	32.32
27	92.8	1483	8092	77.95	5.46	37.78
28	93.0	1481.5	8101	78.11	5.47	43.25
29	92.8	1480.5	8077	77.94	5.45	48.70
30	92.6	1480	8058	77.78	5.44	54.14
31	92.4	1478.5	8033	77.62	5.43	59.57
32	92.2	1476	8002	77.45	5.42	64.99
33	91.9	1474.5	7967	77.19	5.40	70.39
34	91.5	1473	7925	76.86	5.38	75.77
35	91.1	1471	7879	76.52	5.36	81.13
36	90.6	1469.5	7828	76.10	5.33	86.46
37	90.1	1468	7777	75.68	5.30	91.76
38	89.6	1466	7723	75.26	5.27	97.03
39	89.1	1464.5	7672	74.84	5.24	102.27
40	88.6	1463.5	7624	74.42	5.21	107.48
41	88.1	1462	7574	74.01	5.18	112.66
42	87.6	1459.5	7517	73.58	5.15	117.81
43	87.1	1457.5	7464	73.16	5.12	122.93
44	86.5	1456	7405	72.65	5.08	128.01
45	85.9	1454	7343	72.15	5.05	133.06
46	85.3	1451.5	7280	71.65	5.02	138.08

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Age	Theoretical egg-laying curve	Average stock (heads)	Total yield	% egg-laying	Eggs /hen	
					By week	Cumulated
47	84.7	1449	7217	71.15	4.98	143.06
48	84.1	1446.5	7153	70.64	4.95	148.01
49	83.5	1444	7090	70.14	4.91	152.92
50	82.9	1442.5	7031	69.63	4.87	157.79
51	82.3	1441	6973	69.13	4.84	162.63
52	81.6	1439.5	6906	68.53	4.80	167.43
53	80.9	1437.5	6838	67.96	4.76	172.19
54	80.2	1434.5	6765	67.37	4.72	176.91
55	79.5	1432.5	6696	66.78	4.67	181.58
56	78.8	1430.5	6628	66.19	4.63	186.21
57	78.1	1428	6557	65.60	4.59	190.80
58	77.4	1426	6490	65.02	4.55	195.35
59	76.7	1423.5	6420	64.43	4.51	199.86
60	76.0	1420.5	6348	63.84	4.47	204.33
61	75.2	1416	6261	63.17	4.42	208.75
62	74.4	1412.5	6179	62.49	4.37	213.12
63	73.6	1408	6093	61.82	4.33	217.45
64	72.8	1404	6010	61.15	4.28	221.73
65	72.0	1400	5927	60.48	4.23	225.96
66	71.2	1396	5845	59.81	4.19	230.15
67	70.4	1392	5763	59.14	4.14	234.29
68	69.6	1388.5	5682	58.46	4.09	238.38
69	68.8	1385.5	5605	57.79	4.05	242.43
70	68.0	1382.5	5528	57.12	4.00	246.43
71	67.1	1379.5	5442	56.36	3.94	250.37
72	66.2	1376.5	5358	55.61	3.89	254.26
73	65.3	1373.5	5274	54.85	3.84	258.10
74	64.4	1370.5	5189	54.09	3.78	261.88
75	63.5	1367.5	5106	53.34	3.73	265.61
76	62.6	1364.5	5022	52.58	3.68	269.29
77	61.7	1361.5	4940	51.83	3.63	272.92
78	60.8	1358	4855	51.07	3.57	276.49
79	59.9	1354	4773	50.36	3.52	280.01
80	59.0	1349	4680	49.56	3.47	283.48

Correlated to the number of eggs, the egg-laying intensity has registered values under the level of flat egg-laying standard curve, typical of the laying hybrid: thus, at the laying peak, reached at the normal age (28 weeks), the laying intensity was of only 78.11%, in comparison with 93%, which represents the laying peak in the Lohmann Brown hybrid. This low level of egg-laying intensity

was found in the next weeks, too, so that, at the end of egg-laying period (week 80), it was under the normal level (59%), being of only 49.56% (Table 2).

3. Food consumption. In the week of egg-laying beginning (week 19), the average stock of 1508 heads has registered a total consumption of mixed fodder of 980 kg, resulting in daily average consumption of 92.8 g/head. In exchange, the value established for the specific consumption was very high, of 728.1 g mixed fodder/ egg, because of the low egg yield in this week (Table 3).

Table 3

Fodder consumption by studied poultries

Age	Specification	Parameters
Week 19 (7 days)	Average stock (heads)	1508
	Consumed fodder (kg/period)	980
	Average consumption (g/head/day)	92.8
	Egg yield (piece/period)	1346
	Specific consumption (g/egg)	728.1
20-45 weeks (182 days)	Average stock (heads)	1478.5
	Consumed fodder (Kg/period)	33071
	Average consumption (g/head/day)	122.9
	Eggs yield (piece/period)	194898
	Specific consumption (g/egg)	169.7
46-65 weeks (140 days)	Average stock (heads)	1425.5
	Consumed fodder (Kg/period)	25904
	Average consumption (g/head/day)	129.8
	Eggs yield (piece./period)	132862
	Specific consumption (g/egg)	194.9
66-80 weeks (105 days)	Average stock (heads)	1372
	Consumed fodder (Kg/period)	17878
	Average consumption (g/head/day)	124.1
	Eggs yield (piece/period)	79062
	Specific consumption (g/egg)	226.1
19-80 weeks (434 days)	Average stock (heads)	1429
	Consumed fodder (Kg/period)	77833
	Average consumption (g/head/day)	125.5
	Eggs yield (piece/period)	408168
	Specific consumption (g/egg)	190.69

The second feeding stage was extended from the age of 20 weeks in poultries until week 45, inclusively. In that stage, which included the egg-laying peak and the flat period of egg-laying curve, the average stock was of 1478.5 heads, and the total fodder consumption, of 33071 kg. The average daily fodder

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consumption for that period was of 122.9 g/head, and the specific one, of 169.7 g mixed fodder (*Table 3*).

During the age interval of 46-65 weeks, the diminution in egg-laying intensity resulted in an increase in the specific consumption until the level of 194.9 g mixed fodder/egg, and in the average daily consumption, until 129.8 g/head/day. The end of egg-laying period (66-80 weeks) was characterized by a diminution in the average daily fodder consumption, in comparison with the previous stage, being of only 124.1 g/head and by an increase in the specific consumption at the level of 226.1 g mixed fodder /egg (*Table 3*).

For the entire studied period (19-80 weeks), the average stock of 1429 heads has registered a total fodder consumption of 77833 kg, an average daily consumption of 125.5 g/head/day. The total eggs yield, achieved during the studied period, was of 408168 pieces, resulting in the determination of a specific consumption of 190.69 g/egg (*Table 3*).

4. Stock losses and their causes. The normal proportion of maintaining the stock in the Lohmann Brown hybrid is of 94-96%, from the age of 20 weeks until the week 80, inclusively (***) Layer management program Lohmann Brown, 2000).

In the studied stock, the rate of stock losses had high values, caused by the applied technology. At the end of first week (week 19), the stock losses has registered the highest rate of the entire studied period, of 0.53%, caused by the transport and adaptation stress, by fights for social hierarchy, accidents, etc. (*Table 4*). The next control weeks, which coincided to the age of poultry of 20-60 weeks, were characterized by a significant diminution in losses or by lack of mortality in the studied stock, at certain periods, because of instituting the social hierarchy and harmony (*Table 4*).

Table 4

Situation of stock losses in studied poultries

Age	Stock losses			
	Weekly stock		%	Cumulated
	At the beginning	At the end		
19	1512	1504	0.53	0.53
20	1504	1497	0.46	0.99
21	1497	1493	0.27	1.26
22	1493	1490	0.20	1.46
23	1490	1489	0.07	1.53
24	1489	1487	0.13	1.66
25	1487	1486	0.07	1.73
26	1486	1484	0.13	1.86
27	1484	1482	0.13	1.99

Age	Stock losses			
	Weekly stock		%	Cumulated
	At the beginning	At the end		
28	1482	1481	0.07	2.06
29	1481	1480	0.07	2.13
30	1480	1480	-	2.13
31	1480	1477	0.20	2.33
32	1477	1475	0.14	2.47
33	1475	1474	0.07	2.54
34	1474	1472	0.14	2.68
35	1472	1470	0.14	2.82
36	1470	1469	0.07	2.89
37	1469	1467	0.14	3.03
38	1467	1465	0.14	3.17
39	1465	1464	0.07	3.24
40	1464	1463	0.07	3.31
41	1463	1461	0.14	3.45
42	1461	1458	0.21	3.66
43	1458	1457	0.07	3.73
44	1457	1455	0.14	3.87
45	1455	1453	0.14	4.01
46	1453	1450	0.21	4.22
47	1450	1448	0.14	4.36
48	1448	1445	0.21	4.57
49	1445	1443	0.14	4.71
50	1443	1442	0.07	4.78
51	1442	1440	0.14	4.92
52	1440	1439	0.07	4.99
53	1439	1436	0.21	5.20
54	1436	1433	0.21	5.41
55	1433	1432	0.07	5.48
56	1432	1429	0.21	5.69
57	1429	1427	0.14	5.83
58	1427	1425	0.14	5.97
59	1425	1422	0.21	6.17
60	1422	1419	0.21	6.38
61	1419	1415	0.28	6.66
62	1415	1410	0.35	7.01
63	1410	1406	0.28	7.29
64	1406	1402	0.28	7.57
65	1402	1398	0.28	7.85
66	1398	1394	0.28	8.13

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Age	Stock losses			
	Weekly stock		%	Cumulated
	At the beginning	At the end		
67	1394	1390	0.28	8.41
68	1390	1387	0.21	8.62
69	1387	1384	0.21	8.83
70	1384	1381	0.22	9.05
71	1381	1378	0.22	9.27
72	1378	1375	0.22	9.49
73	1375	1372	0.22	9.71
74	1372	1369	0.22	9.93
75	1369	1366	0.22	10.15
76	1366	1363	0.22	10.37
77	1363	1360	0.22	10.59
78	1360	1356	0.29	10.88
79	1356	1352	0.29	11.17
80	1352	1346	0.44	11.61

The next age period (60-70 weeks) corresponded to warm months of the year, when stock losses were higher, with a peak of 0.35%, in week 62. In the last weeks, high mortality levels were found, on the background of poultry body exhausting and microclimate depreciation, caused by the gradual degradation of layer. The highest mortality of 0.44% was reached in week 80. Cumulated, the population losses represented 11.61%, because poultries passed from the breeding system in batteries to the one on permanent layer, and the intensity of fights for social hierarchy has increased (*Table 4*).

CONCLUSIONS

Body weight. It was framed within the standard curve of the hybrid, at lower limit, because poultries had a great movement freedom, and the standard is for battery breeding.

Egg yield and egg-laying intensity. The peak of egg yield was reached in week 28, but the level of egg-laying intensity did not correspond to the potential of the hybrid (92-94%), being only of 78.11%, due to objective factors (lack of acclimatization of the used hall, use of young replacement hens from another breeding system). The egg yield/hen reached a level of only 283.48 eggs.

Fodder consumption. The specific fodder consumption was correlated to the low egg yield, being of 190.69 g/egg, while the average daily consumption was higher than the normal one (110-120 g/head), of 125.50 g/head/day.

Stock losses. The rate of stock losses was influenced by the breeding system, on permanent layer, being of 11.61%, in comparison with the value of 94-96%, normal for the rate of stock preservation. Although the obtained results were lower compared to the productive potential of the hybrid, we recommend his breeding on permanent layer, observing the following conditions: use of young replacement hens, bred under the same system as adult poultries; breeding of the biological material from the age of a day until the liquidation of the series; the increase in poultry denseness /surface unit at 7-8 heads/m² and the selection of young replacement hens at the moment of acquisition.

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