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Evaluation Of Growth Performance Of The Hybrid Hy-Line W 98 Based On Its Management Practices

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***Abstract*— In this work, the growing indicators of a bird flock for the hybrid Hy-Line W 98 at a poultry farm near Durres, were studied. Based on applied management practices on the farm the weight, the weight gain, the uniformity of growth, mortality and the Feed Conversion Ratio (FCR) were monitored continuously for 17 weeks. This flock was fed with feed formulated based on the hybrid's technical guide. Because of the high density of the birds, it was manipulated with the light intensity. From the results obtained in the flock of birds in the study, we find that the performance was optimal and very close to the standard hybrid. Specifically, at 17th weeks the weight of the birds was 2.26% higher than the hybrid standard and with an optimum uniformity. The weight gain was of no-significant difference compared to the standard (p≤0.05). During all period of growing 2.24% feed was saved compared with the standard (non-significant difference). Except the first week, the flock's vitality was satisfactory and showed a slight advantage over the standard for the performance index (5.89% more). Based on the results of this study, it was concluded that with a careful management of Hy-Line W 98 layers' flocks, an optimal performance can be achieved.**

Keywords—birds; body-weight; growth uniformity; lighting; performance

I. INTRODUCTION

The monitoring of growth indicators for the hybrid Hy-Line W-98 from the moment of receipt of the chicks on the farm until the age of 17 weeks has not been to the attention of the technicians and farmers for layer' flocks in Albania. So far we have little evidence of economic growth indicators in the first phase until the 17th week of the birds and we have no comparative data with the standard of this hybrid.

Our goal in this study is to evaluate the growth performance indicators of hybrid Hy-Line W- 98, based on applied management practices on the farm for the period of the receipt day of the chicks until the age of 17th week.

The key performance indicators that will be followed during the growth period will be: growth intensity, uniformity, vitality and Feed Conversion Ratio (FCR).

II. MATERIAL AND METHODS

The growth indicators of a flock of birds of hybrid Hy-Line W 98 at a commercial poultry farm of laying production were monitored and studied, near Durres and compared with hybrid performance standards [1]. Monitoring lasted for a period of 17 weeks.

Farm management practices

The management practices in large part were similar to those of hybrid Hy-Line W 98 described in the technical guide [1].

The birds were kept in closed housing with tunnel ventilation in five-floors of battery cages (cage dimensions 70 x 110). Initially (in the first week) birds were placed on the first three floors of batteries. In the second week they were divided into the four floors and starting from the third week until the end of growth were distributed in five floors of battery. During the period of growth for every week in the morning before feed consumption individual bird weighting was made by the principle of causality, weighing birds from all floors with the same number of heads (a total of 180 birds). After each weighting, weights obtained were faced with those standards, according to the relevant guide [1].

It also calculates uniformity regarding live weight every week. This was done by calculating the coefficient of variation (CV%). The exact method of calculation is as follows:

The amount of feed consumed by the birds has been the standard norms of the hybrid variety. Nutrition is applied in three phases: 0-6, 6-12 and 12-15 weeks. The feed was prepared at its factory farm in the form of powder. The composition of the feed ration is presented in the table below.

Table 1. Composition of the ration according to the phases of growth

The age in weeks	Proteins bruto (%)	Energy (Kkal/ kg)	Ca (%)	P (%)	Lisine (%)	Methionin +Cistine (%)
0-6 weeks	20	2900	1.00	0.76	0.91	0.82
6-12 weeks	18	2850	1.00	0.71	0.91	0.74
12-18 weeks	14.50	2760	0.90	0.58	0.65	0.57
15-5% production	15.50	2930	0.71	0.79	0.76	0.60

Based on the amount of feed consumption and the weight achieved, calculated the reward of extra weight kg feed, or Feed Conversion Ratio (FCR).
The relevant charts meet herd performance on the number of heads, daily decreases, body weights, minimum and maximum temperature and humidity, lighting regime to apply, etc.

A bird in the growth period is provided only 150cm2 / 230cm2 of bird / bird living space. So the leaders in cage density is very high (50 head / cage). As the number of birds in housing has been higher than the norm, then modified lighting program and has become a part of the transfer of the birds in the flock of poultry premises at 12 weeks.

It was applied at the same period as the guide lighting, but the difference lies on the intensity of light.

Table 2. The lighting scheme applied to the growth birds

weeks	Hours of light	The intensity of the light (lux)	
		According the Guide	Modification
1	22	30	30
2	20	30	20
3	18	30	15
4	14	20	5
5	10	20	5
6	9	20	5
7	9	10	4
8	9	10	4
9	9	10	4
10	9	10	4

We should emphasize that this is one of the breeding practices in poultry flocks of this poultry farm. Only the first week the intensity of the light was 30 Lux, in the second week it was 20 lux and in the third week it was 15 lux. Starting from the fourth week onwards, the intensity of the light was 5-4 lux. This is accomplished with 10 watt lamps.

It should be noted that this scheme was successfully applied to increase the bird to achieve the satisfactory body weight, certainly in combination with other factors.
It also calculates the performance index [2][3] as follows:

$$IP = \frac{Live\ Weight\ (kg) \times 100}{FCR}$$

Were:

IP- Index of performance

FCR-Feed Conversion Ratio

Indicators that were numbered:
-The number and weight of the birds.
-Dynamics of growth of birds from the age of 1 day up to 17 weeks of age.
-The uniformity of growth. This was calculated Cv and based on the relevant tables
Hy-Line W-98, Commercial Management Guide (2008-2010), and rated or uniformity.
- Mortality
-Total feed consumed and Feed Conversion Ratio (FCR)
-Schemes of feeding birds in stages of growth. For each stage of growth of birds (starter and grower) premixes with minerals and vitamins were used.
-The age of sexual maturity. This was considered the age when the first egg appeared, and the percentage of fertility until week 20
-Temperature, which was recorded every day.

Data processing: The results were processed statistically, where average values were calculated variation, the authenticity of changes (methods of descriptive statistics and ANOVA) and accounted $_{tT}$es comparisons.

III. RESULTS AND DISCUSIONS

A. Body weight and weight gain

During the growth of the birds their live weight was monitored. As mentioned in the methodology, it became individual bird weight in determined number for each floor of each battery.

Table 3. Weekly body weight and weight gain (g) and the comparison with standard hybrid

Weeks	Live weight		Weight gain	
	Study group	Standard	Study	Standard
1	70.10±3.47	65	30.Tet	25
2	127.00±6.27	110	56.90	45
3	201.18±14.04	180	74.18	70
4	288.14±16.19	260	86.96	80
5	383.21±33.41	350	95.07	90
6	493.20±23.48	450	110.00	100
7	589.28±27.85	550	96.08	100
8	672.40±38.01	650	83.12	100
9	784.4±49.20	750	112	100
10	897.80±49.88	850	113.4	100
11	977.13±33.74	930	79.33	80
12	1018.79±51.27	1000	41.66	70
13	1084.21±50.41	1070	65.42	70
14	1121.55±56.88	1130	37.34	60
15	1180.21±60.10	1180	58.66	50
16	1213.00±90.86	1230	32.79	50
17	1298.67±97.08	1270	85.67	40
Average			74.04± 26.08	72.35± 21.72

This herd has had a satisfying performance of weight, even in the largest part of the growth during these weights were higher than the standard hybrid. An exception is made for week 14 and 16 where values appear slightly lower than standard (8.5 and 17g or less). In conclusion, a weight of 2.26% higher than the standard hybrid was reached.

Some authors note that the high density of birds in the cage, which for our case has been significantly higher than the norm (150 cm2/ bird from 230 cm2/bird living space needed), negatively affects the economic indicators, the behavior and health of birds [4] [5] [6] [7] [8] [9].
To minimize the impact of density on the rate is modified the lighting program and is making the transfer of a part of the flock of birds on the premises of chicken at the age of 12 weeks and is changing the intensity of light as described in the methods relying on quite authors who emphasize the role of lighting on the growing performance, in welfare and in the health status of the birds [10] [11] [12] [13].

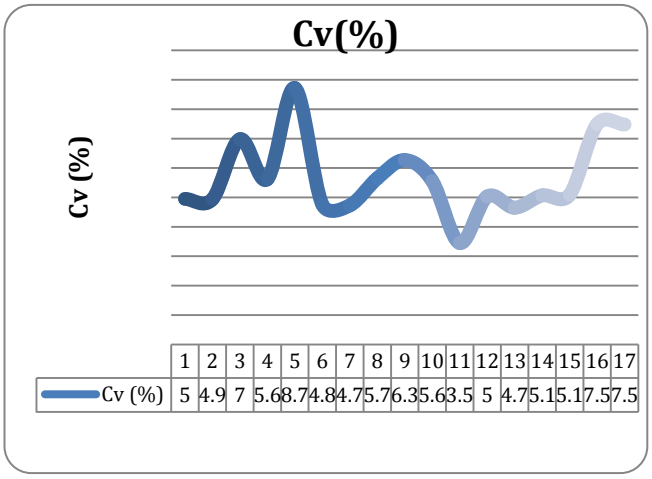
From the table nr. 3 we can see, that the birds during the growing period have been through related additions to the standard weight. At week 8, 12, 14, 16 birds supplements weight of the study were lower than the standard, while in week 17, the weight gain has been 45.7 gram higher than standard, or 53.3% more (the biggest difference). Average weekly weight gain of birds is only 1.69g study rather than standard (or 2.34%). This difference was not significant (tStat tCrit = 1.75 and = 0.40).

From the table we can see that, the maximum values of the weight gain of the hybrid standard appear starting from week 6-10 (100g / week). The same phenomenon is also observed in our study birds. Again within this range limit values observed higher weekly allowances weight, but not with the same consistency. Achieved higher values than the standard hybrid respectively for weeks 6, 9 and 10 (110, 112 and 113,4g / week). In general, differences in the standard of value were small race. The exemption at week 8, 12, 14 and 16, where the first case of bird studies were presented inferior to this indicator. At the end of these additions they were in favor of the birds in the study group. During this period, it obtained 1228.57g weight (standard 1205). This value represents 23.57g, or 1.96% more than standard

B. Uniformity of live weight

Uniformity for live weight measured by calculating the coefficient of variation (CV) shown in the chart below.

Figure 1. Uniformity of birds per week

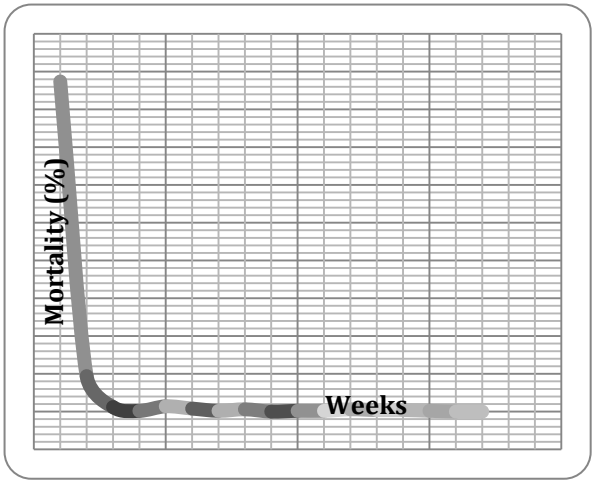


Based on the literature we can emphasize that when CV <8 comes to an optimum uniformity [14] [15] [16].
In this flock it is clear that during the period of growth has excellent uniformity. An exception in the fifth week where values indicate an average uniformity. Even by Commercial Management Guide Hy-line W-98, 2008-2010, the goal is to achieve a uniformity of 80% or more.

C. The mortality

The percentage of mortality for the hybrid Hy-Line W 98 are presented in the following table

Figure 2. Percentage of the mortality during the growth period for the flock in study



If we compare with the standard hybrid (which is 2% up to 16 weeks), we see the flocks of birds in the study had bigger mortality 3.11%. The mortality is higher in the first week due to the conditions of transport. Further batches of birds have had a stable and satisfactory vitality. Studies [5] [17] [18] show that the intensity of lighting shows no impact on mortality of birds.

D. Feed Conversion Ratio (FCR)

During the period of growth three feed ratios were used: 0-6, 6-12 and 12-18 weeks (as in methodology).

Table 4. Feed Conversion Ratio (FCR) for the herd in the study compared to the standard

Weeks	Hy –Line W 98			
	Study		Standard	
	Weekly	Progressive	Weekly	Progressive
1	3.25	3.25	3.92	3.92
2	2.09	2.49	2.64	3.10
3	1.98	2.26	2.10	2.60
4	2.33	2.29	2.54	2.58
5	2.87	2.45	3.03	2.71
6	2.74	2.52	3.01	2.78
7	3.35	2.66	3.22	2.87
8	4.13	2.86	3.43	2.96
9	3.25	2.92	3.64	3.06
10	3.33	2.97	3.78	3.15
11	4.85	3.13	4.81	3.30
12	9.58	3.40	5.70	3.47
13	6.31	3.59	5.90	3.64
14	11.25	3.85	7.00	3.82
15	7.40	4.03	8.68	4.03
16	13.66	4.30	8.96	4.24
17	5.47	4.38	11.73	4.48
Average	5.17± 3.44		4.95± 2.71	

During the period of growth most of the time, the feed is well rewarded by the study birds. 1-17 week period is consumed 4.26% of feed (average per week) less than standard. Well, the feed is effectively used by the birds of the bunch, although at the end of growth differences are quite small for this indication. If we consider this indicator for the entire period of growth (progressive) we will see that the difference is only 0.1, or 2.24% lower than the standard. Study group has achieved better FCR in the third week, as well as standard, even with the difference of 0.12, or used 5.7% less feed per unit of weight. It was consumed less feed for birds and weight supplements are achieved satisfactorily, but the differences are statistically unproven on this indicator (t Stat = 0.37 and tCrit = 1.75).

These results correlate well with the lighting program applied in this herd. According different authors [17] [19], with lower intensity of lighting leads to improved FCR for limited activity of birds.

E. The Index of Performance

Every week was calculated the index of performance for the flock of birds in the study as well as the comparison with the standard became the hybrid.

Table 5. The index of Performance (%) for the birds (study and standards) according the weeks

Weeks	Hy –Line W 98 (V1)	
	Study	Standard
1	2.16	1.66
2	6.08	4.17
3	10.16	8.57
4	12.37	10.24
5	13.35	11.55
6	18.00	14.95
7	17.59	17.08
8	16.28	18.95
9	24.14	20.60
10	26.96	22.49
11	20.15	19.33
12	10.63	17.54
13	17.18	18.14
14	9.97	16.14
15	15.95	13.59
16	8.88	13.73
17	23.74	10.83
Average	**14.92±6.57**	**14.09±6.08**

Based on the above formula (the methodology) we can conclude that the performance index is closely related from two indicators - live weight and FCR. So, as higher as live weight to be achieved and as low as FCR to be achieved, the greater will be the performance index.
Flock in the study, during the growth period there is a performance index higher than the standard rate (except for the week of 8, 12, 13, 14 and 16). Even as the average for the entire period again resulting in a higher value (5.89%), however, the differences are statistically unproven for p≤0.05 (tCrit tStat = 0.74 and = 1.75.

IV. CONCLUSIONS

Although in this herd there was a high concentration of the number of heads, but with careful management was reached to realize a weight, weight gain and an optimum uniformity. Birds used effectively the feed and have achieved good indicator of performance.

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