The Pharma Innovation Journal 2019; 8(2): 553-554

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(2): 553-554

www.thepharmajournal.com
Received: 11-12-2018
Accepted: 14-01-2019

Manjeet
Department of Animal Genetic and Breeding College of Veterinary Science, LUVAS, Hisar, Haryana, India

DS Dalal
Department of Animal Genetic and Breeding College of Veterinary Science, LUVAS, Hisar, Haryana, India

SP Dahiya
Department of Animal Genetic and Breeding College of Veterinary Science, LUVAS, Hisar, Haryana, India

CS Patil
Department of Animal Genetic and Breeding College of Veterinary Science, LUVAS, Hisar, Haryana, India

Correspondence
Manjeet
Department of Animal Genetic and Breeding College of Veterinary Science, LUVAS, Hisar, Haryana, India

40 week egg production based on part egg production in synthetic white leghorn strain

Manjeet, DS Dalal, SP Dahiya and CS Patil

Abstract
A study of white leghorn strain maintained at the poultry farm of department of Animal Genetics and Breeding, LUVAS, Hisar, was conducted to investigate the possibility of prediction of the 40 week egg production from part egg production traits. The part egg production traits included for the prediction of 40 wk egg production were egg production from 25 to 28 week of age (EPP_1), 29 to 32 week of age (EPP_2) and 33 to 36 week of age (EPP_3). Multiple regressions analysis was used to predict the 40 week egg production from part egg production. Equation containingEPP_1 and EPP_2 explained 45% of variation in 40 wk egg production. When all the three traits EPP_1, EPP_2 and EPP_3 were taken together in the prediction equation then equation explained 63% of variation in 40 wk egg production. So it may be concluded that the equation havingEPP_1, EPP_2 and EPP_3 is best for production of 40 wk egg production.

Keywords: 40 wk egg production, equation

Introduction
In India, poultry is one of the fastest growing segments in agriculture sector. The poultry industry in India has become organized and is progressing towards modernization. The total egg production in India is about 88139 million and the per capita availability of 69 eggs per year (BAHS, 2016-17) against 180 eggs per year as recommended by ICMR.EGG production in poultry is a complex quantitative trait showing considerable variation over time within the production period of a hen. Annual egg production could be improved by selection based on part period egg production (Sharma and Chatterjee, 2006) [5].The rate of egg production is the most important trait in layers because it ultimately determines the number of eggs produced in a given period of time. In modern layers, during peak production the production rate almost reaches its maximal biological potential (i.e., 1 egg/hen per day). What differs among birds is how long they can maintain a high rate of lay and at what rate production decreases after the peak (Wolc *et al.*, 2009) [9]. So, the part year record instead of total production derives it advantage as a selection criterion from the fact that loss in the accuracy of selection is more than compensated by reduction in generation interval.

Source of data
The relevant data for the present investigation were collected from synthetic White Leghorn population, maintained at the poultry farm of department of Animal Genetics and Breeding, LUVAS, Hisar. The data were collected over five generations (2012-13 to 2016-17). The birds have been maintained under uniform practices of feeding, housing and management during the period of data recording as far as possible. The following traits were taken for study i.e. Egg production during 25 to 28 weeks (EPP_1), Egg production during 29 to 32 weeks (EPP_2), Egg production during 33 to 36 weeks (EPP_3), Egg production during 37 to 40 weeks (EPP_4).

Statistical analysis
Multiple Regression Analysis (MRA) as described by Draper and Smith (1987) [4] were used to predict breeding values of 40 weeks egg production from early part period egg production and other performance traits.

Prediction equation was as follow:

$$\hat{Y} = a + b_1X_1 + b_2X_2 + \ldots\ldots\ldots b_pX_p$$

Where,
$\hat{Y}$=a variable which is to be predicted (dependent)
â= a constant (intercept)
b_i = partial regression of Y on i^{th} X traits
X_i = independent variables

The coefficient of determination was calculated on the basis of following formula

$$R^2 = \frac{\text{Regression sum of squares}}{\text{Total sum of squares}} \times 100$$

Results and Discussion

Prediction of 40 weeks egg production was done based on part egg production traits. A total of 11 equations were developed in different combinations of various part egg production traits. Predicted equations with their coefficient of determination (R^2) values are presented in Table. Equation containing EPP_1, EPP_2 and EPP_3 accounted for maximum (63%) variation in 40 weeks egg production. These results revealed that the equation combining EPP_1, EPP_2 and EPP_3 which explained 63% of variation in EP_{40} was found the best for prediction of EP_{40}.

Table 1: Prediction of 40 weeks egg production on the basis of part egg production

Sr. No.	Predicted equations	R^2 (%)
1	$\hat{Y}$ = 52.10+1.79 EPP_1	35
2	$\hat{Y}$ = 9.07+3.55 EPP_2	16
3	$\hat{Y}$ = 6.41+3.97 EPP_3	30
4	$\hat{Y}$ = 31.13 +2.95 EPP4	33
5	$\hat{Y}$ = -2.7+1.63 EPP_1+2.75EPP_2	45
6	$\hat{Y}$ = -9.57 +1.57 EPP_1+3.39EPP_3	57
7	$\hat{Y}$ = -40.65 +2.67 EPP_2 +3.52EPP_3	40
8	$\hat{Y}$ = -28.41 +3.02 EPP_2 +2.76EPP_4	45
9	$\hat{Y}$ = 10.81 +1.57EPP_1 +2.56EPP_4	60
10	$\hat{Y}$ = -12.01+2.88 EPP_3 +2.24EPP_4	48
11	$\hat{Y}$ = -44.90 +1.47EPP_1+2.06EPP_2 +3.08 EPP_3	63

Kumar *et al*., (1997) calculated the R^2 values for annual egg production up to 64 wk of age based on EN_{40}, EN_{44}, EN_{48}, EN_{52}, body weight at 16 wk of age and AFE in various combination, the maximum R^2 value come out to be 87.1 percent, which is in close proximity with present finding. Similarly, Sakunthala Devi (2002) observed the values of the coefficient of determination, R^2 for the regression equations predicting EP_{64} from the combination of respective part records and AFE were as 35.03, 49.27, 55.19, 62.48 and 77.96 percent, respectively. These values are also in accordance with present findings. Abraham (2006) [1] adopted step wise regression analysis and developed prediction equation to estimate part term egg production up to 40 and 52 week of age from various segments of egg production, age and body weight at sexual maturity. The R^2 values of these equations were 82.5 percent, 92.9 percent, 70.2 percent and 79.4 percent, respectively.

Samari *et al*., (2008) also observed that total egg production could be calculated from prediction equation based on second and third month egg production in stock of White Leghorn Hens in Iraq, showing conformity with present findings.

The regression equation formed by Kapishwar (2017) [7] based on the optimum body weight and age at first egg of the pullets for maximum egg production. He found that when pullets attain body weight of 1900±50 g at 20 weeks of age these produce more eggs.

The primary objective of this study is to find prediction equations for 40 wk egg production that depends on partial or cumulative egg production as early selection criteria. The generation interval resulting from selection on partial or cumulative records would be decreased and genetic gain measured against time would be improved, but this is not the only way to maximize egg production because genetic gain could be increased also as heritability and selection deferential increased. Results indicated that prediction equation based on EP_{36} alone or in combination with EPP_4 is the best for prediction of 40 week egg production.

References

1. Abraham BL. Prediction of egg production up to forty weeks of age from part records in colored broiler dam line (PB2). Ph. D Thesis, Karnataka Veterinary, Animal and Fisheries Sciences University. Bidar, 2006.
2. Basic Animal Husbandry, Fisheries Statistics. Ministry of Agriculture Department of Animal Husbandry, Dairying & Fisheries. Krishi Bhawan, GOI, New Delhi, 2016-17.
3. Dempster ER, Lerner, IM. The optimum structure of breeding flock. 1. Rate of genetic improvement under different breeding plans. Anim. Breed. Abstr. 1947; 16:689.
4. Draper NR, Smith H. Applied Regression analysis. 1st edn. John wiley, New York, 1987, 709.
5. Sharma RP, Chatterjee RN. Research priorities in poultry genetics and breeding to 2020. In: Poultry Research Priorities to 2020. Proceedings of National Seminar, Central Avian Research Institute, Izatnagar, 2006.
6. Kumar R. Genetic-economic evaluation of selection strategies for improving antagonistic traits in hybrid layer. Ph.D. Thesis, Chaudhary Charan Singh Haryana Agricultural University, Hisar, 2003.
7. Kapishwar. Genetic studies on in on growth, production and reproduction traits of synthetic broiler dam line. M.V.Sc. Thesis. Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, 2017.
8. Samarai FRAl, Kassie GAAl, Ahmed MAN, Kassie KAAAl. Prediction of Total Egg Production from Partial or Cumulative Egg Production in a Stock of White Leghorn Hens in Iraq. International J Poult. Sci. 2008; 7 (9):890-893.
9. Wolc A, Arango J, Settar P, O Sullivan, NP, Dekkers J. C. M Evaluation of egg production in layers using random regression models. Poult. Sci. 2008 ;(9):30-34