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PATTERN OF HOUSING SYSTEMS AND PERFORMANCE OF BROILER BREEDER PARENT STOCKS KEPT IN RAWALPINDI/ISLAMABAD

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ABSTRACT

A survey was carried out on economic efficiency of broiler breeder parent stock (BBPS) to know their housing pattern, production, hatching capabilities of eggs, investment on land, building, equipments and machinery, transport, feed and medicine, by interviewing of randomly selected 25 BBPS farmers in and around Rawalpindi and Islamabad area from August to October, 2002. Results show that two systems of housings were mostly used i.e. environmentally controlled (CH, 13 farms) and open (OH, 12 farms) housing by using deep rice husk litter. Both, CH and OH systems result indicates that day old birds purchased (10239 vs. 5559) and hen housed (9486 vs. 5099) per farm were tend to be significant, respectively. Significantly better peak egg production was observed in CH than OH, for (84.9 vs. 82.0 %), light (16.7 vs. 16.3 hr/24 hr), farm covered area (33649 vs. 16990 sqft/farm), respectively. However, both number of bird purchased and hen housed at each farm, mortality during various period, lighting hours/24 hrs, average farm covered area, hatchability rate, found non-significant respectively. Mortality rate during rearing and production, egg production/H.H for both CH and OH were also found non-significant respectively. It was concluded that for broiler breeder parent stock CH was more profitable than OH, irrespective of any strain housed.

INTRODUCTION

In Pakistan, the poultry breeders mostly adopted their parent broiler flocks in open sheds and larger flock holders adopted environmentally controlled housing. No doubt, the poultry broiler breeders keeping their parent breeding stock in environmentally controlled houses may be producing chicks with lower chick cost and by minimizing daily mortality through adopting effective bio-security measures etc. Furthermore the trend is becoming more favorable for the poultry breeders, which will have their integrated poultry units in the coming future.

Study was designed with the objectives to determine the comparative efficiency of different housing systems on the economics and profitability of broiler parent stock in the study area.

MATERIALS AND METHODS

A proforma was developed for the collection of data concerned with broiler breeder parent flocks. The proforma consist of the farms inventory, land/housing nature related blanks fixtures, equipment, machinery, various capital investments and expenditures, depreciation and finally income from various resources of these farms and net returns. The data was collected from various broiler breeder parent flock farmers in and around Rawalpindi / Islamabad areas from 26th August to 28th October 2002. Proforma comprised of:

Location and characteristics:

It includes information about the farm site; land construction, covered area, and building lay out.

Farm assets and equipment:
Feeders, drinkers, chick guards, exhaust fans, egg trays, laying nest, trolleys, spray pumps, buckets, their condition and estimated value, etc.

Feeding Practice:
Feeding practices was based in two phases i.e. rearing from (0-24 weeks) and production 25-64 weeks.

Vaccine and Vaccination:
Vaccine and vaccination as in practice by the broiler breeder farmers under specific climatic conditions and during out breaks.

Mortality:
Over a flock during rearing and production period confirmed from broiler breeder records and noted on Proforma (Anonymous, 1976).

$$\text{i. During initial rearing (\%)} = \frac{\text{No. broiler breeders died}}{\text{No. broiler breeders purchased}} \times 100$$

$$\text{ii. During production} = \frac{\text{Total No. of broiler breeders died during production}}{\text{Total No. of hen housed}} \times 100$$

iii. **Total Mortality**:
Total mortality was calculated by the submission of both values during rearing and production mortality is (a+b) = C

Light hours:
Over 24 hours lighting hours of each broiler breeder farm was recorded.

Egg Production:
The egg production percentage was calculated on the basis of total no. of hen housed, where as hen housed calculated by total no. of birds purchased – (Mortality recorded + deletion due to other problems) like lame ness.

$$\text{Egg production \%} = \frac{\text{Total No. of eggs produced}}{\text{Total No. of hen housed}} \times 100$$

Peak production:
Out of total production of hatching eggs there was average which was calculated on the basis of maximum of production days.

Housing system:
The system of housing, environmentally controlled or open sheds, provided to the broiler breeder flocks.

The collected data was tabulated and subjected to statistical analysis by using a package Minitab Computer Software (MTB, USA.1992). For analysis of the data a General Linear Model (GLM) was used due to un-balanced data available in each strain and housing system of the area.

RESULTS AND DISCUSSION

Randomly selected 25 private broiler breeder parent flock farms in and around Rawalpindi / Islamabad area were visited and their data was collected. The study mainly based on a sample survey, supplemented by secondary data and some personal observations. The results are produced as under:

HOUSING MANAGEMENT

Housing system

Commonly, under the deep litter system, two hosing systems are in practice in poultry broiler breeder enterprise, at Rawalpindi/Islamabad area, which are

1. Open Housing system
2. Environmentally controlled housing system

It is assumed that the controlled housing system is ultimately more profitable as compared to open housing system for broiler breeders though former system needs more investment for its development. In the Rawalpindi/Islamabad area, a total of 25 farms came under investigation and out of those 13 farms were managed under controlled housing system, while remaining 12 farms were managed in open housing system (Table-1). Krawczyk, *et al.* (2001) reported that a well equipped mechanized house reduced the labour inputs as compared to unmechanized houses.

Table. 1. Housing system in practice at different broiler breeder parent flocks at Rawalpindi/Islamabad area

Housing System	Controlled housing	Open housing
Housing code	C.H.	O.H.
No. of Farms	13	12

Birds purchased and hen housed

It was recorded that in Rawalpindi/Islamabad area in controlled housing system 10239 day old birds of broiler breeder parent stock per farm were purchased and out of that 9486 birds per farm were hen housed; while in case of open housing system 5559 day old birds of broiler breeder parent stock were purchased, out of that 5099 birds were hen housed (Table-2). The probability (P=0.058) for purchase of day old birds suggested significant differences between controlled and open housing systems, while non-significant (P=0.060) for hen housed between these two housing systems.

Table. 2. Birds purchase and hen housed in different housing system at broiler breeder parent flocks at Rawalpindi/Islamabad area

Housing System	C.H	O.H
Bird purchased (day old/farm)[1]	10239±1628	5559±1695
Hen housed (Av. birds/farm)[2]	9486±1535	5099±1598

[1]. P= 0.058 [2]. P= 0.060

Mortality

Mortality was recorded and compared for controlled and open housing systems during the rearing period and production period (Table-3). The compiled results show that during rearing period the mortality of broiler breeder parent stock under controlled housing was averaged 6.13 percent as compared with the mortality of 5.68 percent under open housing system. During production period the mortality of broiler breeder parent stock under controlled housing was averaged 11.35 percent as compared with the mortality of 11.28 percent under open housing conditions. Overall, the mortality of broiler breeder parent stock under controlled housing was 17.48 percent as compared with the mortality of 16.96 percent under open housing system. The probability for rearing period (0.742) and production period (0.963) suggested non-significant differences between the housing systems for mortality. The mortality observed in the present study was well comparable with the observations of Farooq, *et al.* (2001) who reported >15% mortality of female broiler breeders in the farms of Mansehra and Abbotabad areas.

Table. 3. Mortality during rearing and production periods in broiler breeder parent flocks at Rawalpindi/Islamabad area

Housing System	C.H	O.H
During rearing 0-24 weeks (%)[1]	6.13±0.93	5.68±0.97
During production 25-64 weeks (%)[2]	11.35±1.04	11.28±1.08
Total mortality (%)	17.48±1.06	16.96±1.10

[1]. P= 0.742 [2]. P= 0.963

Egg production per hen housed

Average egg production per hen housed was recorded during the study under both the housing systems (Table-4). In Rawalpindi/Islamabad area the broiler breeder parent stock farms managed under controlled housing systems produced 144.62 eggs per hen housed on average while egg production was 141.33 per hen housed under open housing system. The peak egg production under controlled housing system was significantly higher (84.85%) as compared with open housing system having (82.00 %) peak egg production. The probability (0.331) for average number of egg production per hen housed showed non-significant differences between these two systems of housing, while probability (0.027) for peak egg production suggested highly significant differences between the two housing systems. As in the other studies like that of Othman, *et al.* (2000) who also reported that the capacity for profit maximization was 89762 birds producing 12130 thousand eggs.

Table.4. Egg production in various housing system at broiler breeder parent flocks at Rawalpindi/Islamabad area

Housing systems	C.H	O.H
Average No. of eggs per hen housed[1]	144.62±2.29	141.33±1.41
Peak egg production (%)[2]	84.85±0.84	82.00±0.87

[1]. P=0.331 [2]. P=0.027

Initial live bodyweight

Initial live body weight of broiler breeder parent stock at various farms managed under different housing systems was also recorded (Table-5). It was observed that under open housing system of broiler breeder parent stock the initial body weight of broiler breeder chicks on average was slightly higher (40.17 g/chick) as compared with the initial body weight of the chicks (39.92/chick) recorded from the farms under controlled housing system in Rawalpindi and Islamabad area during the study. The probability (0.806) reflects non-significant differences between the initial body weights of broiler breeder chicks under two housing systems.

Table. 5. Initial live body weight of broiler breeder parent flocks at Rawalpindi/ Islamabad area

Housing system	C.H	O.H
Weight (gms/chick)	39.92±0.68	40.17±0.71

P= 0.806

Feed intake

Feed intake was one of the major investment and economic factor for production of the broiler breeder parent stock at the studied farms. Under controlled housing systems the average feed intake during rearing period was 14.19 kg/bird as compared with the birds reared under open housing system where feed intake recorded was 14.2 kg/bird. During production period the feed intake under controlled housing system was 47.81 kg/bird, which was slightly higher than the amount of feed intake 46.50 kg/bird recorded for the broiler breeders reared under open housing system. The probability for rearing period (0.962) and production period (0.287) indicate non-significant differences for feed intake under controlled and open housing systems (Table-6). The studies of Bruggeman, *et al.* (1999) are well comparable with the present research, who concluded that the birds restricted for feed from 7 to 15 weeks of age had higher proportional weights of ovary (more than or equal to 1.7%) and oviduct (more than or equal to 1.58%) at age of sexual maturity.

Table. 6. Feed intake at different housing system at broiler breeder parent at Rawalpindi/Islamabad area

Housing system	C.H	O.H
During rearing [1] (0-24 weeks in kg./bird)	14.19±0.23	14.21±0.24
During production[2] (25-64 weeks in kg./bird)	47.81±0.83	46.50±0.86

[1]. P= 0.962 [2]. P= 0.287

Lighting hours

Lighting hours per 24 hours was also recorded for production of the broiler breeder parent stock at the studied farms (Table-7). It was observed that under controlled housing system average 16.69 hours/day (24 hours) light was provided as compared with the open housing conditions where on average 16.33 hours/day light was provided. The probability (0.041) indicates significant differences in lighting hours between controlled and open housing systems in Rawalpindi and Islamabad area in the studied farms.

A common use of florescent tube lights observed very similar as reported by Shanne (1990) who also reported the use of low bulb and ultra tubes at breeder farms. Furthermore, manual of Hubbard management guide also agrees with the lighting hours, almost begin from 21st week of age to the date of culling (16-17 hours/24 hours) (Anonymous, 2002).

Table. 7. Lighting hours provided/24 hours in broiler breeder parent flocks at Rawalpindi/ Islamabad area

Housing system	C.H	O.H
Light (Hrs/24 hrs)	16.69±0.11	16.33±0.12

P= 0.041

Farm covered area

During management study of broiler breeders, the area covered by each farm has considerable significance from production point of view. In Rawalpindi/Islamabad area the farm covered area under controlled housing system was 33649 sqft on average which was significantly greater than the farm area covered by the farms under open housing systems (16990 sqft/farm) on average (Table-8). The probability (0.056) indicates significant differences in farm area covered by each farm on average under controlled and open housing systems.

Table.8. Farm covered area of each housing system at broiler breeder parent flocks at Rawalpindi/Islamabad area

Housing system	C.H	O.H
Area (av:sq ft/farm)	33649±5747	16990±5981

P= 0.056

Income, expenditure and profits for housing systems

Total income, expenditure and net profits of the average farms at Rawalpindi/Islamabad area under controlled and open housing systems for broiler breeder parent stock production were worked out and shown in Table-9.

The total income under controlled housing systems recorded was significantly higher (14311 thousand rupees per farm) as compared with the average income of the farms (5556 thousand rupees) operated under open housing system. The expenditure amounted to 12088 thousand rupees for each farm under controlled housing system as compared with expenditures (5556 thousand rupees per farm) recorded for open housing system. So far the net profit is concerned, significantly higher amounts profited (2223 thousand rupees per farm) under controlled housing systems as compared to open housing systems where 290 thousand rupees were earned as net profit from each farm.

The probability for income (0.020), expenditure (0.039) and net profits (0.021) illustrated significant differences for controlled and open housing systems. Jiang, *et al.* (1998) also agreed with the results from sensitive analysis to production levels, product price (day old chicks) and its economic values.

Seasonal effect on hatchability

The seasonal effects on hatchability percentage of broiler breeder parent stock (combined for both the housing systems) was worked out and presented in (Table-10). It was noted that during winter season, the hatchability percentage was comparatively higher (84.1 %) than the hatchability of 80.5 % during summer season. The probability (0.065) suggested assuming non-significant differences in hatchability percentage during summer and winter seasons. Contrast to the present study, the studies carried out by Heier and Jarp (2001) reported a significant effect of time (production year/season) and flock size were on the hatching results and several others factors may influence hatchability, the most detrimental being prolonged egg storage time.

Table.9. Income, expenditure and profit in different housing system at broiler breeder parent flocks at Rawalpindi/Islamabad area

Housing system	C.H	O.H
Income (Rs. In thousands/farm)[1]	14311±22416	5556±22514
Expenditure (Rs. in thousands/farm) [2]	12088±2023	5694±2105
Profit (Rs. in thousands/farm) [3]	2223±543	290±565

[1]. P= 0.020 [2]. P= 0.039 [3]. P= 0.021

Table.10. Seasonal effect on eggs hatchability of broiler breeder parent flocks at Rawalpindi/Islamabad area

Season	Summer	Winter
Hatchability (%)	80.50±1.31	84.10±1.50

P= 0.065

Capital turn over and input/output ratio

The capital turn over of broiler breeder parent flock under environmentally controlled and open housing system showed no significant difference CH (0.888) and OH (0.881) respectively. Further more the input/output ratio was also not different statistically for both CH (1.172) and OH (1.203) housing systems in the study area (Table 11).

Table.11. Capital turn over and input/output ratio at different housing systems at Rawalpindi/Islamabad area

Description	CH	OH
Capital turn over[1]	0.888±0.01	0.880±0.14
Input/output ratio[2]	1.172±0.02	1.203±0.02

P= 0.722 P= 0.348

Socio economic status

The results revealed that the farmers made available environmentally controlled housing system (2.154) to their broiler breeder parent stock was enable to be in better status in comparison to open housing system (3.750) those were improved them selves towards good status, and the results was different significantly (Table 12).

Table.12. Socio economic status under different housing systems of broiler breeder parent flocks, at Rawalpindi/Islamabad area

Description	CH	OH
Socio economic status	2.154±0.28	3.750±0.29

P= 0.001 Categories: 1= excellent; 2= very good; 3= average; 4=poor

Conclusions

Rawalpindi/Islamabad area seems to be more suitable for broiler breeder stock keeping, where various strains were observed competing to produce more eggs per H.H and tend to maximized their peak egg production. Range of farmers' status was good (HB) to average (LN). Most of broiler breeder stock was kept under C.H, whose peak production was significantly higher than OH, it became possible due to higher money invested, income and its profit followed by good status of farmers.

Recommendations

1. Study suggest that breeder farmer arrange environmentally controlled housing system to provide effective/scientific management to facilitate birds to produced maximum, by using their genetical potential capabilities.
2. Study suggest that Federal/Provincial Governments should extend support to breeder armers to keep parent stocks in Rawalpindi/ Islamabad area, through introducing interest free loans or allow more subsidies in the sector.

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