STATUS OF BACKYARD CHICKEN REARED BY WOMEN IN CHITRAL, PAKISTAN

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ABSTRACT

Information from 150 females was obtained during the year 1998-99 to investigate status of backyard chicken in Chitral. Estimated human population and number of backyard birds in Chitral were 0.295 and 0.747 million, respectively. Average household flock size was 23.14 ± 1.97 birds, representing 8.04 ± 1.23, 6.83 ± 1.13, 5.67 ± 0.85 and 2.60 ± 0.27 number of Saso, Desi (non-descript indigenous chicken), Rhode Island Red (RIR) and Fayumi birds, respectively. Household flock size and per capita available birds were higher in double than in transitional crop zone. Training status of the farmers, vaccination schedule and crop production zone affected egg production and mortality in backyard chickens. Average mortality in a flock was 13.56 ± 1.38%, representing higher mortality ($P<0.05$) in Saso as compared to non-descript indigenous Desi chicken. Total annual number of eggs obtained by a household from backyard chicken was 2975.95 ± 71.22 eggs, representing 378.28 ± 17.45 and 128.61 ± 21.14 eggs per capita and per bird, respectively. Saso chicken (176.22 ± 21.23 eggs) as compared to non-descript indigenous Desi chicken (58.83 ± 5.27 eggs) produced higher number of eggs per bird. Average number of eggs used for hatching purpose and per capita eggs consumed was 56.34 ± 3.37 and 137.68 ± 23.61, respectively. Mixed rearing practice of exotic birds with Desi chicken resulted in non-broodiness problem that adversely affected hatching performance as reported by most of the farmers. Proper health coverage, provision of training in poultry production, higher flock size, introduction of exotic birds, avoiding haphazard breeding and reduction in mortality were suggested as key factors for better backyard chicken productivity in Chitral.

Key words: Flock size, egg production, egg consumption, backyard chicken, women.

INTRODUCTION

The term backyard chicken designates rearing of chicks on small scale (10-12 birds) for family use and up to some extent for generation of cash income (Qureshi, 1985). Bessei (1989) and Farooq and Mian (2001) reported that chicken kept on small farms under extensive management system considerably contributed to the cash income of the rural families in most of the third world countries. Prior to the establishment of commercial poultry sector in Pakistan, household chickens were the only source of eggs and poultry meat supply (Mian, 1994).

Although, commercial poultry sector has been expanded with a rapid speed during the last three decades and highly productive birds have been imported for boosting production, yet rural poultry is still a significant source of egg production in the country. Such birds are expected to produce high number of eggs if properly managed. However, mortality rates would be high and egg production would be poor if the chicken are not properly vaccinated and managed. Naila *et al*. (2001) reported higher mortality in non-vaccinated flocks, while Farooq *et al*. (2002) reported poor production performance of backyard chicken under poor management conditions.

Chitral, being a remote district of the North West Frontier Province (NWFP) of Pakistan, is more dependent on backyard chicken for eggs and meat than any other livestock species because of meager fodder resources and its diversified climatic conditions. Thus, animal production activities may vary from place to place. Due to the specific climatic conditions and difficulties in communication, commercial chicken production has not yet been well established in Chitral, with the exception of a few small-scale commercial poultry farms recently established through Agha Khan Rural Support Program (AKRSP) and Chitral Area Development Project (CADP). Female farmers were trained in backyard and commercial chicken production by the project staff and were also given exotic chickens

like Saso and Rhode Island Red (RID) for boosting egg production. The present study was designed to investigate production status of backyard chicken, to study the effect of training and to find some effective measures for its development in district Chitral.

MATERIALS AND METHODS

A total of 150 female farmers were selected at random to investigate production status of household chicken in three different crop production zones of Chitral during the year 1998-99. Chitral has been divided into three different climatic zones on the basis of cereal crop productivity namely, single crop zone, double crop zone and transitional zone. In each zone, five villages were randomly selected and in each village 10 farmers were randomly interviewed. Information regarding area location, family size, flock size, training received by the farmers, academic qualification of females involved in chicken production, type of birds maintained, eggs produced, consumed and used for hatching purposes and mortality among birds were collected. The data were analyzed using General Linear Model procedure and univariate analysis (Steel and Torrie, 1981).

In order to ascertain the effect of type of chicken, crop production zone, academic qualification of the farmers, training obtained in backyard chicken production and health coverage programme on egg production performance of backyard chicken, following statistical model was constructed:

$$Y_{ijklmn} = \mu + A_j + B_j + C_k + D_l + E_m + F_{ijklmn}$$

Where Y_{ijklmn} was n-th observation on per household egg production by i-th type of chicken in j-th zone produced under k-th health coverage programme by farmers receiving l-th training and possessing m-th academic qualification, "μ" the population constant to all observations. "A_i the effect of i-th type of chicken: i = Desi, RIR. Saso and Fayumi, "B_j the effect of j-th zone: j = 1, 2 and 3. "C_k the effect of k-th health coverage programme: k = vaccination, no vaccination. "D_l" the effect of l-th training obtained in backyard chicken: l = trained, untrained. "E_m" the effect of m-th academic qualification: m= illiterate, qualified up to primary, and above primary and "F_{ijklmn}" the residual term associated with each Y_{ijklmn} assumed to be normally, independently and identically distributed with mean zero and variance I. A similar model was used for egg consumption, percent mortality, flock size and eggs used for hatching.

RESULTS AND DISCUSSION

Flock Size

Total estimated human population of district Chitral was 2,. 95, .216 heads, representing a household size of 7.87 ± 1.21 persons. There were 7,46,896 numbers of birds with an average flock size of 23.14 ± 1.97 birds per household and 2.54 ± 0.26 available birds per capita (Table 1). Qureshi (1985) reported a smaller flock size (10-12 birds) than the present findings. The larger flock size maintained by a family in Chitral could probably be due to awareness of the people about the use of animal products and importance of rural household chicken production as a subsidiary income in comparison to other livestock production practices which were relatively more difficult due to meager fodder resources.

Zone had a significant effect ($P<0.01$) on flock size (Table 2). Flock size was significantly ($P<0.05$) larger (35.66 ± 1.98 birds) in double crop zone than in single crop (25.45 ± 2.11) or transitional zone (8.33 ± 0.58 birds). Average number of birds available per person was also larger ($P<0.05$) in double crop zone than in transitional zone (Table 2). The larger flock size in double crop zone could be due to better available facilities in the area and availability of more grains for the production of backyard chicken. Double crop zone is lying in the vicinity of Chitral city with greater

Table 1: Production status of backyard chicken reared by women in Chitral

Variables	Mean ± SE
Estimated human population in 1998	2,95,216
Total backyard chicken	7,46,896
Average household size	7.87 ± 1.21
(a) Saso birds	8.04 ± 1.23
(b) Local chicken	6.83 ± 1.13
(c) RIR	5.67 ± 0.85
(d) Fayumi	2.60 ± 0.27
Total flock size (a+b+c+d)	3.14 ± 1.97
Per capita availability of birds	2.54 ± 0.26
Mortality (%)	13.56 ± 1.38
Per household eggs obtained	2975.95 ± 71.22
Per bird eggs produced	128.61 ± 21.14
Household eggs consumed	1255.26 ± 61.35
Per capita availability of eggs	378.28 ± 17.45
Per annum eggs used for hatching	56.34 ± 3.37
Per capita consumption of eggs	137.68 ± 23.61

All values, except mortality, are in No.

opportunities for rearing and marketing of chicken than in transitional zone, which is a remote area with minimal crop production practices because of severe and prolonged winter conditions.

Vaccination practice and training received by farmers had a significant effect (P<0.05) on household flock size and per capita available number of birds in Chitral. Significantly higher (P<0.05) household flock size and per capita number of birds were found with farmers vaccinating their birds than those not vaccinating their birds (Table 2). Farooq *et al*. (2000) also reported higher flock size maintained by trained farmers in Mardan division. Non-significant difference existed in household flock size and per capita number of available birds with illiterate and literate farmers. Higher number (P<0.05) of per capita and per household birds were found with farmers receiving training as compared to untrained farmers. The higher household and per capita available number of birds with trained farmers and those vaccinating their birds against diseases could be attributed to appropriate measures taken for the prevention of infectious diseases and awareness generated among the farmers after getting training.

Mortality

Total mortality in a flock was 13.56 ± 1.38% (Table 1), representing higher mortality (P<0.05) in Saso (18.25 ± 2.48%) than in RIR (15.66 ± 1.97%), Fayumi 11.48 ± 2.11%) and non-descript indigenous Desi chicken (8.98 ± 1.13%, Table 3). Farooq and Mian (2001) and Naila *et al*. (2001) reported higher mortality in backyard chicken than the present findings. The lower mortality in Fayumi and non-descript indigenous Desi chicken could be attributed to better adaptability of these chickens to the local environment.

Zone had a significant effect P<0.01) on percent mortality in backyard chicken. Mortality in chicken was higher (P<0.05) in transitional (17.53 ± 5.28%) than in single (13.94 ± 4.53) or double crop zone (9.22 ± 2.44%, Table 2). The higher mortality in chicken in transitional zone could be attrbitued to its harsh climatic conditions in winter season and unavailability of vaccines and other medicines in the area because of poor infrastructure.

Vaccination programme and academic qualification/training status of the female farmers had a significant effect (P<0.01) on mortality in chicken. Significantly higher (P<0.05) mortality was observed in non vaccinated flocks maintained by untrained and illiterate farmers as compared to vaccinated flocks or flocks maintained by trained women and those qualified up to primary or above (Table 2). Farooq *et al*. (2000) and Naila *et al*. (2001) also reported lower mortality in vaccinated flocks. The lower mortality in vaccinated flocks and those maintained by trained and qualified women could probably be due to better care of the flock and timely vaccination against infectious diseases in the area.

Egg production and consumption status

Total annual household eggs obtained from backyard chicken were 2975.95 ± 71.22 in number, representing 378.28 ± 17.45 eggs per capita and 128.61 ± 21.14 eggs per bird in Chitral. Household and per capita egg consumption in Chitral were 1255.26 ± 61.35 and 137.68 ± 23.61 eggs, respectively (Table 1). Farooq *et al*. (2002) reported smaller household egg production in Charsadda than the present findings. The higher household and per capita number of eggs obtained from backyard chicken in Chitral could be attributed to the keen interest of the people of Chitral in backyard chicken production, awareness generated by training given to female farmers and introduction of highly productive exotic birds for boosting household egg production. This is also evident from the higher (P<0.05) number of eggs produced per bird by Saso (176.22 ± 21.23 eggs) and RIR (151.65 ± 11.24 eggs) than non-descript indigenous Desi chicken (58.83 ± 5.27 eggs; Table 3). Saso and RIR (the exotic chickens, famous for higher egg production) were abundantly available in the area distributed by AKRSP and CADP. Although, these birds produced higher number of eggs, reduced broodiness character was one of the major problems pointed out by the farmers rearing these exotic birds. Thus, if such birds are to be maintained alternative measures should be sorted for hatching of eggs or pure breeding of non-descript indigenous Desi chicken should separately be ensured to have enough birds for natural incubation and hatching of eggs.

Zone had a significant effect (P<0.01) on per capita eggs consumed and eggs obtained from backyard chicken. Significantly higher (P<0.05) per capita per annum eggs were obtained from backyard chicken in double crop zone (516.02 ± 67.28 eggs) than in single crop (449.14 ± 81.24) or transitional zone (169.68 ± 32.53 eggs; Table 2). Similarly, higher per capita eggs were consumed in single (158.27 ± 19.08 eggs) and double crop zone (145.49 ± 10.92) than in transitional zone (109.16 ± 6.59 eggs; Table 2). The higher per capita egg production and consumption in double crop zone could be attributed to the availability of more number of birds in this area than in transitional zone. Double crop zone is lying in the vicinity of the city with better facilities than other zones.

The academic qualification of the farmers and vaccination practice had a significant effect (P<0.01) on per capita egg production and consumption, whereas

Table 2: Per capita annual production status of backyard chicken under variable circumstances in Chitral

Variables	Household flock size (No)	Per capita birds available (No)	Mortality in a flock (%)	Per capita eggs produced (No)	Eggs used for hatchability (No)	Per capita egg consumption (No)
Crop zone						
Single crop	$25.45_b \pm 2.11$	$2.4_b \pm 0.78$	$13.94_b \pm 4.53$	$449.14_b \pm 81.24$	$68.5_b \pm 20.19$	$158.27_a \pm 19.08$
Double crop	$35.66_a \pm 1.98$	$4.3_b \pm 0.88$	$9.22_c \pm 2.44$	$516.02_a \pm 67.28$	$78.7_a \pm 9.98$	$145.49_b \pm 10.92$
Transitional	$8.33_c \pm 0.58$	$0.96_c \pm 0.23$	$17.53_a \pm 5.28$	$169.68_c \pm 32.53$	$25.2_c \pm 3.67$	$109.16_c \pm 6.59$
Vaccine status						
Vaccination	$27.38_a \pm 3.23$	$3.49_a \pm 1.99$	$8.85_b \pm 3.04$	$497.12_a \pm 57.08$	$75.8_a \pm 6.79$	$128.13_b \pm 9.21$
None	$18.91_b \pm 9.78$	$1.59_b \pm 0.26$	$18.28_a \pm 3.18$	$259.22_b \pm 19.76$	$39.5_b \pm 2.88$	$147.26_a \pm 4.24$
Academic qualification						
Illiterate	$23.20_a \pm 5.11$	$2.52_a \pm 1.01$	$16.37_a \pm 7.26$	$343.63_b \pm 45.28$	$52.4_b \pm 9.48$	$131.80_b \pm 31.33$
Up to primary	$21.18_a \pm 3.27$	$2.50_a \pm 0.68$	$11.38_b \pm 6.08$	$390.40_a \pm 22.15$	$59.6_a \pm 6.25$	$136.88_b \pm 11.98$
Above primary	$25.13_a \pm 2.34$	$2.60_a \pm 0.57$	$12.92_b \pm 4.17$	$400.72_a \pm 10.13$	$61.1_a \pm 3.03$	$144.36_a \pm 7.43$
Training status						
Trained	$26.40_a \pm 2.18$	$2.69_a \pm 0.32$	$9.21_b \pm 3.23$	$457.65_a \pm 43.28$	$69.8_a \pm 7.29$	$139.37_a \pm 21.45$
Untrained	$19.88_b \pm 3.13$	$2.39_b \pm 0.98$	$17.93_a \pm 2.78$	$298.69_b \pm 31.27$	$45.6_b \pm 3.29$	$135.95_a \pm 12.18$

Means with different subscripts in each column for each category differ significantly (P<0.05).

Table 3: Mortality and egg production status of various types of backyard chicken in Chitral

Type of chicken	Total household eggs production (No)	Per bird egg production (No)	Mortality (%)
Saso	$1416.77^a \pm 51.39$	$176.22^a \pm 21.23$	$18.25^a \pm 2.48$
RIR	$859.86^b \pm 41.83$	$151.65^b \pm 11.24$	$15.66^a \pm 1.97$
Desi	$401.87^c \pm 9.33$	$58.83^d \pm 5.27$	$8.98^c \pm 1.13$
Fayumi	$297.45^d \pm 2.88$	$114.4^c \pm 3.28$	$11.48^b \pm 2.11$

Means with different superscripts across the rows in each column differ significantly (P<0.05).

training status of women had no effect on per capita egg consumption. Per capita higher (P<0.05) number of eggs were obtained by farmers who had above primary qualification (400.72 ± 10.13 eggs), received training (457.65 ± 43.28 eggs) and those vaccinating their flocks (497.12 ± 57.08 eggs) than untrained (298.69 ± 31.27 eggs) and illiterate farmers (343.63 ± 45.28 eggs) and those not vaccinating their birds (259.22 ± 19.76 eggs; Table 2). Similarly, higher (P<0.05) number of eggs per capita per annum were consumed by farmers who had above primary qualification (144.36 ± 7.43 eggs) and not vaccinating their flocks (147.26 ± 4.24 eggs) than illiterate, and farmers having primary level qualification (131.80 ± 31.33 and 136.88 ± 11.98 eggs, respectively) or vaccinating their birds (Table 2). Non-significant differences existed in per capita annual egg

consumption of a household where chickens were either maintained by trained or untrained female farmers. These findings are in line with Farooq *et al*. (2000). Findings of the present study suggested better egg production of the flocks maintained by trained and qualified farmers and those vaccinating their birds against diseases than others. This could be due to higher survivability of the birds and better care of the flocks than those maintained by untrained and illiterate farmers not vaccinating their birds against infectious diseases.

Eggs used for hatching

Average number of eggs used by a household for hatching in Chitral was 56.34 ± 3.37 eggs; Table 1). Assuming 50% hatchability, the eggs used for hatching were enough to replace the flock of 23.14 birds per year. Zone, vaccination practice, academic qualification and training status of the farmer had a significant effect on per annum number of eggs used by a household for hatching. Significantly higher ($P<0.05$) number of eggs were used for hatching in double crop zone (78.7 ± 9.98 eggs) than in transitional zone (25.2 ± 3.67 eggs; Table 2). Similarly, higher number of eggs were used for hatching by trained females 69.8 ± 7.29 eggs) having above primary qualification (61.1 ± 3.03 eggs) and those vaccinating their birds (75.8 ± 6.79 eggs) as compared to untrained (45.6 ± 3.29 eggs) and illiterate farmers (52.4 ± 9.48 eggs) not vaccinating their birds against diseases (39.5 ± 2.88 eggs; Table 2). The higher number of eggs used for hatching by trained and qualified farmers and those vaccinating their birds could probably be due to awareness of the farmers about appropriate flock replacement programme and interest in generation of revenues from backyard chickens.

Conclusions

Flocks vaccinated against infectious diseases and maintained by trained and qualified farmers performed better than others in terms of egg proudciton and chicken mortality.

Mortality was higher in Saso and RIR than in Fayumi or non-descript indigenous Desi chicken. Conversely, Saso and RIR birds produced higher eggs per bird than Fayumi and Desi chicken. Better egg proudciton of exotic chicken was attributable to their higher genetic potential whereas higher mortality was because of poor resistance of these chicken to infectious diseases. Increased rate of non-broodiness character was one of the major problems in backyard chicken associated with indiscriminate breeding of exotic and indigenous chicken.

Backyard chicken production was more intensively practiced in double crop zone than in single or transitional zone because of the crop production pattern in these zones.

Recommendations

Farmers should be equipped with modern skills of chicken production to ensure appropriate health care and management for reduced mortality and increased productivity.

Haphazard breeding of exotic and indigenous chicken should be avoided to overcome non-broodiness problem and ensure better breeding of the birds. Thus, mating should better be practiced in pens to ensure best possible combinations suggested by the experts working in the area.

Backyard chicken production should also be extended to transitional zone to ensure maximum number of eggs available there. Introduction of exotic chicken through a well planed programme should be encouraged to boost household production.

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