

Characterization of Mewari, an indigenous chicken breed, from hot tropical climate of India

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ABSTRACT

Mewari, an indigenous chicken breed, was characterized for phenotypic parameters, growth, reproduction and production traits under the hot tropical climate of India. The data collected on 690 chicks were analyzed for effect of sex, hatch and their interaction on body weight and body measurements. The body weights of males were significantly higher at different weeks except at day old. Significantly higher shank and keel length was found in males as compared to females. The effect of hatch was significant on mean body weights at all ages, on shank length and breast angles at 8 weeks of age. The fertility and hatchability on fertile eggs set (FES) was $74.15 \pm 4.29\%$ and $71.37 \pm 8.15\%$, respectively. The age at first egg (AFE) in the flock was 142 days and the age at sexual maturity (ASM) was 181.2 ± 3.85 days. The average egg weights at 28 and 40 weeks of age were 36.61 ± 0.29 and 42.59 ± 0.37 g, respectively. The hen day egg production (HDEP) up to 40 and 52 weeks of age was 28.93 ± 0.13 and 59.87 ± 0.14 eggs, respectively. The annual HDEP up to 72 weeks of age was 86.37 ± 0.13 eggs. The growth and egg production of Mewari chicken is comparable with other indigenous breeds. Mewari, a newly registered indigenous breed, needs to be further studied for various parameters to conserve and improve the breed for higher productivity.

Keywords: Body weight, Chicken, Egg production, Indigenous, Mewari

Poultry industry has transformed from a backyard activity to multibillion agri-based industry over the last five decades in India. India ranks 3rd in egg production with 114.38 billion eggs and 5th in chicken meat production with 4.34 tonnes of meat in the country. Though the poultry production in the country has taken a quantum leap in last three decades but the growth has been mainly restricted to commercial poultry sector only. Village poultry contribute only 18% to the egg production in the country. There has been a phenomenal increase (46%) in the population of backyard poultry over 19th census (BAHS 2020) mainly due to the multifaceted approach of the government to promote native chicken farming as a source of livelihood improvement in the country. The per capita availability of egg and chicken meat was 86 eggs and 3.26 kg, respectively in India against the global estimates of 167 eggs and 12.62 kg chicken meat and against the recommended levels of 180 eggs and 11 kg by the Indian Council of Medical Research, Govt of India. This offers a bright scope for expanding the poultry sector globally and particularly in India. The commercial poultry has lot of limitations for further expansion beyond certain limit throwing a

challenge to expand backyard poultry with indigenous as well as improved chicken varieties.

Native chickens grown traditionally have slow growth rate and produce a smaller number of eggs compared to the commercial chicken varieties reared under intensive farm management. Conversely, the high yielding commercial chicken varieties do not sustain, survive and produce under the traditional free-range farming conditions. The indigenous breeds are well adapted and performed under harsh climatic conditions over the ages offers a scope for further strengthening the activity both in size and area of operations. Backyard poultry also gives a scope for including more masses (farmers) in to poultry production and consumption cycle leading to the nutritional security and livelihood development of the rural and tribal peoples (Rajkumar *et al.* 2021). The indigenous chicken represents valuable resources with extensive genetic diversity for livestock development especially in the rural areas (Ajayi 2010). The knowledge on variation in quantitative and qualitative traits in indigenous chicken and their effects on the performance of the birds can be of tremendous help to provide information for planning breeding strategies for genetic improvement (Gowda *et al.* 2020).

Another important factor was that the demand for local chicken and eggs is very high as compared to the commercial broiler meat and eggs due to their better taste, texture and flavour as perceived by the local population

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(Sapkota *et al.* 2002). There is growing interest in native chickens among farmers because of their hardiness, ability to thrive under adverse conditions, and the desirable taste and flavour of their eggs and meat (Rajkumar *et al.* 2016). Regardless of low output from native chicken in the tropics they can thrive and produce under low plane of nutrition, minimum healthcare, harsh environmental conditions etc. They are part of balanced farming system and have vital roles in the rural households as a source of high-quality animal protein and emergency cash income and play a significant role in the socio-cultural life of rural community (Padhi 2016).

Mewari breed was recently recognized and needs to be studied in detail and characterized for phenotypic, growth, reproductive and production traits as the information was limited. Therefore, the present study was carried out to characterize the Mewari chicken breed for phenotypic and economic traits of importance under intensive system.

MATERIALS AND METHODS

The study was conducted at poultry farm, Department of Animal Production, Maharana Pratap University of Agricultural and Technology (MPUAT), Udaipur, located at a height of about 582.2 m above mean sea level between 24°35' North latitude and 74°42' East longitudes in the state of Rajasthan, India. The annual temperature ranges from 7 to 42°C with an average temperature of 24°C. The average rainfall and relative humidity in the region was 600 mm and 50%, respectively.

Experimental population and management: Mewari chicken breed was recognized recently by ICAR-National Bureau of Animal Genetic Resources, the nodal agency for breed registration and conservation in India. The home tract of Mewari chicken breed is Southern region of Rajasthan. The birds had mixed plumage colour with dull pattern, yellow skin, single comb (Mishra *et al.* 2019).

A total of 208 Mewari pullets and 51 cockerels were collected from six districts namely Udaipur, Chittorgarh, Bhilwara, Rajsamand, Dungarpur and Banswara of Southern Rajasthan under All India Coordinated Research Project on Poultry Breeding. The data on total 825 chicks produced through random mating in four hatches were collected. The chicks were reared in brooder cum grower houses having 10' × 10' rooms. Brooder temperature was maintained at 95°F in the first week and gradually reduced to 70°F by the end of the 5th week. Individual chick was wing banded and weighed at the time of hatching and brooded up to 8 weeks of age in deep liter system. *Ad lib.* feed with layer chick ration (2800 kcal/kg and 20% CP) and fresh drinking water at 20-25°C was provided to chicks up to 8 weeks of age. The chicks were vaccinated against Marek's disease (1st day), Newcastle disease (ND) Lasota (7th and 30th day), infectious bursal disease (14th and 26th day), fowl pox (6th week), ND R₂B (9th week), infectious bronchitis (IB) and ND inactivated (18th week).

The pullets were offered grower ration (2800 kcal/kg of ME and 18% CP on calculated basis) till 20th week

of age. During the grower stage, birds were provided only day light. Females were housed in individual cages at 18th week of age and reared up to 72 weeks of age. During the layer stage, birds were provided 16 h of light including day light. Breeder ration (2700 kcal/kg of ME, 16.5% CP and 3.5% calcium) was offered from 20 weeks to the end of the experiment.

Traits studied: The data collected on 607 pullets (268 cocks and 339 hens) on various morphological traits like feather distribution and pattern, comb types, colour of the shank, skin, ear lobe, eye colour etc., at 12 weeks of age were studied for phenotypic characterization of Mewari chicken breed.

Body weight of individual bird was taken at 0, 2, 4, 8, 12, 20 and 40 weeks of age and body measurements viz. shank length, keel length and breast angle at 8 weeks of age were also recorded. The production traits such as age at first egg (AFE), age at sexual maturity (ASM), egg weight at 28 and 40 weeks and hen day egg production (HDEP) at 40, 52 and 72 weeks of age were recorded. The fertility rate was expressed as the proportion of fertile eggs from total eggs set using candling technique on 18th day of incubation. The hatchability rate was estimated as the number of health chicks hatched out from fertile eggs (FES) and total eggs (TES) and expressed as percentage.

Statistical analysis: Randomized Design (CRD) with factorial was utilized for the analysis growth traits (Snedecor and Cochran 1994). A non-orthogonal factorial experiment with sex and hatch (2 × 4) as main effects for growth was employed for analysis of data using univariate GLM procedure of SPSS 16.0 for Windows (SPSS Inc. 1998) and the individual means were compared using

Table 1. Phenotypic characters expressed in percentage (n=607)

Character	Female	Male
n	339	268
<i>Plumage colour</i>		
Brown	86.67 ^a	100
Grey	13.33 ^b	0
<i>Plumage pattern</i>		
Dull	95.55 ^a	0
Solid	4.45 ^b	100
<i>Skin colour</i>		
Yellow	100	100
<i>Shank colour</i>		
Yellow	100	100
<i>Ear lobe</i>		
Red	100	100
<i>Comb colour</i>		
Red	100	100
<i>Comb type</i>		
Single	100	100
<i>Comb size</i>		
Small	100	0
Medium/Large	0	100

Chi square value; ** Significant (p≤0.01).

LSD for significance of difference. The data on qualitative characters were expressed as percentages and chi square test was used to know the significant differences.

RESULTS AND DISCUSSION

Phenotypic characterization: The results of physical characters like plumage, comb, shank, ear lobe, eye and skin colour observed in Mewari chicken expressed as percentage are presented in Table 1. The birds had compact body with small to medium size with multi coloured plumage predominantly brown shades. Majority (86.67%) of Mewari females had light to dark brown plumage while only 13.33% had grey plumage colour (Table 1). The pattern of plumage in most of the female birds was dull (95.55%). Almost all the females had plumage with pencil lining. The plumage colour in all males was brown with bright golden or bronze feathers on neck forming shawl with solid plumage colour pattern. The plumage pattern and distribution showed a clear demarcation between the cocks and hens.. The colour of the skin in all Mewari chickens irrespective of sex was yellow. The shanks were

yellow in colour and strong with small to medium length enabling the birds to move faster in the backyards. The ear lobe was red in colour in both the sexes. Single comb was observed in both male and females in all the birds. The size of comb was small in female and medium to large in males. Multi coloured plumage with red single comb was the breed characteristic of Mewari chicken.

Variations in plumage colours in indigenous chicken breeds were reported by many authors (Faruque *et al.* 2010, Sarkar *et al.* 2012, Suganti 2014, Rajkumar *et al.* 2017, Rofii *et al.* 2018, Dahloun *et al.* 2016) similar to the present study. Majority (more than 96%) of indigenous chicken of Indonesia have multicoloured plumage with yellow, black and grey shanks (Maharani *et al.* 2021). Red single combs predominant in indigenous chickens and 100% single comb type was observed in Black Kedu, Merawang, Gaga and Pelung chicken (Maharani *et al.* 2021) like Mewari chicken. Red pea comb was the breed characteristic of *Aseel* chicken breed known for cock fights (Rajkumar *et al.* 2017). Red, white and red ear lobes were reported by many authors in indigenous chicken

Table 2. Effect of sex, hatch and their interaction on juvenile body weight and conformation traits at 8 weeks of age

Particular	Body weight, g				Conformation traits at 8 weeks of age		
	Day old	2 wks	4 wks	8 wks	SL8, mm	KL8, mm	BA8 (°)
<i>Sex (S)</i>	NS	*	*	*	*	*	NS
Male	25.72±0.20 (288)	53.05 ^a ±0.64 (287)	120.3 ^a ±1.58 (286)	369.9 ^a ±4.9 (279)	40.7 ^a ±0.4 (279)	57.4 ^a ±0.6 (279)	46.56±0.42 (279)
Female	25.38±0.17 (402)	49.45 ^b ±0.54 (400)	104.8 ^b ±1.34 (399)	329.2 ^b ±4.2 (381)	38.8 ^b ±0.3 (381)	54.7 ^b ±0.5 (381)	45.39±0.34 (381)
<i>Hatch (H)</i>	*	*	*	*	*	NS	*
I	26.19 ^a ±0.19 (321)	52.17 ^a ±0.60 (320)	114.0 ^a ±1.50 (319)	341.1 ^{bc} ±4.64 (317)	39.4 ^a ±0.6 (317)	54.8±0.9 (317)	45.68 ^b ±0.63 (317)
II	25.53 ^a ±0.35 (95)	46.32 ^b ±1.11 (95)	86.89 ^b ±2.74 (95)	320.6 ^c ±8.48 (95)	40.0 ^a ±0.5 (95)	55.3±0.8 (95)	46.28 ^b ±0.54 (95)
III	24.76 ^b ±0.32 (116)	47.31 ^b ±1.01 (114)	116.6 ^a ±2.51 (113)	352.3 ^{ab} ±7.99 (107)	37.4 ^b ±0.5 (107)	56.2±0.7 (107)	50.49 ^a ±0.51 (107)
IV	24.70 ^a ±0.27 (158)	53.94 ^a ±0.86 (158)	116.6 ^a ±2.12 (158)	371.2 ^a ±6.9 (141)	41.2 ^a ±0.5 (141)	56.5±0.7 (141)	41.63 ^b ±0.47 (141)
<i>Interaction (S×H)</i>	NS	NS	*	*	*	*	NS
S1H1	26.11±0.29 (142)	53.11±0.91 (142)	119.1 ^b ±2.25 (141)	364.9 ^b ±6.98 (140)	41.3±1.0 (140)	58.1±1.3 (140)	46.24±1.05 (140)
S1H2	25.31 ^{ab} ±0.54 (39)	48.46±1.73 (39)	93.59 ^a ±4.28 (39)	361.4 ^{ab} ±13.2 (39)	42.5±0.8 (39)	59.1±1.2 (39)	46.97±0.84 (39)
S1H3	25.41±0.51 (44)	49.88±1.65 (44)	122.2 ^b ±4.07 (43)	397.3 ^a ±12.5 (43)	39.0±0.8 (43)	58.0±1.1 (43)	51.61±0.80 (43)
S1H4	25.30±0.43 (63)	57.94±1.36 (63)	138.3 ^a ±3.36 (63)	366.9 ^{ab} ±11.0 (57)	40.6±0.7 (57)	55.1±1.1 (57)	41.77±0.76 (57)
S2H1	26.26±0.25 (179)	51.42±0.81 (178)	110.0 ^c ±2.00 (178)	322.3 ^c ±6.2 (177)	38.3±0.8 (177)	52.3±1.1 (177)	45.37±0.78 (177)
S2H2	25.68±0.45 (56)	44.82±1.45 (56)	82.23 ^c ±3.57 (56)	292.2 ^d ±11.0 (56)	38.2±0.7 (56)	52.6±1.0 (56)	45.80±0.70 (56)
S2H3	24.36±0.40 (72)	45.75±1.28 (70)	113.2 ^{bc} ±3.19 (70)	320.8 ^{cd} ±10.4 (63)	36.4±0.7 (63)	54.9±0.9 (63)	49.70±0.66 (63)
S2H4	24.31±0.35 (95)	51.28±1.11 (95)	102.2 ^d ±2.74 (95)	373.9 ^{ab} ±8.9 (85)	41.6±0.6 (85)	57.4±0.9 (85)	41.54±0.60 (85)

Figures in parentheses represent number of observations; *(P<0.05); NS, Non-significant; SL8, Shank length at 8 weeks; KL8, Keel length at 8 weeks; BA8, Breast Angle at 8 weeks.

Table 3. Effect of sex, hatch and their interaction on adult body weight

Particular	Body weight (g)		
	12 wks	20 wks	40 wks
<i>Sex (S)</i>	*	*	*
Male	764.37 ^a ±7.21 (268)	1280 ^a ±18.1 (109)	1418 ^a ±24.9 (75)
Female	609.86 ^b ±6.42 (339)	990.5 ^b ±11.9 (253)	1328 ^b ±20.4 (112)
<i>Hatch (H)</i>	*	*	*
I	707.04 ^a ±6.71 (310)	1139 ^a ±12.9 (212)	1304 ^b ±34.1 (81)
II	609.41 ^b ±12.12 (95)	1023 ^b ±26.4 (51)	1395 ^a ±37.6 (33)
III	605.26 ^b ±12.38 (91)	972.5 ^b ±26.2 (52)	1357 ^b ±23.9 (40)
IV	715.67 ^a ±11.21 (111)	978.1 ^b ±27.5 (47)	1424 ^a ±37.6 (33)
<i>Interaction (S×H)</i>	NS	*	*
S1H1	791.4±10.0 (138)	1428 ^a ±25.4 (55)	1365 ^b ±50.9 (18)
S1H2	704.9±18.9 (39)	1128 ^{bc} ±47.2 (16)	1446 ^a ±53.9 (16)
S1H3	688.6±18.0 (43)	1136 ^b ±43.3 (19)	1401 ^a ±48.3 (20)
S1H4	802.7±17.05 (48)	1123 ^{bc} ±43.3 (19)	1459 ^a ±47.1 (17)
S2H1	639.3±9.01 (172)	1037 ^{cd} ±15.1(157)	1254 ^c ±46.0 (61)
S2H2	542.9±15.7 (56)	974.8 ^{de} ±31.9 (35)	1346 ^b ±52.3 (17)
S2H3	530.6±17.0 (48)	878.4 ^c ±32.8 (33)	1342 ^b ±27.6 (16)
S2H4	649.3±14.9 (63)	880.0 ^c ±35.7 (28)	1364 ^b ±62.3 (12)

Figures in parentheses represent number of observations; *(P<0.05); NS, Non-significant.

from different countries (Faruque *et al.* 2010, Sarkar *et al.* 2012, Rajkumar *et al.* 2017, Maharani *et al.* 2021). Contrary to the present findings, white skin was reported in Aseel indigenous chicken, however shanks were yellow in majority of birds similar to the Mewari chicken (Rajkumar *et al.* 2017). The variations in the colour intensity of different qualitative traits like plumage, comb, earlobe, shank, skin etc. were due to the expression of pigment controlling genes responsible for colour determination (Dahloum *et al.* 2016). All the findings confer to the Indian chicken breed standards as per ICAR-NBAGR guidelines, the nodal agency for breed characterization and registration. The phenotypic characters were in accordance with The American Standards of Perfection (APA 1998) and British Poultry Standards (Roberts 1997) with minor differences due to breed evolution over the years.

Growth performance: The data on body weights were analyzed for effects of sex, hatch and interactions at 0, 2, 4, 8, 12, 20 and 40 weeks of age and the body measurements at 8 weeks of age (Tables 2 and 3). The interaction effect was significant (P≤0.05) on body weight at 4 and 8 weeks; and on shank length and keel length at 8 weeks of age (Table 2). The interaction effect was significant (P≤0.05) on 20 and 40 week body weights (Table 3). Effect of sex was significant (P≤0.05) on body weight at different ages except at day old. The mean body weights of male were significantly (P≤0.05) higher than the females. The mean body measurements viz. shank length and keel length at 8 weeks of age were significantly (P≤0.05) higher in male as compared to females, however, the effect of sex on mean breast angle was non-significant. The effect of hatch was significant (P≤0.05) on body weights at different ages, on shank length and breast angle at 8 weeks of age in

Mewari chicken (Table 2). The mean body weights were significantly (P≤0.05) lower in hatch II up to 12 weeks of age, however, the adult body weights at 20 weeks of age were higher in I and II hatch. The mean body weights at 40 weeks of age were significantly (P≤0.05) higher in hatch II and IV (Table 3). The perusal of data revealed that the males in all the hatches were significantly (P≤0.05) heavier than the females. Similarly, the mean body weights in II hatch were lower as compared to other hatches. The mean body weight at 40 weeks of age was significantly (P≤0.05) higher in males except in hatch I and the females in hatch I had lowest body weight at 40 weeks of age. The mean body weights in Mewari chicken found in present study was higher than the body weights reported by Haunshi *et al.* (2009) for Miri type indigenous chicken at all the ages. Higher body weight than the Mewari was observed in CARI Nirbheek (Malik and Singh 2010); in coloured broiler crosses (Rajkumar *et al.* 2011) which might be due to the hybrid effect in a cross combination. The body weight at 8 and 12 weeks of age in the present study were higher than the findings of Malik and Singh (2013) in Tripura black native germplasm. Pathak *et al.* (2017) reported higher 4 and 6 weeks body weights in Aseel and Kadaknath chicken as compared to Mewari chicken in the present study. The shank length found in Mewari was lower than the values reported by Rajkumar *et al.* (2017) in Aseel as cocks have been selected for their fighting abilities with longer and stronger shank. Padhi *et al.* (2016) observed higher shank length in male and female of three way cross developed for backyard poultry at 8 weeks of age compared to Mewari chicken which might be due to the combining ability of the lines in cross combination. Similarly, higher shank and keel length were reported by Haunshi and Doley (2011) in non-descript

Mizo local chicken which may be attributed to the genetic variability in the chicken germplasm of north eastern hilly region. The adult body weights of males and females at 20 weeks of age were similar to that of Miri chicken and were lower than the improved Gramapriya and Vanaraja (Haunshi *et al.* 2009) chicken varieties. The 20 weeks body weight recorded in the present study were comparable with the body weights found in Tripura black (Malik and Singh 2013) and indigenous and crossbred chicken of Andaman and Nicobar Islands (Sunder *et al.* 2005). Hassen *et al.* (2006) reported similar values for body weights as in Mewari in indigenous chicken in north western Ethiopia. However, the body weights in present Mewari chicken were lower than values reported by Sankhyan and Thakur (2016) in indigenous and Vanaraja chicken. Higher mean body weights at 20 and 40 weeks of age than the present study was reported in Aseel breed by Rajkumar *et al.* (2017) and Mohan *et al.* (2008); in crossbred improved chicken varieties developed for backyard poultry (Niranjan *et al.* 2008, Padhi *et al.* 2016, Rajkumar *et al.* 2018, 2019). However, the body weights at 20 weeks of age in the present study were higher than body weights recorded in Kadaknath (Haunshi *et al.* 2011), local strain of Odisha (Banja *et al.* 2017). Padhi *et al.* (2001, 2004) recorded lower 20 weeks body weights in Nicobari fowl compared to Mewari chicken in the present study. The mean adult body weights of Mewari observed in the present study were lower than the values of Danki, Kalasthi and Ghagus (Vij *et al.* 2006) and Tellicherry (Vij *et al.* 2008) chicken breeds. The difference in body weights at different ages was mainly attributable to the breed characters, feeding, agroclimatic conditions and managemental practices during the experiment.

Reproduction performance: The fertility ranged from 59.8 to 86.3% during different hatches with an average fertility of 74.15% (Table 4). The hatchability was 52.92 and 71.37% on total egg set and fertile egg set, respectively. These findings corroborate with findings of Malik and Singh (2010) in CARI Nirbheek. Almost similar fertility

Table 4. Performance of reproductive and productive traits of Mewari chicken

Traits	Values
Age at first egg in the flock, d	142
Age at sexual maturity, d	181.2±3.85(140)
Fertility, %	74.15±4.29(5)
Hatchability, %	
Total egg set (TES)	52.92±7.48
Fertile egg set (FES)	71.37±8.15
Egg weight, g	
28 wks	36.61±0.29(230)
40 wks	42.59±0.37(222)
Egg production (HDEP), nos.	
40 wks	28.93±0.13 (216)
52 wks	59.87±0.14(193)
72 wks	86.37±0.13(173)

Figures in parentheses represent number of observations

was reported in indigenous chicken Tripura Black and Tripura Brown, Kadaknath. Lower fertility and hatchability on TES were reported by Rajkumar *et al.* (2017) in Aseel chicken, whereas the hatchability on FES basis was higher than the Mewari chicken. Vij *et al.* (2006) reported higher hatchability on TES for Danki, Kalasthi and Ghagus breeds compared to the present findings. Higher fertility and hatchability than the present study was reported by Sarma *et al.* (2017) in Vanaraja, Srinidhi and indigenous chicken from Assam.

Production performance: The production potential of indigenous chicken breeds was generally low except for few breeds like Ankleswar, Kadaknath etc. which are known for their laying ability. The results of the production parameters are presented in Table 4. The average age at first egg (AFE) of flock was 142 days which is considerably lower than AFE in Danki, Kalasthi and Ghagusbreeds (Vij *et al.* 2006) and Tellicherry chicken (Vij *et al.* 2008). The average age at sexual maturity was 181.21±3.85 days. Haunshi *et al.* (2009) reported considerably lower age at sexual maturity in Miri chicken than the Mewari chicken studied. The age at sexual maturity in present study was 181 days which is comparable with Gramapriya and Vanaraja (Haunshi *et al.* 2009); Daothigiri chicken of Assam (Vij *et al.* 2007); CARI Nirbheek chicken (Malik and Singh 2010); Vanaraja, Srinidhi and Desi chicken (Sarma *et al.* 2017) of Assam. Higher age at sexual maturity was reported by many authors viz. Haunshi *et al.* (2011) in Aseel and Kadaknath; Rajkumar *et al.* (2017) in Aseel; Pant *et al.* (2007) in Hill chicken of Uttarakhand; Singh *et al.* (2000) in Aseel; Adedokun *et al.* (2002) and Sola-Oja *et al.* (2011) in Nigerian chicken. The variations in the ASM was due to the feeding regime and lighting schedule followed in different studies as the photoperiod has significant effect on maturity. The egg weight at 28 and 40 weeks was higher in the present study than the Miri type chicken (Haunshi *et al.* 2009) and Aseel chicken at 40 weeks (Rajkumar *et al.* 2017). Haunshi and Doley (2011) reported similar egg weight at 40 weeks of age in Mizo local chicken, whereas Sarma *et al.* (2017) reported higher egg weight at 40 weeks in Vanaraja and Srinidhi chicken in Assam. Haunshi *et al.* (2012) reported similar egg weights in Kadaknath at 28 and 40 weeks of age while the values for Aseel chicken were higher than Mewari chicken reported in this study.

Egg production in indigenous chicken breeds is usually low, which was true in Mewari breed also with an annual (72 weeks) production of 86 eggs (Table 4). Haunshi *et al.* (2009) reported slightly higher HDEP at 40 and 52 weeks than present study. Rajkumar *et al.* (2017) reported lower egg production values for Aseel chicken as compared to Mewari chicken at all ages. The HDEP at 40 and 52 weeks in the present study was similar to non-descript chicken of Assam (Sarma *et al.* 2017). The annual egg production in Mewari chicken was higher than the production of native birds of Himachal Pradesh (Sankhyan and Thakur 2019). The egg production at 40, 52 and 72 weeks of age in desi chicken of Assam were lower compared to Mewari chicken

while the egg production values for Vanaraja and Srinidhi were higher (Sarma *et al.* 2017). Haunshi *et al.* (2011, 2012) reported higher egg production at 40 weeks of age in Aseel and Kadaknath as compared to Mewari chicken. Higher egg production than Mewari chicken was recorded in crossbred chicken varieties developed for backyard poultry (Padhi *et al.* 2016, Rajkumar *et al.* 2018, 2019). The probable reason for higher production might be the breed improvement program practiced in Kadaknath and Aseel chicken; Mewari, a newly registered breed without any selection. Mewari chicken breed needs to be conserved and improved for important economic traits as it was preferred by rural people across the Mewari region of the Rajasthan.

The Mewari birds had compact body with small to medium size with multi coloured plumage and red single combs. The growth, reproduction and production traits in Mewari breed of chicken are comparable with other indigenous breeds of India. The annual egg production was 86 eggs. The research on Mewari chicken should be further strengthened with respect to conservation and improvement.

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