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## STUDY THE EFFECTS OF ECOLOGICAL CONDITIONS ON DESI AND FAYOUMI CHICKEN TRAITS AT SINDH, PAKISTAN

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### ABSTRACT

The present study evaluated the different body organ measurements and multiple phenotypic traits of Desi and Fayoumi chicken breeds under free range and intensive management conditions during 2021. The average values of phenotypic traits like neck length, body height, shank length, beak length, and wing span of Desi and Fayoumi males were measured as (20.4±1.9), (16.5±1.4), (43.4±3.2), (33.7±3.2), (12.5±0.82), (8.3±0.72), (3.6±0.21), (2.7±0.16) and wings span (23.7±1.6), (18.3±1.5) in intensive conditions respectively. While in the free range conditions, the neck length, body height, Shank length, beak length and wing span were recorded as (18.7±1.6), (16.4±1.3), (38.7±3.2), (34.6±3.1), (10.3±0.97), (9.4±0.94), (3.3±0.24), (2.7±0.18), (20.4±1.5), (18.5±1.4) in both chicken breeds. The different phenotype traits of chicken breeds as eye color, comb, plumage, feather, barbell and mumps, body height, Shank length, beak length, and wing span in intensive and free range conditions. It is concluded that Desi chickens were found with larger body parts and varied color. The present study suggests that further research should be carried on other characteristics to improve poultry quality and higher quantities in future endeavors.

**Keywords:** Animal husbandry, Desi chickens, Fayoumi chicken, Phenotype, Plumage

### INTRODUCTION

The common chicken, also known as *Gallus gallus domesticus*, is predominantly derived from its predecessor, the red jungle fowl. However, genetic changes have been recorded compared to other Jungle species (Zheng *et al.*, 2021). Each bird assumes a dominant role in a flock of chickens, creating a hierarchical structure. When a chicken faces danger from predators and experiences anxiety or health issues, it could exhibit fluffing up its feathers (Faruque *et al.*, 2010). The rural population is comparatively more deficient in protein contents than the urban population. (Padhi, 2016). Chicken is a quicker, cheaper, and more efficient source of protein (Khawaja *et al.*, 2013). The implementation of crossbreeding programs, which involve the enhancement of local breeds with appropriate exotic breeds, has been recognized as a notable approach with superior characteristics like growth rate, meat quality, and feed conversion (Fan *et al.*, 2013). The speedy transmission of chicken benefits to the commercial mixed offspring is primarily attributed to genetic choice (Sarma *et al.*, 2020). Desi Chickens rearing is easy and affordable in the local free management system, and Desi chicken products are much better than poultry chickens (Albokhadaim *et al.*, 2012). It is imperative to undertake genetic improvement measures for Desi chicken and an approach to achieve this through

crossbreeding of improved Desi chicken and imported exotic breeds, focusing on conserving desirable genes (Guo *et al.*, 2022). The harsh environmental conditions in their feeding management, overcrowding, dust, litter, and pathogens are relaying harmful effects on valuable eco-friendly avifauna communities (Mangrio *et al.*, 2020). The breeding Desi and Fayoumi chickens play a significant role in the food industry and valuable economy, but climatic changes make it increasingly challenging (Islam *et al.*, 2004). The chicken industry has been widely scoped in Pakistan for the last three decades (Farooq & Shakir, 2004). The supply of commercial poultry yields in rural areas is much low as compared to urban areas (Anjum *et al.*, 2012). Their survival ability and adequate environmental adaptation make chickens a successive indicator of poultry production in harsh ecological niches worldwide, including Pakistan (Bhatti *et al.*, 2002). The native chicken breeds give a prior population for better diversification and production so for sufficient meat production and profitability the domestic chicken breeds can be enhanced genetically (Chitra, 2019). In many aspects of poultry products, some local traits perform much better in terms of egg weight and much better competence, like the weight of eggs, egg laying capacity, and rapid rate of expansion, which can be helpful for the economic effectiveness of rural

poultry. Under rural conditions, the chances of survival for chickens become much more difficult due to the climatic changes, however, cross-breeds between different types of chickens are carried out under rigorous and improved environmental conditions (Kiani, 2022). Rapid trait production of different breeds may be crossed to increase in their population (Faruque *et al.*, 2017), efficient sustainability in respect of harsh ecological conditions, and increase in meat production, which contributes a great part of income for local farmers (Fentie *et al.*, 2013). The variation in weight gain, growth rate, and body organ size was analyzed between purebred chicken breeds. The possible outcomes of this research will help identify distinguish morphological characteristics of Desi and Fayoumi selected chicken breeds.

## MATERIAL AND METHODS

A collection of 30 male and female chickens of Desi and Fayoumi species about 90 days old were collected from local people and hatcheries. The flocks of both species were brought from sample collection points and placed in animal husbandry, Department of Zoology, SALU, Khairpur. A deep litter system was maintained for the required period.

The Desi and Fayoumi chickens were reared in free-range conditions (FRC) and they were kept as in rural domesticated habitats to mate to increase their number. In these conditions, proper feeding and vaccinations were not introduced. Under intensive management conditions (IMC) both were reared separately in different bird cages in respect to their average population. The feeding system and water availability were arranged according to NRC and ISA guidelines. The whole chicken population was vaccinated according to the vaccination schedule given by regional vaccinating authorities (Islam and Dutta, 2010).

The body organ's weight measurements were taken in (grams) through a digital electronic weight machine. The measurement of quantitative linear traits of the chickens was taken in (cm) by using a textile measuring tape. The whole body height was measured by using sawing tape. From the shank joint up to the digituspe dis length of the shank, and from the brooder end of the beak to its pointed end length of the beak were taken. Wingspan measurement was taken from the junction of touches of humor to the spine tip. Neck length was measured from the base of the head to the starting point of the thorax mandibles.

Similarly different qualitative traits were selected for better production of traits. Mainly three colors of each parameter were focused. Before exposure to different ecological conditions, both chicken species were pre-examined comb color (white, black, red), eye color, (white, maroon, red), plumage (white, golden, grey), feather type (curled, smooth, normal), barbell color (red, black, pink), mumps color (orange, red, white), beak color (yellow, white, horned) were recorded on both species.

## RESULTS

**Different body organs measurement of Desi pure and F1 chicken breeds under IMC:** The body height of the Desi male and female was measured as longer ( $43.4 \pm 3.2$ ), ( $37.8 \pm 2.4$ ) and with a neck larger length of ( $20.4 \pm 1.9$ ), ( $15.3 \pm 1.4$ ) respectively. The male shank length was ( $12.5 \pm 0.82$ ), ( $10.3 \pm 0.68$ ). The male was larger in length ( $3.6 \pm 0.2$ ), ( $3.2 \pm 0.17$ ) and the wingspan was measured larger ( $23.7 \pm 1.6$ ) compared with the female ( $20.3 \pm 1.4$ ). All these parameters were longer and larger in males than in females. After F1 generation of body height was measured as ( $38.1 \pm 3.4$ ), ( $34.5 \pm 3.1$ ) and neck length ( $19.3 \pm 1.6$ ), ( $13.5 \pm 1.4$ ). The shank length was ( $10.2 \pm 0.87$ ), ( $8.7 \pm 0.65$ ). The beak length of the male was noted (at  $3.3 \pm 0.21$ ) female ( $3.2 \pm 0.18$ ) and male wingspan was measured (at  $21.3 \pm 1.9$ ) and female ( $18.4 \pm 1.6$ ) cm, respectively. Generally, males were found to have higher and larger body organs than females in the F1 generation.

**Fayoumi pure breeding and F1 generation under IMC:** The chicken breeds were also brought from the sample collection point and reared in intensive conditions. After a period of 90 days, old rooster parent's male body height was ( $33.7 \pm 3.2$ ) and the female ( $32.4 \pm 2.8$ ). The neck length was ( $16.5 \pm 1.4$ ), ( $15.2 \pm 1.4$ ) and the shank length as ( $8.3 \pm 0.72$ ), ( $7.8 \pm 0.64$ ). The beak length ( $2.7 \pm 0.16$ ), ( $2.4 \pm 0.16$ ) and wingspan measured as ( $18.3 \pm 1.5$ ), ( $17.4 \pm 1.6$ ) respectively. After F1 generations of chickens, average body height was measured as ( $34.2 \pm 2.8$ ), ( $33.7 \pm 2.7$ ) and neck length was ( $17.4 \pm 1.6$ ), ( $16.7 \pm 1.4$ ). The shank length was measured as ( $8.6 \pm 0.72$ ), ( $8.3 \pm 0.75$ ). The beak length ( $2.9 \pm 0.17$ ), ( $2.8 \pm 0.18$ ), and male wingspan were found to be larger ( $19.4 \pm 1.7$ ) and female ( $18.7 \pm 1.6$ ) cm, respectively. In the chicken species, the male was found to be higher and larger, as reported in Desi male chickens.

**Table 1 Body organs measurements of chickens under IMC**

Habitat	Chicken breeds		Body Height (cm)	Neck length (cm)	Shank Length (cm)	Beak Length (cm)	Wingspan (cm)
Intensive Condition	Desi	Male	$43.4 \pm 3.2$	$20.4 \pm 1.9$	$12.5 \pm 0.82$	$3.6 \pm 0.21$	$23.7 \pm 1.6$
		Female	$37.8 \pm 2.4$	$15.3 \pm 1.4$	$10.3 \pm 0.68$	$3.2 \pm 0.17$	$20.3 \pm 1.4$
	Desi F <sub>1</sub>	Male	$38.1 \pm 3.4$	$19.3 \pm 1.6$	$10.2 \pm 0.87$	$3.3 \pm 0.21$	$21.3 \pm 1.9$
		Female	$34.5 \pm 3.1$	$13.5 \pm 1.4$	$8.7 \pm 0.65$	$3.2 \pm 0.18$	$18.4 \pm 1.6$
	Fayoumi	Male	$33.7 \pm 3.2$	$16.5 \pm 1.4$	$8.3 \pm 0.72$	$2.7 \pm 0.16$	$18.3 \pm 1.5$
		Female	$32.4 \pm 2.8$	$15.2 \pm 1.4$	$7.8 \pm 0.64$	$2.4 \pm 0.16$	$17.4 \pm 1.6$

	FayoumiF <sub>1</sub>	Male	34.2±2.8	17.4±1.6	8.6±0.72	2.9±0.17	19.4±1.7
		Female	33.7±2.7	16.7±1.4	8.3±0.75	2.8±0.18	18.7±1.6

**The body organs measurement of Desi pure chicken breeds and F<sub>1</sub> generation under FRC:** The quantitative morphological traits examination both male and female pullets chicken was kept in animal husbandry for up to 90 days in free range condition. The populations of the chickens were arranged at the (3:1) ratio for proper breeding and measurement of the male and female body organs were taken in cm. The body height of the male length was measured (at 38.7±3.2) for females (35.2±3.1), male rooster with a neck length (of 18.7±1.6) for females (15.3±1.2). The height length of the male shank was (10.3±0.97) female (8.7±0.92) and male beak length (3.3±0.24) female (3.1±0.25). The average length of the male wingspan measured (20.4±1.5) and the female (19.7±1.07) cm, respectively. After breeding of males and females from Desi chickens the F<sub>1</sub> generation was produced, and the male was found higher and healthier than the female. The body height of males was deliberately longer (38.5±3.3) than females (35.4±3.1), and male neck length was (18.2±1.5) and females (15.3±1.3). The male shank length measured (10.2±0.94) the female (8.6±0.87), and the length of the male beak noted (3.2±0.23) female (3.1±0.21).

The length of the male wingspan was (20.2±1.6) and the female (19.6±1.5) cm, respectively.

**Fayoumi pure breeding and F<sub>1</sub> generation under FRC:** The male and female pure chicken breeds were also brought and kept in free-range conditions for the purpose to examine phenotypic traits in both sexes. The average body height of 90 days old Fayoumi male was calculated (34.6±3.1) for females (32.5±2.8), and the male rooster with average neck length noted (16.4±1.3) female (12.7±1.2). The shank length of the male was measured (9.4±0.94) and the female (9.2±0.82) and the length of the male beak was (2.7±0.18) female (2.4±0.18). The male wingspan length was measured (18.5±1.4) and the female (18.2±1.4) cm, respectively. The average length of the male body height was noted (36.1±3.1) female (35.4±2.9), and the measurement of the male neck, including the rooster, was (17.8±1.4) female (13.2±1.2). The length of the male shank was counted (9.8±0.83) female (9.5±0.87), and the beak length of the male (2.8±0.16) female (2.3±0.16). The length of the male wingspan was (19.3±1.5) female (18.7±1.3) cm, respectively, as depicted in (Table- 2).

Table .2 Body organs measurements chickens under FRC

Habitat	Chicken breeds		Body Height (cm)	Neck length (cm)	Shank Length (cm)	Beak Length (cm)	Wing Span (cm)
Free Range Condition	Desi	Male	38.7±3.2	18.7±1.6	10.3±0.97	3.3±0.24	20.4±1.5
		Female	35.2±3.1	15.3±1.2	8.7±0.92	3.1±0.25	19.7±1.07
	Desi F <sub>1</sub>	Male	38.5±3.3	18.2±1.5	10.2±0.94	3.2±0.23	20.2±1.6
		Female	35.4±3.1	15.3±1.3	8.6±0.87	3.1±0.21	19.6±1.5
	Fayoumi	Male	34.6±3.1	16.4±1.3	9.4±0.94	2.7±0.18	18.5±1.4
		Female	32.5±2.8	12.7±1.2	9.2±0.82	2.4±0.18	18.2±1.4
	FayoumiF <sub>1</sub>	Male	36.1±3.1	17.8±1.4	9.8±0.83	2.8±0.16	19.3±1.5
		Female	35.4±2.9	13.2±1.2	9.5±0.87	2.3±0.16	18.7±1.3

**Qualitative morphogenetic traits % Desi pure and F<sub>1</sub>Chicken under IMC:** Attention was given to examine the color % in pure breeds of male and female under intensive management conditions. Before matting of male and female the color patterns of different traits were counted in %. The comb color observed was white at (15.5%), black (36.2%) red (48.3%) found in male and female Desi chickens. The eye color white (45.8%) maroon (21.3%) black (32.9%) was reported. The color of plumage was found white (30.2%) golden (48.3%) grey (21.2%). The feather type was curly (20.7%) smooth (61.4%) normal (17.9%). The barbell colors were found red at (42.4%) black at (33.4%) and pink (24.2%). The mumps color was reported as orange at (27.3%) red (35.2%) white (37.5%) and the color of the beak was reported as yellow (26.8%) white (37.8%) horned (35.7%), respectively. After mating Desi breeds

F<sub>1</sub>generation was produced but variations were recorded in colour patterns %. The comb color was found in white at (21.5%) black (40.7%) red (37.8%) in both male and female Desi F<sub>1</sub> chickens. Eye color white was at (32.9%) maroon (32.6%) black (34.5%), color of plumage white at (26.8%) golden (42.1%) grey (31.5%). The type of feather was curly (27.3%) smooth (48.4%) normal (24.4%), barbell colors red (25.3%) black (47.4%) pink (27.3%). The color of mumps was found orange (35.2%) red (40.4%) white (24.4%), and beak colors yellow at (17.6%) white (38.3%) horned (44.1%), respectively.

**Qualitative morphogenetic traits Fayoumi pure and F<sub>1</sub> chicken under IMC:** In intensive management conditions, the percentages of comb colors in both male and female chicken breeds were counted and reported as white at (35.8%) black (38.9%) red (25.3%) in male and female chickens.

Eye color was reported as white at (26.7%) maroon (31.8%) black (41.5%), plumage white at (47.3%) golden (28.6%) grey (24.1%). The feather curly types at (52.3%) smooth (24.3%) normal (23.4%), barbell colors red (33.7%) black (41.6%) pink (24.7%). The mumps color orange (27.6%) red (42.6%) white (29.8%), beak colors yellow (29.4%) white (34.5%) horned (36.1%), respectively. After mating breeds F<sub>1</sub> generation was obtained but variations were recorded in male and female color pattern %. The comb color

white was reported at (37.4%) black (24.3%) red (38.3%) F<sub>1</sub> generation. Eye color white was found at (31.7%) maroon (42.6%) black (25.7%), plumage white at (27.8%) golden (35.6%) grey (36.6%). The feather curly type at (28.6%) smooth (36.7%) normal (34.7%), barbell colors red at (17.5%) black (28.3%) pink (54.2%). The mumps color orange at (43.4%) red (37.2%) white (19.4%), and beak colors yellow at (23.7%) white (31.2%) horned (45.1%), respectively, as shown in (Table- 3).

**Table .3 Phenotype traits under IMC**

Habitat		Intensive Management Condition			
Phenotype Traits	Types	Desi	Desi F <sub>1</sub>	Fayoumi	Fayoumi F <sub>1</sub>
Comb colors (%)	White	15.5	21.5	35.8	37.4
	Black	36.2	40.7	38.9	24.3
	Red	48.3	37.8	25.3	38.3
Eyes color (%)	White	45.8	32.9	26.7	31.7
	Maroon	21.3	32.6	31.8	42.6
	Black	32.9	34.5	41.5	25.7
Plumage color (%)	White	30.2	26.8	47.3	27.8
	Golden	48.6	42.1	28.6	35.6
	Grey	21.2	31.5	24.1	36.6
Feather type (%)	Curley	20.7	27.3	52.3	28.6
	Smooth	61.4	48.4	24.3	36.7
	Normal	17.9	24.3	23.4	34.7
Barbel color (%)	Red	42.4	25.3	33.7	17.5
	Black	33.4	47.4	41.6	28.3
	Pink	24.2	27.3	24.7	54.2
Mumps color (%)	Orange	27.3	35.2	27.6	43.4
	Red	35.2	40.4	42.6	37.2
	White	37.5	24.4	29.8	19.4
Beak color (%)	Yellow	26.8	17.6	29.4	23.7
	White	37.5	38.3	34.5	31.2
	Horned	35.7	44.1	36.1	45.1

**Qualitative morphogenetic traits Desi pure and F<sub>1</sub>Chicken under FRC:** The comb colors percentages in both male and female chicken breeds were measured in free-range conditions. The different comb color patterns were selected white at (23.6%), black (45.7%), and red (30.7%) in males and females. Eye color white at (37.2%), maroon (31.4%), black (31.4%), plumage white at (43.5%), golden (24.8%) and grey (31.7%). The feather type curly at (32.7%), smooth (36.1%) normal (31.2%), barbell color was found red (24.8%) black (32.5%) pink (42.7%), mumps color orange (42.3%) red (23.8%) white (33.9%), and beak colors yellow (37.6%) white (30.4%) horned (32.1%), respectively. After mating breeds F<sub>1</sub> generation was produced but color pattern (%) was found differently. The comb colors white was counted (27.6%) black (30.6%) red (41.8%) in both male and female F<sub>1</sub> chickens. Eye color white (42.3%), maroon (28.6%), black (29.1%), plumage white (36.4%) golden (29.2%) and grey (34.4%). The feather type was curly (36.4%), smooth (19.5%), normal (44.1%), red (34.8%), black (27.6%) and pink (37.6%). The mumps color orange (40.2%), red (32.9%), white (24.9%) and beak colors yellow (37.5%) white (28.4%) horned (34.1%), respectively.

#### **Qualitative morphogenetic traits Fayoumi pure and F<sub>1</sub> chicken under FRC**

The percentages of comb colors in chicken breeds were recorded in free-range conditions. Before breeding different comb color patterns (%) white were recorded (24.1%) black (36.5%), red (39.2%) in both male and female chickens. Eye color white (37.2%), maroon (27.6%), black (35.2%), plumage white (38.4%), golden (40.2%) and grey (21.4%). The feather curly type was (27.3%), smooth (35.4%), normal (37.3%), barbell colors red (26.1%), black (34.7%) and pink (39.2%). The mumps color orange (19.3%), red (27.5%), white (53.2%), and beak colors yellow (42.2%), white (31.7%) and horned (38.1%), respectively. After mating breeds F<sub>1</sub> generation was obtained with variations in color pattern. The comb colors white were recorded at (23.8%) black, (33.5%) red and (42.7%) in male and female chickens. Eye color white (34.7%), maroon (28.4%), black (36.9%), plumage white (33.5%), golden (30.2%), grey (36.3%). The feather type curly was found at (40.7%) smooth (36.2%) normal (23.1%), barbell color red (29.4%) black (32.6%) pink (37.9%). The mumps color orange (19.3%) red (39.4%) white (41.3%), and beak color yellow (30.7%) white (29.5%) horned (39.8%), respectively as shown in (Table- 4).

**Table .4 Phenotype traits % under free range condition**

Habitat		Free Range Condition			
Phenotype Traits	Types	Desi	Desi F <sub>1</sub>	Fayoumi	Fayoumi F <sub>1</sub>
Comb colors (%)	White	23.6	27.6	24.1	23.8
	Black	45.7	30.6	36.7	33.5
	Red	30.7	41.8	39.2	42.7
Eyes color (%)	White	37.2	42.3	37.2	34.7
	Maroon	31.4	28.6	27.6	28.4
	Black	31.4	29.1	35.2	36.9
Plumage color (%)	White	43.5	36.4	38.4	33.5
	Golden	24.8	29.2	40.2	30.2
	Grey	31.7	34.4	21.4	36.3
Feather type (%)	Curley	32.7	36.4	27.3	40.7
	Smooth	36.1	19.5	35.4	36.2
	Normal	31.2	44.1	37.3	23.1
Barbel color (%)	Red	24.8	34.8	26.1	29.4
	Black	32.5	27.6	34.7	32.6
	Pink	42.7	37.6	39.2	37.9
Mumps color (%)	Orange	42.3	40.2	19.3	19.3
	Red	23.8	32.9	27.5	39.4
	White	33.9	24.9	53.2	41.3
Beak colors (%)	Yellow	37.6	37.5	24.2	30.7
	White	30.4	28.4	31.7	29.5
	Horned	32.1	34.1	38.1	39.8

## DISCUSSION

The present study was undertaken to evaluate the ecological effect on the phenotypic appearance of Desi and Fayoumi selected chicken breeds under free range and intensive management conditions. It was found that all parameters were found to greater in Desi breeds as compared to Fayoumi chickens when recorded during different stages of growth and these findings comes from reported by (Daikwo *et al.*, 2011). They also reported domestic chickens are incapable of long-distance flight and can fly over fences or into trees in their natural habitat to escape any potential harm. Similarly, the Desi F<sub>1</sub> generation was found healthier and more active compared to the Fayoumi F<sub>1</sub> generation. Same work done by (Zhao *et al.*, 2020), who documented the production capability of Desi chicken, which is used as an important and cheap supply of required protein diet in rural areas. Both species of chickens can serve in free range and intensive conditions and produce sufficiently their progeny. (Mangrio *et al.*, 2017) documented that generally agro-friendly insectivorous birds are social creatures and often form groups, known as flocks, and egg hatching and nurturing offspring involves a communal approach. (Malago and Baitilwake, 2009) suggested birds including chicken species in their natural habitat, frequently use their claws to dig into the ground to forage for nuts, insects, and occasionally prey as sizable as lizards, minor snakes, or juvenile mice. (Benyi *et al.*, 2015) discussed that indigenous chickens possess an innate tendency towards scavenging exhibit higher resistance to various diseases, less susceptible to predation with greater adaptability to endure unfavorable nutritional and environmental conditions.

In the present work, attention was given to the phenotypic color pattern % of Desi male and female breeds. (Chowdhury *et al.*, 2006), designated that chickens could be categorized as a distinct breed or population, despite displaying variations in size, shape, color, and productivity attributable to their genetic makeup. The color % in F<sub>1</sub> of desi chickens found with variation as discussed (Khawaja *et al.*, 2012), the chicken typically rooster's lengthy and glossy tails, pointed feathers on their necks and backs, hackles, and saddles, and appearance is eye-catching. The pure breed of fayoumi male and female reported color variation. (Sarma *et al.*, 2018) reported the Rhode Island red breeds, Fayomi and Desi chickens were reared, and maximum weight was reported in Rhode Island Red breeds followed by Desi and Fayomi. The F<sub>1</sub> generation of the Fayoumi was reported with the color variant as discussed (Hesham *et al.*, 2018), the Fayoumi chickens are quick-maturing breeds, at the age of five to six weeks, roosters begin making their distinctive crowing sounds, and females commence laying eggs as early as 4 and a half to 5 months having the notable capacity for egg production.

## CONCLUSION

This research study concluded that the Desi and Fayomi chickens can serve best in both free range and intensive conditions. The male and female Desi chickens were much darker in their % color patterns compared to Fayomi male and female chickens. To increase animal protein production and boost the income of unemployed farmers, it is imperative to implement a selection process that will lead to improvement. The present study has great importance

in the meat and meat products field in local areas of Sindh.

## IMPACT STATEMENT

The invention of a new technique has the potential to benefit farmers who are currently facing a shortage of resources in our nation. An effective plan is needed to harness the potential of indigenous and Fayoumi breeds in taking advantage of novel resources to balance the demand and supply of animal protein.

## AVAILABILITY OF DATA AND MATERIALS

The corresponding author declares that due to the ethical restriction available at the request regarding the findings of this research manuscript.

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## REFERENCES

- Albokhadaim, I., Althnaian, T. & El-Bahr, S.M. (2012). Investigation of selected biochemical parameters of local chickens with different ages and sexes in Al-Ahsa, Saudi Arabia. *Pak. J. Bio. Scie, PJBs*, **15**(17), 827-832.
- Anjum, M.A., Sahota, A.W., Akram, M., Javed, K. and Mehmood, S. (2012). Effect of selection on productive performance of desi chicken for four generations. *J. Ani. Plant Sci.*, **22**(1), 1-5.
- Benyi, K., Tshilate, T. S., Netshipale, A.J. & Mahlako, K.T. (2015). Effects of genotype and sex on the growth performance and carcass characteristics of broiler chickens. *Tropi. Ani. Health. Prod.*, **47**, 1225-1231.
- Besbes, B., Genotype evaluation and breeding of poultry for performance under sub-optimal village conditions. *World's Poul. Sci. J.*, **65**(2), 260-271 (2009)
- Bhatti, B.M., Talat, T., and Sardar, R. (2002). Estimation of serum alkaline phosphatase, cholesterol, calcium and phosphorus during pre-laying and laying conditions in different strains of chickens. *Pak. Vet. J.*, **22**(2), 94-96.
- Chitra, P. (2019). Comparative study of Nandanam chicken IV (Rhodo White chicken) and desi chicken rearing under backyard system in rural areas of Salem district of Tamil Nadu. *Int. J. Sci. Env. Tech.*, pp. **8**, 1049-1053.
- Chowdhury, S.D., Ahmed, S. & Hamid, M.A. (2006). Improved feeding of desi chicken reared in confinement. *Bangla. Vet.*, **23**(1), 29-35.
- Daikwo, I.S., Okpe, A.A. and Ocheja, J.O. (2011). Phenotypic characterization of local chickens in Dekina. *Int. J. Poul. Sci.*, **10**(6), 444-447.
- Fan, W.L., Ng, C.S., Chen, C.F., Lu, M.Y.J., Chen, Y.H., Liu, C.J. and Li, W.H. (2013). Genome-wide patterns of genetic variation in two domestic chickens. *Gen. bio.evo.*, **5**(7), 1376-1392.
- Farooq, M., Shakir, M.K., Mian, M.A., Mussawar, S., Durrani, F.R. & Cheema, A. (2004). Status of backyard chicken reared by women in Chitral Pakistan. *Pak. Vet. J. Pak.*
- Faruque, S., Bhuiyan, A.K.F.H., Ali, M.Y. and Joy, Z.F. (2017). Breeding for the improvement of indigenous chickens of Bangladesh: performance of foundation stock. *Asian J. Medic Bio. Res.*, **3**(1), 80-87.
- Faruque, S., Siddiquee, N.U., Afronz, M.A. & Islam, M.S. (2010). Phenotypic characterization of Native Chicken reared under an intensive management system. *J. Bangla. Agri. Univ.*, **8**(452-2016-35769).
- Fentie, T., Abebe, B. and Kassa, T. (2013). Small-scale family poultry production in north Gondar: characteristics, productivity, and constraints. *Livestock Rese. Rural Develop.*, **25**(9).
- Guo, H., Zhao, S., Xia, D., Zhao, W., Li, Q., Liu, X. & Lv, J. (2022). The biochemical mechanism of enhancing the conversion of chicken manure to biogenic methane using coal slime as an additive. *Bio. Tech.*, **344**, 126226.
- Hesham, M.H., El Shereen, A.H. & Enas, S.N. (2018). Impact of different light colors in behavior, welfare parameters, and growth performance of Fayoumi broiler chickens strain. *J. Hellenic vete. Med. Society.*, **69**(2), 951-958.
- Islam, M.S. and Dutta, R.K. (2010). Egg quality traits of indigenous, exotic, and crossbred chickens (*Gallus domesticus* L.) in Rajshahi, Bangla. *J. Life Earth Sci.*, **5**, 63-67.
- Islam, M.S., Lucky, N.S., Islam, M.R., Ahad, A., Das, B.R., Rahman, M.M. and Siddiui, (2004). Hematological parameters of Fayoumi, Assil, and local chickens reared in Sylhet region in Bangladesh. *Int. J. Poul. Sci.*, **3**(2), 144-147.
- Khawaja, T., Khan, S.H., Mukhtar, N., Ali, M.A., Ahmed, T. and Ghafar, A. (2012). Comparative study of growth performance, egg production, egg characteristics and haemato-biochemical parameters of Desi, Fayoumi and Rhode Island Red chicken. *J. appli. animal rese.*, **40**(4), 273-283.
- Khawaja, T., Khan, S.H., Mukhtar, N., Ullah, N. and Parveen, A. (2013). Production performance, egg quality and biochemical parameters of Fayoumi, Rhode Island Red and their reciprocal crossbred chickens. *J. app. animal rese.*, **41**(2), 208-217.
- Kiani, A. (2009). Effects of Group Sizing on Behavior, Welfare, and Productivity of Poultry. *J. World's Poul. Rese.*, **12**(1), 52-68 Malago, J.J.

- and Baitilwake, M.A. Egg traits, fertility, hatchability, and chick survivability of Rhode Island Red, local and crossbred chickens. Tanzania Vete. J., **26**(1), 24-36.
- Mangrio, W. M., Sahito, H. A., Kousar, T., Azizullah, J. F., Shah, Z. H., & Ghumro, B. D. (2017). Pervasiveness and different characteristics of Cestode, *Confluaria capillaris* (Rudolphi, 1810) from Jungle babbler, *Turdoides striata* at Sindh, Pakistan. Inter. J Res Studies in Zool, **3**(3), 33-43.
- Mangrio, W. M., Sahito, H. A., Kousar, T., Shah, Z. H., & Jatoti, F. A. (2020). 92. Morphotaxonomic characteristics of *Hymenolepis mehrabpurensis* N. sp., from (*Turdoides striata*, 1823 Leiothrichidae) of the tropical region, Sindh-Pakistan. Pure and Applied Biology (PAB), **9**(1), 979-988.
- Padhi, M. K. (2016). Importance of indigenous breeds of chicken for rural economy and their improvements for higher production performance. Scientifica.,
- Sarma, M., Islam, R., Borah, M.K., Sharma, P., Mahanta, J.D., Kalita, N. & Bhattacharyya, B. N. (2018). Comparative performance of Vanaraja, Srinidhi, and Desi chicken under traditional system among the tribal community of Assam. Indian J. Ani. Rese., **52**(10), 1518–1520.
- Sarma, M., Saharia, J., Boro, P., Brahma, J. and Islam, R. (2020). Comparative Assessment of Performances of Vanaraja, Kamrupa, and Desi Chicken Reared by Tribal Community of Lower Brahmaputra Valley Zone of Assam. Int. J. Curr.Micro. Appli. Scie., **9**(8), 2422-2428.
- Zhao, Xing, T., Xu, X. & Zhou, G. (2020). Influence of extreme alkaline pH induced unfolding and aggregation on PSE-like chicken protein edible film formation. Food Chem., **319**, 126574.
- Zidane, A., Ababou, A., Metlef, S., Niar, A., & Boudroua, K. (2018). Growth and meat quality of three free-range chickens and commercial broiler under the same breeding conditions. Acta Scientiarum. Animal Sciences, **40**.

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