

Special Article - Breeding Techniques

Identification of Non-Genetic Factors Affecting Birth Weight, Weaning Weight, Pre-Weaning Weight, Yearling Weight and Greasy Fleece Performance of Kajli Sheep at Two Ecologies in Pakistan

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Received: November 20, 2020; **Accepted:** December 11 2020; **Published:** December 18, 2020

Introduction

Environmental condition and genetic hereditary qualities elements assume an extensive job in deciding the exhibition attributes. Sheep rearing is a significant endeavor in creature generation yielding food sources, for example, meat and milk which are significant for individuals' sustenance everywhere throughout the world [1]. The small ruminants have high adaptability to modify in outrageous climatic conditions. Sheep rising has especially assumed an imperative job in the improvement of a country in a source of revenue on the globe. In the case of disappointments of regular downpour, it is outstanding that the raising of sheep gives a huge commitment remarkably to the farmers at the hour of emergency because of harvest

Abstract

The present study was carried out to analyze the impact of ecological factors on different development execution qualities of Kajli sheep in Pakistan. For this purpose, we apply two enormous contemporary datasets in sheep to investigate factors that affect execution qualities. For this reason, the reproduction execution record of 13715 Kajli sheep lambing gathered from 1994 to 2010 at Livestock Experimental Stations Khushab and Khizarabad, Punjab. The statistical model was included to assess the Birth Weight (BW), 120 days at Weaning Weight (WW), Pre-Weaning Average Daily Gain (PRADG), Yearling Weight (YW) and Greasy Fleece Weight (GFW). Area of the group, Year of Birth (YOB), Birth Season (BS), Birth Types (BT) and sex was the fixed impact in the model. Results indicated that, the general normal values for birth weight, weaning weight, yearling weight, pre weaning weight and greasy fleece weight were noted 4.13 ± 0.01 , 18.70 ± 0.08 , 37.52 ± 0.06 , 142.34 ± 0.83 and 1.32 ± 0.00 , respectively. Year of birth, sort of birth, sex, and herd affected significantly ($P < 0.001$) while, birth weight and greasy fleece weight, the season of birth indicated no noteworthy contrast ($P > 0.05$). In weaning weight and pre-weaning increase normally, year of birth, kind of birth and herd indicated a significant impact ($P < 0.05$) with the exception of sex. The yearling weight, all parameters demonstrated a positive impact. Male sheep were heavier than female sheep and single conceived sheep were additionally essentially heavier than twins were ($P < 0.05$) during childbirth. Results mirrored that the Kajli breed can be improved through choice and better administration.

Keywords: Kajli sheep; Environmental factors; Execution characteristics; Traits; Variation; Pakistan

dissatisfaction. Along these lines, sheep is communicated as, "money lift" by the wide-open poor farmers [2]. Sheep and goats being simply the biggest clients of rangeland have substantiated themselves as momentous converters of roughages/forages and farming side-effects into practical considerable items, for example, milk, meat, and fleece [3]. Small ruminants add, overall, to the economy of rural farmers. At the point when coordinated cultivating is experienced, sheep was a successful correlative part of this cultivating framework. Nevertheless, regardless of their significance to Pakistan's economy, sheep and goat got meager consideration and poor help for a legitimate generation. Along these lines, the crude character of sheep and goat rising is yet a typical component. Among numerous sheep breeds, Kajli sheep is well known because of its succulent lamb quality, and the males are

hence fattened particularly available to be purchased as conciliatory animals. The breed is local of Sargodha, Khushab, portions of Mianwali, and Gujrat Districts in Punjab. The animals are enormous leggy having white body coat and, they have a huge head with a run of the mill Roman nose and having dark circles around the eyes [4]. Development attributes of financial significance identified with the expense of generation are birth weight, weaning weight and yearling weight, pre-weaning day-by-day weight addition, and productivity of increases. Any program of breed improvement depends on the most extreme misuse of hereditary variety. Nevertheless, the performance qualities are likewise affected by surroundings. Among these natural elements, atmosphere and occasional contrasts among various years influence the production of the entire flock, while sex, kind of birth, age, and weight influence the individual execution. Thusly, estimation of the greatness of every single such factor turns out to be significant for contriving productive and powerful rearing designs for their improvement [5]. The assorted variety of destinations, the diverse administration frameworks and breeds, the degree of farmers association and the level of inclusion of government organizations being developed, usage and support of recording plans, are a portion of the purposes behind the various projects towards the hereditary improvement of sheep and goats [6]. The variety in body weight, profitable and reproductive parameters and fleece yield can be skillfully misused if the degree of hereditary and natural reasons for variety in these characteristics is accurately known. The watched presentation of every creature in every attribute is the consequence of the heredity that it gets from the two parents and nature where it is raised. In any event, when an endeavor is made to give a uniform situation, there are yet unplanned and obscure natural contrasts between animals. Such arbitrary natural factors accordingly cause contrasts in the statement of financially significant characteristics. Execution records of animals ought to be changed in accordance with decrease or rebate is known natural contrasts between animals so hereditary contrasts among animals can be perceived and utilized for powerful rearing arrangement for development. Change ought to be made for natural and physiological wellsprings of variety, for example, age, sex, birth type, years, seasons, and such other ecological factors that can be evaluated or assessed. Hereditary differences between animals do exist yet enormous ecological contrasts make the assessment of such hereditary contrasts amazingly troublesome [7]. After the determination of rearing animals, financial elements related to both market sheep and reproducing ewe execution ought to be considered. Determination choices that improve the qualities related monetary come back to the creation framework by producing more market esteem. Nevertheless, to fuse parts of profitable qualities into a breeding target, information must be accessible to quantify the timeframe a sheep remains in the group to get assessments of hereditary parameters for beneficial characteristics. Besides, any hereditary or natural connections that exist between sheep execution for ideal reaction to determine for financially significant characteristics in a reproducing program. As indicated by Simm, Lewis et al., [8]. Sheep improvement plans are regularly hampered by moderately low utilization of execution recording, generally little size of recorded flocks, and incessant absence of genetic binds to encourage over group hereditary assessments [9]. Contended that the sheep business, particularly the Merino business in Australia, was delayed to embrace an over herds genetically assessment, while the other significant

animals ventures (dairy cows, beef cattle and sheep) have just created assessment plans. These plans rely on ranch information gathering and incorporated preparing for over herd forecasts of the reproducing estimations of seed-stock animals. A few studies have demonstrated that development attributes of sheep are influenced not just by the animals' hereditary potential for development yet additionally by maternal impacts including maternal hereditary and lasting natural impacts. The beneficial and reproductive characteristics are affected by the environment just as genotype [10]. Before, a few studies have been directed on Kajli sheep yet climatic and seasonal contrasts from year to year impact the generation of the whole flock. Accordingly, the present study was intended to explore the different exhibition characteristics of financial significance in Kajli sheep-like birth weight, weaning weight, yearling weight, Pre-weaning day-by-day weight increase and wool weight.

Materials and Methods

Source of data and animals experimental stations

The pedigree and execution record of Kajli sheep from 1994 to 2010 at Livestock Experimental Station, Khushab (District) and Livestock Experiment Station Khizarabad, District Sargodha, Punjab Pakistan was evaluated in the present investigation. The measurable an investigation needs just total and typical records. The spreadsheet of MS Excel for information passage and investigation were utilized for the entire information. The Restricted Maximum Likelihood technique (6), fitting an Animal Model was utilized.

Atmosphere conditions at exploratory destinations

During summer months, day temperature may go as high as 50°C and during winter night, temperature may fall up to -4°C.

Breeding practices at experimental stations

The reproducing ewes have been chosen from and among the flock delivered female stock principally based on compliance and breed attributes: some weight-age was likewise given to developing qualities like body size and quantum of fleece creation. The determination of the males depended on higher creating family records. Mostly, the ewes were reproduced once per year in the fall season and sheep got during the spring season. Be that as it may, in certain years two times every year reproducing of the ewes was rehearsed however later on it was ended because of troublesome administration. The ewes, which were not bred during the fall season, were later on mated in the consequent spring season to get sheep during the harvest time season. The reproducing rams were generally from claim homestead delivered yet outside acquaintance had likewise been practices with giving hereditary heterogeneity. Regularly 10-15 rams for every season were chosen and utilized for breeding. The Significant point in the general reproducing plan had been the improvement of meat creation and a little consideration paid to fleece qualities.

General executive and nourishing practices

The sheep at two farms were kept up in open fenced-in areas consistently. The grown-up animals were kept in an open horse shelter with satisfactory secured zone to give shade and safe houses during the unforgiving climate. All animals were considered touching from 8:00 AM to 5:00 PM during summer and spring yet in the winter with little change in the brushing plan from 9:00 AM to 4:30 PM. The encouraging of the animals was predominantly relying upon brushing

Table 1: Mean values of performance traits in Kajlis sheep.

Traits	No.	Mean ± SE	CV%
Birth Weight (kg)	13715	4.13±0.01	13.24
Weaning weight (kg)	9331	18.70±0.08	17.08
Yearling weight (kg)	6121	37.52±0.06	6.03
Pre weaning daily gain (gms)	9331	142.34±0.83	23.03
Spring greasy fleece weight (kg)	9031	1.32±0.00	18.9
Autumn greasy fleece weight (kg)	9031	1.32±0.00	18.89

of accessible regular fodder and forages yet thinks supplement concentrates were offered during shortage period in breeding seasons for flushing. The recently conceived new-born lambs were for the most part kept in the entryway for at least 4-5 months of age. They were permitted to suckle their dams openly from night through the night till morning when ewes were taken out for grazing. The lambs were offered green feed and enhanced concentrates beginning from 10-15 days of age. Every one of the lamb were totally weaned on a joined date and moved to separate pen for post-weaning growing.

Factual analysis

Information on different execution attributes were analyzed to assess the impact of different natural elements (non-hereditary wellsprings of variety, for example, year and period of birth/lambing, sex of sheep, time of dam, birth type, weaning age, birth weight, weaning weight, yearling weight, fleece yield). Sheep is generally considered as a seasonal breeder, Kajli sheep for the most part displays estrous during two seasons' autumn time and spring. Due to oversee mangemental comfort they are reproduced during the pre-winter season. In any case, some extent of populace additionally shows estrous round the year. The time of birth or lambing was partitioned into two seasons and the meaning of the period of birth/lambing was; spring from January to June and autumn from July to December.

The numerical model accepted that was:

$$Y_{ij} = \mu + F_i + e_{ij} \text{ (Model 1) Where,}$$

Y_{ij} = estimation of the specific characteristic

μ = populace means

F_i = the impact of every fixed impact with the limitation that $\sum F_i = 0$

e_{ij} = the arbitrary blunder related with every perception.

The Harvey's Least Squares Maximum Likelihood Mixed Model (LSMLMW) PC

Programming the software was utilized for all these investigations {Harvey, 1987 # 34}.

Results

The outcomes on 13715 lambing's and execution records of Kajli sheep kept at Livestock Experiment Stations Khushab and Khizerabad (Pakistan) spread over a time of 17 years from 1994 to 2010 are as per the following.

Birth type and sex

The birth type's results demonstrated that there was a higher

Table 2: Least squares mean (±SE) for birth weight (Kg) in kajli sheep.

Year of Birth	No of observation	LSM ± SE	Significance
1994	834	4.25±0.02	P<0.001
1995	1325	4.26±0.01	
1996	1068	4.23±0.02	
1997	948	4.19±0.02	
1998	866	3.87±0.02	
1999	876	4.20±0.02	
2000	948	4.11±0.02	
2001	779	4.27±0.02	
2002	656	3.72±0.02	
2003	497	3.70±0.03	
2004	638	4.10±0.02	
2005	709	4.20±0.02	
2006	707	4.26±0.02	
2007	752	4.12±0.02	
2008	789	4.29±0.02	
2009	830	4.23±0.02	
2010	493	4.19±0.03	
Season of Birth			
Spring	8766	4.14±0.03	NS
Autumn	4949	4.13±0.01	
Sex			
Male	6724	4.43±0.01	P<0.001
Female	6991	3.83±0.01	
Type of Birth			
Single	11557	4.60±0.00	P<0.001
Twin	2158	3.67±0.01	
Area			
Khizerabad	12537	3.96±0.00	P<0.001
Khushab	1178	4.34±0.02	

(84%) single sheep birth contrasted with twinning (15.73%) in two research stations percent. The sex proportion was 49:51 males and females, separately.

Phenotypic execution

The least-squares Mean±SE and coefficient of variation for various execution traits are introduced in (Table1). The mean birth and weaning weight in these flocks were 4.13±0.01 and 18.70±0.08 kg while yearling weight was 37.52±0.06 kg. The pre-weaning normal everyday addition was 142.34±0.083 gms. The wool weight during spring and autumn time was discovered equal quantity.

Ecological Components Influencing Execution Qualities

Birth weight

The analysis of difference to assess the impact of a year of birth, period of birth, sex and sort of birth is given in (Table 2). Birth weight fluctuated fundamentally (P<0.01) because of years, seasons, sex,

Table 3: Least squares mean (\pm SE) for weaning weight (Kg) in kajli sheep.

Year of Birth	No of observation	LSM \pm S.E	Significance
1994	522	20.25 \pm 0.16	P<0.001
1995	1076	20.05 \pm 0.13	
1996	910	19.11 \pm 0.13	
1997	675	19.03 \pm 0.15	
1998	552	19.05 \pm 0.16	
1999	825	17.93 \pm 0.14	
2000	574	19.04 \pm 0.16	
2001	691	18.66 \pm 0.15	
2002	606	19.26 \pm 0.16	
2003	294	16.68 \pm 0.21	
2004	519	17.95 \pm 0.16	
2005	469	17.65 \pm 0.16	
2006	385	17.45 \pm 0.17	
2007	455	19.64 \pm 0.16	
2008	475	19.54 \pm 0.16	
2009	303	17.98 \pm 0.19	
Season of Birth			
Spring	3593	17.83 \pm 0.09	P<0.001
Autumn	5738	19.58 \pm 0.08	
Sex			
Male	3084	18.71 \pm 0.09	NS
Female	6247	18.70 \pm 0.08	
Type of Birth			
Single	7824	18.87 \pm 0.08	P<0.001
Twin	1507	18.53 \pm 0.11	
Area			
Khizerabad	8711	18.98 \pm 0.05	P<0.001
Khushab	620	18.42 \pm 0.14	

kind of birth and research site. It indicated non-huge collaboration between sex and sort of birth. The least-squares mean for birth weight was 4.23 \pm 0.03 kg during 1994 and indicating a fluctuating pattern towards the year 2010. The least-squares mean in birth weight are practically consistent from 1994 to 2010 extending from (4.10 \pm 0.02 to 4.27 \pm 0.02) aside from the years 1998, 2002 and 2003 where least squares means has indicated marginally decreased as 3.87 \pm 0.02, 3.72 \pm 0.02 and 3.70 \pm 0.03, separately. The sheep at Khushab Experimental station showed higher least-squares mean (4.34 \pm 0.02) in birth weight than Khizerabad (3.96 \pm 0.00).

Weaning weight

Assessment of difference uncovered the noteworthy impact of various years, sort of birth, age of the dam and period of birth on weaning weight of sheep. Nevertheless, the distinction because of sex was non-significant (Table 3). The most extreme average least-squares mean for weaning weight was 20.25 \pm 0.16 kg during 1994 and demonstrated a diminishing pattern from 1996 to 1999 pursued by fluctuating until 2009. The sheep conceived during fall were heavier at weaning than conceived in spring. The higher average weaning weight

Table 4: Least Squares Mean (\pm SE) for yearling weight (Kg) in Kajli Sheep.

Year of Birth	No of observation	LSM \pm S.E	Significance
1994	323	37.57 \pm 0.14	P<0.001
1995	914	36.75 \pm 0.10	
1996	676	37.04 \pm 0.10	
1997	389	36.79 \pm 0.13	
1998	210	39.68 \pm 0.16	
1999	427	39.00 \pm 0.12	
2000	326	38.97 \pm 0.14	
2001	312	37.97 \pm 0.14	
2002	460	37.89 \pm 0.12	
2003	246	36.90 \pm 0.16	
2004	394	36.66 \pm 0.12	
2005	254	37.86 \pm 0.14	
2006	342	36.58 \pm 0.12	
2007	338	36.83 \pm 0.12	
2008	359	36.94 \pm 0.12	
2009	151	36.90 \pm 0.19	
Season of Birth			
Spring	2227	37.64 \pm 0.08	P<0.001
Autumn	3894	37.40 \pm 0.07	
Sex			
Male	1417	39.17 \pm 0.08	P<0.001
Female	4704	35.87 \pm 0.06	
Type of Birth			
Single	7824	37.50 \pm 0.06	NS
Twin	1507	37.54 \pm 0.09	
Area			
Khizerabad	5709	37.47 \pm 0.05	NS
Khushab	412	37.57 \pm 0.12	

(18.71 \pm 0.09 kg) of male lambs when contrasted with female lambs (18.70 \pm 0.08 kg) however the single conceived sheep were heavier (18.87 \pm 0.08 kg) at weaning when contrasted with twins (18.53 \pm 0.11 kg). In any case, the thing that matters was non-significant. Anyway, the distinction at all squares means in weaning weight has been found for two experimental flocks viz, Khizerabad and Khushab.

Yearling weight

In general yearling weight variety in body weight during the different years, a period of birth and sex were huge (P<0.01). Though, the impact of the herd and sort of birth were non-significant (P>0.05). The weaning age of the sheep and birth weight had a non-critical impact (P>0.05) on yearling weight (Table 4). The Mean an incentive for the yearling weight was 37.52 \pm 0.06 kg. The yearling weight in 1994 was 37.57 \pm 0.14 kg however; in 1998, it expanded to 39.68 \pm 0.16 kg, pursued by fluctuating pattern up to 2009. The mean yearling weight of male lambs was 39.17 \pm 0.08 kg, which was heavier than that of females' 35.87 \pm 0.06 kg. The yearling weight of sheep conceived in spring was higher when contrasted with those conceived in winter. The twin conceived sheep were heavier 37.54 \pm 0.09 kg than

Table 5: Least Squares Mean (\pm SE) for Pre weaning average daily weight gain (gm).

Year of Birth	No of observation	LSM \pm S.E	Significance
1994	522	154.46 \pm 1.73	P<0.001
1995	1076	155.33 \pm 1.35	
1996	910	145.76 \pm 1.42	
1997	675	145.48 \pm 1.59	
1998	552	144.88 \pm 1.73	
1999	825	135.05 \pm 1.48	
2000	574	144.05 \pm 1.67	
2001	691	141.89 \pm 1.56	
2002	606	147.98 \pm 1.65	
2003	294	122.90 \pm 2.20	
2004	519	135.67 \pm 1.67	
2005	469	132.13 \pm 1.67	
2006	385	130.74 \pm 1.84	
2007	455	150.57 \pm 1.70	
2008	475	152.49 \pm 1.68	
2009	303	138.02 \pm 2.05	
Season of Birth			
Spring	3593	134.57 \pm 0.94	P<0.001
Autumn	5738	150.11 \pm 0.88	
Sex			
Male	3084	142.23 \pm 0.98	NS
Female	6247	142.44 \pm 0.89	
Type of Birth			
Single	7824	143.48 \pm 0.82	P<0.05
Twin	1507	141.20 \pm 1.16	
Area			
Khizerabad	8711	145.11 \pm 0.58	P<0.001
Khushab	620	139.56 \pm 1.54	

the single 37.50 \pm 0.06 kg conceived. This might be because of some compensatory development.

Pre weaning average every day gain

The year and season of birth and birth type demonstrated critical impact on pre-weaning normal day-by-day gain, while sex had a non-noteworthy impact on the attribute (Table 5). The regression of weaning weight and birth weight on pre-weaning average day by day increase were discovered significant (P<0.01).

Greasy fleece weight

This attribute was varied (P<0.05) because of a year of birth, sex, and kind of birth (Table 6). The season of birth has a non-critical (P>0.05) impact on greasy wool weight. During spring shearing and winter greasy wool weight were 1.32 \pm 0.01 and 1.31 \pm 0.00, separately. The distinctions in greasy fleece load because of the year of birth were huge and significant. Though, a period of birth and kind of birth has noncritical impact on fleece weight. While sex and group were essentially influenced the attribute understudy. The regression of

Table 6: Least Squares Mean (\pm SE) for greasy fleece weight (kg).

Year of Birth	No of Observations	Spring Shearing	Autumn Shearing	Significance
1994	1009	1.17 \pm 0.01	1.17 \pm 0.01	P<0.001
1995	1021	1.33 \pm 0.01	1.33 \pm 0.01	
1996	837	1.37 \pm 0.01	1.37 \pm 0.01	
1997	773	1.34 \pm 0.01	1.35 \pm 0.01	
1998	517	1.31 \pm 0.01	1.31 \pm 0.01	
1999	1124	1.30 \pm 0.01	1.30 \pm 0.01	
2000	755	1.31 \pm 0.01	1.31 \pm 0.01	
2001	397	1.38 \pm 0.01	1.38 \pm 0.01	
2002	660	1.37 \pm 0.01	1.37 \pm 0.01	
2003	429	1.34 \pm 0.01	1.34 \pm 0.01	
2004	371	1.34 \pm 0.01	1.34 \pm 0.01	
2005	348	1.36 \pm 0.01	1.37 \pm 0.01	
2006	374	1.28 \pm 0.01	1.28 \pm 0.01	
2007	379	1.22 \pm 0.01	1.22 \pm 0.01	
2008	37	1.28 \pm 0.03	1.28 \pm 0.03	
Season of Birth				
Spring	3513	1.31 \pm 0.01	1.32 \pm 0.01	NS
Autumn	5518	1.31 \pm 0.00	1.31 \pm 0.00	
Sex				
Male	256	1.38 \pm 0.01	1.38 \pm 0.01	P<0.01
Female	8775	1.25 \pm 0.00	1.25 \pm 0.00	
Type of Birth				
Single	7622	1.32 \pm 0.00	1.32 \pm 0.00	P<0.001
Twin	1409	1.31 \pm 0.01	1.31 \pm 0.01	
Area				
Khizerabad	8732	1.06 \pm 0.00	1.07 \pm 0.00	P<0.001
Khushab	299	1.56 \pm 0.01	1.56 \pm 0.01	

weaning age was non-huge while the birth weight was noteworthy (P<0.05).

Discussion

Birth type and sex proportion

The level of birth type and sex proportion change in various breeds revealed by Akhtar [11] as the twinning rate in the Hissardale sheep flocks were 19 and sex proportion was 52.5:47.5 males and females separately which were in concurrence with the present investigation. The slight distinction was may be expected to the diverse in breed and variety in manage mental practice.

Phenotypic execution

The mean birth weight of Kajli lambs in the present study was found the average value of 4.16 \pm 0.01 kg and it is in concurrence with numerous specialists who announced birth weight in various types of sheep kept up in various ecological conditions [12,13,7,14-16]. The comparative mean birth weight in Kajli sheep announced by Hussain [14] like 3.8 and 4.1 kg at Khushab and Khizerabad, individually. Dixit, Dhillon et al., [12] announced average lamb weight as 3.1 \pm 0.03 kg in Bharat Merino in India. Babar, Ahmad et al., [7] reported

least squares mean for birth weight as 3.59 ± 0.02 kg in Lohi sheep whereas, Hussain 2006 [14] revealed average weight during at birth as 4.11 ± 0.82 kg in Thalli sheep kept at LES Rakh Ghulaman. These researchers have revealed low birth weight than the discoveries of the present investigation. These distinctions might be because of contrast in breeds, areas, size of an informational collection, or other managerial practices.

The average weaning weight of sheep as acquired in the present study was 18.70 ± 0.08 kg. The weaning weight of Kajli in the present flock was higher than numerous types of sheep breed (Bharat Merino, Muzaffarnagri) as revealed [17,12]. Sinha and Singh [17] the analysis revealed that the weaning weight of Muzaffarnagri sheep was 16.82 ± 0.37 kg. Dixit, Dhillon et al., [12] reported the average sheep weaning weight were 15.0 ± 0.2 kg at weaning in Bharat Merino. Nonetheless, some different specialists Babar, Ahmad et al., and Qureshi, Babar et al., [7,15] reported higher weaning weight when contrasted with the weaning weight saw in the present study. Babar [18] data analysis revealed that weaning weight in Lohi sheep arrived at the average of 23.09 ± 0.13 kg. Akhtar [11] announced that the weaning weight of Hissardale sheep arrived at the average of 20.1 ± 3.86 kg. The yearling weight of Kajli as researched in the present study was 37.52 ± 0.06 kg. The yearling weight announced by Akhtar [11] was 30.7 ± 3.83 kg which was not exactly the yearling weight detailed in the present investigation. Pre weaning normal day-by-day weight gain as examined in the present investigation was 142.34 ± 0.83 gm. Akhtar [11] detailed 135 ± 0.04 gm pre-weaning normal day-by-day weight in Hissardale sheep. Dixit, Dhillon et al., [12] detailed pre-weaning normal day-by-day weight gain as 133 ± 1.6 gms in Bharat Merino.

Ecological Components Influencing Execution Qualities

Birth weight

The huge impact of year, sex of sheep conceived, sort of birth and flock on birth weight as recorded in the present study are in concurrence with numerous specialists [12,13,7,14-16]. Dixit, Dhillon et al., [12] detailed that year and period of lambing, sex of lamb, sort of birth and time of dam were noteworthy wellsprings of variety for sheep birth loads in Bharat Merino sheep. Akhtar, Javed et al., [16] announced that the birth weight in Hissardale was altogether influenced by year, season, kind of birth, sex, and age of the dam ($P < 0.01$). The discoveries of Qureshi, Babar et al., [19] are totally in concurrence with the present investigation who announced the significant and critical impact of by station, year of birth, sex, and birth type ($P < 0.01$). Further, like our investigation, the impact of season on birth weight was recorded as non-noteworthy and non-significant. The variety of birth weight in lambs at various years mirrored the degree of the executives, some natural impacts like temperature and dampness just as the accessibility of feed. It has been commented that the degree of the board will undoubtedly differ as indicated by the capacity of the homestead administrator, his arrangement of harvest cultivation, strategies and power of separating and his effectiveness in the supervision of farm work just as the accessibility of money related assets [11]. The administration of farms more likely than not been changed much of the time and its belongings are reflected in the presentation attributes throughout the years. The birth weight of lamb likewise fluctuated with sex and kind of birth. Single conceived

lamb is heavier than the variously conceived lamb as they have better open doors in the uterus of their dams when contrasted with differently conceived lamb. Essentially, the males lambs were heavier during birth as the gestation time of males is marginally longer when contrasted with females [18]. Various reports in writing demonstrated that solitary conceived lambs just as the male lambs were heavier than numerous births and females. As in the present analysis, the birth weight of males is heavier than females (4.44 ± 0.01 and 3.88 ± 0.01 individually). So also the single conceived have heavier birth weight than a twin (4.63 ± 0.12 and 3.69 ± 0.19 separately). The extreme lambing was accounted for in the spring season (83.04 percent) while 4.86 percent were accounted for in fall and just 11.92 were accounted for in off-seasons. It demonstrates the season of breeding in Lohi sheep under Pakistan climatic conditions.

Weaning weight

The time of the birth, season, kind of birth, and herd had a significant impact on the characteristic (Table 3). The discoveries of numerous specialists were in fractional concurrence with the present investigation. Qureshi, Babar et al., [19] announced noteworthy contrasts because of year and period of birth and weaning age for generally weaning weight while birth type and sex had non-significant impacts on the characteristic in Kajli sheep kept at LES Khushab and Khizarabad during the period 1980-1994. Bathaei and Leroy [20] the detailed significant impact of a year of birth; sex, sire and kind of birth on all development bend parameters in Mehraban Iranian sheep. Dixit, Dhillon et al., [12] Revealed that year and period of lambing, sex of lamb, sort of birth, time of dam and ewe weight were noteworthy wellsprings of variety for lamb weight and every day gains in Bharat Merino sheep. The birth weight of lambs significantly affected weaning weight ($P < 0.05$) demonstrating that the lambs of higher birth weight had grown up better to weaning when contrasted with lambs having lighter weight during childbirth. Period of birth had noteworthy impact on weaning weight (Table 3). The most extreme weight 19.58 ± 0.08 kg was observed for the lamb conceived during winter season while the lamb conceived during spring season had the base (17.83 ± 0.09 kg) weight at weaning.

Yearling weight

The aftereffects of the present study indicated noteworthy impacts of year of birth, the period of birth and time of dam on yearling weight, there was a critical impact of sex on the attribute. Kinds of birth and herd have non-significant impact on the attribute (Table 4). Numerous researchers detailed comparative outcomes in various types of sheep kept at various areas and managerial conditions. Akhtar [11] led a study on Hissardale sheep and revealed that variety in yearling body weight because of year and sex was significant. Notwithstanding, the impact of season and sort of birth on yearling body weight was non-significant and this was in halfway concurrence with the present analysis. Qureshi, Babar et al., [19] detailed that analysis of variance indicated significant contrasts ($P < 0.01$) in largely yearling body weight, because of year of birth and period of birth and birth type. Nevertheless, the impact of dam age on in general yearling weight was non-significant and it was partially in concurrence with the present investigation. Hussain [15] revealed that the variety in yearling body weight because of the year of birth, sex and sort of birth were huge significant ($P < 0.01$). In any case, the impacts of

season and collaboration among birth and birth type on yearling weight were non-significant and it was additionally incompletely in concurrence with the present investigation, the period of birth had a significant impact ($P < 0.01$) on yearling weight (Table 4). The sheep conceived during spring season had most extreme weight at one-year age pursued by the lambs, conceived during the winter season. The sheep conceived during spring season had the most noteworthy birth weight (Table 4) and a similar pattern stayed during the development period, which finished into higher weight at one-year age.

Pre weaning normal day-by-day weight gain

The time of birth, the period of birth, sort of birth and herd, have noteworthy impact, while sex has non-significant. Babar [18] analyzed data on 3973 sheep and detailed that solitary conceived sheep more increasingly (179.9 ± 1.9 gm/day) than sheep conceived as numerous (157.9 ± 1.9 gm/day), these discoveries are not in concurrence with the discoveries of the present investigation. Akhtar [11] reported that the impact of period of birth was noteworthy which was in agreement with the aftereffects of the present analysis. He detailed that the impact of period of birth on pre-weaning weight increase was significant as spring conceived sheep increased better (135gms) as contrast with harvest time conceived sheep (130gms). Dixit, Dhillon et al., [12] contemplated hereditary and non-hereditary effects on the body-weight of 2425 Bharat Merino sheep sired by 154 rams more than 1982-1996, Year and period of lambing, sex of sheep and kind of birth were significant wellsprings of variety for sheep weight and every day gains. These outcomes were not in accordance with the discoveries of the present investigation.

Greece fleece weight

The outcomes as acquired in the present analysis uncovered that time of birth, herd and sex of sheep had significant impact on fleece weight (Table 6), while the period of birth and kind of birth had non-significant impact on the quality under investigation. Numerous specialists announced the impact of ecological factors on wool yield in various breeds kept up under various managerial conditions. Babar [18] reported that yearly fleece yield in Lohi sheep was 2.49 ± 0.03 kg, it was additionally seen that time of shearing and age at shearing had a significant impact on fleece yield. It was additionally revealed that spring wool yield in Lohi sheep was 1.49 ± 0.02 kg, which was likewise affected by year of shearing and weight at shearing. It was additionally detailed that fleece yield contrasts because of season and age at shearing were non-noteworthy. Qureshi, Babar et al., [19] revealed that normal yearly fleece weight was 2.65 ± 0.03 kg and the investigation of fluctuation for yearly greasy wool weight demonstrated that time of shearing, age at shearing and sex were significant wellsprings of variety while birth type had a non-significant impact, this was in concurrence with the present investigation. Sinha and Singh [17] broke down information on Muzaffarnagri sheep and reported that the impacts of year of birth and kind of the executives on first shearing fleece yield were all significant wellsprings of variety. Hussain [15] reported that the analysis of variance for fleece yield uncovered that time of shearing, kind of birth and age at shearing significantly affected greasy fleece weight. The above studies were partially in concurrence with the present investigation. The yearly variety in greasy fleece weight during various years demonstrated managerial just as dietary contrasts. The expansion in greasy wool weight with the progression of age/equality might be ascribed towards

increment in body size with headway of age. Clearly, it might be because of reality that the male sheep were heavier and cumbersome than females at all age.

Dixit, Singh et al., [21] data analysis revealed that the fleece weight is affected by the contribution of genetic and phenotypic parameters; in Bharat Merino sheep breed study over the period of 1982-1996 was evaluated. The fleece trait was up to 42 %, showed variability due to the phenotypic parameters. Furthermore, they added that body weight and fleece yield have significant and desirable genetic association.

Conclusion

The profitable and reproductive attribute are affected by genotype as well as environment. Previously, a few investigations have been directed on Kajli sheep yet climatic and seasonal contrasts from year to year impact the creation of entire flock. In any case, the exhibition qualities are additionally impacted by environment. Among these ecological elements, atmosphere and seasonal contrasts among various years influence the production of the entire flock, while sex, kind of birth, age and weight influence the individual execution. The observed presentation of every animal in every attribute is the consequence of the heredity that it gets from the both parents and nature wherein it is raised. In any event, when an endeavor is made to give a uniform domain, there are yet unplanned and obscure natural contrasts between animals. Such arbitrary ecological factors in this way cause contrasts in the declaration of financially significant characteristics. The distinction may be ascribed to customary supplementation of apportionment to the flock. Male lambs were heavier than female lambs and single conceived sheep were likewise altogether heavier than twins were during childbirth. Results showed that Kajli breed could be improved through selection and better administration. Which shows ecological variables can be controlled to accomplish higher additions. The twinning was poor however, lambing rate was very higher and, auxiliary sex proportion was by desires. Better administration and supplementation was significant wellspring of contrasts among groups at various areas. These distinctions may be because of normal supplementation of proportion. Male lambs were brought into the world heavier than females and single lambs were likewise altogether heavier than the twins were. These discoveries recommended that Kajli sheep can be improved by determination and better administration rehearse. Low evaluation of the Kajli sheep and wide scope of phenotypic variety because of natural elements recommended that improvement in encouraging, parasites control and the managements and so forth may improve the development performance of Kajli sheep. It is additionally obvious that improvement in efficiency of Kajli sheep might be accomplished through better encouraging and improved managerial practices.

Acknowledgement

The authors wish to thank Agricultural Linkage Program (ALP)-PARC.

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