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Culling rates of Sirohi goats in semi-arid zone

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Abstract

Data pertaining to Sirohi goats, preserved at ICAR-Central Sheep and Wool Research Institute, Avikanagar, spanning a 15-year period from 2001 to 2015, underwent analysis to determine culling rates. The examination of culling rates was conducted across distinct age categories, specifically pre-weaning (0-3 months), post-weaning (3-12 months) and adult culling. The collective culling rate for Sirohi goats was notably higher in the adult age group (6.51%) in comparison to the 0-3 month (0.57%) and 3-12 month (2.32%) age groups.

Keywords: Sirohi goats; pre-weaning culling, post weaning culling, adult culling

1. Introduction

Sustainable livestock management is imperative for maintaining the health and productivity of domestic animal populations, particularly in environmentally challenging regions such as semi-arid zones. The Sirohi goat, a breed renowned for its adaptability and resilience, plays a vital role in the livelihoods of communities in these regions. However, the efficiency of Sirohi goat production is inevitably influenced by various factors, one of which is the culling rate.

Culling, the systematic removal of animals from a herd, is a crucial aspect of herd management that directly impacts the overall productivity, genetic diversity, and welfare of the population. Despite its significance, there is a noticeable dearth of comprehensive studies addressing the culling rates specific to Sirohi goats within semi-arid environments. This research endeavors to fill this gap by providing a nuanced exploration of culling practices and their implications on the Sirohi goat population in semi-arid regions.

2. Materials and Methods

The data for this analysis were sourced from the livestock data repositories for Sirohi goats, which are meticulously maintained at the Animal Genetics and Breeding Division of ICAR-CSWRI in Avikanagar, Rajasthan. The research site is situated in the Malpura block of District Tonk in Rajasthan, India, positioned at 75°28' E Latitude and 26°17' N Longitude, with an altitude of 320 meters above mean sea level. The climate at the farm is characterized as semi-arid and sub-tropical, marked by extreme temperature variations ranging from a maximum of 48 °C to a minimum of 4 °C throughout the year. The annual rainfall in the region is recorded at 615.93 mm.

Selective breeding practices were implemented, and controlled mating was employed for does. Culling was not undertaken until weaning, which occurs at three months of age, except in cases of involuntary culling. Major reasons for culling included off-coloration, uncontrolled mating, stunted growth, congenital defects, repeat breeding, low production, old age, and incurable health problems. Productive female goats were retained in the flock up to seven years of age, and health management was administered following the flock health calendar of the institute. Detailed records of culling, sale, external transfer, slaughter, and predation were maintained on a day-to-day basis. Culling rates were computed both by age and overall for each year of the study.

3. Results and Discussion

3.1 Culling rates: The removal of certain members from the flock, known as culling, was carried out for various reasons. Culling was not practiced until weaning, which occurs at three months of age, unless circumstances were involuntary. The primary reasons for culling included off-coloration, offspring from uncontrolled mating, stunted growth, repeat breeding, low productivity, old age, and incurable health issues. Females demonstrating high productivity were kept within the flock until they reached seven years of age. Culling rates were examined across different age groups: pre-weaning (0-3 months), post-weaning (3-12 months) and adult culling as follows:

3.1.1 Pre-weaning culling (0-3 months)

The total pre-weaning culling rate for the entire Sirohi goat flock was 0.57%. The peak culling rate occurred in 2008, reaching 2.16%, while no culling was recorded in the years 2001, 2006, 2007, 2009, 2012, and 2013 (Table 1). Kumar *et al.* (2016) [3] also reported that the overall pre-weaning culling rate in Sirohi goats was 0.67%.

Table 1: Pre weaning culling rates in Sirohi goats

Year	Total no. of animal	Culling	Culling%
2001	190	0	0.00
2002	228	3	1.32
2003	233	4	1.72
2004	217	1	0.46
2005	259	2	0.77
2006	228	0	0.00
2007	251	0	0.00
2008	278	6	2.16
2009	261	0	0.00
2010	247	1	0.40
2011	303	5	1.65
2012	293	0	0.00
2013	283	0	0.00
2014	289	1	0.35
2015	321	2	0.62
Overall	3881	22	0.57

3.1.2 Post-weaning culling (3-12 months)

The collective post-weaning culling rate for the entire Sirohi goat flock was 2.32%. The highest post-weaning culling for Sirohi goat kids was observed in 2003 (9.86%), while the lowest was recorded in 2010 (0.36%) (Table 2). In a study by Kumar *et al.* (2016) [3], a slightly higher overall post-weaning culling rate of 4.26% was reported in Sirohi goats.

Table 2: Post weaning culling rates in Sirohi goats

Year	Total no. of animal	Culling	Culling%
2001	453	39	8.61
2002	532	9	1.69
2003	355	35	9.86
2004	354	8	2.26
2005	419	17	4.06
2006	529	8	1.51
2007	554	17	3.07
2008	55	8	1.44
2009	630	9	1.43
2010	562	2	0.36
2011	601	18	3.00
2012	594	14	2.36
2013	725	9	1.24
2014	697	6	0.86
2015	748	25	3.34
Overall	8308	193	2.32

3.1.3 Adult culling: The overall culling rate for adult Sirohi goats in the entire flock stood at 6.51%. The highest culling occurred in 2002 (29.02%), while the lowest was recorded in 2010 (1.55%) (Table 3). The observed culling rate aligns with the findings of Tomar *et al.* (1995) [5] for the Barbari breed (12.8%) but is comparatively lower than that reported for the Jamunapuri breed (54.7%). Anjar *et al.* (2014) [1] documented culling rates of 16.4% in sheep and 15.3% in goats. Malther *et al.* (2001) [4] and Didarkhah *et al.* (2019) [2] documented culling rates of 25.9% and 12% respectively.

Table 3: Adult culling rates in Sirohi goats

Year	Total no. of animal	Culling	Culling%
2001	364	19	5.22
2002	379	110	29.02
2003	368	28	7.61
2004	379	26	6.86
2005	329	27	8.21
2006	347	23	6.63
2007	396	23	5.81
2008	524	52	9.92
2009	575	45	7.83
2010	582	9	1.55
2011	569	57	10.02
2012	566	17	3.00
2013	629	39	6.20
2014	641	32	4.99
2015	654	69	10.55
Overall	7302	475	6.51

The average culling rate across all years and age groups was 4.23% (Table 4), ranging from 0.57% in the 0-3 month category to 6.51% in the adult group. A consistent trend of higher culling rates in the adult age group was observed throughout the years, with the exception of 2001 and 2003. The elevated culling rate in adult animals was primarily attributed to the removal of older animals (beyond 7 years of age). However, in 2001, there was a notably higher rate (8.61%) in the 3-12 month age group, primarily due to health reasons. In 2003, 9.86% of animals in the same age group were culled, mainly because of off coloration and stunted growth.

Table 4: Average culling rate for all the years and age groups in Sirohi goats

Year	Total no. of animal	Culling	Culling%
2001	1007	58	5.76
2002	1139	122	10.71
2003	956	67	7.01
2004	950	35	3.68
2005	1007	46	4.57
2006	1104	31	2.81
2007	1201	40	3.33
2008	1357	66	4.86
2009	1466	54	3.68
2010	1391	12	0.86
2011	1473	80	5.43
2012	1453	31	2.13
2013	1637	48	2.93
2014	1627	39	2.40
2015	1723	96	5.57
Overall	19491	825	4.23

4. Conclusion

The pre-weaning culling rate for the entire flock was modest at 0.57%, with a peak observed in 2008 at 2.16% and instances of no culling recorded in specific years. Post-

weaning culling, encompassing the period after 3 months of age, had an overall rate of 2.32%, with the highest observed in 2003 at 9.86% and the lowest in 2010 at 0.36%. The culling of adult Sirohi goats exhibited an overall rate of 6.51%, reaching its zenith in 2002 at 29.02% and hitting its nadir in 2010 at 1.55%. A comprehensive examination, considering all years and age groups, yielded an average culling rate of 4.23%.

5. References

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