Factor Affecting Birth Weight of Mehsana Goat Kid at Organized Farm


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Data on birth weight pertaining to 373 Mehsana kids for a period spread over 7 year (from 2011 to 2017) maintained at organised farm were utilized to study the various factors affecting it. On the basis of date of birth of kids, data were divided in to 3 different seasons and 7 periods (year). Effects of sex of kids as well as type of birth on birth weight were also assessed using least squares analysis. The average birth weight of Mehsana kids was 2.555 ± 0.043 kg. The male (n=180) Mehsana kids showed significantly (P<0.01) higher birth weight than female (n=193). This may be due to the effect of male sex hormone, which influences grow faster during pre-natal development. The birth weight of Mehsana kids born as single (n=263) 2.689 ± 0.042 kg were significantly heavier than those born as twins (n=110) 2.4107 ± 0.064 kg which is obvious because in multiple births the nutrients available from the mother are shared by twin kids. The effects of season on birth weight of Mehsana kids were estimated to be non-significant. The year of birth also had significant (P<0.01) effect on birth weight.

Introduction

Goat (*Capra hircus*) was the earliest ruminant domesticated around 9000 to 7000 B.C. Goat is also known as “poor man’s cow” as the name given by Father of Nation, Mahatma Gandhi. Goat contribution is being the source of revenue for livestock-keepers, especially for family unit with minimum land resources and for landless labours. India possesses the second-largest goat population in the world having 135.17 million goats, but their population has declined by 3.82% over the previous census (Anonymous, 2012). The goat diversity in Gujarat is reflected in the form of five distinct goat breeds namely Mehsana, Surti, Gohilwadi, Zalawadi and Kutchi. The Mehsana goat is a dual purpose breed of domestic goat which is raised primarily for meat and milk production. Birth weight is an economic indicator for any livestock production purpose. There is a positive correlation in birth weight and further increasing of the live weight of animals (Roy *et al.*, 1989). Studies of various authors show that birth weight is influenced by sex, type of birth, season of birth, maternal age and more (Supakorn and Pralomkarn, 2009; Bharathidhasan *et al.*, 2009). The present work was undertaken to study the effect of season,
sex of kid and type of birth on birth weight in mehsana goat kids under semi-intensive system at organised herd.

Materials and Methods

There were 373 Mehsana kids born between 2011 and 2017 at the Goat section, Livestock Research Station, Sardarkrushinagar, Dantiwada, Gujarat. Geographically, the farm is located in North Gujarat at an altitude of 136 meters above the mean sea level. It lies at latitude of 24.35º North and longitude of 72.59º East. Annual rain fall is around 600 mm (Anonymous 2017). The climate of the farm is semi-arid in nature. Goats were maintained under semi-intensive system. In farm feeding done in two time in a day in morning feeding concentrate feeding (1% of body weight) and green fodder and in evening feeding also provide green fodder. Feed provide to the kid half-moon shape Federer and 1.5 feet above the ground level. Grazing time of goat is around 8 hours. Clean adlibitum water is provide to kid. The type of birth was either single or twin and no triplets were noticed. The year was divided into 3 seasons viz., Summer (March-June), Monsoon (July-December), Winter (November-February) to study the effect of season on birth weight of kids. The data were subjected to least-square analysis (Harvey 1987). The variation in Mehsana goats due to sex, type of birth, year, season and month of births were analysed statistically (Snedecor and Cochran, 1994).

Results and Discussion

Effect of sex of kid on birth weight

Birth weight data of 373 Mehsana kids for a period spread over 7 year were tabulated according to the sex of kids to determine the effect of sex on birth weight (Table 1). The overall mean birth weight was 2.555 ± 0.043 kg. The result pertaining to the average body weight at birth for male kids and female kids were 2.642 ± 0.048kg and 2.454 ± 0.051kg, respectively. The statistical analysis revealed that sex had significant (P<0.01) effect on birth weight of kids. Banerjee and Jana (2010) also reported significant effect of sex on birth weights in Sirohi goat kids. Present findings corroborated to reports of Chawla et al., (1984), Sanchez et al., (1994), Tomar et al., (1997), Raza et al., (1998), Elabid (2008), Bharthidhasan et al., (2009), Bhusan (2012), Singh et al., (2013), Harikrishna et al., (2013) and jat et al., (2018) This may be due to anabolic effect of male hormones (Hafez, 1962 and Chandra et al., 2009) which influences growth factor during pre-natal development.

Effect of season on birth weight

Table 1 revealed that maximum birth weight was 2.604 ± 0.022 kg during the monsoon season followed by winter (2.573 ±0.047 kg) and summer season (2.523 ± 0.104 kg) for 271,77, and 25 kids born of the farm. The season had no significant effect on birth weight of kids. The higher birth weight during the monsoon season might be due to good quality forage available and more number of kidding than the other season. Present findings were conformed to the work of Raza et al., (1998), Baiden (2007), Thiruvenkadan et al., (2008), Bharthidhasan et al., (2009), Chandra et al., (2009), and Bhusan (2012). However, Salah et al., (1989), Paul et al., (1990), Elabid (2008), Banerjee and Jana (2010), Meel et al., (2010) also reported significant effect of season on birth weight of goat kids. This might be attributed to effect of large number of observations, period, environmental factors and nutrition supply.

Effect of birth type on birth weight

Table 1 revealed that the mean birth weight of single birth of kids and twin birth of kids was 2.689 ± 0.042kg and 2.407 ± 0.064kg.
respectively. The statistical analysis of data showed that type of birth had significant (P<0.05) effect on birth weight of kids. Banerjee and Jana (2010) also reported significant effect of type of birth on birth weights in Sirohi goat kids. Present findings is agreement to the reports of Tomar et al., (1997), Neeru and Kumar (2002), Elabid (2008), Thiruvenkadan et al., (2009), Bharthidhasan et al., (2009), Chandra et al., (2009), Bhusan (2012), Hristova et al., (2013) and Hegan et al., (2014). Higher birth weight of single born kids was due to more nutrition available from the mother during prenatal period. Further there might be the limitation of space in the uterus for the growth of multiple kids during prenatal period.

Table 1: Effect-wise least square means of birth weight in mehsana kids

<table>
<thead>
<tr>
<th>Effect</th>
<th>N</th>
<th>Mean</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population mean</td>
<td>373</td>
<td>2.548</td>
<td>0.043</td>
</tr>
<tr>
<td>Type of birth</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Single</td>
<td>272</td>
<td>2.689</td>
<td>0.042</td>
</tr>
<tr>
<td>Twin</td>
<td>101</td>
<td>2.407</td>
<td>0.064</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>180</td>
<td>2.642</td>
<td>0.048</td>
</tr>
<tr>
<td>Female</td>
<td>193</td>
<td>2.454</td>
<td>0.051</td>
</tr>
<tr>
<td>Season</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Summer</td>
<td>25</td>
<td>2.523</td>
<td>0.104</td>
</tr>
<tr>
<td>Monsoon</td>
<td>271</td>
<td>2.604</td>
<td>0.022</td>
</tr>
<tr>
<td>Winter</td>
<td>77</td>
<td>2.573</td>
<td>0.047</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>96</td>
<td>2.508</td>
<td>0.069</td>
</tr>
<tr>
<td>2012</td>
<td>54</td>
<td>2.674</td>
<td>0.078</td>
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<tr>
<td>2013</td>
<td>43</td>
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<td>0.086</td>
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<tr>
<td>2014</td>
<td>36</td>
<td>2.778</td>
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<tr>
<td>2015</td>
<td>30</td>
<td>2.338</td>
<td>0.085</td>
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<tr>
<td>2016</td>
<td>54</td>
<td>2.401</td>
<td>0.072</td>
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<tr>
<td>2017</td>
<td>60</td>
<td>2.394</td>
<td>0.077</td>
</tr>
</tbody>
</table>

Mean in the same column with different superscripts differ significantly from each other ** indicate significant at p<0.05 level and NS indicate non-significant.

Effect of period on birth weight

Year wise birth weight has increase trend from 2011 to 2014 then there was sudden decrease in average birth weight by 15.84 % in year 2015. After that it remain almost constant. The effect of year was found significant 1 % between the period several factors viz average rainfall, nutrition supply, disease outbreaks, breeding management and overall management of farm affect the birth weight of kids.

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