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COMPARATIVE PRODUCTIVE PERFORMANCE OF BEETAL GOATS IN ANNUAL AND ACCELERATED SYSTEM

N. Ahmad, K. Javed, M. Abdullah, A. S. Hashmi* A. Ali, Z. Iqbal, U. Younas and Z. M. Iqbal

Department of Livestock Production, University of Veterinary and Animal Sciences, Lahore 54000, Pakistan.
*Department of Biochemistry and Biotechnology, University of Veterinary and Animal Sciences, Lahore 54000, Pakistan.
Corresponding Author E-mail: nisarahmad@uvas.edu.pk

ABSTRACT

Fifty adult Beetal goats were divided into two groups viz. accelerated kidding and annual kidding having 25 animals each. Each group was further divided into 5 sub-groups, 5 animals in each and considered as replicate. The accelerated kidding group produced three crops where as the annual breeding group produced two crops. Birth weight of kids produced in three different seasons of March-April, 2010; October-November, 2010 and June-July, 2011 were as 2.85±0.13, 3.32±0.40 and 3.29±0.31 kg as compared to kid crop produced in annual kidding system showing birth weight as 3.09±0.16 kg and 3.08±0.16 kg, respectively. The average body weight at 3 months of age of first, second and third kid crop in accelerated kidding system was noticed as 12.72±2.29, 11.31±0.98 and 11.44±1.60 kg, respectively as compared to 11.82 and 11.81 kg in annual kidding system. In order to minimize the gap of animal protein in human food, strategies like accelerated kidding may be adopted which might satisfy nutritional demands. The growth rate at 3 months age of two kid crops of annual and three kid crops of accelerated systems were observed as 97.00±2.54, 71.67±2.08, 109.44±5.83, 88.71±2.17 and 90.45±3.75gms, respectively. Whereas, at 6 months age of two kid crops of annual and three kid crops of accelerated systems, the growth rate was observed as 93.56±2.27, 110.71±0.94, 105.78±4.05, 109.86±1.03 and 109.64 ±1.26gms, respectively. The growth rate of two kid crops of annual and three kid crops of accelerated systems was 66.64 ±1.42, 91.22 ±2.74, 67.00 ±0.48, 67.57 ±2.72 and 67.73 ±6.08gms at 9 months of age, respectively.

Keywords: annual kidding, accelerated kidding, Beetal goats, birth weight, weight gain.

INTRODUCTION

Accelerated kidding is defined as three kidding in two years or five kidding in three years. Accelerated kidding is a profitable technique which can be used in small ruminants to increase the number of kids per year than once a year resultantly the mutton production will be increased. The most significant advantages of an accelerated kidding in production program are to fetch higher market prices during the off-season, premium prices for the smaller kids and to cash available market options. Management conditions in which the animals were kept also matters and acts as a tool to govern the success of accelerated kidding. Meat does planned to kid thrice in two years through synchronization importantly resulted in higher meat production particularly during anestrus (Schneider and Stanko, 2005). The efficiency of chevon production from small ruminants can be achieved by adopting various methods like increasing the reproductive rate, exploiting the potential of breeds with superior genetic makeup and by combining breeds for variation at the time of mating and mating female young stocks to produce young ones by the time, they are about one year old. Frequency of kidding may be helpful in increasing the total number of kids produced during particular period of year. However, a certain proportion of does have to be in estrus stage during any season (Lewis *et al.* 1996). An accelerated breeding program for sheep housed indoors superimposed upon genetic and nutritional programs has been established at Animal Research Centre in Ottawa (Hackett and Wolynetz, 1984). There are various factors beside slow growth rate that affect the production of small ruminants like various disease conditions, poor nutrition and health management (Malole *et al.* 2002) which results in gap between demand and supply of animal protein. This deficiency can be filled by accelerated kidding to have maximum kid crops in 2 years. There is need to conduct research on various production parameters like birth weight of kids and growth rate while comparing the accelerated kidding system with annual kidding system in Beetal goats as no work has been reported previously on these lines.

MATERIALS AND METHODS

For this study, 50 adult Beetal goats were divided into two groups viz. accelerated kidding and annual kidding having 25 animals in each. The experiment was conducted at Small Ruminant Training and Research Centre (SRT&RC), Ravi Campus, Pattoki, University of Veterinary & Animal Sciences, Lahore, Pakistan. The does were selected having same age, body

size, weight and parity. Different breeding bucks were used for each group having similar size, weight and age. All the animals included in this study were fed according to National Research Council (NRC) nutrient requirements for goats (NRC, 1981) at various stages of age, production and reproduction. Flushing ration and estrus inducing hormones both were provided to the does of respective groups for the preparation of breeding activity during out of season breeding. The annual kidding group was considered as the control group (Fig.1: Breeding pattern 1) while the does were bred to kid every eight months for accelerated kidding (Fig.2: Breeding pattern 2). Both of the breeding schemes were started from October, 2009 and were completed in September, 2011 (for the period of two years). During the whole study the accelerated kidding group produced three crops where as the annual breeding group produced two crops. The data regarding productive performance of both groups were recorded. The off-springs produced by the pregnant does of 1st batch of annual and accelerated kidding experiment were reared carefully under similar managemental conditions up to maturity. The green fodder was provided @ 10 % of body weight to all the animals. The fresh and clean water was made available to all the animals round the clock. Vaccination against Enterotoxemia, Pleuropneumonia, Contagious caprine pleuropneumonia was also done to all the animals. The kids were not weaned. Data on birth weight of kids and growth rate at different ages of life were recorded, regularly. To asses the effect of treatments, the analysis of variance was performed by completely randomized design (Steel *et al*., 1997) using proc GLM procedure of SAS. 1995 (SAS Institute, Cary, NC).

RESULTS AND DISCUSSION

Birth weight: The total kids born were 23 and 42 in number by two kid crops of annual and three kid crops of accelerated system, respectively. The total birth weight of kids produced by two kid crops of annual and three kid crops of accelerated system was 70.75 and 124.75kg, respectively. The growth rate of kids was found to be 99.61,107.75,67.33 and 87.09,104,76.26 grams at 3,6,9 months of age by two kid crops of annual and three kid crops of accelerated system. As far as net difference was concerned, same number of goats in accelerated system proved better in terms of producing 19 kids more and 54 kg of birth weight than goats at annual system during the experimental period of two years.

Data on different productive parameters (birth weight, growth rate and total body weight) were analyzed among three kid crops of accelerated and two crops of annual kidding system. Birth weight of kids produced in three different seasons of March-April, 2010; October-November, 2010 and June-July, 2011 were noticed as 2.85±0.13 kg, 3.32±0.40 kg and 3.29±0.31 kg as compared to two kid crops produced in annual kidding system having birth weight as 3.09±0.16 kg and 3.08±0.16 kg, respectively (Table 1). Findings of present study agree with the results of Mohammed and Amin, (1997) who reported as 2.7±0.5kg in male Sahel goat kids. However, high birth weight i.e. 3.56 kg was reported by Abd El Gadir *et al*. (2005) in crossbred of Saanen and Nubian, respectively. Malau-Aduli *et al*. (2004) and Khanum *et al*. (2007) observed birth weight of kids ranged from 1.3-1.4 kg in Red Sokoto and 1.6±0.2 - 2.1±0.5kg Dwarf goats, respectively. These breeds showed significantly less weight as compared to Beetal kids.

The findings of present work are in line with the results of Bhusan and Singh (2005) who reported birth weight as 2.4±0.14 kg in 45 Jakhrana goat kids. The results of present study coincide with the findings of Montaldo and Juarez, (1982) who observed birth weight as 2.7±0.07 kg in 84 Granada as well as 2.8 kg in 224 Jamnapari goats (Setiadi, 1988) and 3.0 kg in 232 Jamnapari goats (Sinha and Sahni, 1983).

Body weight at 3, 6 and 9 months: The average body weight of first kid crop in accelerated kidding system was noticed as 12.72±2.29 kg at 3 months of age. The body weight in this age group was found higher than other age groups of accelerated kidding system as well as annual kidding system (Figure.4). Second group of accelerated kidding system showed 11.31±0.98 kg and 3rd group represent body weight as 11.44±1.40 at 3 months of age (Figure.1). Birth weight was observed as 11.81±1.07 kg and 9.53±0.78 kg among two kid crops of annual kidding system at 3 months of age while it was lowest in second kid crop as 11.31 kg in accelerated kidding system.

Results of present study coincide with the findings of Gerstmayr and Horst (1995) who reported weaning weight in Angora goats as 10.8±1.9 kg. Similarly, findings of present study coincide with the results of Das *et al*. (1994) who reported body weight of 4779 Blended goats as 11.1±0.2kg. These findings are more close to the results of two crops of annual kidding system as compared to accelerated kidding system where first crop showed body weight as 12.71 kg. Another similar finding was reported by Ismail *et al*. (2011) who observed the body weight as 10.5±0.05 kg in Sudanese desert goat. Hyder *et al*. (2000) noticed body weight of Teddy goats as 10.4±2.05 kg. However, there are different findings of different researchers from different regions of world that were quite different from present study like Bharathidhasan *et al*. (2009), Singh *et al*. (2005d), Singh *et al*. (2011) and Sharma and Rai (2008) did work with Barbari goats and found body weight result as 6.93±0.30 kg, 7.6±0.11 kg, 7.85±0.05 kg and 7.63±0.05 kg. Less body weight in Barbari goat breed was noticed by many researchers at different period of year, gave a strong indication about miniature type,

although methods of managementel practices carry equal importance, too.

The average body weight of first kid crop in accelerated kidding system was noticed as 22.24±1.33 kg at 6 months of age (Figure. 2). The body weight in this age group was found higher than other age groups of accelerated as well as annual kidding system. Various scientists reported body weight of Jamnapari goat at this age was 16 kg, 12.2±3.5 kg, 13.81 kg and 11.68±0.12 kg, respectively. These results showed that Jamnapari breed got less productive potential in terms of body weight at 6 months of age as compared to the findings of Beetal goat breed. Similarly, Kumar *et al*. (2010), Gowane *et al*. (2011) and Sharma and Rai (2008) observed the body weight in Sirohi goat at 6 months of age and found body weight as 16.31±0.21 kg, 18.36±0.09 kg and 16.77±0.30 kg, respectively. The most probable reason for these findings showing no match with our results may be due to breed difference as well as seasonal variation prevailing in those regions. Second group of accelerated kidding system showed body weight as 21.20±0.98 kg and 3rd group represent body weight as 21.31±1.53 kg at 6 months of age. Whereas, average body weight among two kid crops of annual kidding system were observed as 11.82 kg and 11.81kg at 6 months of age. The lowest average body weight at 6 months of age was found in second kid crop as 21.20±0.98 kg in accelerated kidding system.

The average body weight of first kid crop in accelerated kidding system was noticed as 28.26±1.38 kg at 9 months of age (Figure.3). The body weight in this kid crop was found higher than other age groups of accelerated kidding system as well as annual kidding system. The results of this study coincides with the findings of Bazzi and Ghazaghi (2011) who reported body weight in Sistani goat breed as 26.25 kg at nine months of age. Second group of accelerated kidding system showed body weight as 27.29±0.65 kg and 3rd group represent body weight as 27.40 kg at 9 months of age. The lowest average body weight at 9 months of age was found in second kid crop as 27.29±0.65 kg in accelerated kidding system. However, results of study in Jamnapari breed showed body weight as 16.8±3.9 kg, 22.0 kg and 15.04±0.70 kg as narrated by Hassan *et al*. (2010), Rout *et al*. (2000) and Sharma and Rai (2008), respectively. These findings gave indications of goat breed that may be short or miniature type.

Growth rate at 3, 6 and 9 month age: The average growth rate of first kid crop in accelerated kidding system was noticed as 109.44±5.83 gm at 3 months of age, which was found significantly higher than other age groups of accelerated kidding system as well as annual kidding system (Figure.5). The second group of accelerated kidding system showed growth rate as 88.71±2.17 gm and 3rd group represent growth rate as 90.45±3.75 gm at 3 months of age. Whereas, growth rate among two kid crops of annual kidding system were observed as 97.00±2.54 and 71.67±2.08 gm in same age groups. The lowest growth rate was found in second kid crop as 88.71±2.17 gm in accelerated kidding system. The growth rate of first kid crop in accelerated kidding system was noticed as 105.78±4.05 gm at 6 months of age. The growth rate of first kid crop was found less than other age groups of accelerated kidding system.

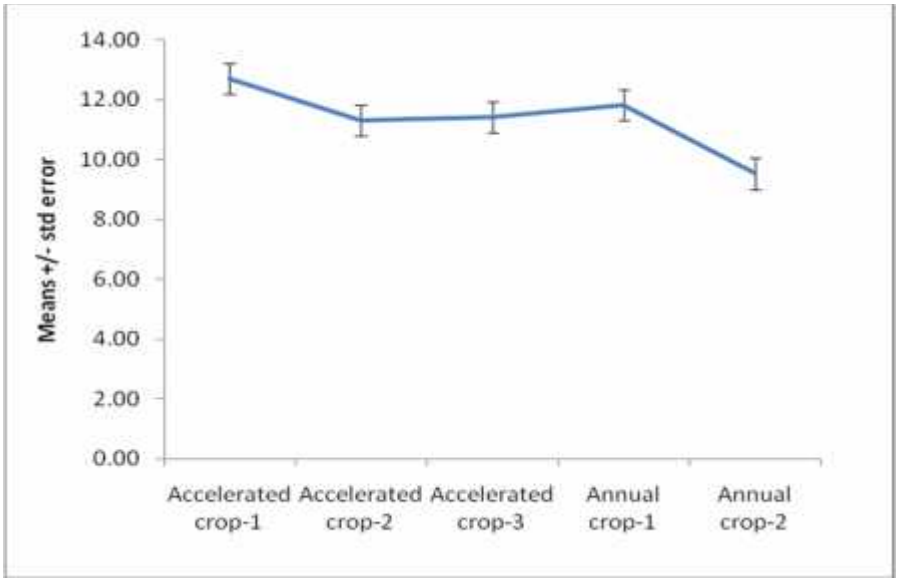

Figure.1. Weight of different crops at 3 months in accelerated and annual kidding systems

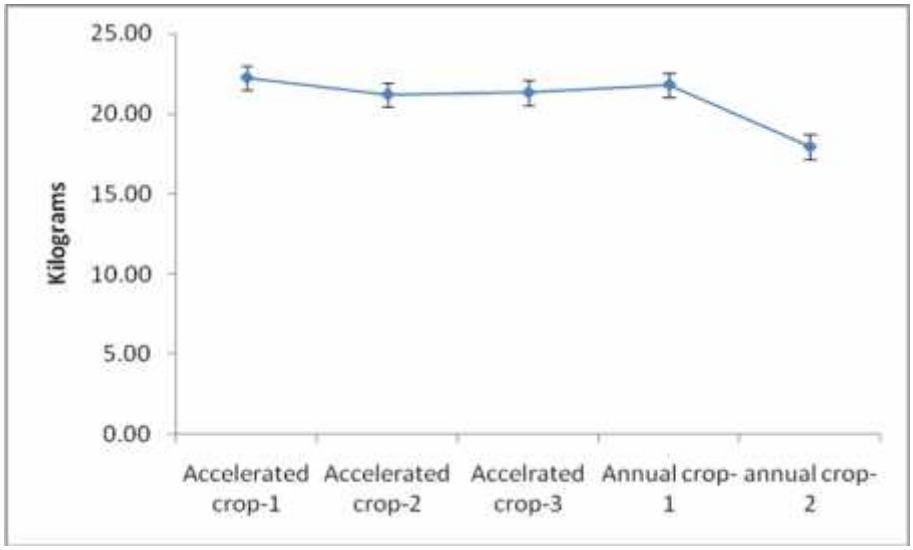

Figure. 2. Weight of different crops of goats at 6 months of age

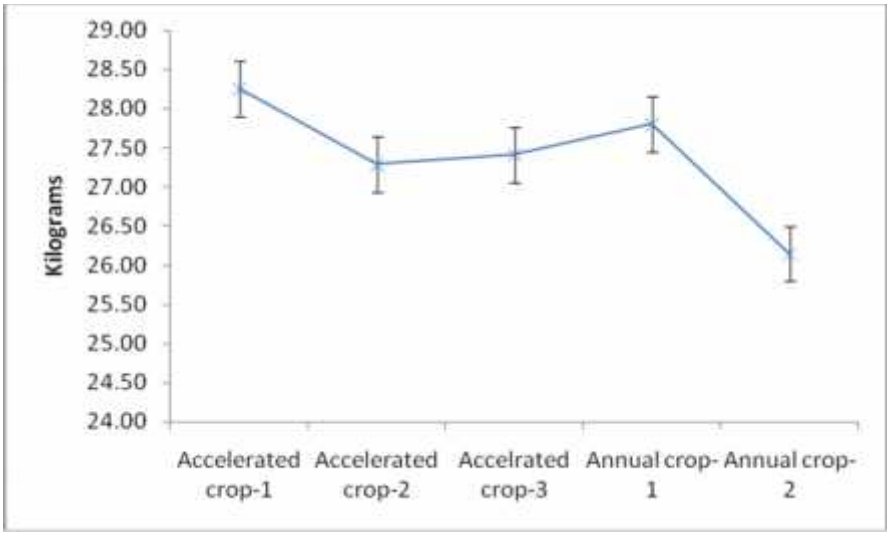

Figure.3. Weight of different crops of goats at 9 months of age

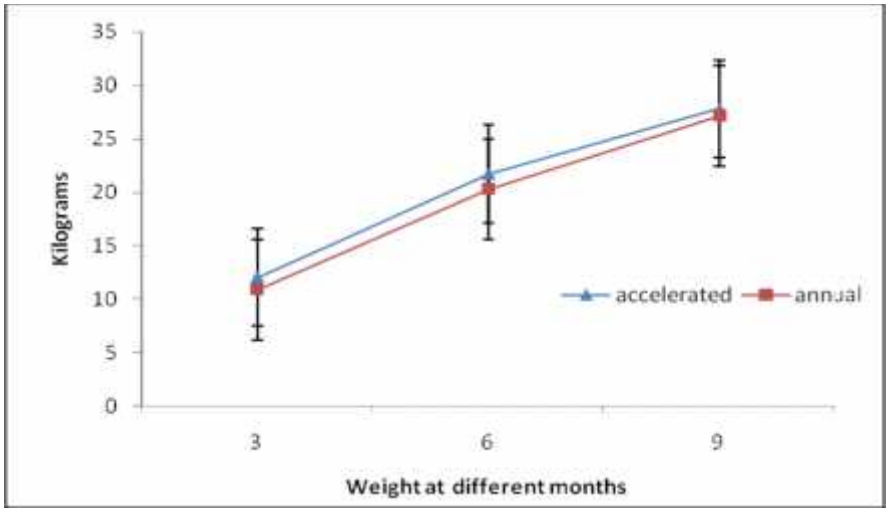

Figure . 4. Trends of attaining weight at 3, 6 and 9 months of age by accelerated vs. annual kid crops

The second group of accelerated kidding system showed growth rate as 67.57±2.72 gm and 3rd group represent growth rate as 67.73±6.08 gm at 3 months of age. Whereas, growth rate among two kid crops of annual kidding system was observed as 66.64±1.42 gm and 91.22±2.74 gm in same age group. The lowest growth rate was found in first kid crop as 66.64±1.42 gm in annual kidding system. The growth rate of first kid crop in accelerated kidding system was noticed as 67.00±0.48 gm at 9 months of age. The growth rate of this first kid crop was found less than other age groups of accelerated kidding system.

The second group of accelerated kidding system showed growth rate as 67.57±2.72 gm and 3rd group represent growth rate as 67.73±6.08 at 9 months of age. Whereas, growth rate among two kid crops of annual kidding system were observed as 66.64±1.42 and 91.22±2.74 gm in same age group. The lowest growth rate was found in first kid crops as 66.64±1.42 and 67.00±0.48 gm in annual kidding and accelerated kidding system, respectively.

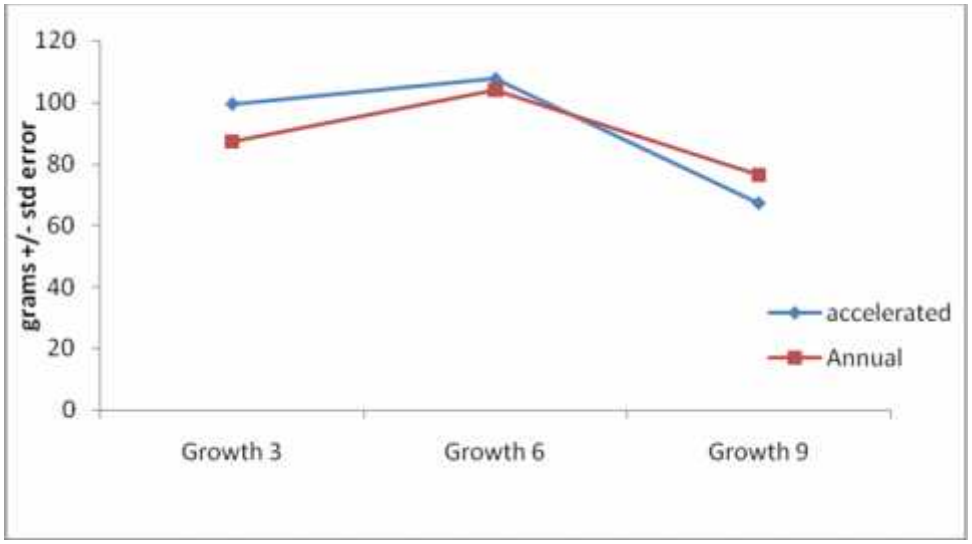

Figure . 5. Trends of attaining growth at 3, 6 and 9 months of age by accelerated vs annual kid crops

Table 1. Comparative productive performance in Beetal goats kids under accelerated and annual kidding systems

Parameters	Months of birth of kids						
	Annual kidding system			Accelerated kidding system			
	March-April.2010	March-April.2011	Mean Values	March-April.2010	October-November 2010	June – July. 2011	Mean Values
Birth Weight (kg)	3.09^{ab} ±0.16 (2.50-4.25)	3.08^{ab} ±0.16 (2.00-3.75)	3.08^{a} ±0.11	2.85^{b} ±0.13 (2.00-3.75)	3.32^{a} ±0.40 (2.00-4.50)	3.29^{a} ±0.31 (2.00-5.00)	3.07^{a} ±0.13
Growth rate from birth to 3 months (gm)	97.00^{b} ±2.54 (84-119)	71.67^{c} ±2.08 (66-84)	87.08^{b} ±3.14	109.44^{a} ±5.83 (37-142)	88.71^{b} ±2.17 (83-98)	90.45^{c} ±3.75 (68-107)	99.61^{a} ±3.51
Growth rate from 3- 6 months(gm)	93.56^{a} ±2.27 (86-103)	110.7 1^{c} ±0.94 (103-114)	104.00^{a} ±2.05	105.78^{a} ±4.05 (74-146)	109.86^{a} ±1.03 (106-112)	109.64^{c} ±1.26 (104-116)	107.75^{a} ±2.06
Growth rate from 6- 9 months(gm)	66.64^{b} ±1.42 (62-83)	91.22^{a} ±2.74 (76-101)	76.26^{b} ±2.88	67.00^{b} ±0.48 (62-70)	67.57^{b} ±2.72 (54-77)	67.73^{b} ±6.08 (33-101)	67.34^{a} ±1.87
Weight at 3 months (kg)	11.81^{ab} ±0.28 (10.30-14.70)	9.53^{c} ±0.25 (8.00-10.60)	10.92^{b} ±0.30	12.71^{a} ±0.53 (5.80-15.90)	11.31^{b} ±0.36 (10.00-12.50)	11.43^{b} ±0.48 (9.10-14.10)	12.05^{a} ±0.32
Weight at 6 months (kg)	21.80^{a} ±0.31 (19.90-24.90)	17.94^{b} ±0.33 (16.20-19.50)	20.29^{b} ±0.46	22.23^{a} ±0.31 (18.00-23.90)	21.20^{a} ±0.37 (19.90-22.50)	21.30^{a} ±0.46 (18.70-23.50)	21.75^{a} ±0.23

Parameters	Months of birth of kids						
	Annual kidding system			Accelerated kidding system			
	March-April.2010	March-April.2011	Mean Values	March-April.2010	October-November 2010	June – July. 2011	Mean Values
Weight at 9 months (kg)	27.80[a] ±0.27 (26.50-30.60)	26.14[b] ±0.45 (24.30-28.10)	27.15[b] ±0.29	28.25[a] ±0.32 (24.00-29.90)	27.28[ab] ±0.24 (26.70-28.50)	27.40[a] ±0.34 (25.30-28.90)	27.80[a] ±0.20

Means having different superscripts in a row are statistically significant (P< 0.05)
Values in parentheses are range values

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