

Fattening performance of Iranian goats under intensive feeding system

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ABSTRACT

Goat population in Iran is more than 25 million with 9 different identified breeds which represents a very significant component of livestock production potential over the country. Although goat keeping is a multi-purpose activity (milk, fiber and meat), meat is the most important product of these animals in many parts of the world, particularly in Iran, where the main purpose of goat keeping is being shifted to meat production. During the last decade, demand for meat has been increasingly grown and will continue to rise in Iran and its northern neighbored countries due to growth in their population and per capita income. Therefore the optimized management of the existing resources tends the perfecting of appropriate analysis models of production systems throughout needful information. A plenty national research works has been done to find out the performance and meat production potentials of kids from various goat types since last years. This paper, presents the results of works done on the growth performance and meat production of some Iranian Kids under intensive feeding system.

Key words: Goat meat, kids performance

INTRODUCTION

Small ruminant production is a very significant component of livestock production throughout the world and more especially in the developing countries (Ketema, T.K. 2007; Thornton et al., 2009). They were originally domesticated in southwest Asia, and Iran which today has been the homelands of one of the first types of wild sheep and goats (Dubeuf and Boyazoglu, 2009). Through adaptive capacities to survive and ability to produce in severe environmental conditions, they spread into other parts of the world and

now can be found in almost every environment (Devendra, C. 2007).

Goat have adaptive capacities to survive and produce in harsh and difficult environmental conditions particularly in dry areas. They are efficient converter of forage feeds whether they are farmed in cool, temperate, arid or tropical conditions (Lebbie, 2004; Richards, 2002; Ser´e and Steinfeld, 1996). Perhaps its greatest advantage relative to large ruminants is low cost, small body size, suitability to small holdings and its triple purpose use for meat, milk and fiber (Oregui and Falagan, 2006). Goat population is widely distributed and is of great importance as a major source of livelihood of the small farmer and the landless families in rural area of many countries with particular to Middle-East area and southern Iran, where the livestock keeping is based on the traditional extensive grazing system as well (Tavakolian, 2000; Kmalzadeh *et al.*, 2008).

Goat is a multi-functional animal and plays a significant role in the economy and nutrition of landless, small and marginal farmers through managing under extensive and village production systems and goat husbandry has been developed based on the range land and pastures as main feed resources, but cereal stubbles and supplements are becoming more important sources of feed for efficient goat production in the country and across the globe (Fazaeli, 2008). All these resources are going to be limited, therefore this system requires to be investigated comprehensively in order to find out other possible ways could maintain good productive performance.

The main inclination of goaterly in Iran, is also being shifted towards meat production and during the past decade demand for meat has been increasingly grown and will continue to rise in the country neighbors due to the growth of population and livelihood promotion

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(Kamali and Banabazi, 2009; Mirzaei, F. 2011).

There are over 25 million goats in Iran (IASTAT. 2007), which serve as important resource for improvement of local economies in many parts of the country. Similar to most parts of the world (Singh et al., 2009), goat population in Iran are mainly managed under extensive production systems and husbandry of goat has been developed based on availability of range land and pastures as a main feed sources, where it couples with the economic status of smallholder farmers (Eskandari et al., 2008).

Indications, however, are that the productivity of the conventional system is low and that there is ample opportunity for improvement. The economic exploitation of the resources in the future demands the perfecting of models for efficiency analysis of production systems. This efficiency must take into account not only the apparent productivity per animal but also technical, energetic, economic, social and ecological parameters necessary to obtain this production. This exploitation requires a considerable methodological effort to propose technical improvements of the systems.

PRODUCTION POTENTIAL

The greatest potential, which goats have, in contrast to other food commodities, is high ceiling on biological efficiency (Islam et al, 2009). This is the opportunity or potential for further increase in yield of product per unit of production. There is a little applied information for efficiency analysis of current and changing production systems. However improved animal nutrition appears to be a more critical factor in increasing small stock productivity. The main weaknesses in goatery are related to feeding management, particularly grazing schemes over the year (Mahmoudzadeh and Fazaeli. 2004; Monem and Keyanzad. 2008). Therefore research and development on the nutritional utilization of rangelands and pastures and proper feed supplementation is to be encouraged (Ruiz *et al.*, 2009). Furthermore, the existing goat production capacity should be improved,

without ignoring the concerned balance between hardiness and general productivity in the real status.

The average carcass weight of Iranian goats is about 13 kg and it gets heavier with advancing the seasons, probably due to their growth pattern and maturity. Kids grow faster but their slaughter weight is lighter over the spring and summer, but they grow slower but have heavier carcass weight in autumn and winter respectively. Although, large variation in carcass weight and characteristics is observed between and within the breeds, but as overall the carcass weight of fattening kids is about 55% of their live weight under the intensive system (Monem and Keyanzad. 2008).

Reports indicated that the body weight gain is limited to only 60–70 g for kids reared on natural range/browsing. This can be improved to 80 g by supplementary feeding with legume hay at rate 120–140 g/day through intensive feeding system (Reza-Yazdi, 2002; Mir-Haydari, 2007). The dressing percentage based on live weight also can be improved by the above- mentioned feeding system.

Assessment by Karimkhani et al.,(2005) indicated that average daily gain of breeds of Rayeeni, Black hair and Tali kids were 100, 65 and 93 grams respectively when they fed a similar intensive feeding system for 100 days period with initial age of nearby 4 months. The obtained final body weights were 21, 21 and 23 kg with carcass percentages of 46.4, 48.5 and 44.4% that were significantly differed among the breeds ($P < 0.05$). They concluded that Black hair goat seems to be a fitable breed for fattening followed by Rayeeni comparing to Tali.

Breeds: Iranian goats are not scientifically well grouped according to their products importance, color or conformation. Although, more than 20 breeds of goats have been recognized in Iran, but the typical breeds are: Tali or Saheli, Adani, Marghoz, Najdei, Rayeeni, Baluchi, Mamasani and Nadoshan. However Marghoz and Rayeeni are known for their Mohair and Kashmir production (Kamali and Banabazi, 2009). Identifying the variations among breeds could help to develop the appropriate modeling approaches of production systems.

Rayeeni goat: This type of goat is famous for producing a fine Kashmir fiber. They range 30 to 35 kg in body weight. Characterize with ability to survive in the arid and dryland zones such as Kerman and Yazd provinces.

Rayeeni kids have daily gain between 90 and 100 g and carcass dressing percentage of 48.7 to 49.9% when fed diet contained 10% CP and 2.2 Mcal/kg ME with initial weight of 33kg and slaughtering weight of 43 kg. Reports indicated that the feed conversion ratio may varied from 6.8 to 8.7 in feedlot kids kept under an intensive feeding system from age 4 to 7 months (Fazaeli, personal communication). A growth rate of 93 to 100 g/day and carcass dressing percentage of 49 to 50%, with slaughtering weight of 40.6 to 41 kg were reported by Fazaeli and Nuroozian (2005) for Rayeeni mature kids with initial weight of 33 ± 1.4 kg and 10 months age, during 85 days as finishing period on 60:50 concentrate: roughage ration fed ad lib. The dry matter intake ranged 1119 to 1145 g/day and feed conversion ratio 11.26 to 12.0 for animals fed rations contained 10.6% crude protein and 2.18 to 2.26 Mcal/kg of metabolizable energy. Although Rayeeni goat is a fibre type animal, they have a reasonable daily gain average 123 g for kids fed diet contained 11.1 MJ/kg of ME and 13% of crude protein or 7.65% metabolisable protein in an intensive system (Gholami, 2004). However, average daily gain in kids could be affected by the type and energy-protein content of diet. Meanwhile, the high energy-protein rations are not required to optimize the kid fattening performance. Another experiment (Taghizadeh *et al.*, 2005) on Rayeeni kids with average initial live weight of 30 kg, showed that daily gain increased from 44 to 97 g when the animals received 100 g/day of protein supplement (fish meal) in addition to the basal diet (contained 10 MJ/kg of ME). Protein supplementation resulted a higher slaughtering weight (37.5 vs. 33.8kg), and carcass weight (16.6 vs. 15.4kg) as well. It means that the feed efficiency improved more than two times.

In an intensive livestock keeping system, a daily gain of 180 g/day was obtained in

Rayeeni kids, during early weaning age but it showed a reducing trend toward the end of weaning period where daily gain reached 140g/day at 90 days age (Mir-Haydari, 2007).

Tali kids: A study by Ghasemi(2003) indicated that live body weight at six months for Tali kids kept in traditional rural system was around 13 kg but the average daily gain ranged 87 to 97 g to reach 20-22 kg live weight when fed for a 3 months on intensive system with 12% protein and 2.43 Mcal/kg ME diet with feed conversion ratio of 7.7 to 8.7. Similar results were reported by Asgari (2003) with slightly higher (8.2 – 9.7) feed conversion ratio in Tali kids fed 12.8% CP and 2.35 Mcal/kg ME diets.

In another experiment (Asgari *et al.*, 2005), 48 growing Tali male kids with average body weight of 13.5 Kg were used to test the performance of 4 different rations contained dried *Prosopis cineraria* and *Acacia tortilis* pods (fruits with seeds). Final weight ranged 17.9 to 20.6 kg and daily gains ranged 62 to 85 g/day. It was concluded that incorporation of the above mentioned feeds up to 30% of the diet resulted the optimum performance in terms of feed intake, growth rate and feed efficiency.

Experiences obtained in Booshehr Research Center (Kamali *et al.*, 2005) indicated that male kids with initial weight of 18 kg fed diet contained 13% crude protein and 1.96 Mcal/kg ME could reach 24-25 kg of body weight with average daily gain of about 67 g during a 3 months feeding on roughage based on the supplemented agricultural by-products .

Lori kids: Cheginy *et al.*, (2005) studied the fattening performance of Lori kids in four age groups (4, 6, 8 and 10 months age) for a 90 days intensive feeding schedule. Average daily gain obtained were 105 ± 14 and 63 ± 24 g for male and female animals, respectively which was significantly ($P < 0.05$) different. Average daily gain of different ages (4, 6, 8 and 10 months) were 93 ± 16 , 91 ± 22 , 111 ± 28 and 125 ± 20 g/day for male and 55 ± 14 , 64 ± 9 , 70 ± 9 and 62 ± 16 g/d for female kids, respectively which were significantly ($P < 0.05$) different between sexes and ages. The final body live

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weight was 23.5 and 38.1 kg for male kids and 19.5 and 26.3 for females at 4 and 10 month ages respectively. The optimum performance with the lowest feed intake per body weight gain (6.15) obtained with the male kids started at 8 months age.

Yarahmadi et al., (2005) studied the correlation coefficients between some pre-weaning traits with feedlot and carcass traits kids of 159 Lori male kids weaned at 90 ±5 days of age then they were kept for 90,105 and 120 days in pasture then slaughtered. The correlation coefficients between birth and weaning weights with feedlot initial weight and final weight were significant ($P < 0.05$). The results of this study indicated the increase of carcass weight fat when the lean were increased. Acquired gain after 120 days feedlot was due to increasing body fat which is not economic issue.

Markhoze: Morkhoze is a fibre type goat which is being reared in north-western Iran near the Turkey and Iraqi borders but it is also used for meat production. It is believed the Angora goats are originated from this breed of goat. Angora goats appear in one color which is between white to silver, but Marghoz goats produce Mohair in different natural colors which is a unique character of this type of goat.

A growth rate range 56 to 100 g/day and feed conversion efficiency of 12.8 to 8.7 were obtained with Markhoze goat when the 4 months male kids with initial live weight of 18 kg fed in an intensive system with different levels of energy and protein in the diets. The highest final weight of 27 kg and dressing percentage of 45.2% were obtained with enriched energy and protein diet. Dry matter content of carcass ranged 27 to 48%, protein 33 to 47% and fat 42 to 53 % in kids fed different diets (Ebne-Abbasi et al., 2006).

Crossbreds: Birjandi (2005) conducted a project with 120 kids from three goat types including: Baloochi (B), Pakistani (P) and crossbred of native with Pakistani (BP) in four age groups (3, 6, 9 and 12 months) fed similar diets for 114 days. All animals kept under intensive feeding on a ration contained 13% CP and 2.7 Mcal/kg of ME. Mean daily gains

of the above breeds were 70, 120 and 90 grams, respectively. Total average daily gains of the age groups were 41, 71, 101 and 110 gram for 3, 6, 9 and 12 month kids' respectively. The average daily gain between the males and females were 100 and 71 grams, respectively. The dressing carcass were 44.4, 47.0 and 48.8 % for B, P and BP; 47.84 and 45.7 % for male and female kids; 44.32, 44.5, 47.73 and 48.3 for 3, 6, 9 and 12 months age groups respectively. In relation to this characteristic, the highest ratio of internal fat to carcass weight, among breed, sex and age groups, was related to native breed, females and to the 12 months age group. In conclusion, BP and P kids of 9 months age and initial body weight of around 13 kg could have better performance of meat production and relatively low (11%) abdominal fat. A summaries of information obtained from intensive feeding of kids from different breeds are presented in Table 1.

CONCLUSION

Goat is presently making the most efficient use of the marginal land in the Near East region including Iran, especially in some areas with rainfall below 200 mm. The potential capacity of different regions to accelerate the meat producing capacity from goat is therefore one of paramount importance. The justification for increasing meat production from goats which are reared extensively with sheep in Iran is associated with increasing demand for the meat. However, the main weaknesses in goat husbandry are related to feeding management, particularly grazing, and to the goatery productivity. Therefore research and development on the nutritional utilization of rangelands and pastures and appropriate feed supplementation is to be encouraged. Thereafter, the production capacity of the goats in these systems should be improved. Efficiency of slaughtered kids can be increased by selecting higher growth and meat production breeds, but similar to the sheep, the goat fattening with appropriate feeding management must be developed towards intensive system.

Table . Summaries of kid's performance from different breeds in intensive feedlot system

Type of goat	Initial weight (kg)	Final weight (kg)	Carcass weight (kg)	Daily Gain (g)	DMI (kg)	FCR	References
Rayeeni	33-35	41-43	19.8-21	93-100	1.1-1.15	11-12	Fazaeli and Nuroozian, 2005
Rayeeni	30	37.5	16.5	97	-	-	Taghizadeh <i>et al.</i> , 2005
Rayeeni	17.5	30	-	76 -132	0.7 - 0.8	6.7- 8	Gholami, 2004
Lori	15- 26	24 -38	9 -18	90 -125	0.61- 1.03	6.2 - 9.4	Cheginy <i>et al.</i> , (2005)
Tali	13	21	-	85-100	0.70 - 0.8	8.2 - 9.7	Asgari, 2003
Tali	12.7	17-21	-	62- 85	0.66 - 0.7	8 -10.6	Asgari and Reza-Yazdi, 2005
Tali	13	21	-	87-97		7.7-8.7	Ghasemi, 2003
Markhoze	18	27	12.5	56-100	0.7-0.8	8.7-12.8	Ebne-Abbasi <i>et al.</i> , 2006
Booshehr Native	18	24-25	11.5- 12	67	0.471- 0.475	7 - 8	Kamali <i>et al.</i> , 2005

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