Camel production potential and recent research in Iran

M. Salehi – A.A. Gharahdaghi [Animal Science Research Institute, Tehran]

Introduction

In order to preserve and utilize natural resources appropriately, the development of knowledge of those resources (and where possible their restoration) is crucial, as is the selection of appropriate animals for grazing in the rangelands. Almost all Iranian rangelands are categorized as medium class (41.4%) and poor (unproductive and relatively salty) class (48.2%). In such regions in which nothing grows but salt-growing, bland and thorny plants it is difficult to choose domesticated livestock suitable for raising, other than the camel. The economic potential of camel products is substantial. It includes meat, to provide a part of the protein needs of urban and rural societies; fibre, to provide a part of the raw materials of the textile industry; and also draught power in agriculture. For researchers who are concerned about sustainable agriculture, there is a strong motivation to establish research projects addressing the present and potential productivity of this unique animal.

Iranian camel population

There are nearly 150,000 dromedary camels living in the desert areas (South and Central) of Iran; this is 0.56% of the world camel population and 3.8% of the Asian camel population (FAO, 2011). The majority of country's camel are dromedary, they are scattered across the country's 14 provinces (Table 1). The Bactrian camel population is very low – around 200 camels which live mostly in Ardebil province .

Table 1: Camel population in different provinces of Iran in 2003
(Minstry of Jihad –e- Agriculture, 2002)

No.	Provinces	Number	Percentage
1	Sistan-Baluchistan	50000	32.47
2	Khorasan	37400	24.29
3	Kerman	14200	9.22
4	Yazd	11300	7.34
5	Hormozgan	7700	5.00
6	Kohgiluye-Booyerahmad	6200	4.03
7	Isfahan	5500	3.57
8	Semnan	5200	3.38
9	Khuzestan	4100	2.66
10	Boshehr	2600	1.69
11	Qom	2100	1.36
12	Golestan	2000	1.30
13	Tehran	1600	1.04
14	Fars	1300	0.84
15	East Azarbaijan	1100	0.71
16	West Azarbujan	500	0.32
17	Ilam	500	0.32
18	Qazvin	400	0.26
19	Ardebil	300	0.19
	Total country	154000	100

The principal products from the camel are meat, wool and milk; it is also used as work power in agriculture, and as a pack animal in trnsportation.

Iranian camel type

Iran's camel are divided into four basic types, based on the climatic condition and production capabilities such as meat type, milk type, dual purpose (meat-milk and wool-meat) and riding camels.

Meat type: These camels have a large hump; wide posterior parts, firm body, short neck, large and heavy muscular head. In Eastern and Souther-estern Iran, at the borders with Afghanistan and Pakistan, Balochi camels are reared for their high abilities in meat production (Khodaie, 2004).

Milk type: Under suitable management conditions, milk type camels in the world often produce up to 2,500 litres of milk during a milking period. Turkamani camels in north Khorasan are known as milk producing camels, producing from 1,500 to 1,800 litres of milk per lactation period. In Golestan province Turkmani camels are bred mostly for milk and meat. The average period of lactation is around 8 months, and the average milk production is 1,880 kg annually (Gharabash et al., 2009).

Dual purpose: These have a medium body size, a milk production of 1,000-1,500 litres, relatively heavy weight, and medium size hump. Kalakuhy, Naeni and Balochi camels in the desert margin areas of Qom and Isfahan provinces are known as dual purpose (meat-wool and meat-milk type) camels (Sarhadi, 2012).

Riding Type: These camels are divided into two branches – riding (Jamaz camels) and pack camels. Jamaz camels such as the Bandari camel are more suitable for riding and competition. They have a small head, a thin, short neck, a deep breast with oblique ribs and muscular poster legs. They originate in the south ofr south-east of Iran, near the Pakistan border, and their numbers are gradually diminishing.

Bactrian camels: These are kept by Ardebil province tribes in the north of Iran. This species is adapted to cold areas, and is raised for meat, milk and soft wool production. In the local language the males are called Baghuor and the females Hachamaya . Their body size is larger than that of dromedaries, and for pack-carrying they are much stronger than the dromedaries. Cross-bred camels between Bactrians and dromedaries are stronger than pure-bred Bactrian for carrying heavy loads. Bactrian adult males are used for crossbreeding with single humped camels.

Management and breeding:

In the past, the keeping and breeding of camel in Iran was done in various ways, including breeding camels by skilled local people known as Charvadar. They were very skilled in breeding camel, and they used the camels for transporting commercial and agriculture products. That is seldom done these days.

Another way was the rearing of camels along with other domestic animal by tribes and villagers such as the Ilsawan tribe of Moghan plain, Turkmens, Fars, Kerman and Baluchistan tribes. This way still continues. These people usually benefit from fattening camel for meat production as a semi industrialized job.

Another way, which includes most camel population, is the keeping of camels by the villagers located around two large desert areas of Iran, namely the Salt and Loot deserts, in a way of cauterizing females whch are then left in the desert for the whole year. These camels naturally reproduce and increase the generation. Each year, usually in spring, the camels are gathered by their owners, and after shearing, they are treated, and young camels are cauterized and selection for sale is carried out; then they are returned to the desert. During the summer, the camels need more water, so they return to the village every day, but in spring, when pastures are more suitable and water is available naturally, they go very far from the villages to the depth of desert. The importance of this way is that it benefits from exploitation of the pastures of dry regions with minimum expense.

The fattening camel is another way of raising the animal. Fattening is concentrated around the cities and margins of the villages. Camels are fattened over periods of 2 to 4 months, using residual remains and waste from agricultural activities (Minstry of Jihad –e- Agriculture, 2002).

One study has shown that camel rearing in most parts of the country generally takes place in villages in desert areas, and rarely in mountainous and plain areas. The distance traveled is 40 to 120 km and is during a year or part of annual (Salehi, et al., 2009).

The most expanses of camel breeding are related to their cure, feeding other than grazing and shepherding. The size of herds may vary from 4-5 up to 100-150, which are mostly released to the desert and often do not have camel driver. As mentioned above, camel breeders gathers their animal in early spring, and after removing their soft wool and treating the camels, they cauterize calf camels and culling undesirables camels, and again released them in the desert. Selling calf camels of 1 to 3 years old provides the basic income for camel breeders. In one study the number of camels in each flock varied between 4 and 400. The make-up of the flock was 1 to 2% adult males, 7.5% male calves and 91% calves and adult female camels. On average the adult males were 10 (between 3 and 20) years old and the adult females were 16 (between 8 and 30) years old. The time of mating of camel began with the onset of the cold season (late autumn) and continued till early spring. One adult male camel was sufficient to impregnate 30 to 80 female camels (Salehi et al., 2009).

Another research results show that 64% of mating was in middle winter, while the lowest figure was in early spring. Parturition was from early winter until early spring, and 9.3% of calf camels died after birth (Farzad, 2003). The pregnancy period of camel has been reported as 12.5 to 13 months (Farzad, 2003).

Camel nutrition

The camel has the ability to eat low nutritional value plants that other animal reject. Thirty species of plant available in the Iranian poor rangelands have been named as camel feed. These include *Alhagi camelorum, Adropogon spp., Aristida spp., Atriplex spp., Bromus, Cenchus spp., Poa spp., Penniserum spp., Sporobolus, Lolium spp., Salavadora persica, Panicum spp., Zizyphus spina christi, Medicago spp., Calatropis procera, Crotalaria spp., Tribulus terrestris, Trigonella, Prosopis spp., Calligonum spp., Lycium spp., Zygohyllum spp., Tamarix spp., Astragalus spp., Haloxylon spp., Indiofera spp., Artemisia spp* and *Noaea muctonata*. In order to find food camels are likely to travel up to 20 km from their watering places to graze desert plants (Ministry of Jihad -e- Agriculture, 2002).

In some cases camels are fed by hand feeding or supplementary feed. Supplementary feedstuffs include: barley and its flour, legume straw, green barley, wheat straw, sorghum, beet pulp, dried bread and cotton seed (Salehi et al., 2009).

In a study of nutritional value of rangeland plants consumed by camel in Semnan, Ghom and Yazd provinces contents *Salsola rigida, Salsola yazdiana, Salsola spp., Salsola spp., Salsola spp., Saueda spp., Salsola arbescola, Calligonum comosum,Tamarix tetragyna,Tamarix strica, Artemisia spp., Artiplex lentiformis, Zygophyllum spp., Anabasis haussknechti, Haloxylon spp., Seidlitzia rosmarinus, Alhagi camelorum, Kalidium capsicum, Halostachys spp., Tamarix spp., Hammada salicornica, Salsola tomentos, Haloxylon Spp., Tareshor* were determined, the best plant were defined *Artiplex lentiformis* and *Alhagi camelorum* which had more nutritional value related to other plants in camel nutrition (Towhidi et al. 2009). The effect of two different rations including 0% and 30% concentrate on digestive potential and kinetic of digesta in Iranian camel and sheep were compared. A significant difference was observed in pH values and VFA concentrations in the rumen in camels. The difference in VFA concentrations between sheep and camel was significant but no difference was observed in ammonia nitrogen concentration and pH values in rumen between the two animals. In camel, the digestibility of NDF and ADF of the ration containing 0% concentrate was higher as compared to the other ration (Tabatabaee, 2008).

Camel stable:

Unike cattle, because of the camel's tolerance of changing temperatures and its ability to live in hot areas, it does not need stabling and maintenance facilities. Most of its days it lives in open areas, but in winter and unfavorable conditions it must be kept in suitable shelter. In one study of camel keeping it was shown that in some provinces (Sistan and Baluchistan, Hormozgan, Kerman and Booshehr) camels had no special stables. But in Khorasan they used pit or open area. In Semnan province camels were kept in closed area at night, and also during the pregnancy and fattening. In Golestan province for keeping camels they used open or roofed ground (Salehi et al., 2009).

Diseases and parasites

The camel lives almost its whole life in the desert. It is liable to be contaminated with various internal and external parasites including most widespread kinds of scab (foot scab) and ticks, which cause weakness of the body and increasing abortion in pregnant camels. Scab, itching, dry skin, bleeding, tick, foot and mouth diseases, mental disorder, fly invasion, leech, hair shedding, pox, diarrhoea, scab (mange), tuberculosis, abortion, rabies, being loose, foot blister, eye worm, ulcers of flank and anus and fungi are diseases that have been noted.

The most common ways to prevent these diseases are vaccination, spraying with anti-insect and anti-fungi toxins, lubrication with arugula oil, exhausted oil or animal origin oil and petroleum, taking a shower, cauterizing or injecting antibiotics (Salehi, et al., 2009)

Most of the mortality rate occurs at infancy period. The most common calf camels disease terminating to death from birth to the first 6 months and then to yearling is related to gastrointestinal complications. Mortality rate reported by a research result show; gastrointestinal complications about 31%, respiratory difficulties 17 to 30%, urinary 1.6 to 7%, diarrhea 7 to 11%, physical injuries 5 to 31%, heat shock up to 5.5% and unknown causes between 7 to 16 percent. In Khorasan province mortality rate has been reported about 2 to 10 percent in critical occasions it can increase to 40 percent (Farzad, 2003).

Cross breeding of camel:

The history of camel crossbreeding showed that dromedary and Bactrian camels and mating them together for having cross bred camels with better potential were customary in Russia, Afghanistan, Iran and Turkey and background of this phenomena probably back to Parthian period around 2200 B.C (Ahmadi, 1987). Probably the first one who made systematical studies on Asian Bactrian camels and its crossbreeding to produce fibers with finest quality was Thomas Hutton in India which became successful to do the first crossbreeding between two species of camel and producing a grate flock of crossbred camel and gradually made a new combination that were heat tolerance and had a larger amount of fibrous cover (Von Bergen, 1968)

Nowadays one of the most important problems is nonscheduled crossing between large size male camels (Sendi, Afghani, and Chinese breeds) illegally entered from neighboring countries and Iranian camels by the camel herders. These process in addition to diminishing the genetics potential of native breeds, make spreading of illnesses such as camel type brucellosis and Johne's diseases. Most of these camels which are used for carrying drugs are addicted to drugs (Rasekh Afshar and Khodaie, 2009).

It was reported that, mating of Bactrian male with female dromedaries resulted better feed efficiency in the crossbred calves obtained. So crossbreeding between camels caused producing more meat (Sarhadi et al., 2012). Another study showed that crossbred camels group with parental basis of Bactrian and maternal basis of dromedary Kalkuhi in comparison with pure Kalkuhi camels group and also males in comparison with females had better fattening performance (daily weight gain, feed efficiency and carcass traits). In spite of low energy content of their ration during fattening period crossbred animals had relatively good daily weight gain (Asadzadeh, 2009).

Camel productions

Biological characteristics

The biological characteristics during 10 years (1991-2000) on Baphgh station camel herd demonstrated, that generation interval from mother to mother in first calving was 2142 days, calving interval between first and second parturition was 1262 days. Birth weights, 3, 6 and 12 months old for male and female were 32.36 and 31.98, 93.9 and 90.6, 128.3 and 134.0, 144.4 and 140.4 kg respectively. The result shown that, growth rate in first few months was high and then after six months old decreased. Therefore, it is important for delete male ones after weaning time (six-nine month of age) for the best quality and quantity of meat (Emami Mibodi, et al., 2009).

Camel meat and Fattening of camel:

Camel meat in Iran with production of 4.5 thousand tones includes 0.5% of total red meat production of the country (Gharadaghi, et al., 2009).

In in recent years fattening camel is being common in village and margins of desert in Iran and for its relative benefit it is expanding. Camel fatting because of no need to have expensive stables and modern facilities, low work power demand, low especial care and relatively cheap feedstuffs is a beneficial job for breeders. Breeding camel's especially young females are usually gathered in dry years by camel breeders from desert and kept and fed maintenance diet in the village. Males will receive fattening diets. Young female camels after finishing the drought periods again join the flock in the desert. Most of camels of fattening units are entered from neighbor countries of east or south east of Iran, and their numbers are variable depends on drought on those countries reach up to 50000 per year. The most of camel fattening units are in Yazd, Kerman, Semnan, Sistan and Baluchistan provinces (Sarhadi et al., 2010).

The results of an investigation showed that 5 months length of fattening period in comparison with 8 months for one year old camel calves was more desirable and they had a better carcass quality (Asadzadeh et al., 2012). In another research also increasing the period of fattening had negative effect on feed efficiency so that camels fattened for 256 days had a worse feed efficiency than camels fattened for 84 and 154 days (Emami-meybody. 2009).

Farzad, et al. (2009), reported maximum amounts of meat, fat, bone and hump 68.9, 10.1, 26.2 and 4.7 % and the minimum amounts 60, 6.7, 20.7 and 3.5 %, respectively. In an investigation the birth weight of young camels in south Khorasan province during 10 years, showed that flock effects, month and day of birth were not significant to this trait but the year effect that resulted from different conditions, pastures quality and draught were significant (Naeemipour, et al., 2009).
Sarhadi et al., (2012), showed there were no significant difference between birth weight of crossbred 39.80 ± 5.67 and 39.08±5.42 kg and dormedary 39.67±2.52 and 37.33±4.64 kg male and female calves, respectively.

In a study different diets contain of 0.0, 0.45, 0.9 and 1.35% urea used by fattening camels calves (1.5 years old) for 4 months. All diets contain 14% cp and 67% TDN. The range of daily gain was 410 – 1300 g/day. the effect of diets on daily gain was not significant. The feed/gain ratio was 10.98, 9.43, 10.26 and 10.66 respectively on the base of dry matters. The ratio of carcass weight on live weight was 60.8, 59.0, 79.6 and 58.2 respectively. The effect of diets on was not significant. The fat deposit of abdominal, hump and carcass were 5.74 ± 2.54, 11.59 ± 2.13 and 7.2 ± 2.35 kg, respectively. The effect of diet on this trait was not significant. The average body weight of camel in the end of fattening was 289.6 kg (Emami Mibodi, 2001).

Three types of diets on fattening performance for yearling and 2-3 years old of camels was assessed. Average feed intake of two group ages were (3.81 Kg vs 5.42 Kg), average daily gain (549g vs 547g), average warm carcass weight (152.29 Kg vs 218.01 Kg), average carcass efficiency (54.36 vs 54.12),

average cold carcass weight (148.44 Kg vs 215.58 Kg), average feed conversion ratio (7.03 vs 10.43) respectively (Allameh, 2009).
Surveying quantitative and qualitative traits of camel meat showed that meat percent of crossbred camels was more than the dromedaries and fat percent and wastage of crossbred camels' carcass were less than the dromedaries. Meat dry matter percent in dromedaries was more and average percent of protein was more than dromedaries in crossbred camels (Ebadi et al, 2012).

Camel milk

Camel milk in Iran is mostly consumed by their calves and rarely used as a drug for treatment.

Camel fibers and leather

Camel soft fiber alone and/or with sheep wool has a lot of consuming options on textile industry. Because of climatic conditions camel wool generally produced in Asian countries and Europe and U.S are always importer and processor of these fibers. Camel fibers are consumed in producing expensive clothes from different kinds of overcoat, knitted work, woolen apparel, lining, parts of tweedy yarns, soft wool sport clothes, stock and tender textiles such as jacket, blouse, skirt, glove, scarf, shall, hat, furniture, fine filter in oil piping, car industries and carpet. The basic sources of producing camel fibers are China, Mongolia, Central Asia countries, Iran, Afghanistan, and Tibet.
Iran's camel appear in different color to black, but 99 percent are

Estimates of the color assortment to be expected white sugar 6 %, light and dark fawn 50 and 28, dark brown and mixed 8 and 8 % (von Bergen, 1968)

In the country, soft wool of camel in previous years was an export item (von Bergen, 1968). Now, soft wool of camel in most areas are self-consumed, in some areas such as Bushehr its soft wool is sold with a good price, or after making ebaia (sort of a coat), it transferred to some neighbor countries.

A report demonstrated, the average fibre production of different ages of camel was 753.1 gr per year with low repeatability 0.115 in mature females (Emami Mibodi, et al., 2009). The crossbred camel (3.78±1.26) produced significantly more fleece than dromedary (2.01±0.43) in15 moths age (Sarhadi et al., 2012).

To qualitative measurements of Iranian camel hair performances, Dromedary camel of 8 provinces include Khorasan, Sistan Baluchestan and Kerman provinces in the East, Hormozgan and Boshher provinces in South, Gorgan province in North, Semnan and Yazd provinces from central and Bactrian and hybrid camels from Ardebil province of country were selected for hair sampling. Hair samples were taken from right flank in mid spring of 438 camels, aged 2 to 20 years. A significant effect of age group and regions on inner coat percentage which were higher in females (82.5±0.5%), yearling-2ed age group (84.5±1%) and Kerman province (84.6±2%). There was significantly different in non medullated fibers between the sex, regions and age groups. The effect of region was significantly different on shoulder. Flank, rump, under hump and total staple lengths while the effect of sex and interaction effect between sex and age group were not significant on staple lengths in expect under hump staple length that affected by sex. Shorter and longer total staple related to calf female camels (2.9±1.5cm) and male between yearling-2ed age group (6.85±1.5cm) res. The effect of region and age were different on fiber diameter and CV of mean fiber diameter which the Bactrian 1-2 old camels in Ardebil province have finest down fibers 20.4±0.7 and 17.9±0.8 *um* and 7-10 olds dromedary camels in Kerman province have most coarse down fibers 28.9±1.3 and 23.18±1.4 *um*, respectively (Salehi, et al., 2009)

To determine follicle characteristics, samples of skin were taken from 200 camels kept in different provinces of Iran. The overall average S/P ratio, primary follicle density, secondary follicle density, total primary plus secondary follicle density and percentage of inactive secondary follicles of dromedarian

camels were 6.3±0.1, 4.2±0.1, 26.0±0.4, 30.1±0.4 and 29.2±1.2 and of bactrian camels were 8.5±0.4, 3.8±0.2, 29.1±1.4, 32.8±1.3 and 31.2±4.7 respectively (Ansari-Renani, 2010).

A study carried out to detect characteristics of skin, leather and hair of one hump and crossbred (Bac. * Dro.) camel. There was significantly different in slaughter weight among 6 and 9 fattening periods (339.1 ±9.7, 370.3± 10.6 kg), one hump and hybrid (340.4±9.7, 369±10.6 kg), male and female camels (383.4±9.7 , 326±10.6 kg). A significant effect of sex on wet skin (34± 1.7, 29.3±1.3) were observed. The effects of sex (22.4±0.8, 19±0.9 kg) and fattening (17.2±0.8, 24.2±0.8 kg) on dry salting skin were significantly. Also there were significantly different in leather surface (28.9±0.95, 26±0.99 sq.ft). There was no significantly different in thickness of different regions (Salehi et al., 2013).

The effect of breed was significantly different on fiber characteristics except inner coat. However the down hair diameters of Dromedary, hybrid and Bactrian were (21.6±0.6, 18.6±0.5 and 16.4±0.86 mu) respectively and there were significantly different between them. The staple length of one and two hump camels (8.3±0.5 and 5.5±0.7 cm) were significantly different (Salehi et al., 2009).

Genetics and Cytogenetics

Some research have been showed that the chromosome number of a diploid Bactrian cell are 74 which some of them have been identified as acrocentric, metacentric and sub metacentric, also chromosome X is a large sub metacentric and chromosome Y is a small sub metacentric chromosome (Asadi. 2006). In a study, genetic variation within Iranian two-humped camel populations investigated. Sixteen microsatellite markers; CMS9, CMS15, CVRL01, CVRL05, CVRL07, LCA33, LCA56, LCA63, LCA66, LCA77, VOLP03, VOLP10, VOLP67, YWLL08, YWLL38 and YWLL59 were used. For 56 alleles, except for CMS15 and LCA77, all primers were found polymorphic. Polymorphism ratio for nine microsatellite primers calculated 87.50 percent. Allelic and polymorphic information content (PIC) averages for all loci were 3.50 and 0.427, respectively. Significant deviations from Hardy-Weinberg equilibrium (HWE) occurred for all loci (Afraz, 1998).

Genetic diversity and evolutionary relations between Iranian camels using microsatellite marker is another project performing in Animal Science Research Institute of Iran results not published yet (Afraz, 2013) .

The main obstacles of camel breeding

Results achieved by experts showed that desertification, water shortage and drought, low efficiency and out-put, difficult on camel product marketing and low literacy in most of the camel breeders were main principle and basic problems. Also unlike other agricultural sectors camel breeding receive no subsidizes from government therefore, camel breeders mentioned their most important challenges as the price of forages and concentrates, uncertainty in farmers' income and market condition and low relationship between specialists and producers (Ziaie, 2009).

In order to improve recent condition with notice to effective factors these solutions are in priorities:

- ; Control and preventing of diseases and curing illnesses and parasites.
- ; Insurance of camel herders and their
- ; Preventing of malnutrition of livestock.
- ; Making industrialize of camel fattening and using heterosis effect
- ; Increasing the fertility efficiency and decreasing the mortality of newborn camels
- ; Determining the amount of water needed for camels for clarifying the proper spread of drinking places based on different climatic areas.
- ; Introducing new consuming from of camel products, packaging of camel milk and optimizing textile making method of camel fiber.

References

Afraz , F., Banabazi, M. Asadi, N. and K. Razavi. 1998. Analysis of genetic structure of Iranian bactrian camel, using microsatellite markers. Report Number: 40823. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Afraz , F., M. Banabazi, N. Asadi, K. Razavi.2013. Gentic variation within the Iranian Bactrian camel (*Camelus bacterianus)* using microsatellite markers. In print.

Ahmadi, B and S. Saami. 1987. The chemistry of hide, skin and leather. Mohit. Pub. Iran

Allameh, A., Abbasi, A. Zahedifar, M. Kamalzadeh, A. Mirhadi, A. Teymuri, A. Shabani, A. 2009. Determination of feed convertion ratio (FCR) and Fattening charectrictics on the one-humped camel in different ages. ARN:IR2011000233. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Ansari – Renani., H.R., M. Salehi, Z. Ebadi and S. Moradi. 2010. Identification of hair follicle characterstics and activity of one and two humped camels. Small Ruminat Research. Vol 90:64-70.

Asadi, N., S. Esmaeelkhanian, A.A. Gharadaghi, F. Sarhadi. 2009. Cytogenetics of camel (Dromedary) in Iran. The Regional Con. of Camel Research Priorities. Razi Vaccine and Serum Research Institute. Mashhad, Iran. 164.

Asadzadeh, N., H. Sadeghipanah, M.H. Banabazi, A. Aghashahi. 2010. Effects of feedlot duration and sex on carcass charecterstics of Kalkoohi dromedary camels. Pages 6. 248. in Proc. 61st Annu. Mtg., European Association for Animal Production (EAAP), Heraklion, Greece.

Dioli, M. 2013. Importance, Past and Modern Uses of the One-humped Camel (*Camelus dromedarius*). (Dioli M. Pictorial guide to traditional management, husbandry and diseases of the one-humped camel Chapter 1). 2nd Edition, ISBN, 978-82-303-2367-0.

Ebadi, Z., H.R. Ansari, M. Salehi, A. Kamalzare. 2012. Evaluation of Physical and Chemical Characteristics of Crossbred (Dromedarius and Bactrianus) Camel Meat in Different Parts of Body. 29th Jan -1st Feb 2012. 3rd ISOCARD International Conference. Sultan Qaboos University.

Emami Meybodi, M.A., http://agris.fao.org/?query=%2Bauthor:%22Shafi%60%20Naderi,%20A%60li%22 M. Khaki M. 2007. Productive performance of Iranian one humped camel (Fattening, Dairy and Racer breeds) First Phase, Fattening breed. Report Number 29604. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Emami Mibodi, M.A. 2001. The Possibility Use of different levels of urea in camels fattening diet (Dromedarious camel). ARN: IR2012013196. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

FAO 2011, FAOSTAT. Food and Agriculture Organization of the United Nations, Rome. Available at http://faostat.fao.org [verified 2 October 2013].

Farzad, A.R, D.A. Saghi. 2009. Camel fatting with different ages.The Regional conferences of camel research priorities. April. 15-16, 2009. Razi Vaccine & Serum Research Institute, Mashhad Branch, Khorasan Razavi, Iran.

Farzad, A.R, J. Bashtini, A.A. Ardalandoost. 2004. Survey of potential meat production of 1–4 years old camels in South Khorasan. The 1st Congress on Animal and Aquatic Sciences, Faculty of Agriculture and Natural Resources, University of Tehran, Iran, PP.163.

Gharabash, A.M. Ahmadi, M., H. Akbarpour. 2009. Turkman one-humped camel and its products in Golestan province. The Regional conferences of camel research priorities. April. 15-16, 2009. Razi Vaccine & Serum Research Institute, Mashhad Branch, Khorasan Razavi, Iran.

Gharadaghi , A., M. A. Emami Meybodi, H. Afshar, A. Niyasari, M. Arab, M. Khaki. 2009. Identification and conservation of Iranian Bactrian Camels. Report Number 30045. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at:http://www.//agris.fao.org.

Khatami, K. 1990. Research on camel rising for revival and improve economical production status in Iran. Livestock Research Institute. Agricultural Research Education and Extension Organization. Ministry of Agriculture. Iran, PP. 20-25.

Khatami, K.; Khawki, M. . 1988. Research on wheather camels should be raised in Iran and its economic potential. ARN: IR880002688. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Khodai, S.A. 2004. The report on camel production systems and the socio-economics of camel herders in the Islamic Republic of Iran. Cardn/Acsad/Camel/P107/2002. Deputy for Livestock Affairs Directorate of Animal Breeding. Iran, PP. 4-10.

Minstry of Jihad-e- Agriculture 2002. Jihad-e- Agriculture in the mirror of statistics. no, Deputy for Livestock Affairs, Minstry of Jihad-e- Agriculture. Tehran. Iran.WWW.maj.ir.

Naeemipour , H. H. Farhangfar, H.Ziaei and G. Haderbadi, 2009. Estimation of phenotypic trend or birth weight of newborn camel in South Khorasan provience. The Regional Con. of Camel Research Priorities. Razi Vaccine and Serum Research Institute. Mashhad, Iran. 40.

Rasekh Afshar, M. A. Khodaie, 2009. Camel breeding strategies in Iran. Rsearch priorities in camel production management studies (experts and exploiters in South Khorasan). The Regional Con. of Camel Research Priorities. Razi Vaccine and Serum Research Institute. Mashhad, Iran. 357.

Salehi, M. Taherpour, N. Ansari Renani, H. Kamali, A. Ghayur, M. Arab, M. 2009. Improvement of camel fiber production. ARN: IR2009000002. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.
Salehi, M. Taherpour, N. Sarhaddi, F. Lotfollahnia, B. 2007. Evalution of fiber and skin characteristics from camel hybrid and its comparison with one hump camel. Report Number 28335. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Salehi, M. Taherpour, N. Sarhaddi, F. Lotfollahnia, B. 2009. Evalution of fiber and skin characteristics from camel hybrid and its comparison with one hump camel . ARN:IR2008001235. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Salehi, M., A. Mirhadi, Ghafouri-Kesbi, Asadi Fozi, Babak. 2013. An Evaluation of Live Weight, Carcass and Hide Characteristics in Dromedary *vs*. Bactrian×Dromedary Crossbred Camels. Journal of Agricultural Science and Technology(JAST)**.** Vol 15, No5. IRAN.

Sarhadi, F., Asadzadeh, N. Abbasi, A. Kalantar, M. Razavi, K. 2010. Dtermiation the perfer age of fattening on crossbred camel. ARN: IR2009000283. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Sarhadi, F., Niasari Naslaji, M. Arab, M. Khaki , M. Asadzadeh , N. 2012. Comparison of growth trend and fleece weight between dormedary (Kalkoei breed) and crossbred (Bactrain * Dormedary) camel. ARN:IR2011009026. International Information System for the Agricultural Sciences and Technology AGRIS, FAO. Available online at: http://www.//agris.fao.org.

Tabatabaee, S.N., Nikkhah, A. Zahedifar, M. Zamiri, M.J. 2008. Comparative Digestion And Digesta Kinetics In Iranian Sheep And On - Humped Camel. Pajouhesh and Sazandegi. Iran.

Towhidi, A, F. Rostami and M. Dirandeh. 2009. Determination of chemical composition of some plant species for dromedary camels in the province of Ghom, Iran. The Regional conferences of camel research priorities. April. 15-16, 2009. Razi Vaccine & Serum Research Institute, Mashhad Branch, Khorasan Razavi, Iran.

Von Bergen, W., 1968. Wool handbook. Vol 1.Interscience publishers.

Ziaie, H., GH. Haderbabi, A. Dadras Moghadam and A. Zeinali. 2009. Rsearch priorities in camel production management studies (experts and exploiters in South Khorasan). The Regional Con. of Camel Research Priorities. Razi Vaccine and Serum Research Institute. Mashhad, Iran. 97.

Department of Animal Products Processing
Animal Science Research Institute
Agricultural Research & Education Organization
Ministry of Jihad-e-Agriculture
Tehran, Iran

E-mail: m_salehi@asri.ir or msalehi572000@yahoo.com