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Double Humped Camel : The Endangered Animal

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Double-humped camel (*Camelus bactrianus*) is an important component of the cold desert ecosystem and to the people inhabiting in region of Nubra valley of Ladakh (Jammu & Kashmir) where the remoteness, inaccessibility and extreme climatic conditions of the area spell slow economic development. The camel is a source of superior quality of hair, meat and milk in addition to load carrying/haulage utility for people of cold arid region. The breed available in India is *Ladakhi* which is originated from Ladakh. The *Ladakhi* camels are short in height, compact with well-built robust muscular body, long thick hair cover on body particularly at neck, shoulder, hump and mid-side region. The double-humped camel originated from Gobi desert of Mongolia: *Camelus bactrianus* comes under the Order Artiodactyla, Sub-order Tylopoda and Family Camelidae. The total World population is estimated at about 2.2 millions (FAO, 2005) most of which are confined in high land of central Asian countries like China, Mongolia, Turkmenistan, Kazakhstan, Uzbekistan and

Afghanistan. A small population of about 105 camels is confined to Nubra valley of Ladakh (Sahani, 2002). The birth weight of bactrian camel varies from 30 to 40 kg. The body weight in adult camels varies from 350 to 650 kg and males were found to be heavier than females. The body colour varies from brown to dark tan. The body length varies from 170 to 178 cm in male and from 152 to 156 cm, in female. The height at withers varies from 168 to 176 cm in male and from 152 to 156 cm in female. The heart girth ranges from 194 to 208 cm in male and from 192 to 199 cm in female (Sahani, 2002). In earlier times, double-humped camel has served as a vital means of transport on the 6,400 km historic silk route. It was used to carry tea, silk and porcelain of China. Business men from Central Asian countries also used the camels to carry their merchandise to Ladakh and adjoining desert regions via the Karakoram pass. Double-humped camels can easily thrive on natural resources which might otherwise be unusable.

Sustainable Livelihood through Double-Humped Camel

One important aspect which is common to many places where camel inhabits is the utilization of its hair. Although draught use is the primary utility of Indian double-humped camel but hair is also being utilized by local communities just as in case of dromedary camels. Hair is used in village cottage sector for preparation of common utility items, viz., rope, blankets, floor rugs, bags and mattresses etc. in Rajasthan and Gujarat (Sahani and Khanna, 1993). The hair and its products of this species can be an important source of additional income for camel keepers. The handicraft articles made up of camel hair, provide work to rural women in the field of grading of hair, tops preparation, spinning of hair, weaving, embroidery with 100% speciality hair and blending with sheep wool, goat hair, cotton and other products. The hair of camel is durable, strong and has low conductivity (Mukasa, 1981). It has been estimated that a camel hair fabric of 620 gm weight will be as warm as a pure wool fabric of 900 gm weight (Khanna and Rai, 1991). The main body sites of hair coverage in bactrian camels are shoulders, mid portion of body, neck and hump regions.

This species gives return in terms of cash by draught, at the same time it gives sufficient milk to provide calories to the family of camel keepers and also protects them by providing all sorts of warm clothing and household items. The cost to the camel keepers for such items would otherwise be very high and out of reach. This requirement is

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being fulfilled by this animal in such a small form, which otherwise would go unnoticed. Small and marginal farmers in their own village and in their own house prepare blankets from the hair of adults and shawl from the hair of calves. Some of the traditional weavers charge Rs. 50 per kg for yarn making and Rs. 80 per kg for making blankets and shawl. These carpets and blankets are very cheap and durable. The life of a carpet is approximately 20 to 30 years and that of a blanket is 30 to 40 years. Camel hair is also used for making ropes, which are subsequently used for tying the animals and in making cots. Thus, this species beautifully adjusts in the economics of a camel keeper in cold desert region.

Distribution Status

The archeological survey indicated that the Persians and their northern and eastern neighbours were familiar with the double-humped camels, however, they were inclined to adopt the dromedary when they met it in their conquest of the West. As per previous record of double-humped camel have been found in northern Persia and Mongolia, Mesopotamia, on the Iranian plateau and in Turkistan. The double-humped camel had a wide distribution as a wild animal in Central and North western Asia in pre-historic times. Russian travellers have reported existence of double-humped camel as wild animal and recent observation of a Russian expedition has confirmed this view that wild double-humped camels are still in existence.

Rearing Systems

The double-humped camels are left open for grazing in forest of Nubra valley near the banks of river Shayok and Siachen round the year. The close inbreeding activities are going on since more than last few decades. Presently, these camels are reared under extensive system of management. They breed in natural condition with browsing and grazing in the rangeland all over the year. Nobody provides any supplementary feeding except for the few working camels and females during parturition for a short time period. Since salt availability is limited, so it should be provided for the well being of the species. As per the practice no herd men follow the camels in rangeland and they are supervised only according to their requirements. The lucerne/ alfalfa locally called "Ole" is the main and only cultivated legume fodder, which also grows wild. Even people harvest certain wild plants and dry them properly for winter use. Legumes and grasses dominate

the fodder plants. In addition, the fodder, viz. oat (*Avena fatua*), Zamak (*Agropyron repens*) etc. are grown and generally utilized for feeding purpose.

Double-humped camels are seasonal breeders. Breeding occurs during winter month from December to March. The camel attains puberty at the age of 3 to 4 years in female and 5 to 6 years in male. The reproductive life usually continues up to 16 to 18 years of age. Generally, parturition occurs once in 1.5 to 2 years. During sexual arousal males and females seek the company of each other. Male smell and bite the vulva, rubs the female along the back with the under side on his neck or rubs his head under her abdomen and forces her to a crouched position. Once the female sits down, the male mounts her, takes a grip on the female, erects his penis and copulates. Coitus lasts 1 to 6 minutes. After copulation, the male will lift one of the fore legs over the female to the other side and knee on the ground with fore legs and then gets up. Conception rate in double-humped camel is around 60 to 70%. In normal practice hair clipping is done during onset of summer months. In case of wild animals the shedded hair is collected by the farmers from April to June. In draft camels wooden nose peg are inserted at around 3 to 4 years of age and then camels are trained for work. The working camels are used for transportation of fodder, fuel, wood, stones, manure and building materials etc. on hilly tract.

Production of Hair

The hair of double-humped camel and its products can be an important source of additional income for farmers inhabiting the cold arid region. The annual hair production of adult double-humped camels varies from 3 to 4 kg per Indian animal, whereas annual hair production is 6 to 8 kg from bactrian camels of Mongolia and Kazakhstan. In China, with a population of around 6.0 lakh double-humped camels, the total annual production is around 1,500 tonnes out of which about 600 to 800 tonnes is exported to other countries (Sahani, 2002). The longest, fine and densest fibers are from the shoulder region of the body of camel. The number of wool fibers per square cm of skin of a camel in good physical condition varies from 4,000 to 4,800, while the number in an animal in poor condition is only a half of this number. The total yield of the male is about 30% higher than that of female bactrian camel. Bhakat *et al.* (2002) found

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Utilization of Hair

The hair is spun by camel keepers by using traditional simple techniques. The coarse variety is spun by hand dheryai. The other method of spinning fine quality camel hair is by hand charkhas. In the recent times machine spinning is becoming popular for carpets, durries and clothing. The preliminary results of camel hair blends with wool, silk waste and polyester have shown encouraging results (Gupta *et al.*, 1987, 1989). Blended products may also be prepared with sheep wool, goat hair and cotton. Patni and Dhillon (1988) reported that it is worthwhile to blend camel hair with polyester, wool or silk waste. Hair is one of the important production traits of bactrian camel, which is extensively used for manufacture of various items like shawls, coats, caps, sweaters and hand gloves etc. in village cottage sector of this region. Double humped camel's wool is soft, elastic and has good insulation properties too. The fineness of the wool compares to that of sheep but is less dense, with fewer scales, the crimps are irregular and the diameter of the individual fibre is uneven, so the spinning quality is inferior as compared to sheep wool.

Quality of Hair

The fibre diameter of pure hair among three sites of double-humped camel calves varied from 12 to 19 m, hetero fibres from 20 to 26 m and hairy fibre 30 to 55 m, while in adult double-humped camel pure hair diameter varies from 20 to 32 m, hetero 30 to 46 m and diameter of hairy fiber varies from 45 to 68 m. Bhakat *et al.* (2001) found comparatively more hair diameter. The staple length of bactrian camel is the highest (16.13 cm) in the hump region of calves which varies from 16 to 18 cm, while staple length of shoulder and mid side is 10 to 11 cm and 5 to 6 cm, respectively in adults. Yadav *et al.* (2000) reported lesser staple length. The mean fiber diameter in calves varies between 19 to 26 m while in adult from 25 to 43 m. The mid-side region fibre was found to be finer both in calves (17 m) and adults (25 m) as compared to hump region (26 m for calves and 43 m in adults). In case of adult bactrian camel the mean fibre diameter values show more variance in hump and shoulder regions than the mid-side region. However, the fibre fineness trend is same, i.e., the mid-side region fibers have the highest fineness (30 m) in comparison

As far as the elongation percent property is concerned, higher elongation per cent value has been observed in mid, shoulder and hump regions. It shows that in adult camel too the mid-side region fibres not only possess lowest mean fibre diameter, highest fibre strength but also comparable elongation percent with the fibers of other regions. The fibres from mid-side region have much high elongation percentage, viz., 38% as compared to 16% of those from the hump region at the same gauge length, i.e., 50 mm indicating that fibre from mid-side region are more suitable to be used for textile purpose, in blends with wool and other fibres.

Management of Milk Production

The milk of bactrian camel is rich in vitamin C. It is an important source of milk supply for people living in the Gobi desert and steppe area of Mongolia. Camel's milk consumption in these areas makes up about 35% of the total food ration. Milk production potential of Indian bactrian camel varies, generally it is considered to be low in milk production (1 to 1.5 l/day) as compared to Indian dromedaries whereas the data of milk production of bactrian camel of Kazakhstan is as high as 6 to 7 l/day. The lactation length varies from 13 to 19 months and lactation yield varies from 500 to 1254 l. The peak milk yield is obtained at around 3 to 4 months after calving.

Health Hazards

The calf mortality is the major health hazard in this area. The higher mortality is mostly due to accidental ground such as drowning etc. in nearby rivers of Nubra valley in the new born calves as compared to adults. The common diseases prevalent in double-humped camels are contagious cough, vaginal and prepuce myiasis, fungal disease caused by *Trichosporum capitatum*, *Herpes encephalitis*, diseases caused by *Thelazia leesi*, *Dictyocaulus cameli* and other common helminths, osteoporosis, senile plaques, influenza virus, multiple lipomas of liver and sub-clinical mastitis (Sahani, 2002). As compared to single-humped camel skin affections and ectoparasite are not common in bactrian camel.

Female Reproductive Features

Generally, gestation period of this species varies from 380 to 410 days. Double humped camels are seasonal breeders. The breeding season commences from mid December and extends up to March. In

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females puberty can occur before physical maturity. The female can be bred at three years of age and calving can occur at four years of age. The triggering factor for initiation of cycling during breeding season appears to be increasing daylight in this cold desert region. Like dromedary camel bactrian too is an induced ovulator. Once a normal follicle starts growing, it usually takes up to 19 to 24 days from initiation of development to onset of regression.

Parturition Behaviour

Parturient female shows signs of marked restlessness and tends to seek isolation from the main herd. The female gets agitated, stops feeding, lies down and gets up repeatedly, lifts the tail and walks around. The signs of approaching parturition also include swelling and oedema of vulva, softening of pelvic ligaments and udder enlargement. Swelling and oedema of vulva occurs 10 to 40 days before parturition. Swelling of udder begins 1 to 1.5 months before. The udder becomes enlarged 10 or more days before. It is filled with milk from 1 to 6 days before delivery. The teats become swollen up but colostrum does not ooze from the teat orifice till the delivery of foetus. Parturition process takes place in 3 stages. First stage is characterized by intermittent restlessness of the female. During this particular phase, parts of the amnion and the fore feet of the foetus are forced through the dilated cervix into the vagina. Second stage is rapid and comparable to that of mare. It is of 10 to 60 minutes duration. Third stage varies from 91 to 188 minutes. In bactrian camel whole foetal membrane leaves the uterus without eversion. The placenta is diffuse and epitheliochorial type. Foetus is covered by a pale and transparent epidermal membrane being characteristic of camelids. Uterine involution is completed within 40 days.

Male Rutting Behaviour

The sexual desire in male is called rut. The rutting continues from December to April month. Individual breeding activity lasts for 50 to 100 days. There are major changes in behaviour as soon as breeding season commences. Sexually excited males develop fighting instinct, their lips are smeared with saliva, the soft palate is frequently exposed and loud noise is frequently uttered. They grind their teeth continuously, make some peculiar metallic sound from mouth, seek air, belch, draw the head back, rub the poll or lash the tail. They often adopt a squatting posture with the croup lowered, the hind legs placed

widely apart, the tail beating up and down and frequent urine sprayed to form a typical urine mark on rear hump. The male in rut loses condition due to loss of appetite and increased physical activity. The abdomen is tucked up and the hump gradually decreases in size. The male becomes emaciated after rutting period. The poll gland secretes copious colourless and transparent secretion, which adheres on the hair, and becomes dark brown in colour. It has a typical smell also. The puberty and rut appears at 3 to 4 years of age especially in the male of good body condition. Sexual activity to a desire level is attained by 5 to 6 years of age. Physiological capacity may increase and remain at a more or less constant level until 15 to 20 years of age, then decreases gradually.

Opportunities and Limitations

The major opportunities of double-humped camels are utilization of this species as load carrying for short distance transportation (5 to 10 km) in hilly tract of cold desert area. This species is used for transportation of various items such as fodder, manure, sand, fuel wood and stone etc. They can carry an average load of 150 to 200 kg. Very few camel carts are introduced for short distance transportation under cold arid region. As per literature available on draught power of bactrian camel from China, it is indicated that it can carry load around 40% of the live weight, i.e., 150-200 kg. with a maximum of 250 kg. Carrying this load, the camel can cover 35 to 40 km within 24 hours. As riding camel, it usually maintains a speed of 5 to 8 km per hour in summer and autumn season. The speed is of 7 to 10 km in winter and spring season. In long distance travel camels can cover 40 to 50 km per day for a month. Double-humped camel can plough 0.2 hectare of land in 8 hours.

The bactrian camels are short in height which may be considered as one of the limitations of the species. Presently rearing and maintenance of small population of double-humped camel has become unprofitable and the survival of this species in this region was endangered because of fast mechanization and expansion of roads. Some other limitations are scarcity of grazing land, non-availability of fodder and lack of bactrian camel product's market. But the wide prospects of double-humped camel can be towards five dimension (meat, skin, bone, dung, sport) which are as follows:

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Utilization as Meat Animal

Bactrian camel meat may be another use of the species. It is not a common practice to eat camel meat in India, although it is used in substantial quantities in several other countries. Dressing percentage of camel carcass ranges from 40 to 60%. Camel meat contains about 22% protein and only 1% fat. It has been estimated that an average carcass weighing 210 kg would yield 10 kg fat, 160 kg meat and 40 kg bones and would thus yield 35 kg protein and 9973125 KJ energy which will be sufficient to meet the protein requirement of about 35 peoples (Wilson, 1984). The optimum age for camel slaughter is around 3 to 4 years. Liu Zongping (2003) reported that in China bactrian camel are providing meat, hair, wool, hides along with indispensable means of transport.

Utilization of Skin

The skin of bactrian camel may be used for making various type of leather goods and fancy items of public interest, viz., shoes, sandals, purse, bag, stool cover, rope, jewelry box, toys and various decorative items etc. as utilized in case of dromedary (Bhakat and Sahani, 2004). In earlier era, camel's hides have utilized to make containers for storing and carrying water, oil and ghee etc. This hide is well suited for application of colour and in Rajasthan there is a tradition of making elaborately painted small container (*kuppi*) by using camel hide. It is having good export potential.

Utilization of Bone

Bactrian camel bones may be used as important raw material for the manufacture of jewelry in some parts of the world. In India, since ivory has been banned, it may be replaced by camel bone. Now a days ivory is replaced by dromedary camel bone and use for making toys, jewelry and camel long bone may be used for various decorative items. A few samples of various items are kept at camel museum, NRCC, Bikaner. It has potentiality as good as ivory but cost is less as compared to that of ivory. The bone of double-humped camel is also used as bone-meal and fertilizer at cold desert region.

Utilization of Dung

Dung ranks as an important by-product. Camel dung is good source of organic manure and dry dung is also used as fuel. For farmers inhabiting cold desert barren territories, it can be the most important

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Utilization As Sport Animal

In recent times, certain amount of money is involved and the economic importance as sport animal is increased. The safari and riding on double-humped camel is very much popular among tourists. In India, camel dance is major attraction in this area. The tourist importance of double-humped camel is in increasing trend. The use of camel in marriage and other social programme have a great socio-cultural importance.

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