

Interspecific hybridization in Cattle-  
 A report of successful cross between  
Bos taurus and Bos grunniens in  
 HIMACHAL PRADESH (INDIA)

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Yak (Bos grunniens) is relatively recently domesticated and is bred in high elevated mountain ranges of Central Asia. It is reared in India (parts of Jammu and Kashmir, Himachal Pradesh, Arunachal Pradesh and Uttar Pradesh), Nepal and Bhutan. It is abundantly found in Tibetan Plateau, the Pamirs, Thien Shan and Altai, and in Sayan mountains of Siberia.

The Yak has been domesticated in Tibet by the introduction of Yak calves (whose dams had been killed by hunters) into herds of ordinary cattle. As the adaptability of Yak to harsh climate was superior to that of cattle, they gradually increased in number. The male of this species is a savagely fierce animal, though the female is comparatively docile.

Yak and cattle have the same diploid number of chromosomes i.e. 60. Hybrid of cattle (Bos indicus) (♀) and Yak (Bos grunniens) (♂) are found throughout the Yak breeding areas. In Jammu & Kashmir and Himachal Pradesh, they are called 'churu' or 'Djo' (♂) and 'churu' or 'Djomo' (♀).

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Here the reciprocals are not produced but in some countries like Mangolia the reciprocals also are reported to have been produced. In hybrid production, the Yak is mostly used as sire for ordinary cattle. The hybrid male is a sterile animal but its draft capacity is considerably higher than that of the local bullock. The hybrid female produces more milk with appreciable higher fat content than the local cows.

Only scanty published information is available on the performance of Yak in India. Some work has been done in U.S.S.R. and Mangolia. Kalia (1974), reported that interspecific hybrids between Yak and indigenous hill cow are raised in sparsely populated pockets in elevated parts of Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh and Arunachal Pradesh. The hybrid male with normal and functional external genitals is sterile genetically. The hybrid female is well adapted to adverse cold climate and produces milk containing 7.6 to 9.1 per cent milk fat and 18.5 per cent total solids as compared with 2.3 to 4.9 per cent milk fat and 13.45 per cent total solids in the milk of the Zebu hill cattle.

Bonnemeire and Teissior (1976) reported that milk production of Yak was similar to that of the Tibetan cows, i.e. 1½ to 2 litres per day. But the Yak x Tibetan cattle hybrids produced 3 to 4 litres per day. Schulthess (1967) observed that F<sub>1</sub> female of Yak x cattle in Nepal calved annually and yielded 2.0 to 2.5 litres of milk per day as compared with one calving in 2 to 3 years and one litre of milk per day in case of cattle.

According to Epstein (1964) hybrid females reach sexual maturity earlier and exhibited better yield than Yak cows (locally called 'Bremes').

The Yak Breeding Farm, Sangla (District Kinnaur), Himachal Pradesh (India) was established in the year 1963 with 15 animals with the sole objective of producing and supplying Yak bulls to local farmers for cross-breeding. The farm was transferred to the Himachal Pradesh University, Agricultural Complex, in 1974 with an additional objective of conducting research. According to the established practice, the farmers use Yak males to sire local Zebu cattle. It was natural to know the crossing ability of Yak with taurus type cattle about which no information was available. Some observations relating to performance of Bremes (Yak females) at the Yak Breeding Farm, Sangla are presented in the following table (1977):

The average performance (1963-76) of 'Bremes'

Traits	Range	Average	No. of observations
1. Ist Lactation yield (litres)	42- 474	154.58	9
2. Age at first calving (days)	1097-2166	1539.73	15
3. Gestation period (days)	248- 278	257.54	15
4. First Post-partum heat (days)	86- 655	344.67	9
5. Calving interval (days)	346- 719	593.44	16

With the objective of studying the cross-bred performance of Yak and taurus type cattle, one two-year old Jersey bull and two Jersey heifers were added to the Yak herd in November, 1975. In the following breeding season i.e. June to October, 1976, in the high land pasture, the Jersey male did not mount on the oestrus 'Breme'. The Jersey animals were frightened by the other Yak males inhabiting the pasture. The 'Bremes' also did not allow the

Jersey bull to mount on them while in the pastures but when the oestrus female was tied and the Jersey bull was prompted to mount, it did and penetration of penis and ejaculation was successful. In this way, five Bremes were served by the Jersey bull but no female was impregnated. In the same breeding season, however, the Bremes served by male Yak became pregnant. During the next season i.e. June to October, 1977, again six Bremes were got served by the Jersey bull by the tying method. The attempt again proved futile. Again in the year 1978, six Bremes were made to be served by the Jersey bull, but no conception resulted.

Bonnemaire and Teissier (1976) observed the same behaviour of male Yak and male cattle. Male Yaks were found to be reluctant to mate with female cattle (or hybrids) and cattle male were found to be reluctant to mate with female Yaks (or hybrids). Likewise, Gaidyheva (1976), reported that male Yak prefers to mate with female of its own species rather than with cattle female and many exhibit antagonism towards female of the latter species.

To overcome the failure of physical mating of Jersey bulls with females Yak, recourse to artificial insemination was thought of. In the breeding season of July- September, 1979. Thirteen inseminations were done on six Bremes with deep frozen semen of a Jersey bull. This attempt also ended in failure.

Conversely, the Jersey cows brought to the Yak farm in 1975 could not be served by the male yak by the tying method as it was very difficult and dangerous to manipulate the male Yak at the time of breeding although the cows were served by the Jersey bull and calved normally in year 1977 producing one male calf and one female calf.



According to Epstein (1974), humpless Zebu bulls have to be trained for the service of Yak cows (Bremes) by mixing them in the herd at an early age of 4-5 months and the same applied to Yak bulls and Zebu or humpless cows. This practice was, therefore, adopted during 1977. The Jersey male calf born in 1977 was reared alongwith other Yak calves born in the same year. They were kept under the same management and feeding practices. The Yak heifers attained puberty in 1980 and the Jersey calf started mounting on the Yak heifers of the same age group. Out of two Yak heifers served by the male Jersey calf, only one became pregnant which calved on 3.5.1981 with a gestation period of 264 days. The birth weight of the male calf so born was 17 kg as compared with the average birth-weight of 12-13 kg of Yak calf. The coat colour of the hybrid calf was light brown, somewhat in between those of the parents. The hybrid had shorter hair at birth than the pure Yak calves. The head and face of the calf resembled greatly that of Jersey. This resemblance of cross-bred calf with Jersey sire is in contrast to the observations of Epstein (1974).

Three more Jersey-Yak (taurus-grunniens) hybrids are expected to be borne during 1982.

#### SUMMARY

The yak, by virtue of multiplicity of usages, is an animal of immense value to human inhabitants of lofty and cold Himalayan ranges where the animal thrives on extensive grassy meadows. The practice of producing interspecific hybrids of yak (♂) x Zebu (♀) in these regions has been in vogue for long. The female progeny of the hybrid locally called 'Churi' or 'Djo' is better milk producer and the male progeny locally called 'Cnuru' or 'Djomo' is sterile yet sturdy. The animal, therefore, fits well in the total economy of these remote, far flung and inaccessible areas of

In view of the importance of 'Churi', the future strategy of improving the hybrid progenies involved use of Jersey breed (Bos taurus) in addition to zebu. Early attempts to produce the intended hybrid by natural mating in either direction did not succeed possibly due to fright from the male yak on one hand, and non-avidity of Jersey male towards the female yak (locally called 'Breme'), on the other. Even the artificial insemination of 'Breme' with Jersey semen did not work. However, the long companionship of the 'Bremes' with the Jersey male calf right from the birth of the latter resulted, as it appears, in successful mating and producing a male calf. More of such offsprings are in the offing.

#### REFERENCES

1. Bonnemaire, J., Teissier, J.H. (1976). Some aspects of breeding of high altitudes in the Central Himalayas: Yaks, cattle, hybrids and cross-breeds in Langtang Valley (Nepal). In le yak. Son role dans La Vie materielle et culturelle des eleveurs d'Asie Centrale. France, Paris; Societe d' Ethnozootechnie. 91-118 ISBN 2-901081-03-7 (Fr. 6 ref Ethnozootechnie No. 15). Ecole Nationale Superieure des Sciences Agronomiques Appliquees, Dijon, France (fide, ABA, 45 (5), No. 2244).
2. Epstein, H. (1974). Yak and Chauri. World Animal Review, 9: 8-12.
3. Gairdyheva, V.D. (1976). Some difficulties in crossing Yaks with cattle. Nauch. Trud. Tyumen. Universitat. No. 23, 125 127 (Ru) From Referativnyi Zhurnal (1977). 2. 58. 288 (fide ABA 45(7), 3195).
4. Kalia, H.R. (1974). Appraisal of cow (Bos indicus) x Yak (Bos grunniens) cross breeding work in cold and elevated regions of Himachal Pradesh (India). Proceedings of the 1st World Congress on Genetics applied to Livestock Production. Madrid. 723-730.
5. Marwaha, C.L., Katoch, R.C. and Bhowmik, K.B.D. (1977). A short note on the performance of Yak (Bos grunniens) Haryana Veterinarian, 15: (2): 110-11.
6. Schulthess, W. (1967). Yak and Chauri in Nepal. World Anim. Produc. 3(13): 88-97 (fide, 1976).