

**APPRAISAL OF COW («Bos indicus») × YAK («Bos grunniens»)
CROSSBREEDING WORK IN COLD AND ELEVATED REGIONS
OF HIMACHAL PRADESH (INDIA)**

**Interspezifische Mischlinge zwischen Kuh («Bos indicus») und Jak
(«Bos grunniens») im kalten und höheren Gebiet Himachal Pradesh (Indien)**

**Evaluation du croisement de la vache cebu («Bos indicus») × taureau yak
(«Bos grunniens») dans les hautes et froides régions du Himachal
Pradesh (Inde)**

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The cold (max. temp. below 26°C) and upper reaches (4000 to 6000 meters above sea level) of the Himalayas seem to be the exclusive preserves of the yak (*Bos grunniens*) (Figs. 1 and 2), a close relative of our domestic cattle zebu (*Bos indicus*) (Fig. 3). Known to be the heaviest among the cattle species, the yaks get reduced in size on domestication. The female called «Breme» in the native language, contains as high as or even higher than 12% fat in its milk (the highest fat content in the mammalian milk). The female being more sensitive in adaptability than the yak, the term commonly used for the male counterpart, loses its fecundity at the lower altitudes with warmer climate. Maintenance of this thermal sensitive species at other locations, therefore, poses a problem.

The indispensability of the animal for the natives of the rough and desolate terrain of mid-Himalayan regions of Central Asia can easily be judged from the multiplicity of its uses to them. It does not only serve as a beast of burden and draught but is also a source of milk, meat, manure, hide and hair. The domesticated animals are horned or polled, have varying coat colours, black being the most predominant and docile or ferocious, males often tending to be ferocious particularly during the mating season. The population of those animals, domestic and wild, in India is estimated at about 24000 heads. The breme is a poor milk producer with a daily yield of 1/2 to 2 litres and has lactation period of about 200 days. Having a life span of 15-20 years the female reaches puberty much earlier than the male, about 2 years in former case and about 6 years in the latter. The gestation period of breme is 250-270 days and calving interval about 330 days.

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FIG. 1
Polled yak: side view



FIG. 2
Polled yak: hind view

INTER-SPECIFIC HYBRID ANIMALS

The origin of inter-specific hybrids between the yak and Indian hill cow in the sparsely populated pockets along the cross-continental trade routes connecting India with Russia, China and Tibet particularly in elevated parts of Jammu, Kashmir, Chamba, Lahaul, Spiti, Kinnaur, Garhwal, etc. which remain snow-bound and inaccessible for a part of the year, is an event of great economic and evolutionary significance associated with the trade. The hybrid animal plays an important role in the economy of the settlers whose main avocation was trade but agriculture now is equally important. The traders of Central Asia used yaks to transport their merchandise to India while their Indian counterparts brought along with merchandise to these «exchange areas» the cows primarily for supply of milk. The hybrid female, called «churi» in native language (Fig. 4) is known to

COMPOSITION OF MILK OF HYBRID AND BACK-CROSS ANIMALS
IN LAHAUL VALLEY (ELEVATION: 3000 METERS)

Sr. No.	Category of the female cattle	Range of fat % age	Total solid	Remarks
1.	Hill cow	2.3 to 4.9	13.45	—
2.	Churi (hybrid)	7.6 to 9.1	18.51	—
3.	Gari (B C)	7.5 17.39	Data from single animal.	single
4.	Breme	Data not available-	to be communi-	cated later.

NOTE: 1. Fat % age determined by GERBER'S method.
2. Total solid values derived from RICHMOND'S formula based on lactometer reading adjusted at 13 °C. and fat percentage.

produce more milk than breme or cow, has more fat content in its milk than the cow. It can be maintained on low-value ration and can withstand severe winter like breme but warmer climate unlike breme. It is fertile hereas its male counterpart, «churu» (Fig. 5) is sterile though its external sex organs look normal and are fully functional. The back-cross progenies of the hybrid sired by yak (Fig. 6) or ox (Fig. 7) are also me with. All hybrid and back-cross males are castrated and used for transport and draught purposes. It is generally believed that repeated back-crossing with yak for 4 generations leads to restoration of fertility among the males when the animals closely resemble the pure forms of yaks. The back-cross male in other direction i.e. using ox as the sire, is known to restore fertility after about 2 back-cross generations and hence is less practised, because of better qualities of adaptation of the animal having greater share of yak in its genetic make-up. It is interesting to note that hill cows generally do not survive more than two winters under the prevalent management practices in these localities where the animals live on pasture grazing in fair weather and have to be stall-fed with hay during winter. The cows are brought in only to produce the hybrid «churi» the prized animal. The male yaks are replaced after 5-6 years of service when they decline in vigour and servicing efficiency.



FIG. 3
Hill cow



FIG. 4
 F_1 female q cow \times yak Horned «Churi»



FIG. 5

*F*₁ male *q* cow × yak Horned «Churu»

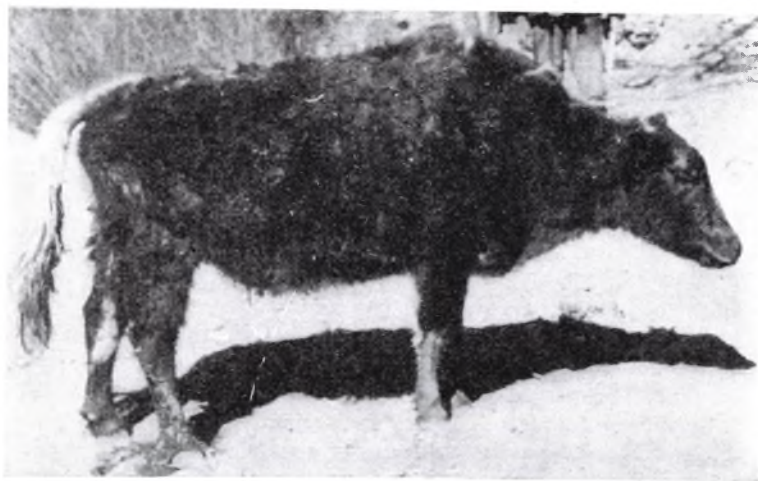


FIG. 6

*BC*₁ female *q* *F*₁ × yak Polled «Gari»

Raising of cross-bred animals is now a regular and well-established practice. Yielding daily 1-3 litres of milk of high fat content with subsistence ration only and other physical and physiological features of «churi» responsible for its excellent survival and adaptability in those rough and rugged locations where starving or semi-starving conditions prevail for a substantial part of the year, should characterise «churi» as a dairy animal of immense importance. The high fat content in its milk (see table below) higher than that of buffalo or sheep milk is a feature that should attract special attention of dairy cattle breeders for incorporation of this characteristic in to-day's leading milck breeds of cattle.



FIG. 7

BC_1 female $q F_1 \times o \times$ «Tolmo»

In consideration of special importance of these interspecific hybrids and their back-cross progenies for the cold and elevated parts of India, the Government of Himachal Pradesh with the financial support from Indian Council of Agricultural Research started a cross breeding project in the district of Kinnaur bordering Tibet, in 1962. The project could not make much headway for a number of reasons chiefly because of high cost of maintenance of pure animals (yak and breme) and the difficult living conditions for the personnel. At present about 30 pure animals are being maintained at Sangla, about 2500 m. above sea level from where they are moved to Chitkul, about 4000 m. above sea level, during summer. Systematic cross breeding using local and Jersey dams is, however, proposed to be initiated in the coming year by the University scientists to which organisation

the project now stands transferred. Genetic Studies relating to various morphological, physiological and other *dairy* characteristics particularly the fat content will receive special attention.

The project is both interesting and challenging from the academic as well as economic stand-points. The study affords an exciting opportunity to involve a dairy breed of cattle with a high fat content in its milk.

SUMMARY

The inter-specific hybrids between cow (*Bos indicus*) and yak (*Bos grunniens*) being raised in mid-Himalayan cold and elevated regions of India are of special economic importance in those rough and desolate terrains. The hybrid animals have come into existence through the agency of intercontinental traders of Central Asia who brought the male yaks, serving as «ship of mountains», in contact with hill cows brought by their Indian counterparts in the «merchandise exchange» transit camps now turned permanent settlements. The hybrid male with normal and functional external sex organs is sterile genetically. The hybrid female besides being winter hardy, efficient grazer on steep and slopy pastures, low ration requiring, produces milk with fat content as high or higher than that of buffalo and sheep. This particular characteristic for dairy countries where value of the dairy animal is determined by its fat production in a lactation, is of special importance. The practice of raising hybrid and back-cross animals is now fully established in the mid-Himalayan regions of relatively low altitudes with warmer climate where the pure yaks do not thrive. Information relating to several physiological and genetical traits of this interesting hybrid, however, is lacking. The Himachal Pradesh University (India) is maintaining a herd of pure yaks and is initiating cross breeding programme using local and jersey dams. The project is likely to yield useful information of academic and economic values.

ZUSAMMENFASSUNG

Die interspezifische Mischlinge zwischen Kuh (*Bos indicus*) und Jak sind im kalten und höheren Gebiet Zentralhimalayas zu finden, die ökonomisch für das rohe und öde Gebiet sehr wichtig sind. Die Existenz der Mischlinge ist durch die intercontinental Geschäftsleute von Zentralasien, die männliche Jak als «ship of mountains» zu dem indischen Gebirgsvieh, die die indische Geschäftsleute zu den Handelsstellen brachten, aufgekommen. Genetisch sind die männliche Mischlinge mit normalen äußeren Sexorganen Steril. Die weibliche Mischlinge erzeugen Milch mit Fettgehalt, die gleich oder höher als die Büffel oder Schaffmilch ist. Außerdem sind sie sehr resistent gegen Kälte und sehr leistungsfähig. Diese Merkmale sind sehr wichtig in den Ländern, wo man Wert auf den Fettgehalt der Milch legt. Das Aufziehen von Mischlingen in den Gebieten Himalayas, wo es mäßig warm ist, wo normalerweise die Jaken nicht wohl fühlen, wird praktiziert.

Zu wenige Informationen ist über die physiologischen und genetischen Eigenschaften zu finden. Die Himachal Pradesh Universität hat eine reine Herde von

Jaken und ein Krueuzungsprogramm mit einheimlichen und Jersey Kühen ist im Gange. Wertvolle akademische und ökonomische Informationen sind von diesem Projekt erwartet.

RESUMEN

Los híbridos interespecíficos entre la vaca cebú (*Bos indicus*) y el toro yak (*Bos grunniens*), realizados en las regiones del Himalaya central, frías y de altura, tienen una importancia económica especial en estos accidentados y desolados terrenos. Los híbridos surgieron a través de la actividad de comerciantes de ganado intercontinentales del Asia Central, que compraban los yaks machos, utilizados como «el barco de la montaña» con vacas de zonas altas aportadas por sus colaboradores indios del mercado en forma de intercambio en régimen de nomadeo, ahora transformado en sedentario. El macho híbrido, con órganos sexuales externamente normales y funcionales, son genéticamente estériles. Los híbridos hembra resisten muy bien el invierno, pastan con eficacia los recursos naturales sobre terrenos accidentados, necesitando poco alimento, produciendo leche con elevado contenido graso, tanto o más que la leche de búfala o de oveja. Esta característica es particularmente interesante para los países necesitados de leche, en los que muchas veces el animal dedicado a esta producción se valora por el contenido graso en una lactación. La práctica del cruzamiento simple o incluso retrógrado se ha establecido ahora totalmente en las regiones del Himalaya medio, con altitudes relativamente bajas y climas más cálidos que los que soporta la cría pura del yak, y en donde, por tanto, los yaks puros no pueden vivir. No obstante, falta información sobre diversas características fisiológicas y genéticas del híbrido. La Himachal Pradesh University (India) mantiene un establo de yaks en pureza y está iniciando programas de cruzamientos con vacas nativas o de raza Jersey. El proyecto ofrecerá seguramente resultados interesantes como información científica y económica.

REFERENCE

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