2. ZEBUS AND ZEBOIDS

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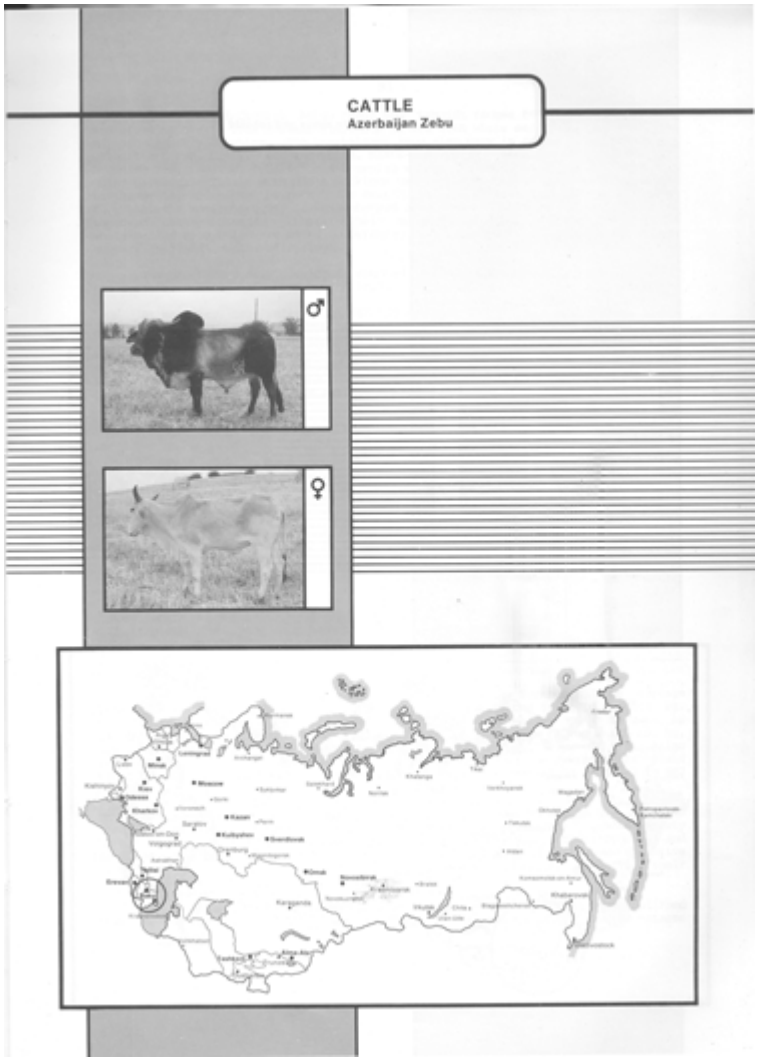

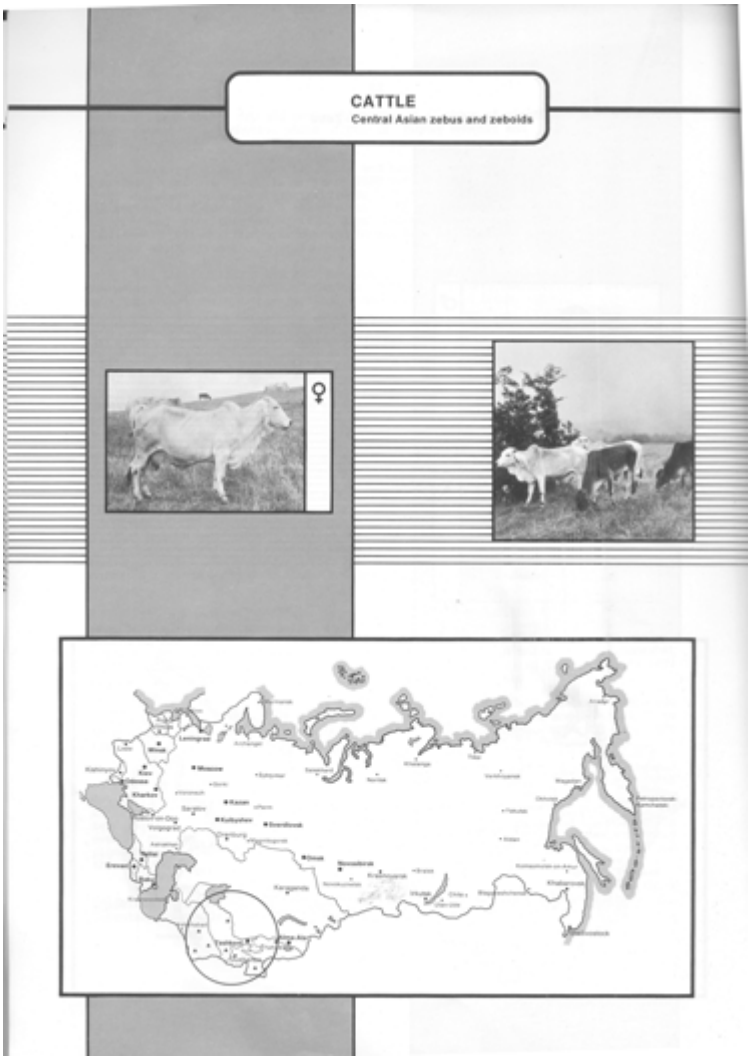

There are two varieties of zebu in the Soviet Union, a true (typical) zebu with well-pronounced zebu traits, and nearly humpless zebu-like cattle or zeboids. True zebu are currently raised in the southeast of the Azerbaijan SSR. In Central Asia there are both zebus and zeboids.

There are grounds for believing that zebus were raised on the territory of the present-day Azerbaijan 4000-4500 years ago. During the excavations of a stone burial ground in the vicinity of the city of Lenkoran the French archaeologist Jacques De Morgan unearthed and described a unique round seal of black and grey agate depicting a humped zebu bull covered with dense hair. This he dated to 2500-2000 B.C. The excavations carried out by personnel of the Institute of History (Academy of Sciences of the Azerbaijan SSR) at Eddi Tepe (or Seven Hills) in the Feazulin district have produced numerous finds, including two bronze figures of a humped zebu. Another rare find unearthed at Eddi Tepe is an elegant ring made of some precious metal, with a fine drawing depicting a zebu. It is currently exhibited in the Museum of Ancient Culture of Azerbaijan. These finds, which are believed to date to the middle of the first millennium A.D., confirm that zebu with various types of humps were widely spread in the past on the territory of the present-day Azerbaijan SSR.

A particularly important role in determining the time when zebu first appeared in Central Asia is assigned to the archaeological excavations at Kaunchip (Uzbekistan). V.I. Gromova (1940) writes: "Noteworthy is the presence of zebu, which is confirmed by the finding of the bifid spinous process of a thoracic vertebra of a young animal; no other ungulate animal except zebu has such a bifid spinous process". This find permits us to assume that the true zebu appeared in Central Asia during 3000 to 2500 years B.C. It also confirms the view once expressed by Frederiks who believed that zebu had appeared in Turkestan before they came to Mesopotamia or at least they spread into the two regions at the same time. Numerous present-day studies suggest that a wild variety of zebu did not exist - at least no one has yet described it. Extensive studies of the morphological and other traits of humped and humpless cattle, which have been performed by scientists from different countries, confirm the correctness of the theory advanced by W. Durst that the zebu's ancestor was the aurochs.

Some scientists believe that the zebu's ancestor was Bos namadicus, others point to Bos primigenius. However, Bos namadicus is a geographical race or subspecies of Bos primigenius. Therefore, the two views are not in contradiction. While discussing the theory of the origin and domestication of animals, Herre (1958) concluded that the zebu did not inherit its adaptability to tropical and subtropical climates from its wild ancestor but rather acquired this characteristic in the process of evolution after domestication.

The ecological conditions of the regions where zebu and zeboid cattle are raised are very specific. As has already been mentioned, zebu are chiefly raised in the Lenkoran natural region of the Azerbaijan SSR. A great variety of plants grow in the Lenkoran natural pastures. The lowlands and foothills in the north are occupied by steppe and semi-desert covered with mugwort (Artemisia) and various grasses. The coastal area is characterized by swamp meadows rich with Persian clover which is cut for hay. There are various groups of aquatic plants and moorland vegetation. The southern areas are covered here and there by dense high reed thickets; sedge and cat-tail swamps and alder groves are common. These areas border on a solonchak strip covered by Puccinellia. The higher mountain treeless formation is typical of mountain areas with a dry and severe climate. Two types of plants are distinguished here: mountain xerophytes, whose flora is highly endemic and unique, and meadow plants.

The prevailing climate is humid and subtropical. The northern lowlands and the upper mountain zone (more than 1000 metres above sea level) excluded, the Lenkoran natural area is characterized by high precipitation; the weather is warm at all seasons with occasional light frosts. The grazing and confinement periods last for 210 and 150 (December-April) days respectively. Basic fodder during the confinement period includes meadow and forest hay, sainfoin, processed straw, grain, and some acorns from the forests.

The Central Asia zebus and zeboids are raised in Uzbekistan, Tajikistan, and Turkmenistan. The ecological conditions of these areas are characterized in general by a hot dry climate, low precipitation and a xerophytic flora.

The Azerbaijan zebu and Central Asian zeboids are independent populations. The Azerbaijan population has existed for 3000-4500 years. It

represents a true zebu fully comparable with zebu in other countries. The Central Asian (or Turkestan) zeboid is, in fact, a crossbred nearly humpless population that carries the blood of local cattle in the Turkmen, Uzbek, and Tajik republics. The male has a small hump and the female is humpless. It was obtained by crossing local cattle with the Iranian zebu as early as the 7th or 8th century A.D. The influence of the Iranian zebu on local cattle continued until the 17th century or even later. At the same time, in some regions of the Turkmen SSR adjacent to Iran, there are some animals with external characteristics which are typical of zebu. These animals have all the traits and qualities of the species and are known as the Khorosan and Seistan zebu breeds. Today the most typical Turkmen zebu is raised in Kerki district.

In recent years the distribution and use of zebus and zeboids have considerably expanded. They have spread to the Ukraine, Georgia, the Altai and Krasnodar territories, Dagestan, Kazakhstan and the non-blackearth zone of the Russian Federation. In 1954 native zebus and zeboids numbered some 2 million head. On the basis of this stock large numbers of the Schwyz-zeboid and Red-zeboid have been obtained, the latter by crossing zebus with the Red Steppe breed. In 1983 purebred zebu numbered 6000 head. Another 1000 head of zebu have been imported from Cuba.

In conformation zebu are rather light and elegant animals. Their most important special characteristic is the hump which is composed of muscular tissue permeated with fat deposits. The hump weighs 5-8 kg and accounts for 2-3% of the total weight of the animal. It is particularly large in males and is somewhat smaller in females although some cows have a pronounced hump. In the Azerbaijan zebu the hump is usually cervico-thoracic, while in the Turkmen zebu it is,thoracic.

The head of Russian zebus is light, with a short forehead. Zebus and zeboids have horns directed upwards. The horn core is 4.8 to 8.9 cm long and 2.9 to 4.3 cm in diameter. Both the Central Asian zeboids and Azerbaijan zebus have slim, upright ears.

Most zebu breeds have a large wrinkled dewlap. Compared with typical humped cattle, Central Asian zeboids have a small dewlap, while in Azerbaijan cattle the dewlap is much larger. The neck is short and deep, with a lot of skin wrinkles; the chest is relatively narrow; the limbs are lean and thin, with well-shaped joints and tendons; the hoofs are high, with solid keratin; the line of the back and loin is even; the rump is elevated; the skin is loose, wrinkled, thick, and intensely pigmentated; the hair covering is thick, sparse and glossy; the tail is long and thin.

The zebu skin is hard and tough with a thinner dermal layer and thick epidermis. These traits are characteristic of a tough, rather than thick, hide. Subcutaneous muscles are well developed.

The colour of Central Asian zebus and zeboids ranges from black through red and brown to grey. Some animals are black or red with white markings. The back line may occasionally be white. The Azerbaijani zebu also vary in colour. The prevailing colours are red, black, red-and-white, black-and-white. Less frequent colours are brownish red, reddish, reddish or a brownish with white markings, grey and grey with white markings. Cattle with white markings usually have them on the forehead, limbs, in the groin, and along the back. The switch is also white. Extensive observations show

that the entire progeny of white-backed zebu cows mated to solid colour bulls of improved cattle breeds, inherit their mother's colour. When heterozygous white-backed zebu bulls are mated to purebred cows with solid colour, the white back appears in 54-82% of the offspring.
The udder is poorly developed, rounded in shape and densely covered with hair; the teats are short, thin, and cylindrical.
At maturity, zebu bulls weigh 400-500 kg, cows 230-280 kg, and newborn calves 12-15 kg. The live weight of some breeding bulls at the Snegiri Experimental Farm of the Main Botanical Gardens of the USSR Academy of Sciences, exceeds 550 kg. This figure shows the possibility of increasing the live weight of zebu when proper management and feeding are provided. Poor feeding leaves zebu almost unaffected: they lose only 8.4% of their usual live weight while other cattle breeds may lose up to 20-25%. During fattening the average daily weight gain ranges from 700 to 900 g.
Zebus and zeboids are not free of conformational defects: they are short-bodied and narrow-chested; the rump is roof-like in shape, sloping and pointed.

Table 2.1 DIMENSIONS OF MATURE ZEBU AND ZEBOID COWS
(centimetres)

	Azerbaijan SSR	Uzbek SSR	Tajik SSR	Turkmen SSR
Height at withers	107.3	114.9	109.6	112.3
Chest depth	54.5	56.5	57.5	57.1
Chest width	28.4	30.3	-	32.7
Body length	119.5	127.1	121.0	121.3
Chest girth	150.0	158.7	147.5	152.1
Cannon bone girth	14.3	15.2	13.3	14.4

Zeboids are small in size and mature late. In the Turkmen SSR the average live weight of cows at maturity is 274.4 kg, with variations from 147 to 404 kg. Adult bulls weigh 277-450 kg. In the Tajik SSR the live weight of local cows is 180-260 kg, and that of breeding bulls is 365-400 kg. Newborn calves weigh 15 kg, and three- and six-month-old calves weigh 43 and 60 kg respectively. Central Asian zeboids, like many other zebu breeds, are not specialized. The average milk yield under the primitive management conditions is 802 kg with a variation from 742 to 882 kg.
The Khorosan variety is very variable. Perhaps, that is why it has survived throughout its 1000-year-long history. The smaller size of animals of this variety is the result of the unsatisfactory rearing of the young. Better feeding and management conditions and a higher level of zootechnical work on state and collective farms have contributed to the improvement of zebu-like cattle, enhancing their development, conformation, and productivity.
The reproductive abilities of zebu are good. Research studies have confirmed that the semen of the Azerbaijan zebu has a high fertilizing ability. In the extreme environmental conditions the fertility rate in zebu herds exceeds 75%. Zebu cows are sexually active for 10-12 years, and bulls are used for 5-6 years.
The Azerbaijan zebu is tolerant not only to heat but cold as well. Its cold tolerance has been proved by the fact that purebred Azerbaijan zebu have long been raised in a cold climate on the Snegiri farm in the Moscow region.

One-eighth of zebu blood is enough to ensure cold tolerance in hybrid animals. For example, zebu-like hybrid cattle, which were obtained by mating Azerbaijan zebu bulls to Black Pied cows, are successfully raised in the Altai area. Their good cold resistance is due to a thick hair covering in winter. It is formed by long thick hair and down, which is similar in terms of fineness to Merino wool. Moreover, in winter zebu develop numerous skin wrinkles that arrest the loss of internal heat.

The Azerbaijan zebus and Central Asian zeboids, like other zebus, have developed a natural immunity to various infectious and blood diseases caused by parasites; they are also tick resistant. Zebu and their hybrids in Azerbaijan have shown high resistance to experimental and natural brucellosis. In terms of numbers infected by brucellosis cattle of improved breeds ranked first, followed by buffalo, zebu hybrids, and, finally, by zebu.

Zebu are slow eaters; it takes them almost an hour to consume the forage which other cattle eat in ten minutes. At the Azerbaijan Animal Husbandry and Agricultural Research Institutes it has been shown that zebu and their crosses have a higher digestibility of fibre in high roughage diets than other cattle breeds.

The milk yield of zebu cows is not high - 800-1000 kg per lactation. At the same time zebu are quite responsive to any improvements in feeding and management. The conditions at the Experimental Farm of the Azerbaijan Livestock Breeding Research Institute permit a yield of 1500 kg of milk per head. Zebu milk has a high butterfat content. On average it contains 5.0% of fat and 4.3% of protein. Astara, a champion cow, produced 2053 kg of milk in a 395-day lactation, the fat content being 4.9%.

It should be noted that despite their low milk production zebu provide a useful genetic material for producing hybrids or new breeds. This possible use of zebu is due to their valuable biological potential: they are tolerant to heat and cold, resistant to various diseases, and capable of consuming bulky rations of fibrous plants, cotton waste, etc.

Although zebus and zeboids, particularly the young, have a relatively low live weight, they possess good gaining and fattening abilities and have a high dressing yield and meat/bone ratio. The dressing yield ranges from 55.8 to 62.0%, and the proportion of bone is 15-16%. The daily live weight gain of steers is 900 g, and over 90 days of range fattening they gain 55-60 kg in weight.

Experiments with one- and two-year-old zebu heifers have shown that they utilize nutrients much better than young cattle, though worse than buffalos. To achieve 1 kg of live-weight gain, yearling zebu calves required 6.01 fodder units and 519 g of digestible protein or 0.26 fodder units and 26 g of digestible protein less than cattle calves. Two-year-old zebu heifers correspondingly required 8.91 fodder units and 912 g of digestible protein per kg of weight gain, or 0.94 fodder units and 104 g of digestible protein less than cattle heifers.

Table 2.2 THE COEFFICIENTS OF DIGESTIBILITY OF NUTRIENTS IN YOUNG AND ADULT ZEBUS (%)

Age group	Dry matter	Ash	Protein	Fat	Fibre	Nitrogen-free extract
Yearlings	59.49	37.71	61.44	71.13	60.62	60.32
2-year-olds	63.32	37.61	51.36	85.09	63.32	65.20
Cows	65.46	39.98	59.56	80.53	60.93	72.67

In this country zebu are either purebred (on a limited scale) or crossed with the best foreign breeds, in particular with the Cuban zebu. The aim of such crossing is to increase live weight, improve conformation and earliness of maturity. Purebreeding is widely used in the Azerbaijan SSR where there are stocks of true zebu. The Azerbaijan zebu is bred pure with the aim of obtaining a better conformation, higher live weight and milk production and at the same time maintaining or increasing the butterfat content. The task of purebreeding of the Azerbaijan zebu is to preserve the gene pool of the animals with the following average production figures: milk yield for the third lactation - not less than 1600 kg, butterfat content - 5%, minimum live weight of females - 330-360 kg and of sires - 520-550 kg. Herds of purebred Azerbaijan zebu have been established on Socialist Cuba state farm and on Karl Marx and Aslanov collective farms of Lerik district. Komsomol state farm breeds an intermediate type using Azerbaijan females and Cuban sires. The crossbreds obtained have a high live weight and lack conformation defects.

Hybridization today is aimed at producing specialized types and milk and meat breeds with a high degree of adaptability. Hybridization is carried out in all areas where zebus and zeboids are raised: in the Azerbaijan, Turkmen and Uzbek Republics and in the non-blackearth zone.

The feasibility and prospects of hybridization between the zeboid and improved breeds of cattle like the Swiss Brown is confirmed by the outcome of work which has been carried out in the Uzbek and Turkmen and particularly, in the Tajik Republics. The Schwyz-zeboid hybrids have inherited from the zeboid adaptation to the ecological conditions of the subtropical climate and resistance to infectious and parasitic blood diseases, and from the Swiss Brown, their high productivity.

The animals have an elongated body and a well-developed chest. Noteworthy is the fact that the hybrid animals inherit the characteristics of the local zeboids: less-developed muscles and a deep chest. The prevailing colour is brown, from light reddish-brown to dark brown.

Under conditions of complete ration feeding the Schwyz-zeboid youngsters mature early. The live weight of new born bull calves is 29.1 kg and that of heifers is 27.5 kg, at six months it is 180.1 and 172.2 kg, and at twelve months 262.2 and 229.1 kg, respectively. The live weight of cows is 455-470 kg and that of bulls 805 kg.

The milk yield of hybrid cows of the desired type noticeably exceeds the standard figures for the Swiss Brown breed raised in the Central Asian republics (Table 2.3). Of particular interest are the figures pertaining to the productivity of hybrid cows of different generations obtained in the process of creating the herds of the Schwyz-zeboid (Table 2.4).

Table 2.3 MILK YIELD OF SCHWYZ-ZEBOID COWS (KG)
(according to data compiled by N.G. Stepanova)

Lactation	Average milk yield (kg)	Range	Swiss Brown standard
First	2595	1875-4210	1950
Second	3114	2263-5049	2400
Third	3760	2512-7200	2700

Table 2.4 MILK PRODUCTION OF VARIOUS HYBRIDS OF SWISS BROWN X ZEBOID
(according to the data of the Tajik Livestock Breeding Institute)

	Crossbred generation				2nd and 3rd crossbred generations bred inter se
	I	II	III	IV	
Milk yield, 2nd lactation, kg	1775	2772	2832	2335	2883
Fat content (%)	3.83	3.93	4.07	3.92	4.06
Live weight, kg	287.9	420.9	455.5	399.9	464.4
Milk yield per 100 kg live weight	590	648	633	572	631

The figures in Table 2.4 show that reproductive crossing is advantageous provided the animals of the second and third crossbred generations (i.e. the 3/4-breds and 7/8-breds) are bred inter se. The reduction of zebu blood to one-sixteenth results in decline in adaptability, lower live weight and poor productivity. One of the characteristics of Schwyz-zeboid cows with a milk yield above 4000 kg is a slower rate of decline in yield during the lactation. Hybrids also have high fertility - more than 90 calves dropped per hundred cows. The interval between calvings averages 358 days. Valuable stocks of the Schwyz-zeboid are raised on the Lenin Collective Farm of the Kumsangir district. Mature cows produce 3310 kg of milk per head, and the milk yield from first-calf heifers is 2613 kg. The milk of hybrid cows has a high content of protein (3.42%) and fat (4% or more).

Two- and three-way crosses of the zebu on other beef breeds have gained recognition as excellent beef cattle. Two-way crosses were obtained on the Kovlyarskoe Experimental Farm of the Azerbaijan Agricultural Institute by crossing the zebu with the Aberdeen-Angus breed. Three-way commercial crosses were obtained on Shaumyan State Farm by crossing the zebu with the Aberdeen-Angus and mating the crosses with the Estonian Black Pied. Calves of Aberdeen-Angus hybrids are small in size which facilitates the calving of zebu females. However they are larger than zebus and weigh 20-22 kg at birth. The live weight of 18-month-old hybrids is 300-390 kg. In conformation hybrids are similar to the Aberdeen-Angus. The head is short and broad in the forehead and without horns. The body is compact and legs are short. The colour is black.

The carcass weight of 18-month-old two-way hybrids is 85 kg more, and that of three-way crosses is 138 kg more, than that of the purebred

Azerbaijani zebu. The difference in the dressing yield is 6.3 and 9.4%, respectively.
Hybridization increases the weight of raw hides, which, from the age of 18 months, fall into the heavy bull category.
The carcasses of 18-month-old first crosses are characterized by higher yields of muscle (72.0%) and lower yields of intermuscular fat (6.5%) and bone (18.3%). Meat quantity is 4.3 kg of meat per kg of bones. The quality of beef is quite satisfactory: the yield of first-grade meat is 65.3%. In terms of its chemical composition the meat of hybrids is better than the meat of the Azerbaijan zebu; it contains more protein and less fat. Unlike zebu meat that of the hybrids is rich, juicy, and tender.
The efforts of scientists and farmers are aimed at ensuring the preservation and improvement of zebus and zeboids and expanding the use of these cattle whose biological and commercial potential is currently underutilized.

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