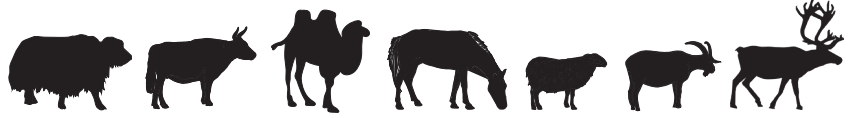


MONGOLIAN DAIRY LIVESTOCK



Mongolia is a land of horses and...more horses!



HORSES

Equus caballus, also known as horses (адуу), were domesticated near the Black Sea. Horse milk is rich in sugar, making it highly suited for making airag, an important alcoholic beverage in consumed in Mongolia for more than 3,000 years.

THE DNA SEQUENCE BELOW IS FROM THE CYTOCHROME C OXIDASE 1 (COX1) GENE IN HORSES. THIS GENE PERFORMS ESSENTIAL FUNCTIONS IN THE ENERGY PRODUCTION OF CELLS. THE COX1 GENE SEQUENCE IS DIFFERENT IN DIFFERENT ANIMAL SPECIES, AND BY SEQUENCING THIS GENE IT IS POSSIBLE TO DETERMINE THE SPECIES OF AN ANIMAL.



- 1 A partial sequence of the cytochrome C oxidase 1 (COX1) gene is shown below. Part of the sequence is highlighted in **BOLD**. This part of the sequence is 32 nucleotides long, and it is different in each of the major dairy animals in Mongolia.

Equus caballus, cytochrome C oxidase 1 (COX1) gene sequence (partial):

ATGTTTCATCAACCGCTGACTATTTTCAACTAACCACAAAGACATCGGCACTCTGTACCTCCTATTCGGCGCTTGAGCTGGAATAGTAGG
AACTGCCCTAAGCCTCCTAATCCGTGCTGA**ATTAGGCCAACCTGGGACCCTACTAGGAGATG**ATCAGATCTACAATGTCATTGTAACCG
CCCATGCATTCGTAATAATTTTCTTTATGGTCATACCCATTATAATCGGAGGATTCGGAACTGATTAGTCCCCCTGATAATTGGAGCA
CCTGATATAGCTTCCCCGAATAAACATAAGCTTCTGATTACTTCCCCATCATTCCTACTTCTTCTCGCTTCTCAATAATTGA
AGCAGGTGCCGAACAGGCTGAACCGTATATCCTCCTTAGCTGGAAATCTGGCGCATGCAGGAGCCTCTGTTGACTTAACCATTTTCT

- 2 Below, we've shown this sequence again in comparison to the DNA sequences found in other dairy animals. This is called an **alignment**. Differences in the DNA sequences between the different animals are highlighted in pink. This sequence is like a **DNA fingerprint** of the animal species.

ATTAGGCCAACCTGGGACCCTACTAGGAGATG

Cattle	ATTAGGCCAACCCGGAAC TCTG CTCGGAGACG
Yak	ATTAGGCCAACCCGGAAC CCTG CTCGGAGACG
Sheep	A CT AGGCCAACCCGGAAC TCT ACTCGGAGAT G
Goat	A CT AGG T CAACCCGGAAC CCT ACTTGGAGAT G
Reindeer	A CT GGGCCAAC CT GGGACC CT ACT CG AGACG
Camel	ATT GGG ACAGCCCGGGAC GTTG CTTGGAGACG
Horse	ATTAGGCCAACCTGGGACCCTACTAGGAGATG



- 3 Can you make a DNA bracelet with the HORSE sequence? Use your beads and string to make a HORSE DNA bracelet!

A T T A G G C C A A C C T G G G A C C C T A C T A G G A G A T G