

Identification of species within the cattle monobaramin (kind)

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The Bible documents that God made animals according to their kind and with the ability to reproduce and fill the earth. Baraminology, the study of created kinds, uses hybrid data to determine what species can hybridize and thus belong to the same monobaramin or basic type. Hybrid data indicate that domestic cattle (*Bos taurus*) are in a monobaramin with all other species of the genera *Bos*, *Bison*, and probably *Bubalus*. These species are all within the family Bovidae and subfamily Bovinae. Additionally, there are alleged hybrids between cattle and the musk ox (subfamily Caprinae) and cattle and moose (family Cervidae). More data would be helpful to determine the full extent of this baramin. Variation within the genus *Bos* shows different individuals adapted to extremes in environmental conditions, from the yak which can tolerate extremely cold environments and high altitudes, to the zebu which can tolerate very hot conditions and is more resistant to parasites.

The Bible's history makes it clear that God created animals according to their kinds and with the ability to reproduce and fill the earth.¹ The study of created kinds is sometimes called baraminology (from Hebrew בָּרָא *bara'*—create, מִין *mîn*—kind). One technique used to determine if two species belong to the same baramin (created kind) is to demonstrate that they can hybridize with each other or they can both hybridize with a third species. Species that are linked by hybrid data are termed a monobaramin (or basic type²). However, lack of hybridization is inconclusive since differences can arise during speciation which prevent hybridization.³

In vitro (done in a laboratory, outside the animal) fertilization is a well developed technology for a number of animal species, including cattle. This has been a useful tool in attempts to form hybrids. Mere fertilization is not considered sufficient evidence of hybridization. The embryo must develop to the point where there is a coordinated expression of embryonic genes.² There is no strong consensus within creationist circles of exactly when this occurs.⁴

Biblical creationists recognize that intrabaraminic (within kind) changes may occur over time. Such changes may be related to God's provision and help animals survive in particular environments. Other changes are recognized as being degenerative and the result of the Curse (Genesis 3, Romans 8:19–23).⁵ However, the evolutionary notion that all living things have a common ancestor and throughout history have gained new organs and complex, well-integrated biochemical pathways is rejected. Both the historical accounts of Scripture and the pattern of changes seen in the real world are in direct conflict with molecules-to-man evolutionary ideas.

In my previous paper,⁶ I identified a number of species within the Tsoan (sheep-goat) monobaramin. There was insufficient hybrid data to conclude that cattle (members of the genus *Bos*) belong to the Tsoan monobaramin, so they are examined separately in this paper.

The biblical record

The Bible is not primarily a book about biology. However, it is completely true in all that it presents and it makes comments that relate to biology. Thus, it is essential to examine it to properly develop models regarding animal origins and relationships.

Within the English language, the term 'cattle' has changed somewhat in meaning over the years. *Webster's 1828 Dictionary* defines cattle as 'Beasts or quadrupeds in general' that are used in Man's service. It further states that 'In its primary sense, the word includes camels, horses, asses, all the varieties of domesticated horned beasts or the bovine genus, sheep of all kinds and goats, and perhaps swine. In this general sense, it is constantly used in the scriptures.'⁷

Early historical narratives in the Bible were written in Hebrew, so a look at Hebrew words, including their definitions and how and where they are used, can give us a solid base for understanding what the Bible teaches. There are a number of Hebrew words that have been translated as cattle. The first is בהמה (*behēmā*), which is often translated 'cattle' in English translations.⁸ It is used 190 times beginning in Genesis 1:24.⁹ *Strong's Concordance* defines it as 'any large quadruped or animal'.¹⁰ *The Brown, Driver, & Briggs Hebrew Lexicon* reports a range of meanings: from 'beasts (collectively used of all animals)' to 'cattle, livestock (used of domestic animals)' to 'wild beasts'.¹¹ A specific example of where it refers to more animals than are likely related to the *Bos* genus is in Leviticus 11:2. It says, 'These are the living things which you shall eat out of all the בהמה (*behēmā*) that (are) on the earth.'¹² The passage then goes on to describe how animals which chew their cud and have a split hoof are clean, but the camel, rock badger, hare, and swine are not.

A second Hebrew word that is sometimes translated as cattle is מִקְנֵה (*mīqneh*). It first appears in Genesis 4:20 and is used 78 times.¹³ *Strong's* defines it as 'something bought, i.e. property, but only livestock; abstractly, acquisition.' It is used in Genesis 13:2 to relate that 'Abram was very rich in livestock, in silver, and in gold.' Several verses previous to this (Genesis 12:16) it mentions that he had oxen, sheep, male

and female donkeys, male and female servants, and camels.¹⁴ Also, Joseph, as the second highest official in Egypt, traded food for *miqneh* during the famine after the people ran out of money. This included horses and donkeys as well as herds (cattle) and flocks (sheep and goats).¹⁵

The Hebrew word בקר (*bāqār*) refers more specifically to members of the genus *Bos*. It first appears in Genesis 12:16 where it is translated ‘cattle’ in the NIV and ‘oxen’ in the KJV. It occurs just over 180 times.¹⁶ It is also used in Job to describe his livestock.

The Hebrew word שׁוֹר (*šôr*) also refers to cattle in the modern context. Generally translated bull or ox, this word is used 79 times.¹⁷ It first appears in Genesis 32:5 when Jacob is returning with his wives and children to Canaan

and is sending his brother Esau a message in an attempt to make peace with him. However, the word is also used in the book of Job. Job is generally regarded as a contemporary of Jacob’s grandfather, Abraham.

The Hebrew word פַּר (*par*) and its feminine form פַּרְיָה (*pārā*) refer to bulls and cows and are used 133 and 26 times respectively.¹⁸ They first appear in Genesis 32:15; the same passage mentioned above where Jacob returns to Canaan.

The KJV translates שֶׁה (*śeh*) and צֹאֵן (*šō’n*) as cattle in Genesis 30: 32 and 39 respectively.¹⁹ The first term describes ‘one of a flock, a lamb, a sheep, a goat ...’. The second refers to ‘sheep, sheep and goats, flock ...’ which some Bible dictionaries refer to as small cattle.¹⁰

In summary, the words sometimes translated ‘cattle’

	<i>Bison bison</i>	<i>Bison bonasus</i>	<i>Bos frontalis</i>	<i>Bos grunniens</i>	<i>Bos indicus</i>	<i>Bos javanicus</i>	<i>Bos sauveli</i>	<i>Bos taurus</i>	<i>Boselaphus tragocamelus</i>	<i>Bubalus bubalis</i>	<i>Bubalus depressicornis</i>	<i>Bubalus mindorensis</i>	<i>Bubalus quarlesi</i>	<i>Pseudoryx nghetinhensis</i>	<i>Syncerus caffer</i>	<i>Taurotragus derbianus</i>	<i>Taurotragus oryx</i>	<i>Tetracerus quadricornis</i>	<i>Tragelaphus spp.</i>	<i>Ovibos moschatus</i>	<i>Ovis aries</i>	<i>Oryx dammah</i>	<i>Alces alces</i>
Bovidae; Bovinae:																							
<i>Bison bison</i>	*	V	V	V	V			V															
<i>Bison bonasus</i>	V	*		V				V															
<i>Bos frontalis</i>	V		*	V	V	V		V															
<i>Bos grunniens</i>	V	V	V	*	V	V		V															
<i>Bos indicus</i>	V		V	V	*	V		VF									?						
<i>Bos javanicus</i>			V	V	V	*		V															
<i>Bos sauveli</i>							*																
<i>Bos taurus</i>	V	V	V	V	VF	V		*		?B										?	I	I	?
<i>Boselaphus tragocamelus</i>									*														
<i>Bubalus bubalis</i>								?B		*													
<i>Bubalus depressicornis</i>										*													
<i>Bubalus mindorensis</i>											*												
<i>Bubalus quarlesi</i>												*											
<i>Pseudoryx nghetinhensis</i>													*										
<i>Syncerus caffer</i>														*									
<i>Taurotragus derbianus</i>															*								
<i>Taurotragus oryx</i>						?										*		?					
<i>Tetracerus quadricornis</i>																		*					
<i>Tragelaphus spp.</i>																	?		*				
Bovidae; Caprinae:																							
<i>Ovibos moschatus</i>								?												*			
<i>Ovis aries</i>								I													*		
Bovidae; Hippotraginae:																							
<i>Oryx dammah</i>								I														*	
Cervidae; Odocoileinae:																							
<i>Alces alces</i>								?															*

Table 1. A hybridogram for cattle (*Bos* spp., family Bovidae, subfamily Bovinae) showing relevant crosses. V = viable hybrid(s); VF = viable, fertile hybrid(s); ? = presumed or alleged hybrid(s); B = well developed blastocysts produced in vitro; I = insufficient in vitro development to consider a true hybrid; * = the same species.

before the Flood²⁰ have a broader meaning that often includes animals that are most certainly apobaraminic (from different kinds). Words that refer to cattle appear in narratives about Abraham and Job some 400 years after the Flood. At that time sheep and goats were distinct from cattle. Also, horses were distinct from donkeys.²¹ We recognize that horses and donkeys can hybridize to form a mule, so they belong to a monobaramin. Scripturally, there is insufficient data to determine whether or not cattle are in a monobaramin with sheep and goats.

Hybridization data

Within the genus *Bos*, hybrids form quite readily. Domestic cattle of European descent (*Bos taurus*, $2n = 60$) hybridize with Indian cattle, or the zebu, (*B. indicus*, $2n = 60$) to form fertile offspring so that the latter is sometimes considered a subspecies of the former (i.e. *B. taurus indicus*). The yak (*B. grunniens*, $2n = 60$) will hybridize with the above species as well; the resulting females are fertile, but the males are sterile. The guar (*B. frontalis*, $2n = 58$) and the banteng (*B. javanicus*, $2n = 60$) have formed a three way cross with domestic cattle. Other hybrid combinations have been formed as well. With the exception of the first cross mentioned, hybrid males are nearly always sterile while the females are fertile.²² This is in spite of the fact that, except for the guar, they all have the same number of chromosomes.

Both the American bison (*Bison bison*, $2n = 60$) and the European bison, or wisent, (*Bison bonasus*, $2n = 60$) have hybridized with various *Bos* species. Again there is the pattern of fertile females and usually sterile males in the hybrids. Water buffalo (*Bubalus bubalis*, $2n = 48$ or 50) have been observed mating with the gaur and zebu cattle, but no progeny have been observed. Hybrids between water buffalo and domestic cattle (*B. taurus*) have been reported in China, but they are generally regarded as doubtful because other attempts have repeatedly failed.²² *In vitro* fertilization has resulted in hybrid embryos that developed until about the 8-cell stage, but then failed and did not express mRNA transcripts found in control buffalo embryos.²³ However, at least one study was able to bring hybrid embryos to the advanced blastocyst stage, with cattle oocytes fertilized by buffalo sperm resulting in a significantly larger percentage of blastocysts than the reverse cross.²⁴

A report of hybrids between zebu cattle and the eland (*Taurotragus oryx*, $2n = 31$ in males, 32 in females) exists. Further attempts to cross the eland with domestic cattle have failed, so these 'hybrids' are considered by some to be eland bulls.²²

All hybrids considered thus far are within the subfamily Bovinae, however there are also alleged hybrids between domestic cattle and species outside this subfamily. One is with the muskox (*Ovibos moschatus*, $2n = 48$) which belongs to the subfamily Caprinae. Sheep also belong to the subfamily Caprinae. Attempts to artificially cross sheep with cattle have resulted in fertilization and development to the 8-cell stage, but the embryos failed to transition from maternal to embryonic control as indicated by a lack of RNA synthesis.²⁵



The yak (*Bos grunniens*) is a member of the cattle monobaramin that is well adapted to cold environments and high altitudes.

In vitro fertilization of cattle oocytes with sperm from the endangered scimitar-horned oryx (*Oryx dammah*, $2n = 56-58$) from the subfamily Hippotraginae has been reported. However, the embryos were only reported to have reached the 5- to 8-cell stage.²⁶ The purpose of the study was to evaluate the quality of oryx semen rather than investigate the viability of the hybrid embryos. Until such embryos are documented to undergo further development, this cross should not be considered a hybrid because a coordinated expression of embryonic genes has not been demonstrated.

Cattle, sheep and the oryx are members of the family Bovidae. Mating has been reported to occur between cattle and a species of deer (*Cervus elaphus*, $2n = 68$), a member of the family Cervidae. There has also been an alleged hybrid between a cow and a moose (*Alces alces*, $2n = 68$ or 70) which is also in the family Cervidae.

Natural variety within the kind

Cattle vary in body build (e.g. beef breeds vs dairy breeds), size, coloration, and horn morphology (e.g. long-horn vs shorthorn vs polled (no horn)). The yak has long, coarse hair and a dense, woolen undercoat that grows in the winter. The yak is able to endure colder environments and higher altitudes than any other cattle.²⁷ On the other hand, zebu cattle, such as the Brahman, have large pendulous ears, a dewlap (folds of loose skin that hang down in front of the chest), a hump over the neck and shoulders from extended dorsal processes, and better developed sweat glands than other cattle. Zebu cattle can withstand hotter environments and are more resistant to parasites than other cattle.²⁸

Conclusions

All species in the genera *Bos* and *Bison* can be considered part of the cattle monobaramin. *Bubalus* is probably included since some hybrid embryos have developed to the advanced blastocyst stage. In one study cited,²³ failure around the 8-cell stage was associated with a lack of mRNA transcripts. This suggests that coordinated expression of embryonic genes is necessary for an embryo to develop past this stage into a

morula and then a blastocyst.²⁹ The blastocyst stage, at least in cattle, is when the embryo would be placed back into a recipient animal for implantation and further development. More research should be done to determine if the advanced blastocyst stage is really a satisfactory indicator of hybridization in mammals.

Alleged hybrids of cattle with members of another subfamily (Caprinae) and family (Cervidae) hint that the holobaramin (*all* organisms derived from the created common ancestors, whether known or not) could possibly include the entire family Bovidae and several, if not all, of the five other ruminant families.³⁰

Considerable variety is apparent within the cattle monobaramin. In my previous paper on the Tsoan (sheep-goat) monobaramin,⁶ I suggested that some of the variety may have resulted from directed mutations. These are changes in genes that occur in response to certain environmental clues and help the organism adapt to the new environment. So far, heritable directed mutations have only been documented in microbes. Within the evolutionary paradigm, mutations are essentially the result of random processes. In the creationary paradigm, mutations may be programmed into the genome so animals could adapt to changing environments after the Curse. Further study of variation within monobaramins, particularly looking at the molecular basis of these differences, may reveal programming of an infinitely wise Creator who provides for his creation in ways we had never before imagined.

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- The six ruminant families are Bovidae (cattle, sheep, goat and antelope), Cervidae (deer), Tragulidae (mouse deer), Moschidae (musk deer), Antilocapridae (pronghorn), and Giraffidae (giraffe and okapi). They are in the suborder Ruminantia because they all have the unique ruminant stomach.

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