Chapter 1

BUFFALO SPECIES AND POPULATION

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The buffalo species (Bubalus bubalis) is a very common species, particularly widespread in tropical and subtropical countries with hot and humid climates.

In the most South East Asia countries (India, Pakistan, China) there are the quite whole of buffalo population: 152 million head on total of 182 million (83.5%).

If we add the other Asian countries (Thailand, Indonesia, Philippines, Vietnam, Bangladesh, Nepal, Sri Lanka, Myanmar, Laos, Cambodia, Iran) we have in Asia 174 million head, 95% of the world population.

In Africa we find domestic buffalo only in Egypt, with more than 5 million head (2.9%); there is also the wild buffalo but it is another species (Syncerus caffer).

In Europe the most number and practically the alone product economy is in Italy with about 400,000 head (0.2%) and a very strong market of mozzarella and other quality cheeses, fresh and processed meat, semen of high genetic level.

In America the buffalo are mostly represented in Brazil with more than 3,5 million head (1.9%), but its number and food production is increasing too in Venezuela, Colombia, Argentina, Cuba.

In the most of Asian countries, the buffalo was used for draught power in paddy fields and haulage, so, with the advent of mechanization, its number is rapidly decreasing and buffalo was substituted by dairy bovine cows for milk purposes (Borghese, 2005).

Only Italy, India and Pakistan created dairy purpose buffalo and their number is increasing because of the link with the market economy.

In Italy a dairy purpose animal was selected, Mediterranean Italian Breed with genetic potential until 5,000 kg milk/ 270 days of lactation. All the milk produced from buffaloes is processed in mozzarella cheese and 36,000 tons of mozzarella was produced in 2010 for internal market and for the export, plus ricotta, other cheeses, yogurt, ice cream.

India is working in selection of Murrah breed for dairy purpose. The white revolution achieved the result to increase strongly the milk production for human needs. The fat is separated to produce
butter, ghee, cream for human food, and the milk is used for direct consumption.
Pakistan is working to select Nili Ravi and Kundi breeds for dairy purpose too and the milk is used for human needs as in India.
American countries produce mostly meat from buffalo but some farms are working for select dairy animals.
Therefore the buffalo is a priority animal in the world as a source of protein food for human survival and sustainability as it is explained in every detail for each country, where buffalo has a pivotal role in human food sustainability.
Asian buffalo or Water buffalo is classified under the genus Bubalus, species bubalis.
The Bubalus bubalis belongs to the class Mammalia, subclass Ungulata, order Cetoartiodactyla, suborder Ruminantia, family Bovidae, subfamily Bovinae, tribe Bovini, which includes the following three groups: Bovina (cattle) with 60 chromosomes, Bubalina and Syncerina, between which no interbreeding appears possible.
Syncerina includes only the species Syncerus caffer (the African buffalo) with four subspecies. Syncerus caffer caffer, with 52 chromosomes, lives in savannah of eastern and southern Africa. Calves are born black or reddish brown and turn black later. It is a large animal, surpassing 180 cm in height and 1000 kg in weight. The horns are very large until 130 cm from tip to tip. The animals live in herds of 30/50 or more, calving throughout the year at 2 years intervals. Males start to breed at 3 years, then they fight for females and territory (Cockrill, 1974). Many experiences showed the possibility of domestication of the wild African buffalo as it is shown in figure 1, where some animals are used as trailers.
Syncerus caffer nanus, with 54 chromosomes, lives in the forests of Congo and it is named Congo buffalo. It is smaller than the previous one and with small horns, it is retiring, furtive and nocturnal in habit, living in small herds of ten and feeding leaves of trees and shrubs (Cockrill, 1974).
Syncerus caffer brachyceros lives in west Africa but is quite disappeared.
Syncerus caffer aequinotialis lives in savannah of East Africa and it is intermediate in size and in horn form between Syncerus caffer caffer and Syncerus caffer nanus.
Bubalina (the Asian buffalo) includes three species.
Bubalus depressicornis or Anoa which lives only in Indonesia, with 46 chromosomes, very small animal (100 cm high) with thin and straight horns 25 cm long, conserved in the zoo and never used for draught or for products as it was a wild buffalo living singly or in pairs in mountains or in lowland forests (fig. 2 and 3).
Bubalus mindorensis which was found only in the Mindoro island in the Philippines and therefore is called also Tamarao or Mindoro buffalo. It is a small animal (100 cm high) with short and strong
horns. It is quite extinct, living only in the zoo. Bubalus arnee is original in the north of India as wild animal, living in the marshes and in the jungles; very large animal as it can reach 200 cm high and 1000 kg, the color is grey-black, dark gray or dark brown, the horns large and separated from each other at the base (Cockrill, 1974); the population is very reduced.

Bubalus bubalis is deriving from the domestication of the Bubalus arnee, the Indian wild buffalo. The domestication of this species occurred relatively recently (5000 years ago) compared to the domestication of Bos taurus and Bos indicus (10000 years ago). Asian buffalo appears to be domesticated in the Indus valley, in China and in Mesopotamia, from where it was introduced in Egypt and in Italy by Arabs invasion in the 8th century, as in the Balkans (east Europe) the buffaloes were introduced later with Crusaders and after with Turkey Selgiuchidi invasion during the expansion of Ottoman empire (15th century).

Bubalus bubalis, named also water buffalo or Asian buffalo or domestic buffalo, includes two subspecies known as the River and Swamp types, the morphology and purposes of which are different as are the genetics. The River buffalo has 50 chromosomes of which five pairs are submetacentric, while 20 are acrocentric: the Swamp buffalo has 48 chromosomes, of which 5 pairs are submetacentric and 19 pairs are acrocentric. The two subspecies are inter-fertile and produce progeny with 49 chromosomes. Male crossbred progeny have sometimes displayed fertility problems while female progeny have manifested longer calving intervals only in the case of further backcross. Morphology of the two types differs considerably. Swamp buffaloes, called too Krbao or Carabao, are less heavy, the adult male weight ranging between 325 and 450 kg, while the River type weighs between 450 and 1000 kg. While the Swamp buffalo is reared mainly for draught purposes, although it also produces a valuable milk yield of up to 600 kg milk per year, the importance of the River buffalo depends on the high quality and quantity of the milk that it produces. River buffaloes, called too domestic buffalo, are generally large in size, with curled horns and are mainly found in India, Pakistan and in some countries of western Asia. They prefer to enter clear water, and are primarily used for milk production, but are also used for meat production and for draught purposes. Swamp buffaloes are stocky animals with marshy land habitats. They are primarily used for draught power in paddy fields and haulage but are also used for meat and milk production. Swamp buffaloes are mostly found in south east Asian countries. A few animals can also be found in the north eastern states of India (Sethi, 2003). Each subspecies includes many breeds, that will be described in this book.

The Bison is not described in this book as it is classified in genus Bison with two species:
Bison bison (the American bison) and Bison bonasus (the European bison). Bison has 60 chromosomes and it is totally different from Bubalus as phylo-genetically as morphologically, even if American people created a big confusion calling “buffalo” both the species, with the only differentiation of “water buffalo” to identify the Bubalus bubalis. The Bison bison was the basis for the surviving of American Indians, nomad people in the great grasslands of the Centrum of United States, who shot the herd of bison, utilizing the meat as food, the skin for the tents, the bone for arms and utensils. Now it is a species at extinction risk, living in the natural parks of USA (figure 4). The European Bison too is living only in the parks and in the zoo, in Poland.

The buffalo population trend is increasing in the world and in the different continents as people discovered the possibility to obtain, not only draught, but also more milk, very useful for food purposes.

In the World, according FAO data (FAOSTAT, 2010), there are 180,702,923 buffalo head, at this moment about 182 million (Borghese, 2011), with a positive trend (+8.3%) in comparison with the value of 168 million reported in the previous book “Buffalo Production and Research” (Borghese, 2005).

In Asia, according FAO data (FAOSTAT, 2010) there are 174,208,357 buffalo head (95% of total population), with a positive trend too (+ 8.1%) as 5 years before the Asian population was 161 million (Borghese, 2005), and the Asian population was the 95% of the global one, as now. This positive trend is due to the increasing population in India and Pakistan, where milk purpose breeds were selected and where the buffalo milk market is very strong, balanced by the decreasing in other countries where draught animals are less required than in the past.

In Africa, where the buffalo is found only in Egypt, there are 5,231,162 head (FAOSTAT, 2010), while 6 years before the Egyptian buffalo population was 3,717,000 (Borghese, 2004), with an incredible positive trend of 40.7%, passing from the 2.2% to the 2.9% of the total population in the world, as buffalo in Egypt is a basic draught animal in rice fields and irreplaceable for milk production for direct consumption.

In Europe this year, the most of population is in Italy with about 400,000 buffaloes, while the European buffalo population is 459,000 (0.25% on world population), less than the found one 7 years ago (500,000; 0.30%) (Borghese, 2005) for the decreasing trend in many Balkan countries as Romania, Bulgaria, Macedonia, Greece, Albania, Serbia, partially balanced by the increasing trend in Italy, link to the expansion of mozzarella market.

In America we can consider this year 4,227,000 buffalo head, 2.32% of total population, while 11 years ago there were only 3,345,000 (Rocha Loures, 2001), about 2% of the global one, with a very positive trend (+26.4%) due to the enormous availability of land and free pasture in South
America, the unique adaptability of buffalo to lagoons and marshy land, the changing from a meat purpose breeding to a double purpose (milk and meat) livestock.

Figure 1. Bufalo cafro (Syncerus caffer caffer), Zimbabwe (Antinori photo, 1984)
Figure 2. Bubalus depressicornis (Anoa), Bogor, Java, Indonesia (Borghese photo, 2004)

Figure 3. Bubalus depressicornis (Anoa), Bogor, Java, Indonesia (Borghese photo, 2004)
Figure 4. Bison bison, South Dakota, USA.
References


