



Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Faculty of Veterinary Medicine and Animal Science
Department of Animal Breeding and Genetics

Global Horse Population with respect to Breeds and Risk Status

Rupak Khadka

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Department of Animal Breeding and Genetics
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– European Master in Animal
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Supervisors:

Prof. Dr. Georg Thaller, CAU, Institute of Animal Breeding and Husbandry
Prof. Dr. Jan Philipsson, SLU, Department of Animal Breeding and Genetics

Examiner:

Birgitta Malmfors, SLU, Department of Animal Breeding and Genetics

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Rupak Khadka
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Institute of Animal Breeding and Husbandry, CAU
Department of Animal Breeding and Genetics, SLU

SUPERVISORS

Prof. Dr. Georg Thaller, CAU, Germany
Prof. Dr. Jan Philipsson, SLU, Sweden



Education and Culture

Erasmus Mundus

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Abbreviations

AHC	American Horse Council
AnGR	Animal Genetic Resources
BC	Before Christ
CAU	Christian Albrechts University
CB	Cold Blood horses
CR	Countries Reporting
DAD-IS	Domestic Animal Diversity Information System
EAAP	European Association for Animal Production
EM-ABG	European Master in Animal Breeding and Genetics
EU	European Union
FAO	Food and Agriculture Organisation
FEI	Fédération Equestre Internationale
ITB	International Transboundary Breeds
IUCN	International Union for the Conservation of Nature and Natural Resources
LAC	Latin America and Caribbean
NZ	New Zealand
OSU	Oklahoma State University
SA	South Africa
SLU	Swedish University of Agricultural Sciences
UK	United Kingdom
UN	United Nations
UNPD	United Nations Population Division
USA	United States of America
WB	Warm Blood horses

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Summary

This study was performed based on FAOSTAT and DAD-IS database systems of Food and Agriculture of United Nations in order to describe the number of horses, horses per 1000 persons, number of horse breeds and the risk status of horse breeds in the world. In 2008, there are 58.7 million horses in the world, South America dominating (15 millions) followed by Asia (13.8 millions), North America (9.8 millions), Latin America and Caribbean (8.7 millions), Europe (6.3 millions), Africa (4.5 millions) and Oceania (0.41 million). Interestingly from the results of 2000 to 2008 data the population of horses is continuously decreasing in Europe, Asia and South America whilst gradually increasing in North America, Latin America and Caribbean, Africa and Oceania. The figure of horses per 1000 persons in the world was 8.7 for 2008. In the same year, Latin America and Caribbean, South America, North America, Oceania, Europe, Africa and Asia had 45.7, 38.9, 28.7, 11.8, 8.7, 4.6 and 3.4 horses per 1000 persons respectively. A total of 784 horse breeds have been reported in the world of which 655 are local, 62 are regional transboundary and 67 are international transboundary breeds. Europe makes up more than half of all horse breeds in the world while Latin America and Caribbean reported the least number of horse breeds. The majority of the reported horse breeds are unknown breeds. The Arab and Thoroughbred horses are the most diversified horse breeds in the world. A total of 22.6 % of the world's horse breeds are "at risk" while 11.5 % are extinct from the world. It was shown that 31.8 % of the horse breeds were not at risk while 34.1 % had an unknown status. This study reflects that Europe provides relatively good information of the horses to FAO as compared to other continents. It would be very informative to do further studies to determine the overall impression of the horses in the world.

1. Introduction

Horses are present throughout the world. Horses have been with humans throughout history and have served a variety of practical purposes. These include serving as a means of transport, a work animal in agriculture and in war. Horses were domesticated and utilized by humans since ancient times. Horses are the species most differentiated into breeds throughout the world (Hall & Raune, 1993). Nowadays because of their power, agility, gracefulness and speed, horses are mostly used for personal pleasure and in sport competitions. In recent years the globalization of horses has been widely recognized being developed as sports animal. The trade, breeding and sports significantly attracted the attention of people. Like other species of animals, horses are also an important component of global biodiversity. If the relationship of various populations is ignored, then remarkable genetic erosion can occur in the global population (Alderson, 2008). Failure to conserve domesticated genetic resources will definitely lead to a situation where a large portion of the horse genome will be on the verge of being lost. The use of the horse as a sport animal or for leisure helps to stimulate the maintenance of genetic diversity within the horse population. On the other hand the wide use of selected popular stallions and their semen is seen as a threat to genetic diversity within the horse population (Bowling and Ruvinsky, 2000).

The contribution of horse breeds to the total number of mammalian breeds in the world being 10.33 %, far outweighs their contribution in terms of animal numbers. Population data is not available for 36 % of all breeds. The population size and structure at breed level are inadequately reported in many parts of the world, especially in context of developing countries (FAO, 2007). As a result of mechanization and globalization, horses have been reinvented as sports and leisure animals while little interest has been placed on identifying the equine populations. Despite a wealth of scientific research in equine sciences, there has not been many studies conducted in order to describe the global population census, breeds and geographical distribution of the horse (Mellor et al., 1999). There are no direct measures at a genetic level, so the status of domestic horse breed populations provides the best available indication of trends in biodiversity.

A sound knowledge of the global horse populations is crucial to know parameters such as existing population size, type and use of the horses, breeds and breeding strategies, epidemiological studies, risk status etc. With regarding the lack of many studies in this field, the present study has been carried out which is based on the Food and Agriculture Organisation (FAO) databases: Domestic Animal Diversity Information System (DAD-IS) and FAOSTAT. The main objectives of this study were to describe:

- a. the number of the horses in the world and by region
- b. the number of horses per 1000 persons in the world and by region
- c. the number of horse breeds in the world and by region
- d. the risk status of the horse breeds in the world and by region

2. Literature Review

2.1. Domestication of the horses

The horse (*Equus caballus*) is a hoofed animal of the family Equidae. Horses, one of the most historically vital domesticated animals to humans, have a special place among our domestic animals and in our hearts. They have played essential roles in the history and developments of civilizations. Humans maintain a mutual trust and strong affiliation with horses, not only for riding and pleasure but also to maintain physical and mental health. They are highly social and intelligent domesticated animals. Horses are not as old as other domesticated species such as sheep, goats, pigs, cattle and dogs (FAO, 1987). Horses acquired a special place next to dogs in recent times because of their close relationship with man. The evolution of domestic horses can be traced from its wild ancestors (Bokonyi, 1987). It is believed that different wild equids gave rise to the different breeds of domestic horses we see today. Many enormous heavy wild horses developed during the Pleistocene period (19th and early 20th centuries) and became extinct by the end of the Ice age (Epstein, 1971; Clutton-Brock, 1999 & Olsen, 2006). Forsten (1988) argued that out of many different varieties of horses in the Pleistocene period, only one species of wild horses survived. That small, single wild horse, referred as *Equus ferus*, is the ancestor of present day domesticated horses.

The domestication of horses is still an ongoing debate. Questions such as when, where and why the horses were first domesticated are still unclear. Horses had historically played an important role in the human progress. They became increasingly powerful components of Eurasian civilizations from the middle of the second millennium BC (<http://www.imh.org/>). The Tarpan (*E. ferus*), a wild European horse and the Przewalski (*E. przewalskii*), a wild Asiatic horse, are regarded as the ancestors of present day horses. Tarpans are small extinct horses with a mouse dun coat and a light underbelly, sooty to black limbs from knees and hocks down, short frizzled mane and a short tail with dark hair (Olsen, 2006). The last captive Tarpan died in Poland in between 1918 and 1919 (Bokonyi, 1974a) and the last wild Tarpan was killed in Ukraine in 1851 (Zeuner, 1963). The Przewalski horse is considered to be

the only remaining wild horse in the world and is the closest living wild relative of the present domestic horses (*Equus caballus*). Przewalski horses are robustly built with sandy tan, dun or reddish bay coat and dark brown upright mane, dorsal and shoulder stripe, barring in their legs, light coloring on their muzzles and bellies, a low set tail and smaller in size to the domestic horse (<http://www.ansi.okstate.edu/breeds/horses/>). Evidence from North Kazakhstan suggests that horses were domesticated in the era during the Copper Age - around 3700 to 3100 BC (Olsen, 2006). However, molecular studies suggest that the diversity of the horses on the maternal side probably originates from several populations in different geographical areas. Vila et al. (2001) suggested that a single point of origin was unlikely as there were multiple successful efforts for horse domestication in different regions. The domestication of horses might have taken a very long time to develop and wild genes have been introduced into domestic genes (Levine, 2006). Horse back riding supported a good indicator of horse domestication which first appeared in the steppes east of the Ural Mountains (Kavar & Dovc, 2008).

2.2. Utilization of the horses

Humans have conquered the world with the aid and sacrifice of the loyal horse in the past. The history of utilization of horses can be traced from the rise and fall of empires, the conquest of entire continents, great battles, developments of transport systems, mail, agriculture, forestry progress and in times of war and peace (Bowling & Ruvinsky, 2000). During the middle of the 19th century, heavy breeds of horses were developed for agricultural and forestry works, coal mines, as power to other pieces of heavy machinery and for pulling carts. With the advent of combustion engines the role of the horses became overshadowed. However, they are still being used in subsistence agricultural regions particularly in Eastern Europe, Asia, Africa, Central and South America. The importance of horses for agricultural work has decreased to insignificant proportions. The exceptions are the use of horses by sheep farmers when herding their grazing sheep (Arnason, 1984) and by “cowboys” at cattle ranches in Western (Iverson, 1994) and Latin (Jordan, 1989 and Bishko, 1952) America. Draft horses still play an important role in rural life, despite the increased mechanization of agriculture. Pack horses and ponies

are still the backbone for the means of transport in some developing countries. Horses have been also used by military forces for expeditions, riding, and transportation.

The mechanization of transport and agriculture increased the attention of many horse breeds for the development of breeds for sport and leisure activities. The role of the horses has mirrored the changes in the human society from war horse to draft horse to today's sport or companion animal (Waran, 2002). In recent times, one of the promising and emerging areas for the use of many breeds of horses is for competitive events or as sports animals. During the last few decades, the equestrian sphere has rather briskly emerged to become a field of wide diversification. The development of leisure riding, diversification of the utilization of horses, and increasing role of horses are of high concern for the developed countries.

The development of leisure activities for horses reflects a regular decrease in the number of draft horses and a constant increase in the number of blood/sport horses (Langlois et al., 1983). Sport horse breeds are intended to be used in competitions for the major international equestrian disciplines of dressage, jumping, three day eventing, racing, trotting, endurance, and vaulting. The development of sport horse breeds and participation at the Olympic level at Stockholm in 1956 had lead to the creation of a new horse market for equestrian sports. The elite horses of different breeds continuously compete at the Olympic Games and World Championship level. In recent years, horses are used in tourism, medical therapy, hobby, social rehabilitation, or social eventing, aesthetic and for cultural values. Horse breeding is characterized by a significant international exchange of breeding material. Besides this, horses are kept for meat purposes in all the regions of the world. Every year about 100, 000 horses are transported for slaughter over long distances within Europe (EU Equus, 2009). FAO estimated that 752, 913 tonnes of horse meat was produced in the world in 2008. Horses became progressively used for transportation, agriculture and forestry, leisure, recreation, sports, meat and therapeutic riding (Hausberger et al., 2008; Splan, 2004 & Anderson et al., 1999). Besides this, the equine industry plays a significant role in the socio-economic and environmental sector of a country.

2.3. Horse populations in the world

A population is a group of individuals that share one or more characteristics on which data can be collected and analyzed. A population can also be characterised as a group of organisms of one species that are interbred and live in the same place at the same time (<http://www.biology-online.org/dictionary/Population>). The distribution of different livestock populations and breeds across regions of the globe is affected by a range of agro-ecological, socio-economic, religious and cultural factors. According to production statistics of the Food and Agricultural Organization of the United Nations (FAOSTAT), in 2008 there were about 1,347 million cattle, 1,078 million sheep, 941 million pigs, 862 million goats, 180 million buffaloes, 18 billion chickens and 58 million horses in the world (<http://faostat.fao.org/>; cited on 15th, May, 2010). Recent data of FAOSTAT (2008) shows that there are 58.8 millions of horses in the world. Cattle are widely domesticated in all regions of the world followed by sheep. The population of horses seems to be quite low, compared to cattle because horses are not productive, but rather leisure or companion animals. According to the FAOSTAT (2006) report the United States reported the highest total number of horses with an approximate number of 9.5 million horses. The data provided by FAOSTAT is strikingly similar to the American Horse Council's own independent study which reported the US horse population to be 9.2 million in 2005. In 2006, the other countries with horse populations over one millions were China, Mongolia and Kazakhstan from Asia, Russia from Europe, Brazil and Argentina from South America, Mexico and Columbia from Central America and Ethiopia from Africa.

According to FAOSTAT (2005), there are 9.1 horses per 1000 persons in the world (Table 1). The figure is highest for Latin America and Caribbean with 46.4 horses per 1000 persons followed by South America with 41, North America with 28.7, Oceania 11.1, Europe 8.9, Africa 4.6 and Asia 3.7 horses per 1000 persons.

Table 1: Number of horses per 1000 persons by regions in 2005

Continents	Number of horses	Number of people (in 1000)	Horses per persons (in 1000)
Africa	4240612	921073	4.6
Asia	14256852	3936535	3.7
Europe	6489242	729420	8.9
Latin America & Caribbean	8562285	184854	46.4
North America	9586060	335175	28.7
Oceania	374657	33559	11.1
South America	15225273	371658	41
Total	58734981	6512274	9.1

Source: FAOSTAT & UNPD, 2005

EU Equus (2009) reported that there were 5.8 million horses in the European Union with Germany and Great Britain having the highest horse populations and Sweden has the highest number of horses per 1000 persons, i.e. 30.9. EU Equus (2001) study reported 4.4 million horses in the European Union member countries but there are not more than 6 millions equine animals or equidae (including horses, donkeys, ass, zebra and their crosses) in the whole of Europe (European Commission, 2010). The average number of horses per 1000 persons among the member countries in the European Union was 11.7 in 2000 (EU Equus, 2001) and 16.6 in 2008 (EU Equus, 2009). Tables 2 and 3 indicate that within the EU, Germany, the United Kingdom and France have the highest number of horses. Sweden, Denmark, Belgium and the Netherlands have the highest number of horses per 1000 persons while Greece, Portugal and Slovakia have the lowest number of horses and horses per 1000 persons.

Table 2 . Total number of horses in some European countries in 2008

Country	Number of horses	Number of people	Horses/1000 persons
Austria	100000	8 265 925	12.1
Belgium	300000	10511382	28.5
Czech Rep.	64126	10188000	6.3
Denmark	150000	5427459	27.6
Estonia	4900	1339000	3.7
Finland	77000	5266000	14.6
France	900000	62998773	14.3
Germany	1000000	82437995	12.1
Great Britain	1000000	60393044	16.6
Greece	27000	11122000	2.4
Hungary	60000	10058000	6.0
Ireland	80000	4221000	19.0
Italy	300000	5877800	5.1
Latvia	13600	2289000	5.9
Luxembourg	4490	461000	9.7
Netherlands	400000	16334210	24.5
Norway	45000	4668000	9.6
Poland	320000	38157055	8.4
Serbia	35000	2003358	17.5
Slovakia	8000	5388000	1.5
Slovenia	22000	2000000	11.0
Spain	559598	43886000	12.8
Sweden	280000	9047752	30.9
Total	7570714	455240953	16.6

Source: EU Equus, 2009

Table 3: Number of horses per 1000 persons in EU in 2000

Country	Number of horses	Number of people	Horses/1000 persons
Austria	81864	8200000	10.0
Belgium	200-250000	10200000	22.0
Denmark	150000	5300000	28.3
Finland	57400	5200000	11.0
France	452000	59100000	7.65
Germany	1000000	82200000	12.2
Greece	35000	10600000	3.3
Ireland	60000	3700000	16.2
Italy	323000	57300000	5.6
Luxembourg	NA	431000	NA
Netherlands	400000	15800000	25.3
Portugal	27000	9900000	2.5
Spain	350000	39600000	8.8
Sweden	250000	8900000	28.1
United Kingdom	965000	58800000	16.4
Total	4376264	375231000	11.7

Source: EU Equus, 2001

NA: Not Available

2.4. Breeds of horses

A breed is an interbreeding group of animals within a species with some identifiable common appearance, performance, ancestry or selection history (Oldenbroek, 2007). Breeds are regarded as the basic units of genetic resources in domesticated species. A breed is usually associated with a particular ecological zone, geographical area and farming system. Breeds have been developed according to the geographic and cultural differences and to meet human food and agricultural requirements. (FAO World Watch List, 2000).

Breeds are defined in different ways:

- “Animals that, through selection and breeding, have come to resemble one another and pass those traits uniformly to their offspring”.
(<http://www.ani.okstate.edu/breeds/>)
- “Either a sub specific group of domestic livestock with definable and identifiable external characteristics that enable it to be separated by visual appraisal from other similarly defined groups within the same species, or a group for which geographical and/or cultural separation from phenotypically similar groups have led to acceptance of its separate identity. Breed is very often accepted as cultural term rather than a technical term”. (FAO World Watch List, 2000)
- “A race or variety of men or other animals (or of plants), perpetuating its special or distinctive characteristics by inheritance”.
(<http://www.biology-online.org/dictionary/Breed>)
- “A breed is a group of domestic animals, termed such by common consent of the breeders... a term which arose among breeders of livestock, created one might say, for their own use, and no one is warranted in assigning to this word a scientific definition and in calling the breeders wrong when they deviate from the formulated definition. It is their word and the breeders’ common usage is what we must accept as the correct definition”. (Lush, 1994; The Genetics of Populations)
- “A group of animals that has been selected by man to possess a uniform appearance that is inheritable and distinguishes them from other group of animals within the same species”. (Clutton-Brock, 1987)

Local Breeds: Those breeds that occur only in one country. For example: Jumli is a local horse breed from Nepal.

Transboundary Breeds: Those breeds that occur in more than one country. Transboundary breeds are of two types:

- a. Regional Transboundary Breeds:** Those transboundary breeds that occur only within one region of the seven continents. For example: Hutsul is a regional transboundary horse breed found in Czech

Republic, Poland, Slovakia, Germany, Hungary, Romaina and Ukraine of Europe.

- b. International Transboundary Breeds:** Those transboundary breeds that occur in more than one continent. For example: The Arab horse is an international transboundary horse breed found in all seven continents of the world.

There are hundreds of horse breeds distributed throughout the globe. FAO's Global Databank for Animal Genetic Resources (AnGR) for Food and Agriculture (FAO, 2007) contains information on a total of 7,616 livestock breeds. The number of livestock breeds reported in the FAO databank includes both mammalian and avian species. A total of 786 breeds of horses were reported as of January 2006 which is 10.33 % of the total number of livestock breeds. Excluding 87 extinct horse breeds, there are 570 local breeds, 63 regional transboundary breeds and 66 international transboundary breeds. Out of the 570 local horse breeds, Europe reported the highest number of breeds with 269 local breeds followed by 38 out of 63 regional transboundary breeds. The other details are presented in Table 4.

Table 4: Total number of horse breeds[†] in the world in 2006

Geographic Region	Local	Regional transboundary	International transboundary
Africa	36	7	-
Asia	141	10	-
Europe & the Caucasus	269	38	-
Latin America & Caribbean	65	5	-
Near & Middle East	14	0	-
North America	23	3	-
Southwest Pacific	22	0	-
World	570	63	66

Source: The State of the World's Animal Genetic Resources for Food and Agriculture, 2007

[†] Excludes extinct breeds

As of June 2010, the breeds of livestock database system of Oklahoma State University (OSU) (<http://www.ansi.okstate.edu/breeds/horses/>) have reported 217 horse breeds. Hall and Raune (1993) reported 427 horse breeds. The EAAP Animal Genetic Data Bank contained 707 entries which include 110 horse breeds (Simon, 1992). The livestock dictionary of Mason (1988) includes 592 breeds of horses which also accounted for varieties of horse breeds. A different study illustrating the great diversity of horse breeds in the world is presented in Table 5 and suggests that there were 527 horse breeds in the world.

Table 5: Number of breeds of horses by geographic region

Geographic Region	Number of breeds	Breeds in %
Africa	60	11
Asia	148	28
Europe	209	40
Latin America/Caribbean	32	6
Pacific Islands	30	4
USA/Canada	58	11
Total	527	100

Source: The Genetics of the Horses, 2000

A number of breeds have been developed which illustrates the diversity of the breeds. The adaptability has allowed horses to survive in different environments over the time and to develop distinctive characteristics among breeds. The breed of the horse can be established into different types depending on the temperament (coldblood, warmblood and thoroughbred); nature of work (riding or draft); type of horse (light, heavy or ponies); type of breed (purebred or crossbred). No matter what the classification of horse breeds is, they are found in all regions of the globe. Coldblood or draft horses are generally heavily built with deep bodies, short stocky legs, small ears, large heads, thick coats and less reactive temperaments. These are well adapted for energy conservation and survival in cold climates. Warmblood or

riding horses and trotters are graceful with long slender legs, fine coats, small heads, large ears and other physiological adaptations to aid heat dissipation. They are fast, highly reactive and enduring and are adapted to life in a warmer environment (Hendricks and Dent, 1995).

2.5. Risk status of horse breeds

A total of 1,491 out of 7,616 breeds reported, 20 % were classified as being at risk. Cattle have the highest number of breeds at risk, followed by 23 % for horses. According to Signorello and Pappalardo (2003), 10% of domesticated breeds have been lost in the last century, and a further 20% are at risk of extinction. For more than one-third of all reported breeds, risk status is not known because of missing population data or unreliable information that can only be estimated (FAO, 2007). For example in Africa and Southwest Pacific the population size has not been reported for over two thirds of the breed populations. The lack of knowledge hinders concerted actions and the setting of conservation priorities. There are several important reasons for classification of the risk status of breeds: genetic uniqueness (Raune, 2000), a high degree of endangerment (Gandini et. al, 2004), economic, cultural, scientific, ecological value and optimal allocation of funds (Simianer et. al, 2003). However, the prospects of the breeds of any species largely depend on their present and future functions in livestock systems. When circumstances change, certain breeds are set aside and are faced with the danger of extinction unless alternative strategies are adopted (Oldenbroek, 1999).

2.6. Risk status classification of FAO

Critical: a breed is categorized as critical if the total number of breeding females is less than or equal to 100 or the total number of breeding males is less than or equal to five; or the overall population size is less than or equal to 120 and decreasing and the %age of females being bred to males of the same breed is below 80 %, and it is not classified as extinct (Table 6).

Critical-maintained: are those critical populations for which active conservation programmes are in place or populations are maintained by commercial companies or research institutions.

Endangered: a breed is categorized as endangered if the total number of breeding females is greater than 100 and less than or equal to 1,000 or the total number of breeding males is less than or equal to 20 and greater than five; or the overall population size is greater than 80 and less than 100 and increasing and the %age of females being bred to males of the same breed is above 80 %; or the overall population size is greater than 1,000 and less than or equal to 1,200 and decreasing and the %age of females being bred to males of the same breed is below 80 %, and it is not assigned to any of above categories (Table 6).

Endangered-maintained: are those endangered populations for which active conservation programmes are in place or populations are maintained by commercial companies or research institutions.

Breed at risk: a breed that has been classified as critical, critical-maintained, endangered, or endangered-maintained.

Extinct: a breed is categorized as extinct when there are no breeding males or breeding females remaining. Nevertheless, genetic material might have been cryoconserved which would allow recreation of the breed. In reality, extinction may be realized well before the loss of the last animal or genetic material (Table 6). Extinction is absolute when there are no embryos remaining (Signorello & Pappalardo, 2003).

Not at risk: are those breeds for which the total number of breeding females and males is greater than 1,000 and 20 respectively; or the population size approaches 1,000 and the %age of pure-bred females is close to 100%, and the overall population size is increasing (Table 6).

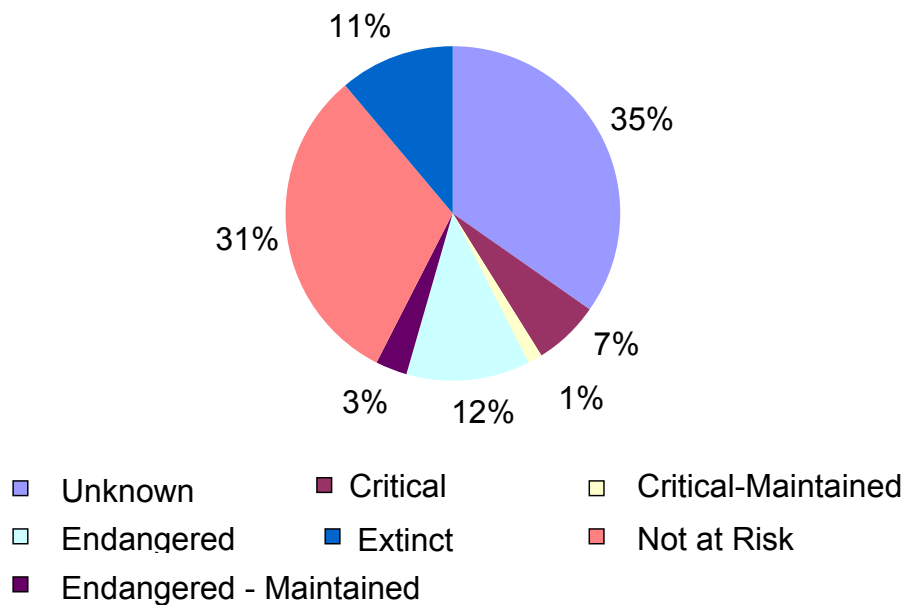
Unknown: a breed for which no data are available.

Table 6: Risk status used by FAO

Risk status	Females	Males	Total breeding animals	Additional criteria
Extinct	0	or 0		Impossible to re-establish the breed
Critical	< 100	or < 5	or < 120 and decreasing and < 80% pure breeding	
Critical-maintained				Critical + conservation or commercial breeding program in place
Endangered	<1000	or < 20	or between 80 and 100 and increasing and > 80% pure breeding or between 1000 and 1200 and decreasing and < 80% pure breeding	
Endangered - maintained				Endangered + conservation or commercial breeding program in place
Not at risk	>1000	or > 20	or >1200 and increasing	Other categories do not apply

Source: Scherf, 2000

There were 786 horse breeds reported to the FAO Global Data Bank until 2006. Out of 768 horse breeds, 272 (35 %) were unknown, 52 (7 %) were critical, 10 (1 %) were critical-maintained, 95 (12 %) were endangered, 24 (3 %) were endangered-maintained, 246 (31 %) were not at risk and 87 (11 %) were extinct breeds. Among 87 extinct horse breeds, Europe alone reported 71 breeds.



Source: DAD-IS, 2006

Figure 1: Risk status of horse breeds in the world

3. Methodology

The data generated for this study was derived by country or territory or concerning the delimitation of its frontiers or boundaries of FAO from member countries of the world. The FAOSTAT and DAD-IS database systems of FAO are the primary sources for developing the information. The data included in the database may be official, semi-official or estimated. The database system of Breeds of Livestock – Oklahoma State University has also been reviewed especially during the study of horse breeds of the world. A World Dictionary of Livestock Breeds, Types and Varieties of I L Mason (1988) also provided a good source of information to input the horse breeds in this study.

3.1 FAOSTAT

<http://faostat.fao.org/>

FAOSTAT database was the main basis for deriving the horse population from 2000 to 2008. The world was divided into seven continents: Africa, Asia, Europe, Latin America and Caribbean, North America, Oceania and South America. Furthermore each continent was divided into sub-regions and from those sub-regions the data of each countries' horse population was collected. For example Africa was divided into East, Middle, Northern, Southern and West Africa; Asia was divided into Central, Eastern, Southern, South-Eastern and Western Asia; Europe into Eastern, Northern, Southern and Western Europe; Latin America and Caribbean into Central America and Caribbean and Oceania into Australia and New Zealand, Melanesia, Micronesia and Polynesia.

3.2 United Nations Population Division (UNPD)

<http://esa.un.org/unpp/index.asp>

World Population Prospects: The 2008 Revision Population Database system of the United Nations Population Division was followed to determine the total human population from each continent in the world for the year 2000, 2005 and 2008. The human population from each continent was assessed with UNPD database system and consequently the horse population in the world from each continent is also assessed from the FAOSTAT database system for

the years 2000, 2005 and 2008. In this way the horse per 1000 persons for each continent and for the world was calculated.

Horses per 1000 persons is the total number of horses in the world by the total human population in the world in the respective years.

3.3 Domestic Animal Diversity Information System (DAD-IS)

<http://dad.fao.org/>

The Domestic Animal Diversity Information System (DAD-IS) is the first globally accessible dynamic multilingual database of Animal Genetic Resources. This database system was the main basis for generating the breeds and risk status of horses for this study. It provides a summary of national breed level information on the origin, population, risk status, special characteristics, morphology and performance of breeds of FAO member countries. It contains more than 14,000 national breed populations of 35 species from 181 countries. Besides breed level information, it provides a virtual library containing a large number of selected technical and policy documents, including tools and guidelines for research related to animal genetic resources.

3.4 Breeds of Livestock Database– Oklahoma State University

<http://www.ansi.okstate.edu/breeds/horses/>

The Department of Animal Science of Oklahoma State University has maintained the breeds of livestock database system since 1995 as an educational and informational resource on breeds of livestock throughout the world. This database system is used to assess the number of horse breeds for this study. It provides a brief description of horse breeds in terms of origin, distribution, typical features, uses and population status. It displayed the information for 217 horse breeds out of 1,063 livestock breeds in the world.

4. Results

4.1. Horse populations in the world

The world population of horses was analysed from the FAOSTAT database from 2000 to 2008. As of March 2010, the global horse population was 58.7 million individuals in 2008. This figure includes official or semi-official or estimated data depending on the reporting of the FAO member countries. According to FAOSTAT 2008 data, South America has the highest number of horses with 15 millions followed by Asia with 13.9 millions, North America with 9.9 millions, Latin America with 8.7 million, Europe with 6.4 million, Africa with 4.5 million and Oceania having the least number of horses 0.4 million.

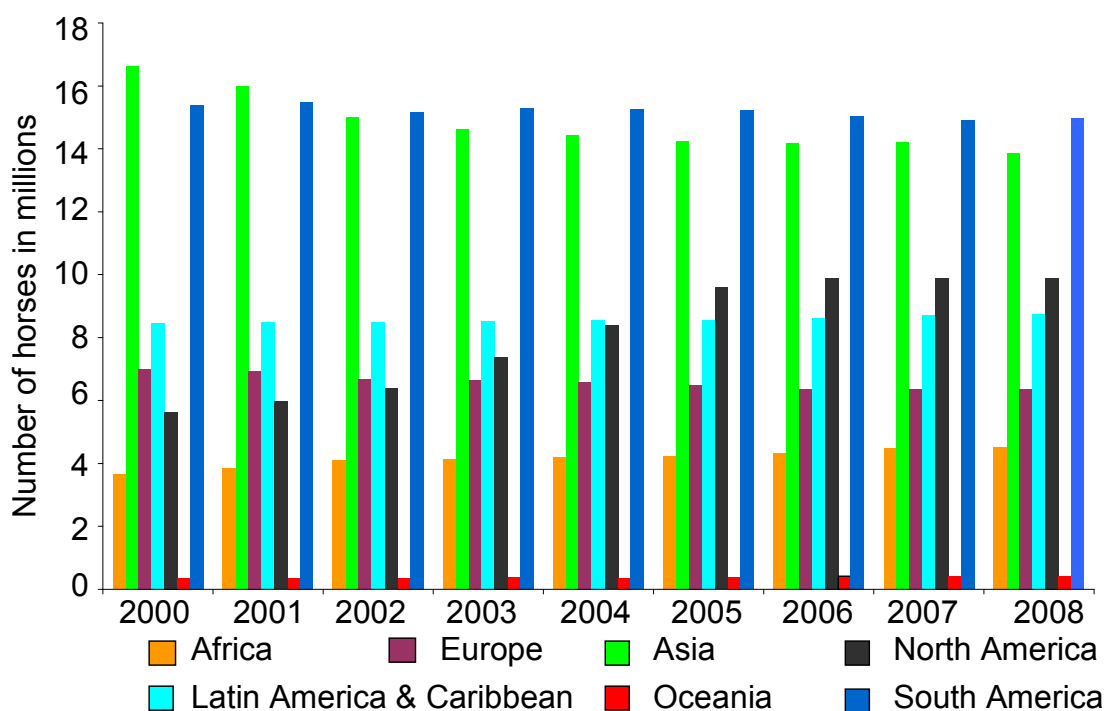


Fig 2a: Global Horse Population per continent (FAOSTAT, 2010)

The trend in world population numbers varies from 2000 to 2008. The global figure shows that the horse population is increasing despite a decrease in 2002. By continent, the figures are declining in Asia, Europe and South America from 2000 to 2008. The other continents show an increasing trend. The total figures for 2000 and 2001 were 57.1 million but dropped to 56.1 million in the year 2002 and increased to 58.7 million in 2008. The horse

population of the world and per continent from 2000 to 2008 is presented in Table 7 and shown in Figures 2a and 2b.

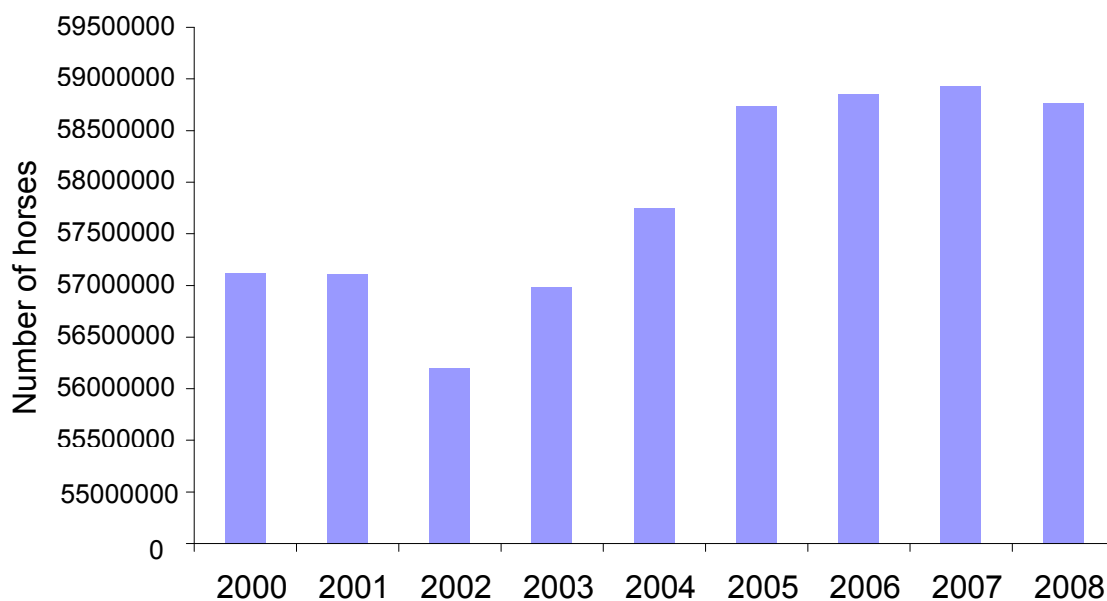


Figure 2b: Horse Population in the World (FAOSTAT, 2010)

The horse population in Africa has gradually increased from 3.6 million in 2000 to 4.5 million in 2008 (Figure 3).

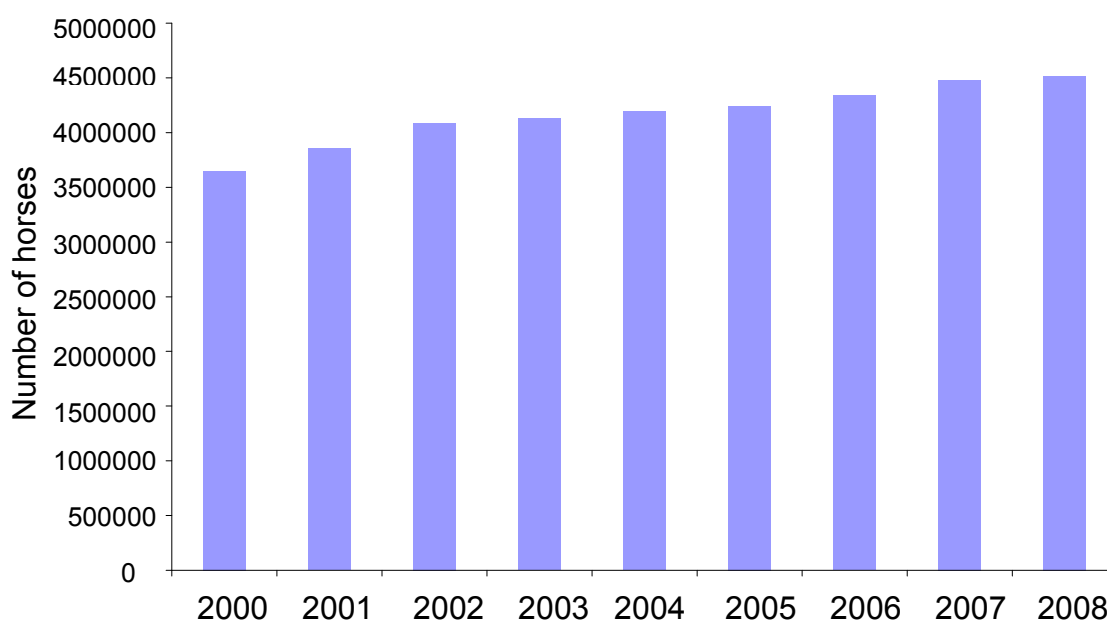


Figure 3: Horse Population in Africa (FAOSTAT, 2010)

In Asia, the population has gradually decreased from 16.6 million in 2000 to 13.8 million in 2008 (Figure 4).

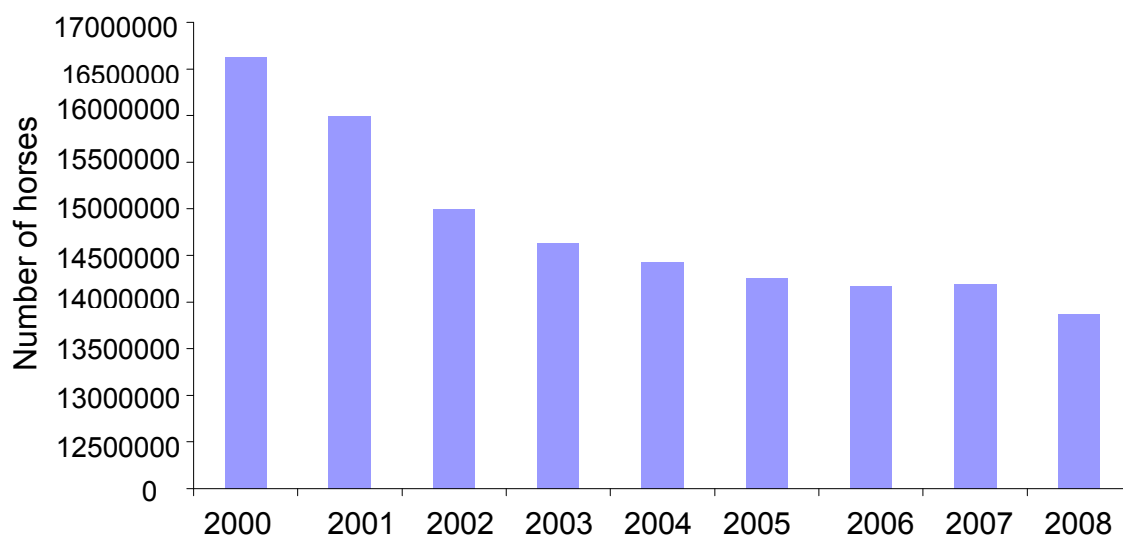


Fig 4: Horse Population in Asia (FAOSTAT, 2010)

In Europe, the horse population has decreased from 6.9 million in 2000 to 6.3 million in 2007 but increased to 6.4 million in 2008 (Figure 5).

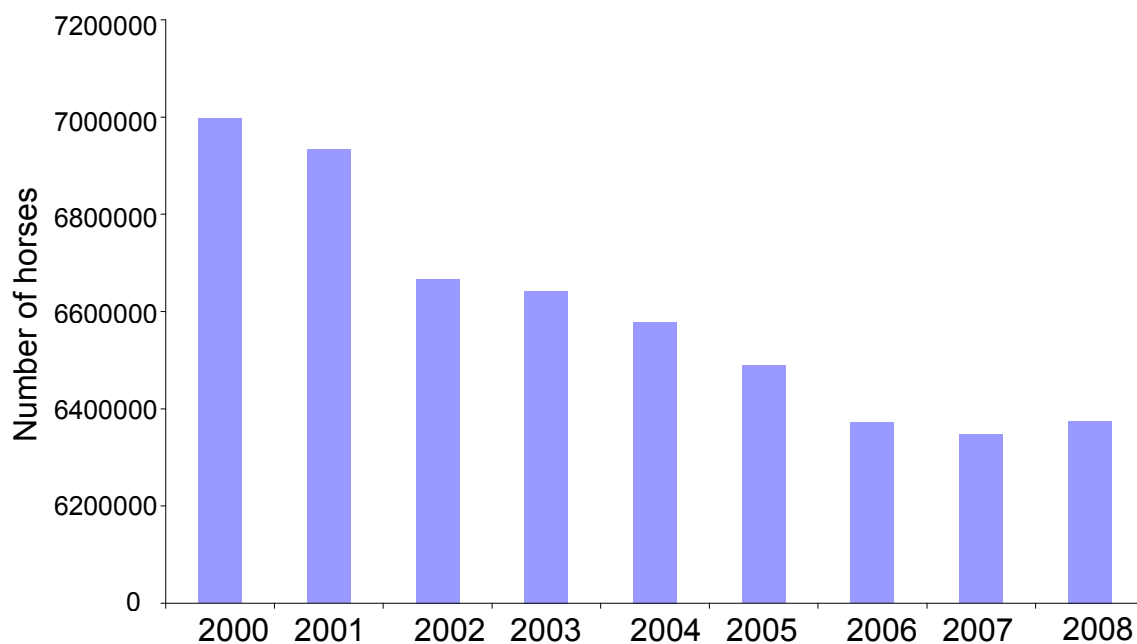


Fig 5: Horse Population of Europe (FAOSTAT, 2010)

In Latin America & Caribbean, the trend is slowly increasing from 8.4 million in 2000 to 8.7 million in 2008 (Figure 6).

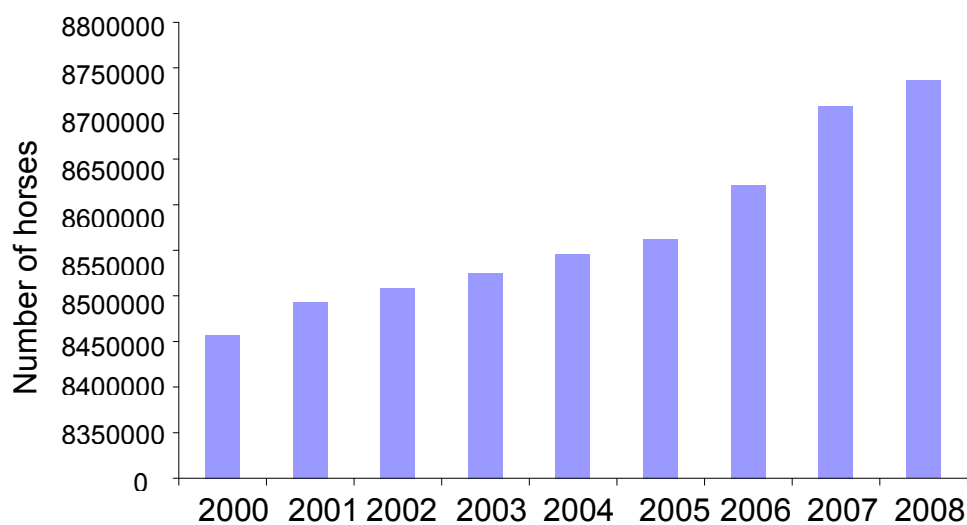


Fig 6: Horse Population of Latin America & Caribbean (FAOSTAT, 2010)

The horse population in North America has increased from 5.6 million in 2000 to 9.8 million in 2008 (Figure 7).

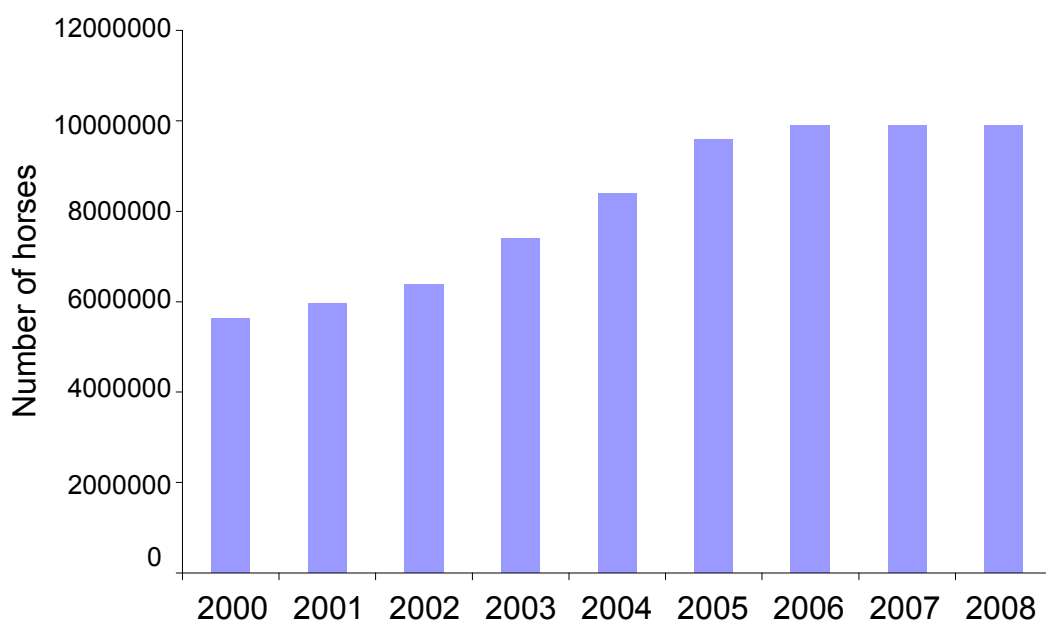


Fig 7: Horse Population of North America (FAOSTAT, 2010)

Oceania has the least number of horses with 0.36 million in 2000 but the population has increased to 0.41 in 2008 (Figure 8).

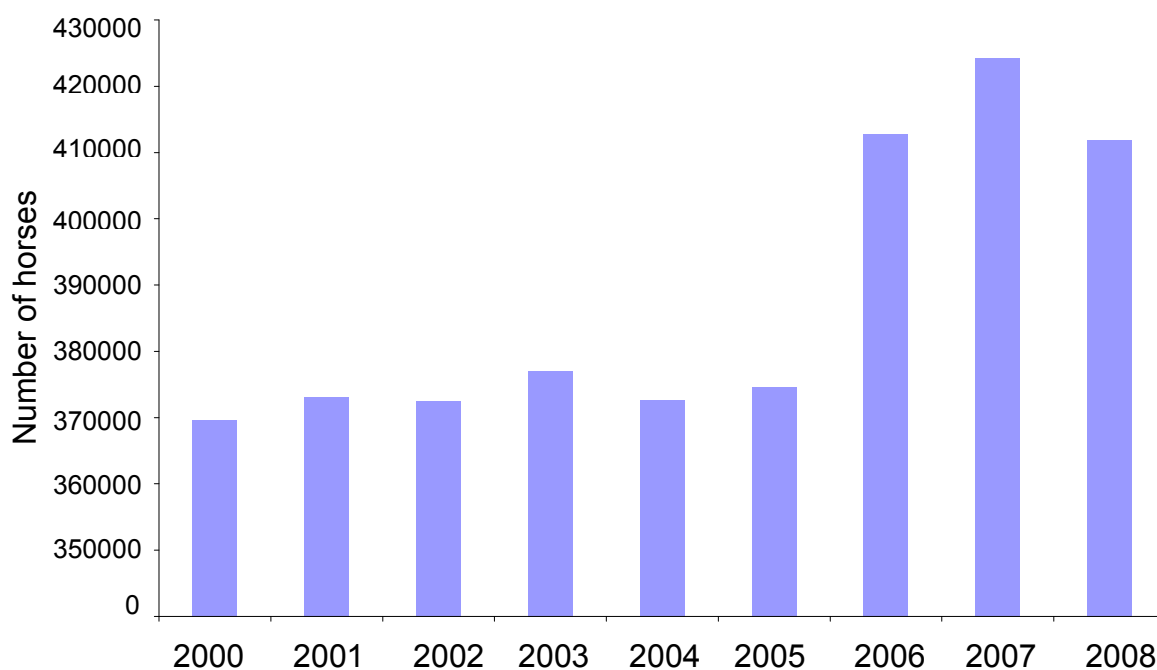


Fig 8: Horse population in Oceania (FAOSTAT, 2010)

South America has the highest number of horses. The trend fluctuated from 15.3 million in 2000 to 15 million in 2008 (Figure 9).

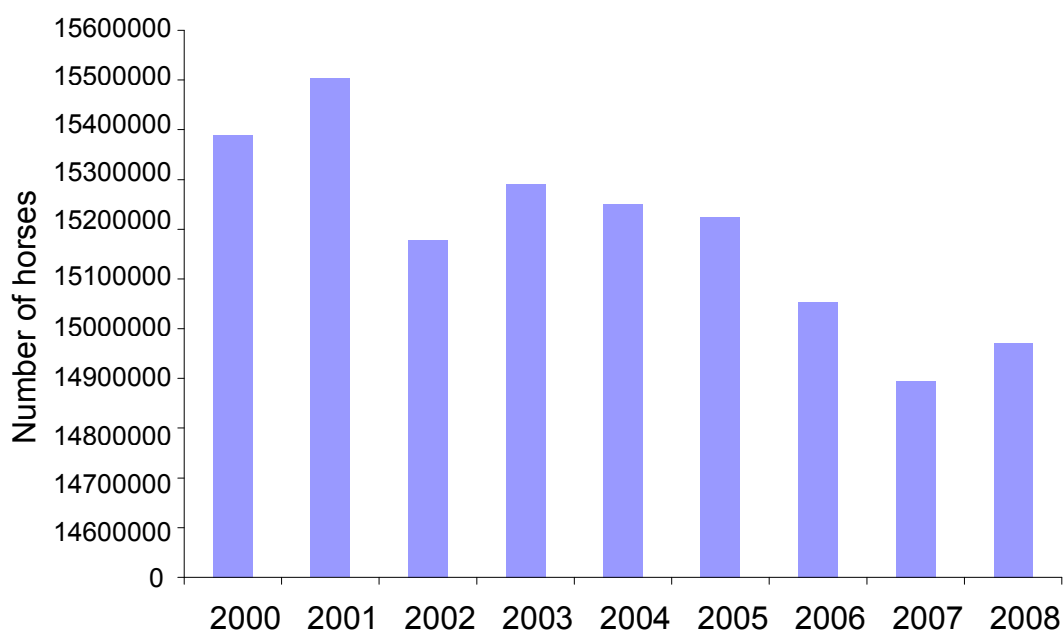


Fig 9: Horse population in South America (FAOSTAT, 2010)

Table 7 : Number of horses per continent from 2000 to 2008

Continents	2000	2001	2002	2003	2004	2005	2006	2007	2008
Africa	3647853	3852104	4085271	4129953	4190489	4240612	4336388	4480177	4519216
Asia	16629500	15986920	15001551	14635979	14424171	14256852	14169783	14191428	13870140
Europe	6997448	6933720	6667045	6642281	6578171	6489242	6371427	6347509	6374740
Latin America & Caribbean	8456949	8493614	8508420	8525068	8545916	8562285	8621220	8708120	8736320
North America	5626038	5971031	6386048	7386062	8386060	9586060	9886060	9886050	9886150
Oceania	369589	373099	372460	377011	372680	374657	412793	424321	411956
South America	15389515	15503238	15177920	15290113	15249911	15225273	15053992	14894674	14971649
World	57116892	57113726	56198715	56986467	57747398	58734981	58851663	58932279	58770171

Source: FAOSTAT, 2010 (Last cited on 20 May, 2010)

4. 2. Horses per 1000 persons in the world

The number of horse per 1000 persons is compared for 2000, 2005 and 2008 among the continents. The figures for 2000, 2005 and 2008 are 9.4, 9.1 and 8.7 horses per 1000 persons respectively in the world. The trend shows a continuous decrease in the number of horses per person in the world. Latin America and Caribbean have the highest number of horses per persons, i.e. 45.7 horses per 1000 persons. Asia has the least number with 3.4 horses per 1000 persons. In North America, there is a sharp increase from 17.7 in 2000 to 28.7 in 2005 and remained constant for 2008. In Africa, there was a slight increase from 4.5 in 2000 to 4.6 in 2005 but the trend remained constant for 2008. In Europe there was a decrease from 9.6 in 2000 to 8.9 in 2005 and to 8.7 in 2008. In Latin America and Caribbean, there was also a decrease from 48.7 in 2000 to 46.4 in 2005 and to 45.7 in 2008. In South America, there was a similiar trend, with figures is decreasing from 44.3 in 2000 to 41.0 in 2005 and to 38.9 in 2008. In Asia the figures dropped from 4.5 in 2000 to 3.7 in 2005 and to 3.4 in 2008. In Oceania the figures decreased from 11.9 in 2000 to 11.1 in 2005 but increased to 11.8 in 2008. The respective figures are shown in Figure 10 & presented in Table 8.

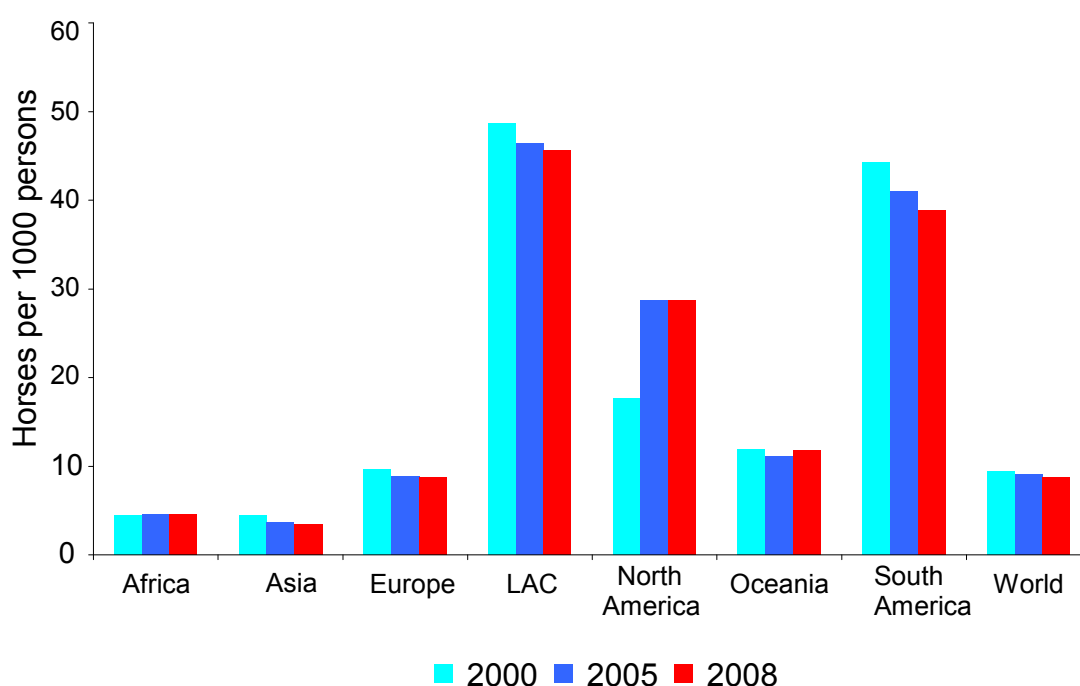


Figure 10: Horses per 1000 persons in the world (FAOSTAT & UNPD, 2010)

Table 8: Horses per 1000 persons in 2000, 2005 & 2008

Continents	Horses per Continent			Human Population (in 1000)			Horses per 1000 persons		
	2000	2005	2008	2000	2005	2008	2000	2005	2008
Africa	3647853	4240612	4519216	819463	921073	987091	4.5	4.6	4.6
Asia	16629500	14256852	13870140	3698295	3936535	4075309	4.5	3.7	3.4
Europe	6997448	6489242	6374740	726567	729420	731568	9.6	8.9	8.7
Latin America & Caribbean	8456949	8562285	8736320	173821	184854	191209	48.7	46.4	45.7
North America	5626038	9586060	9886150	318 654	335175	345053	17.7	28.7	28.7
Oceania	369589	374657	411956	31160	33559	34937	11.9	11.1	11.8
South America	15389515	15225273	14971649	347407	371658	384892	44.3	41	38.9
World	57116892	58734981	58770171	6115367	6512274	6750059	9.4	9.1	8.7

Source: FAOSTAT & UNPD, 2010 (Cited on 28 May, 2010)

4.3. Horse breeds in the world

There are 784 breeds of horses in the world as of data cited from FAO database: DAD-IS latest on 12 June, 2010. Out of 784 breeds, 655 were local breeds, 62 regional transboundary breeds and 67 international transboundary breeds. The proportion of local, regional and international transboundary horse breeds is presented in Figures 11 and 12. In the world, 83.5 % were local breeds, 8 % were regional transboundary breeds and 8.5 % were international transboundary breeds. In all regions of the globe, the local breeds were far higher in number while regional and international transboundary breeds were similarly quite small in numbers. In all aspects, Europe by far outweighs the other regions as regards the total number of horse breeds and the number of local and transboundary breeds. Nevertheless, the number of local horse breeds in Asia was also remarkable. Interestingly, Latin America & Caribbean, had the highest number of horses in the world but also had the least number of breeds. Regional transboundary horse breeds were relatively numerous in Europe and Asia compared to other continents. Europe and Oceania had a significant number of international transboundary horse breeds.

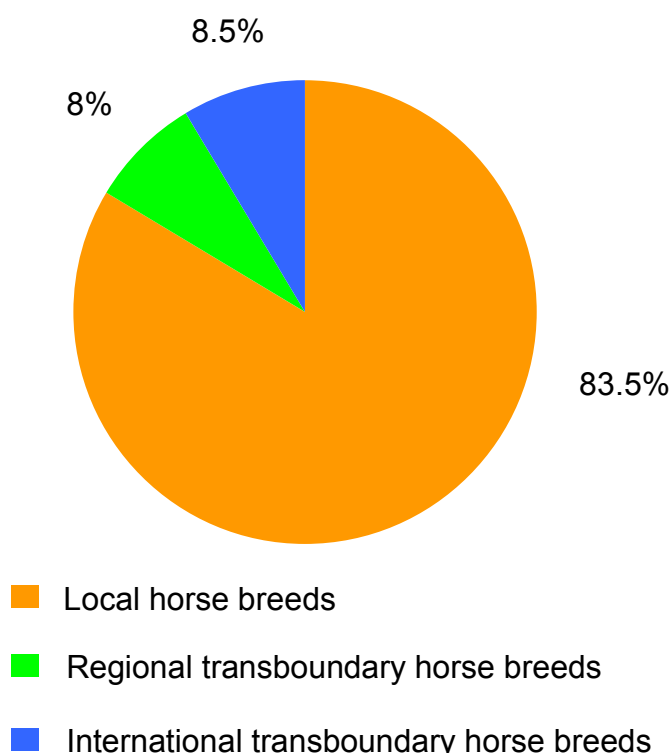
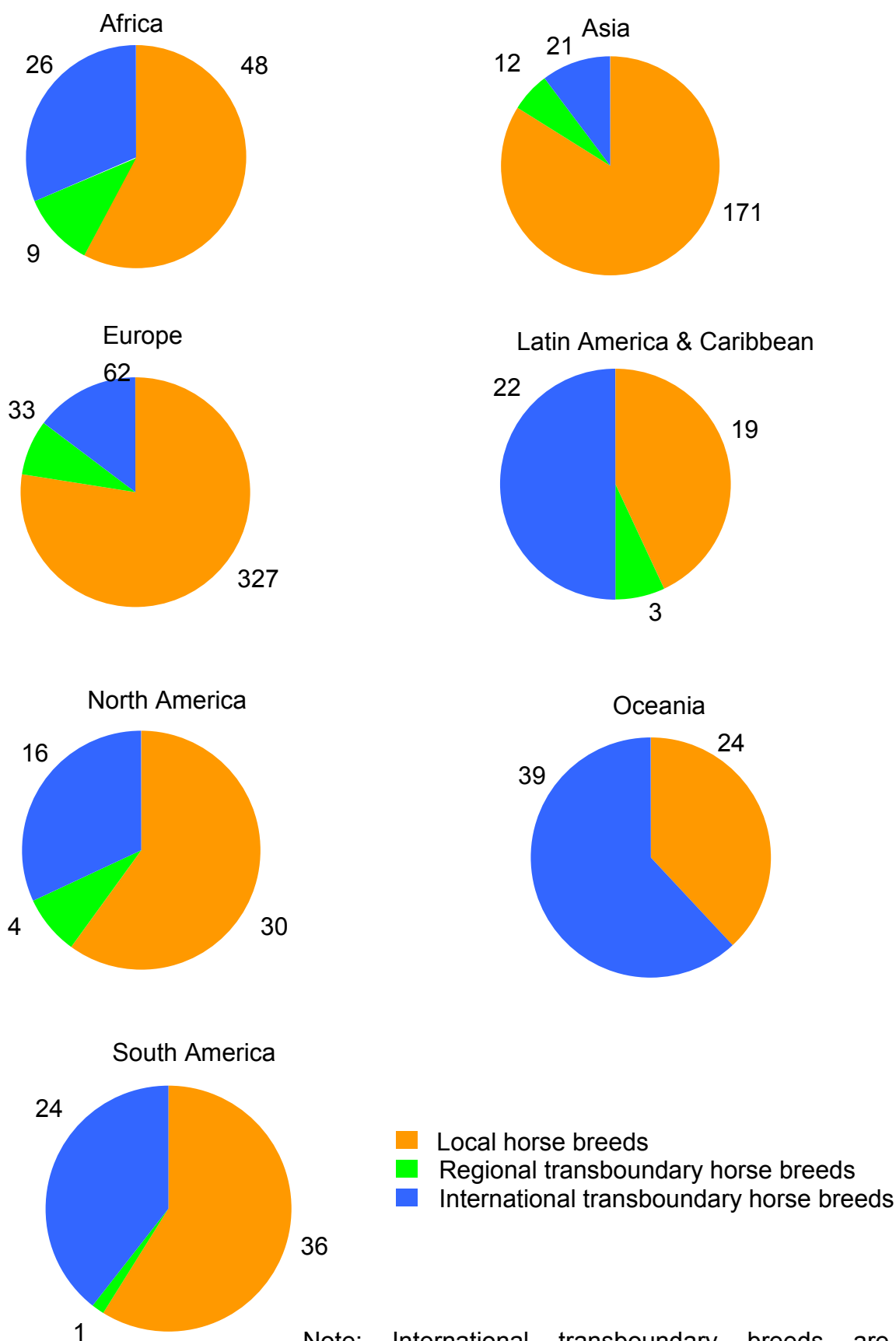


Figure 11: Local and transboundary horse breeds in the world (DAD-IS, 2010)

Figure 12: Local & transboundary horse breeds per continents (DAD-IS, 2010)



Note: International transboundary breeds are counted more than once in each region as they occur in at least two countries

The global status of local, regional and international transboundary horse breeds is presented in Table 9. The international transboundary breeds were accounted for more than once in each region where they occurred. For example the Arab horse is distributed throughout all continents so this breed was counted in all seven continents. Europe reported the most number of horse breeds in the world, followed by Asia. Europe makes up more than half of all horse breeds with 327 local, 33 regional and 62 reported international transboundary horse breeds. In Asia there were 171 local breeds, 12 regional and 20 international transboundary horse breeds. Africa reported 48 local breeds and 9 regional transboundary breeds with a significant number of 26 international transboundary horse breeds. Following closely was South America with 36 local breeds, 1 regional and 24 international transboundary horse breeds. North America reported 30 local breeds, 4 regional and 16 international transboundary horse breeds. Oceania reported 24 local breeds and no regional transboundary horse breeds but a significant number of 39 international transboundary horse breeds. Latin America and Caribbean reported 19 local, 3 regional and 22 international transboundary horse breeds.

Table 9: Number of horse breeds in the world in 2008

Continents	Local	Regional Transboundary	International Transboundary [†]
Africa	48	9	26
Asia	171	12	20
Europe	327	33	62
Latin America & Caribbean	19	3	22
North America	30	4	16
Oceania	24	0	39
South America	36	1	24
World	655	62	67

Source: DAD-IS, 2010; cited on 12 June, 2010

[†] International transboundary breeds were counted more than once in each region as they occurred in at least two countries

4.4. Type of horse breeds in the world

The results of this study (Figure 13) shows that the Arab horses occupy 6 % of the total horse breeds. Warmblood or riding or light horses share 18 % while Coldblood or draft horses contribute 22 % of the total horse breeds. Ponies represented 20 % of reported horse breeds. Trotters and Thoroughbred or racing horses contribute 3 % each to the total horse breeds. The majority of the reported horse breeds, i.e. 28 %, are unknown breeds.

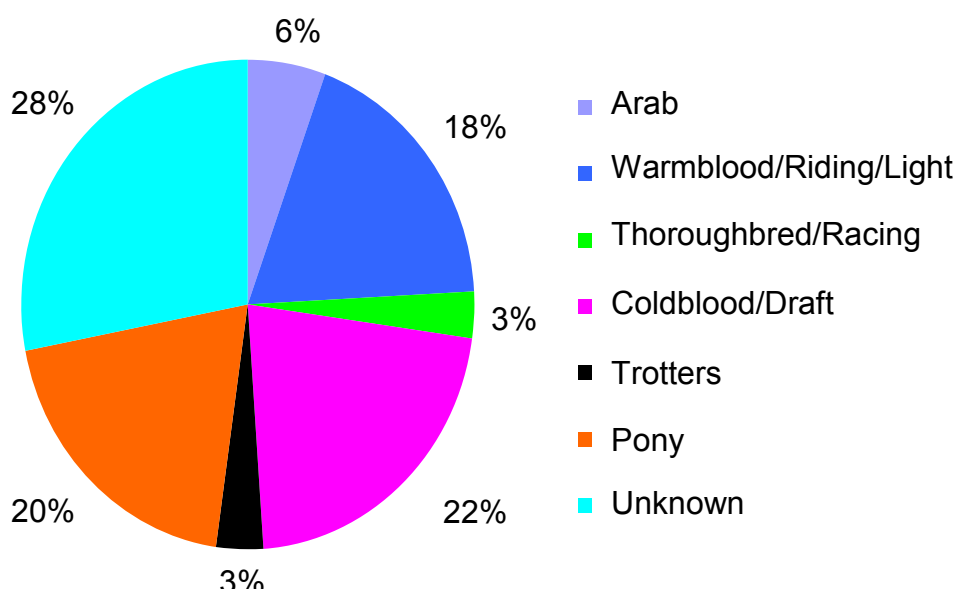


Figure 13: Type of horse breeds in the world

Source: DAD-IS, 2008 and Breeds of Livestock, 1995

The Arab horse: A versatile horse breed widely distributed throughout the globe. 59 countries in the world have reported this breed (Table 10). They are being widely used in different disciplines of equestrian sport.

Thoroughbred: A light horse widely distributed throughout the globe. 45 countries have reported this breed. They are very popular for horse racing.

Quarter horse: 28 countries have reported this breed. It is the most popular breed in the US and widely used for racing.

Icelandic horse: A local indigenous breed of Nordic origin distributed in 9 countries of the world. A large population of this breed exists in Europe and North America. It is a five gaited horse used for riding sport.

Belgian draft: It is a draft horse breed originating from Belgium and is reported by 12 countries in the world. It is mainly used for draught power.

Fjord horse: A small draft horse breed from Scandinavia reported from 11 countries in the world. It is mainly used as a farm horse, and in sport.

Lippizaner: A breed originating in Central Europe and distributed around the world. This breed was reported in 18 countries, mostly in Europe. It is very popular as a dressage horse.

Lusitano: A light horse breeds reported from 11 countries in the world. It is mainly used in sport.

Haflinger: A small draft horse originating from Austria and distributed in 19 countries of the world. It is mainly used for draft work and nowadays in sport.

Percheron: A draft horse breed distributed in 15 countries throughout the world. It is mainly used for draft work, meat and in sport.

Ponies: Different breeds of ponies are distributed throughout the globe. Some of the interesting pony breeds are:

- **Shetland pony:** It is one of the oldest, smallest and most popular pony breed distributed in 17 countries throughout the world. They are used especially for children for riding and driving and as a pleasure or hobby ponies .
- **Welsh pony:** 14 countries have reported this breed. They are mainly used for sport and riding.

Warmblood horses: A light horses primarily originated from Europe. Some of the interesting warmblood horses are:

- **Hanoverian:** A noble warmblood horse breed originating from Germany and distributed in 12 countries in the world. It is mainly used for dressage, show jumping, eventing and leisure riding.
- **Oldenburg:** A warmblood horse breed reported from 5 countries in the world and is mainly used for dressage and show jumping.
- **Holstein:** One of the oldest warmblood horse breeds reported from 4 countries in the world and is mainly used for dressage and show jumping.
- **Belgian, Danish, Dutch and Swedish WB:** Each of them are reported from 3 different countries and are mainly used for dressage, show jumping and eventing.

Table 10 : Most common breeds by continents

Europe		North America	
Horse breeds	CR	Horse breeds	CR
Arab	25	American Saddle Horse	2
Thoroughbred	16	American Trotter	2
Hafflinger	13	Appaloosa	2
Welsh Pony	11	Quarter Horse	2
Lipizzaner	10	Kanata Pony	2
Shetland Pony	9	Morgan	2
Latin America and Caribbean		South America	
Horse breeds	CR	Horse breeds	CR
Quarter Horse	7	Thoroughbred	8
Arab	6	Quarter Horse	7
Criollo	6	Arab	6
Andalusian	6	Percheron	5
Thoroughbred	5	Appaloosa	4
Asia		Africa	
Horse breeds	CR	Horse breeds	CR
Arab	11	Arab	8
Thoroughbred	8	Thoroughbred	7
Akhal-Teke	3	Arab-Barb	6
Adaev	3	Barb	6
Bhotia Pony	3	Dongola	3
Oceania			
Horse breeds	CR		
Arab	2		
Caspian	2		

Source: DAD-IS, 2008

CR: Countries Reporting

4.5. Risk status of horse breeds in the world

Breeds classified as being “at risk” include critical, critical-maintained, endangered or endangered-maintained. A recent proportion of risk status of horse breeds in the world is shown in Figure 14. A total of 177 horse breeds, i.e. 22.6 %, are at risk status in the world. Among breeds at risk, 6.6 %, 1.4 %, 11.4 % and 3.2 % of horse breeds are in critical, critical-maintained, endangered and endangered-maintained state respectively. At present more than every 1/5th horse breed is at risk. A total of 90 horse breeds are extinct from the world which is equivalent to 11.5 %. Extinct breeds are not listed at risk because there are no breeding males or females left. The total number of horse breeds that are not at risk is 31.8 %. A large number of horse breeds, i.e. 268 breeds, equivalent to 34.1 % of total number of horse breeds, have an unknown status. This is because of lack data or unavailability of population figures.

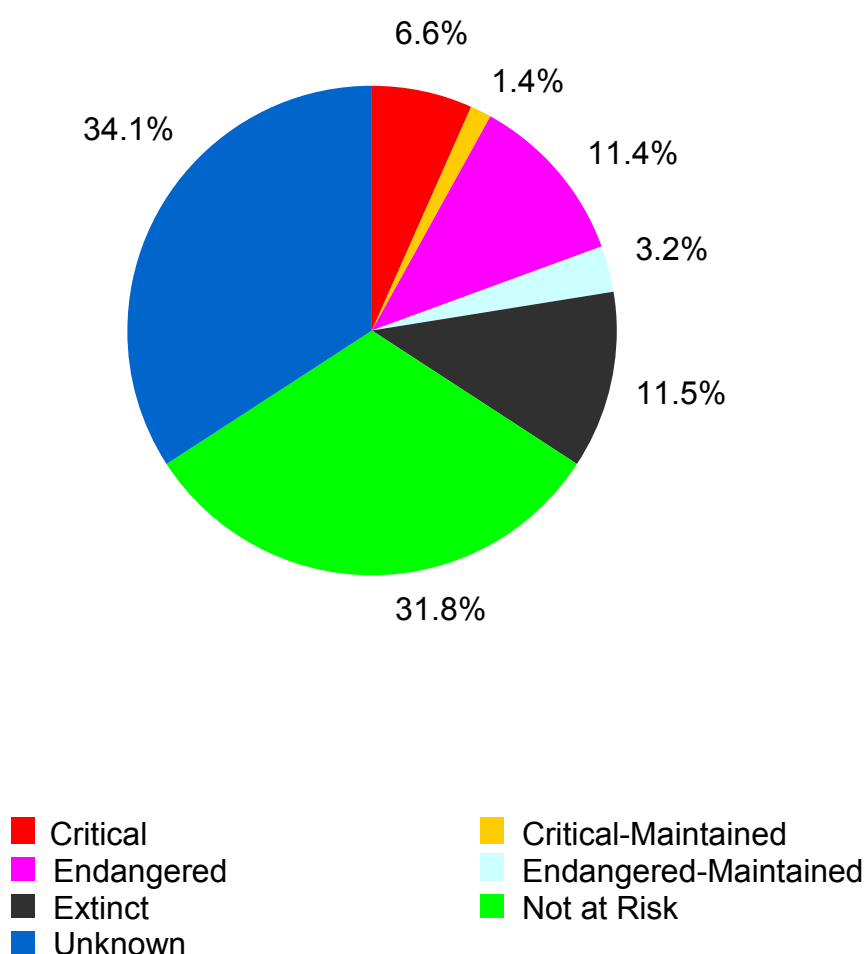
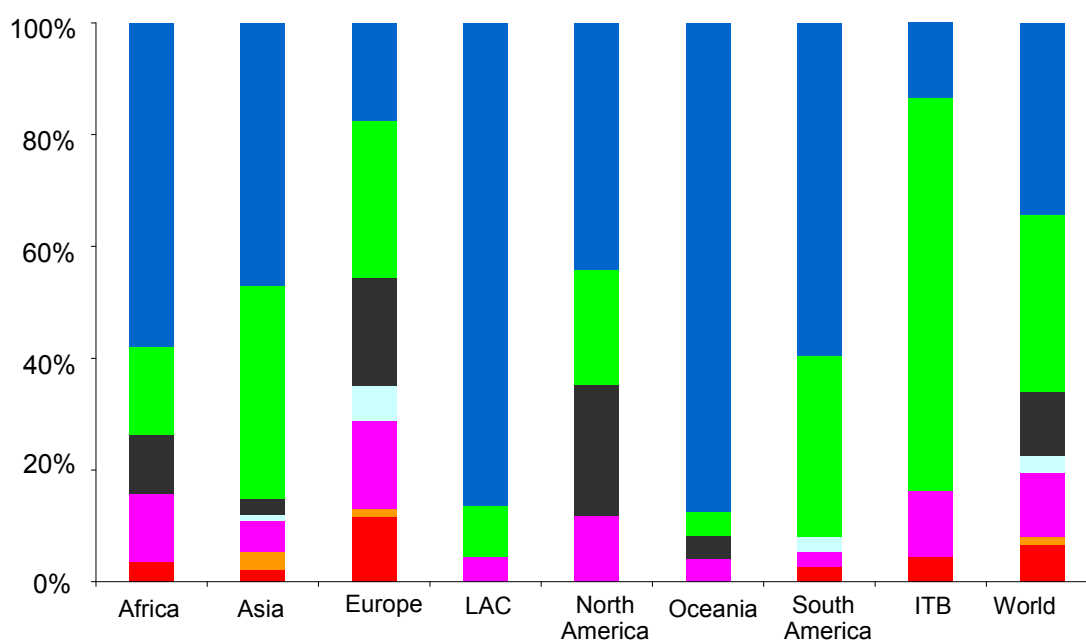


Figure 14: Proportion of risk status of horse breeds in the world (DAD-IS, 2010)



Critical	2	4	42	0	0	0	1	3	52
Critical-Maintained	0	6	5	0	0	0	0	0	11
Endangered	7	10	57	1	4	1	1	8	89
Endangered-Maintained	0	2	22	0	0	0	1	0	25
Extinct	6	5	70	0	8	1	0	0	90
Not at Risk	9	70	101	2	7	1	12	47	249
Unknown	33	86	63	19	15	21	22	9	268
Total	57	183	360	22	34	24	37	67	784

Figure 15 : Distribution of risk status of horse breeds in the world

Source: DAD-IS, 2010; cited on 15 June, 2010

Europe has the highest proportion of extinct and “at risk” horse breeds. Europe also has a higher number of critical and endangered horse breeds than other regions. Only Asia and Europe have critical-maintained horse breeds. Only Asia, Europe and South America have endangered-maintained horse breeds. Latin America and Caribbean, North America and Oceania do not have critical horse breeds. Asia reported the highest percentage of horse breeds not at risk. Oceania has the highest proportion of horse breeds classified as having an unknown risk status. Europe reported a low proportion of horse breeds classified as being of unknown status.

4.6. Risk status of some transboundary breeds:

The risk status of different transboundary horse breeds varies depending on the countries where they are present and reported.

The Arab horse: The Arab is a critical breed in Finland, Romania, Serbia and Slovenia; an endangered breed in Egypt, Iran, Ireland, Japan, Slovakia, Syria and Tunisia; an endangered-maintained breed in Austria and Poland and not at risk in Albaina, France, Germany, Iraq, Netherlands, Russia, Sweden, Turkey and UK. The other remaining reported countries listed them having an unknown status.

Thoroughbred: The Thoroughbred is a critical breed in Finland and Italy; an endangered breed in Greece, Kyrgyzstan, Netherlands, Serbia, Slovakia, Slovenia and Tunisia; an endangered-maintained breed in Indonesia and Poland and a not at risk breed in Cyprus, Denmark, France, Ireland, Japan, Russia and Sweden. The other remaining reported countries listed them having an unknown status.

Quarter horse: The Quarter horse is an endangered breed in South Africa and Sweden and a not at risk breed in Brazil, Canada, UK and USA. The rest of the remaining reported countries listed them having an unknown status.

Belgian draft: The Belgian draft is an endangered breed in Denmark and France; an endangered-maintained breed in Luxembourg and not at risk breed in Belgium. The remaining reported countries listed them having an unknown status.

Shetland pony: The Shetland pony is an endangered breed in Czech Republic, Finland, France and USA and a not at risk breed in Denmark, Germany, Netherlands, Sweden and UK. The remaining reported countries listed them having an unknown status.

Lippizaner: The Lippizaner is a critical breed in Belgium, Czech Republic, France, Germany and UK; a critical-maintained breed in Austria; an endangered breed in Italy, Romania, Slovakia and Sweden and an endangered-maintained breed in Croatia, Hungary and Slovenia. The other reported countries listed them having an unknown status.

Icelandic horse: The Icelandic horse is a critical breed in Finland; an endangered breed in France and Slovenia; a not at risk breed in Iceland and Sweden and of unknown status in Australia, Belgium and UK.

Warmblood horses: The risk status of most of the European warmblood horses are either not at risk or unknown. Exceptions are Hanoverian, a critical breed in Ukraine and Oldenburg, an endangered breed in Denmark.

5. Discussion

Horses are globally distributed in all seven continents. Interests in horses and the horse industry is increasing day by day. For the past ten years the development of the horse industry seems to have been oriented towards diversification rather than growth (EU Equus, 2009). The concerns regarding the need of reliable data of horses in the world have to be addressed. The information or knowledge about the horse population, the breeds and their distribution is fundamental for epidemiological, economical, genetic and risk status studies (EU Equus, 2001). As compared to other livestock mammalian species, horses are less numerous because they are not considered as only food producing animals like cattle, which produce either milk or meat, so there is a great interest to keep cattle, thus their population is very large. No doubt horse power has a great role in agriculture and forestry. Working animals provide more than 50 % of the world's agricultural power needs while internal combustion engines supply less than 30 %. The remaining percentage provided by human power (Wilson, 2003).

Before the urbanisation and economic development of internal combustion power, working animals were the power providers in the developing countries (Swann, 2006). In developing countries they are still the good means of transportation. Pearson (1999) estimated that 51 % of the 921 million cattle, 35 % of 135 million buffalo, 65 % of 43 million horses, 87 % of 43 million donkeys, 70 % of 14 million mules and 15 % of 19 million camels were used for work in the developing world in 1994. They are also used as a source of meat also. The total production of horse meat in the world for 2008 was 752.9 tonnes (FAO, 2010). The total consumption of horse meat in the EU amounted to 168 tonnes in 1998 (EU Equus, 2001). The popularity of horses

nowadays is because they are being widely developed as sport companion or recreation animals. Equestrian sport has been included in the Olympics since 1912 in disciplines such as jumping, dressage and eventing disciplines (FEI, <http://www.horsesport.org/>). Equestrian sports are very common in Europe and North America. Besides these, equine trade and breeding also plays a significant role in the equine industry.

The contribution of the number of horses to the total number of livestock mammalian species in the world is only 1.2 %, whereas cattle with 29.5 % have the largest contribution followed by sheep with 23.7 %, pig with 20.7 % and goat with 19 % (FAO, 2010). The trend of the global horse population is steadily increased from 2000 to 2008 except for the figure in 2002. There are no studies being conducted to determine the reason for the decline of the global horse population in 2002. This increase in number of horses or increased interest in the horse sector is due to development of new equestrian uses and sports.

In Asia, the number of horses has decreased from 16.6 million in 2000 to 13.8 million in 2008 due to mechanisation and selective breeding for elite sport horses (Alderson L, 2010; Personal Contact in FAO, Rome). Horses are mainly used for draught purposes in Asia. This is one of the reasons that Asia has the large number of horses. In Europe, the number of horses for 2008 was 6.3 million which is far lower than the figure of 2000 which is 6.9 million. The Animal Health and Animal Welfare section of Directorate – General for Health and Consumers of European Commission (2010) reported there are probably not more than 6 million equine animals in Europe. This data provided by European Commission is a bit surprising to the results of this study which show that there are 6.3 million horses in Europe. The reason is that European Commission only maintains the records for European Union member countries rather than the whole of Europe. The number of horses in the European Union in 2000 was 4.3 million (EU Equus, 2001) and in 2009 was 5.8 million (EU Equus, 2009). This study reflects that there are 6.9 million horses in the whole of Europe.

The population trend for Africa, North America, Oceania and Latin America and Caribbean is increasing. Especially the United States contributes with a highest number of horses in the world, i.e. 9.5 million of horses in North America (FAO, 2008). This is strikingly similar to the data of the American Horse Council's own study which reported the number of horses in the US to be 9.2 million (AHC, 2008). The figure for South America shows a decline in population trend.

The number of horses per 1000 persons in the world is 8.7 for 2008. This trend is also decreasing when comparing the data of 2000 and 2005, which is 9.4 and 9.1 respectively. There is a negative correlation between the number of horses per person decrease and the total number of people in the world, i.e. as the global human population increases. The horse population is increasing steadily from 57.1 million in 2000 to 58.8 million in 2008, but the human population is swiftly increasing from 6.1 billion in 2000 to 6.7 billion in 2008. The number of horses per person is slightly increasing for Africa as the horse population is also increasing and the human population are simultaneously increasing. In Asia, the horse population is decreasing and the human population is increasing so the figure for horses per 1000 persons is decreasing. The number of horses per 1000 persons in Europe is also declining. The reason behind this is that as the horse population is decreasing and human population is increasing. But EU Equus (2001 & 2009) reported 11.7 and 16.6 horses per 1000 persons in the EU countries.

The number of horses per 1000 persons for Latin America & Caribbean and South America are quite high as compared to other continents because these continents have a large number of working horses. In both of these continents the number of horses per 1000 persons is also decreasing as the human population is increasing rapidly despite an increase in the number of horses in Latin America and Caribbean and a decrease in South America. North America has a promising increasing figure because the number of horses is significantly increasing along with a parallel increase in the human population while Oceania has a fluctuating figure.

The breed concept may be interpreted in different ways. According to Bowling and Ruvinsky (2000), breeds are the basic components of animal genetic resources in livestock species. They differ from one another because every breed has a different array of genetic combinations which is distinct and constantly repeatable throughout the breed population. According to Groeneveld et al. (2010), breeds are the unit of conservation which leaves the floor for subjective perceptions of their uniqueness. A breed covers groups of animals having similar characteristics that depend on geographical area and origin and is a cultural rather than a biological or technical entity according to Eding (2008). Most of the world's domestic animal breeds are found in developing countries and breeds in such countries have been less thoroughly characterized (Mason and Crawford, 1993). Additionally, opportunities and challenges for animal genetic resources in developing countries have been correspondingly neglected (Notter, 1999).

The different breeds of horses are distributed throughout the world. More than four-fifths of the horse breeds are local breeds, while regional and international transboundary horse breeds are quite similar. The density of horse breeds is quite different from that of other livestock animals. Horse breeds accounted for 10.3 % of the total livestock breeds in the world (FAO, 2007). From the results of this study, 784 breeds of horses are reported in the world. Among 784 breeds, 655 (83.5 %) are local breeds, 62 (8 %) are regional transboundary breeds and 67 (8.5 %) are international transboundary breeds. FAO (2007) reported 786 horse breeds, which is quite close to the results of this study. Out of 786 horse breeds reported by FAO, 570 (72.5 %) breeds are local, which does not account for 87 (11 %) of extinct breeds, 63 (8 %) of regional transboundary breeds and 66 (8.4 %) of international transboundary breeds. Breed diversity differs markedly being Europe has the highest and Latin America and Caribbean have the lowest number of horse breeds in the world.

Europe reported half of all the world's local horse breeds which are far more numerous than in other continents. A similar pattern was observed for regional and international transboundary horse breeds in Europe. Europe has the highest number of international transboundary horse breeds in the world.

The large number of horse breeds in Europe is the reflection of the more advanced state of breed recording and characterization (FAO, 2007). Most European breeds are well defined, distinct and for a large part genetically isolated (Hoffmann, 2010). The other reason could be that Europe is updating and reporting the facts about horse breed data at regular intervals as compared to other continents. Hall and Raune (1993) stated that 38 % of the world's livestock animal breeds are reported from Europe. The Genetics of Horses (2000) mentioned that 40 % of world's horse breeds are from Europe.

Asia reported 26 % of world's local horse breeds and the number of regional and international transboundary horse breeds was also promising. Africa reported 7 % and 14.5 % of local and regional transboundary horse breeds respectively. Asia and Africa contribute 28 % and 11 % of world horse breeds respectively (The Genetics of Horses 2000). Hall and Raune (1993) reported that 27 % and 13 % of the world's livestock animal breeds are from Asia and Africa respectively. Due to lack of technical and human resources for breed recording and characterization, the proportion of horse breeds is less in Asia and Africa.

North America reported only 4.5 % and 6.5 % of the total local and regional transboundary horse breeds. However, the figures for international transboundary horse breeds was significant. The Genetics of Horses (2000) stated that 11 % of world's horse breeds are from North America while Hall and Raune (1993) mentioned that 6 % of the world's livestock animal breeds are reported from North and Central America together.

South America contributes 5.5 % of the total local horse breeds in the world. Hall and Raune (1993) stated that 4 % of world's livestock breeds are from South America. Latin America and Caribbean, despite having high number of horse populations and horses per 1000 persons, has only reported 3 % of the total local horse breeds in the world. The Genetics of Horses (2000) reported that 6 % of world's horse breeds are from Latin America and Caribbean. Oceania reported 3.7 % of the total local horse breeds in the world as the Genetics of Horses (2000) mentioned that 4 % of world's horse breeds are

from Pacific Islands. Similarly, Hall and Raune (1993) stated that Oceania contributes 2 % of world's livestock breeds.

Most of the countries have reported the Arab horse and Thoroughbred as they comprise 6 % and 3 % respectively of the total number of horse breeds in the world. Both of them are distributed in all regions of the globe and the blood of the Arab horse flows in all breeds of light horses (Breeds of Livestock, 1995). The Arab horses are believed to be one of the oldest and the most influential horse breeds in the world (Glazewska, 2010 and Cacic et.al., 2007). Warmblood horses cover 18 % of the total number of horse breeds. They primarily originated in Europe and are widely distributed in the world. Warmblood horses for the Olympics sports of dressage, show jumping and eventing are used all over the world (Koenen et.al, 2004). Coldblood or draft horses contributes 22 % to the total number of horse breeds. They are still used for agriculture and forestry work in developing countries and some developed ones too but their population is decreasing day by day because of mechanisation of transportation and agriculture (Alderson, 2010 and Parker, 2003). Ponies occupy 20 % of the total horse breeds in the world and are distributed all over the globe. Trotters are mostly found in the Europe and America because of their high use in the harness or trotting races. The majority, i.e. 28 %, of the total horse breeds are still unknown or unidentified in the world. It could be because of lack of information or not reporting the number or lack of technical or human manpower.

Livestock breeds are recognized as genetic resources in the World Conservation Strategy (IUCN, 1980). As a consequence of change in production systems, husbandry management, and demand of market, significant genetic erosion may occur leading to dramatic losses of genetic variation. Considering the fact that horses became increasingly used for sport or recreational purposes, many breeds that had specific draught or work purposes have become at risk or extinct. The risk status of 36 % of the total livestock breeds is unknown (Hoffmann, 2010). There are 20 % of the total reported livestock breeds being classified as at risk and 23 % of as at risk. A total of 9 % of totally reported livestock breeds in the world are extinct. Already, 30 % of cattle breed and 12.7 % of horse breeds are extinct from the

world (FAO, 2007). Conserving breeds is comparable to the conservation and maintenance of cultural-historical aspects, buildings and environments (Maijala et al, 1984).

The results of this study show that 177 horse breeds are at risk. This figure is close to the data of FAO (2007) which stated that 181 horse breeds are at risk. Within the breeds at risk, 52, 11, 89 and 25 horse breeds are in critical, critical-maintained, endangered and endangered-maintained state respectively. FAO (2007) reported 52, 10, 95 and 24 horse breeds are in critical, critical-maintained, endangered and endangered-maintained state respectively. A total of 90 (11.5 %) horse breeds are extinct from the world which is close to the FAO data, i.e. 87 (11 %). Hall and Raune (1993) reported 17 % of horse breeds, as being extinct from the world. There are 249 and 268 horse breeds being reported not at risk and of unknown status respectively. Unfortunately, a large number of horses have an unknown status, especially from the developing countries, because of lack of data or unavailability of correct population sizes. Apparently, there exists a large number of unrecorded horse breeds which are at risk.

Europe reported the highest number of breed at risk. The number of extinct breeds is also very high in Europe probably due to rapid and centralized agricultural development (Hall and Raune, 1993). 101 horse breeds are not at risk but relatively very few i.e. 63 breeds are of unknown status. The relative low number of unknown status of horse breeds reflects the seriousness in establishing the risk status of breeds to assess the conservation program in time. Europe is updating the data of risk status of breeds at regular intervals (Personal contact, Beate Scherf, 2010) which could be a good reason that the figure from Europe contains more stable numbers. Europe has the highest number of breeds and has a highly specialized equine industry and excellent research centres for equine studies.

Asia reported 12 %, 2.7 %, 38.3 and 47 % horse breeds are at risk, extinct, not at risk and unknown respectively. Significant number of horse breeds are not at risk. The majority of horses reported are of unknown status which means either no characterization program is implemented or no tracking

system is available. The number of not at risk breeds for Africa is similar to that of Asia but there is a high number of extinct breeds. Significantly low proportion of breeds are not at risk. More than half of the horse breeds from Africa have been classified having an unknown status which reflects a lack of technical or human resources for assessing the risk status of breeds. A low proportion of breeds have been classified as at risk breeds and not at risk breeds for Latin America and Caribbean. There is lack of records for critical, critical-maintained, endangered-maintained and extinct horse breeds in that region. On the other hand, reporting of unknown horse breeds is very high in Latin America and Caribbean.

Oceania also has also weak records for risk status of horse breeds. Oceania reported the highest percentage of unknown status of horse breeds. The could be reason that the recording of risk status of horse breeds does not occur regularly or it is not followed up. North and South America have many horse breeds at risk. There is no record for critical, critical-maintained, endangered-maintained horse breeds from North America while South America does not have records of critical-maintained and extinct horse breeds. The status of reporting unknown horse breeds is high for South America than North America.

Overall, the impression of Europe is very good in assessing the risk status of horse breeds. The reasons could be that Europe has large and diversified horse breeds, a highly specialized equine industry, equestrian activities, research centres, and routine collection of risk status of data from the governing organizations like EAAP. EU Equus (2009) reported that FEI annually organizes about 250 international competitions in Europe. North America and Oceania, despite having large equine industries, equestrian activities and research centres, do not have strong inclination in assessing the risk status of horse breeds. On the other hand, in the rest of the continents, the condition for assessing the risk status of horse breeds is very weak. The reasons outlined are lack in number and quality of data records for many breeds, lack of technical and human manpower to judge the real situation, irregular updates of the risk status of horse breeds and no development of proper equine industry and equine activities activities.

6. Conclusion

Horses are distributed throughout the globe. The distribution of horse populations is random among the continents. The trend of population is increasing from 2000 to 2008 in the world despite a continuous decrease of the horse populations in Asia and Europe. In 2008, the world horse population was 58.7 million. South America, with 15 million horses, has the highest number of horses, while Oceania with 0.4 million horses has the least. The number of horses per 1000 persons in the world is 8.7. Latin America and Caribbean has the highest number of horses per 1000 persons, i.e. 45.7, while Asia has the least number of horses per 1000 persons, i.e. 3.4. 784 horse breeds are reported in the world. The number of local, regional and international transboundary horse breeds is 655, 62 and 67 respectively. Only Europe reported more than half the number of these breeds. Interestingly, Latin America and Caribbean, though having the highest number of horses per 1000 persons, has reported the least number of horse breeds. 28 % of reported horse breeds are of unknown breeds followed by 20 % of ponies and 22 % of coldblood or draft horses. The Arab and Thoroughbred horses are the most common and diversified breeds in the world.

There are 22.6 % and 11.5 % of horse breeds being classified as “at risk” and extinct respectively in the world. Similarly, 31.8 % of world’s horse breeds are reported as not at risk. The majority of horse breeds, i.e. 34.1 %, are of unknown status. Europe has the highest number of “at risk” and extinct horse breeds with a low proportion of horse breeds classified as being of unknown status. Asia reported the highest % of not at risk horse breeds. Oceania and Latin America & Caribbean have higher proportions of horse breeds classified as of unknown risk status. The aspects of breed recording, identification, characterization, updating the information at regular intervals, large equine industry, equestrian activities and a wide range of equine related education, training and researches are the main key factors to get large number of horse breed figures from developed countries. On the other hand, in case of developing countries, there is still lack of reporting the correct data or lack of technical and human resources, missing population data or unreliable sources that account for the low number of breeds reported.

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Appendix 1 : Global horse populations (2000 – 2008)

Continents	2000	2001	2002	2003	2004	2005	2006	2007	2008
Africa									
East Africa	1174221	1284685	1514175	1531229	1548859	1601125	1687158	1807580	1818997
Middle Africa	220154	272805	279310	285315	291315	293325	295525	297745	299985
North Africa	368670	379010	384730	394230	391590	392442	386070	390214	401037
Southern Africa	463102	447202	429158	430295	447154	422855	419638	422500	419500
Western Africa	1421706	1468402	1477898	1488884	1511571	1530865	1547997	1562138	1579697
Total	3647853	3852104	4085271	4129953	4190489	4240612	4336388	4480177	4519216
North America	5626038	5971031	6386048	7386062	8386060	9586060	9886060	9886050	9886150
Asia									
South-Central	2956487	2956487	2979600	3007501	3036536	3095390	3171482	3247019	3337661
East Asia	12161251	11509518	10541366	10168524	9962749	9763957	9612751	9534916	9110365
South-East Asia	998480	998688	1007539	1005816	987818	976783	966269	992881	1020764
West Asia	513282	471614	473046	454138	437068	420722	419281	416612	401350
Total	16629500	15986920	15001551	14635979	14424171	14256852	14169783	14191428	13870140

Europe									
East Europe	4321725	4269111	3992390	3901422	3839599	3626349	3478115	3410558	3429791
North Europe	756121	763935	765206	783210	804807	851949	879427	879603	889580
South Europe	810171	798335	791052	783573	766311	783513	770578	779302	779128
West Europe	1109431	1102339	1118397	1174076	1167454	1227431	1243307	1278046	1276241
Total	6997448	6933720	6667045	6642281	6578171	6489242	6371427	6347509	6374740
Latin America & Caribbean									
Central America	7176500	7186550	7192600	7216200	7224250	7229250	7274300	7335300	7335300
Caribbean	1280449	1307064	1315820	1308868	1321666	1333035	1346920	1372820	1401020
Total	8456949	8493614	8508420	8525068	8545916	8562285	8621220	8708120	8736320
Oceania									
Australia & NZ	293000	296500	295856	300397	296065	298042	264923	344876	332511
Melanesia	60730	60740	60740	60740	60740	60740	61750	63350	63350
Micronesia	15	15	20	20	20	20	20	30	40
Polynesia	15844	15844	15844	15844	15845	15845	15900	16065	16065
Total	369589	373099	372460	377011	372680	374657	412793	424321	411956
South America	15389515	15503238	15177920	15290113	15249911	15225273	15053992	14894674	14971649
World	57116892	57113726	56198715	56986467	57747398	58734981	58851663	58932279	58770171

Source: FAOSTAT, 2010 (Cited on May, 2010)

Appendix 2: Global horses per 1000 persons 2000, 2005 and 2008

Continents	Horse/Continent			Human Population (in 1000)			Horses/1000 persons		
	2000	2005	2008	2000	2005	2008	2000	2005	2008
Africa									
East Africa	1174221	1601125	1818997	252 710	287 413	310 570	4.6	5.6	5.9
Middle Africa	220154	293325	299985	98 060	113 185	122 501	2.2	2.6	2.4
North Africa	368670	392442	401037	179 525	195 444	205 814	2.0	2.0	1.9
Southern Africa	463102	422855	419500	51 387	55 041	56 936	9.0	7.7	7.4
Western Africa	1421706	1530865	1579697	237 781	269 990	291 270	6.0	5.7	5.4
Total	3647853	4240612	4519216	819463	921073	987 091	4.5	4.6	4.6
North America	5626038	9586060	9886150	318 654	335 175	345 053	17.7	28.7	28.7
Asia									
South-Central Asia	2956487	3095390	3337661	1 518 322	1 650 635	1 728 752	1.9	1.9	1.9
East Asia	12161251	9763957	9110365	1 472 444	1 520 717	1 546 825	8.2	6.4	5.9
South-East Asia	998480	976783	1020764	517 193	554 079	575 626	1.9	1.7	1.8
West Asia	513282	420722	401350	190 336	211 104	224 106	2.7	2.0	1.8
Total	16629500	14256852	13870140	3698295	3936535	4 075 309	4.5	3.7	3.4

Europe									
East Europe	4321725	3626349	3429791	304 088	296 912	293 488	14.2	12.2	11.7
North Europe	756121	851949	889580	94 359	96 439	97 918	8.0	8.8	9.0
South Europe	810171	783513	779128	145 119	149 711	152 316	5.6	5.2	5.1
West Europe	1109431	1227431	1276241	183 001	186 358	187 846	6.0	6.6	6.8
Total	6997448	6489242	6374740	726567	729420	731 568	9.6	8.9	8.7
Latin America & Caribbean									
Central America	7176500	7229250	7335300	135 171	144 288	149 580	53.0	50.1	49.0
Caribbean	1280449	1333035	1401020	38 650	40 566	41 629	33.1	32.9	33.7
Total	8456949	8562285	8736320	173821	184854	191 209	48.7	46.4	45.7
Oceania									
Australia & NZ	293000	298042	332511	23 039	24 505	25 304	12.7	12.1	13.1
Melanesia	60730	60740	63350	7 010	7 871	8 412	8.7	7.7	7.5
Micronesia	15	20	40	497	537	559	0.03	0.03	0.07
Polynesia	15844	15845	16065	614	646	662	25.8	24.5	24.2
Total	369589	374657	411956	31160	33559	34 937	11.9	11.1	11.8
South America	15389515	15225273	14971649	347 407	371 658	384 892	44.3	41	38.9
World	57116892	58734981	58770171	6 115 367	6 512 274	6 750 059	9.4	9.1	8.7

Source: FAOSTAT & UNPD, 2010

Appendix 3: Local horse breeds in the world

Africa	Western Sudan Pony	Garabarah
Abyssinian	Yagha	Gayo
Bahr-EI-Ghazal		Gemlik
Basotho Pony	Asia	Giawf
Beledougou	Abeia	Guanzhong
Bhirum Pony	Anatolian	Guba
Bobo	Azerbaijan Horse	Guizhou
Bornu	Baguio light horse	Haddian
Calvinia	Baguio pony	Heihe
Cape Harness	Bajau	Heilongjiang
Cape Horse	Bakhtiari	Henan Light Draught
Chadian	Bali	Hequ
Cheval de Nioro	Balikun	Herati
Djerma	Baluchi	Hinis
Dombi	Bangladesh Native Horse	Hirzai
Egyptian	Basseri	Horse (Indonesia)
English WB	Batak	Iyi
European WB	Bima	Jabe
Fleuve	Boeta	Jaf
Fouta	Bohai	Jargalant
Horse (Tanzania)	Bose	Jata
Horse (Uganda)	Bose-Baise Pony	Javakhuri Harness Horse
L'arabe-barbe	Burmese	Jawa
Locale	Buzkashi	Jeju
Logone pony	Cabadin	Jianchang
M'bayar	Cambodian	Jilin
Mogods pony	Canik	Jinjiang
Mossi	Chaidamu	Jinzhou
M'Par	Chakou	Jofi
Namaqua Horse	Cheju	Jumli
Namib horse	Chyanta	Karacabey-Halfbred Arab
Nefza Pony	Cukurova	Karacabey-Nonius
Poney	Dahmaa	Kathiawari
Rancher	Dareshuri	Keheilan
SA Miniature horse	Darkhad	Kerqin
SA Sporting Horse	Datong	Khilan
SA WB	Dawand	Kipriakis Ektrofis
Sahel	Deccani	Kirgiz
Somali Pony	Deliboz	Kiso
Songhoi	Dilbaz	Kohband
Sudan Country breed	Dosanko	Kuda-Lombok
Sulebawa	Ebian	Kuningan
Tawleed	Elenchus	Kushum
Torodi	Flores	Kustanai
Tsawana	Galshar	Lichuan
Vlampeerd	Ganzi	Lokai
West African Pony		

Appendix 3: Local horse breeds in the world

Lombok	Tagaytay light horse	Asturcón pony
Makasar	Tagaytay pony	Augeron
Makra	Tajik Riding horse	Auxois
Malakan	Taleshi	Avarskaya
Maneghi	Tarai Pony	Avelignese Tradizionale
Manipuri Pony	Taropud	Balkar
Marwari	Tattu	Banat
Mazari	Tes	Bardigiano
Megruli Horse	Thai pony	Barra Pony
Merak Sakten ta	Tibetian-Sikang Pony	Barut
Minahasa	Tieling Draught	Bashkir
Miniature horse	Tokara Pony	Belarus Coach
Misaki	Tooraq	Belgian Draft
Miyako	Tsushima Pony	Belgian trotter
Mongolian -Ujumqin	Turkemin	Belgium Riding Pony
Mugalzhar	Turkish Arab	Berrichon
Mytilene Pony	Tushuri	Bessarabian
Nanbu	Uzunyayla	Bityug
Native Racehorse	Wenshan	Black Forest
New Kirgiz	Xiangfen	Black Sea
New Lijiang	Xilinguole	Bohemian moravian belgien
Ngua Noi	Xini	Bosnian
Ningqiang	Yabu	Bosnian Mountain Pony
Noma	Yanqi	Brandenburg WB
Omarqoub	Yargha	Bulgarian Native
Pacu Indonesia	Yiwu	Burgdorfer
Philippine pony	Yomood	Burguette
Qatgani	Yonaguni	Buryat pony
Qazal	Yongning	Busa Pony
Rajshai Pony	Yunnan	Byryatskaya
Rumelain Pony	Yunnan-Lijiang	Calabrian
Samand	Yushu	Camarque
Sandel	Yuta	Carrossier Normand
Sanhe	Zaniskari Pony	Castillon
Saqallwiya	Zhangbei	Catria
Shan Pony	Zhongdian	Charentais
Shandan		Charolais
Shirazi	Europe	Charysh
Shirvan	Akhal-Teke	Chilkov
Shweimaa	Alpine	Chumysh
Sistani	Altwurttemberg	Chuvash
Spiti Pony	American Miniature horse	CB Trotter
Sri Lankan Pony	Amurskaya	Comune
Sumbar-Sandel Arab	Anglo-Arabo-Sardo	Corlais
Sumbawa	Anglo-Normand	Corse
Syrian	Arravani	Cremonese
Taejung	Asino Baio Lucano	Crete

Appendix 3: Local horse breeds in the world

Criollo	Gazal	Konik (Dutch)
Croatian Busa Pony	Gelderland horse	Krk Island Pony
Croatian CB	German Bessarabian	Kumyk Pony
Curly Horse	German Riding Pony	Kun Kinsky
Cushendale	German Sport horse	Kushum
Czech Arab Horse	German Thoroughbred	Kuznet Horse
Czech Riding Pony	German Trakehner	Landais Pony
Czech Trotter	German Trotter	Latvian Coach Horse
Dales Pony	German WB	Latvian Draught
Danish Trotter	Giara pony	Latvian Harness Horse
Danubian horse	Glasinacki	Lenkoran
Deli-Orman	Gocan	Leutstettener
Delta	Goonhilly	Lewitzer
Devon Pack Horse	Great Horse	Lezgian Pony
Dobrogeana	Groningen horse	Lithuanian Cart
Dole Horse	Halfbred of Mezohegyes	Lithuanian heavy draft
Dolny-Iskar	Heavy Draught (Bulgarian)	Local Moldavian
Donska	Heavy WB (Dutch)	Loire
Draver	Heavy WB (German)	Long Mynd
Dulmen Pony	Hebridean Pony	Losina
Dutch draught horse	Henson	Lovets
Dutch Lippizaner	Hessen WB	Lundy
Dutch Miniature Horse	Hispano-Bretón	Maine
Dutch Riding Horse/Pony	Hungarian Cold-blood	Majorcan
Einsiedler	Hungarian Draft	Mallorquina
English Thoroughbred (Czech)	Hungarian horse	Małopolski
English WB (Latvia)	Hungarian Sport Horse	Manx
Eriskay	Hungarian Trotter	Maremanno
Erlenbach	Ialomita	Maremmano tradizionale
Esperia Pony	Icelandic Horse (Danish)	Mecklenburg WB
Estonian Heavy Draught	Icelandic horse (Dutch)	Medjimurje
Estonian Native Horse	Irish Cob	Menorquina
Exmoor (Dutch)	Irish Hobby	Mezens
Falabella Miniature Horse	Irish Pony	Miniature (Belgian)
Finnish Riding Pony	Irish Sport Horse	Minusinsk
Finnish WB trotter	Irski poni	Misko
Finnish WB	Italian Maremmano	Moldavian horse
Flanders	Italian Saddlebreed	Monchina
Flemish Horse	Italian trotter	Monte Horse
Fox-trotter	Jaca Navarra	Monterufoli Pony
Franches-Montagnes	Jutland Horse	Moravian WB
Frederiksborg	Kalmyk	Morvandeaux
French Saddlebred pony	Karakachan	Mountain Horse (Montenegro)
French Trotters	Karatschaewer	Mulassie
Galloway Pony	Karelian Pony	Murgese
Garrano	Kerry Bog Pony	Napoletano
	Kisber halfbred	Narym

Appendix 3: Local horse breeds in the world

Nivernais	Russian (English)	Tarbésan
Nogai	Russian Ardennes	Tavda
Nordland Horse	Russian Cart Horse	Thessalia
North Swedish Horse	Russian Clydesdale	Thuringian WB
Northern Ardennes	Russian Courser	Tiree
Norwegian Heavy trotter	Russian Draft	Tolfetana
Novoalexandrivska Cart	Russian Percheron	Tolter
Novoaltaiskaya	Russian Saddlebred	Tomsk
Ob pony	Sabih	Tori
Obva	Sachsen WB	Torian
Old Don/Cossack	Salernitano	Toriyskaya
Old Kladruby	Samolaco	Tory
Old Kladruby Black	Sanfratellana	Transylvanian
Old Kladruby White	Saône-et-Loire	Tuva
Onega	Sarcidano	Tuva Coach
Ox-Araber	Sardo	Ukrainian Saddle Horse
Paint Horse	Saxony WB	Ukrainian Pony
Palatine Ardennes	Schleswig CB	Upper Yenisei
Paso Peruano	Schweres WB	Vardy
Pedigree Saddle Horse	Scottish pony	Vendéen
Pentro	Senner	Ventasso
Persano	Shtumsky CB	Verkhoyansk
Piebald and Skewbald	Siciliano	Vladimir
Pindos	Siglavi	Vollblutarber
Pineaia	Silesian horse	Voronezh Draft
Pinto	Skewbald and Piebald	Vyatka pony
Pleven's horse	Skyrose Pony	Wels
Podveleski	Slovak Sport Pony	Wielkopolski
Poitevin	Slovak WB	Work Horse
Polesian	Slovenian CB	Wurtemberg WB
Polish CB	Slovenian Haflinger	Yakut
Polo Horse	Slovenian Trotter	Yorkshire Coach Horse
Poni (Lithuania)	Slovenian WB	Zabaykalskaya
Pony of the Americas	Small German Riding Horse	Zangersheide
Pugliese	Small Horse	Zematukai
Pura Raza Gallega	Sokolski CB	Zematukai(Modern type)
Rapid Heavy Draft	Sorraia	Zweibrucker WB
Rheinish German CB	South German CB	
Rheinish WB	Soviet Saddle	Latin America and Caribbean
Riding Horse (Finnish)	Spotted	Atheland
Rila Mountain	Stara Planina	Caballo des trote
Romanian Draft	Strelets	Crillo de Hondureno
Romanian Mountain	Styrian Horse	Criollo Militar
Romanian Sport Horse	Swedish Ardennes	Cuban Trotter
Romanian Trotter	Swedish Riding Pony	Galiceno
Rostopchin	Swedish WB Trotter	Horse (Saint Kitts & Nevis)
Rottaler	Swiss WB	Media sangre

Appendix 3: Local horse breeds in the world

Mexican Pony	Australian Draught Horse	Marchador
OISK	Australian Pony	Morochuco Chumbivilcano
Patibarcino	Australian Stockhorse	Nordestino
Peruana	Australian Waler	Pantaneiro
Ponny Welch	Australian WB	Paulista
Pony (El Salvador)	Brumbie	Pony (Paraguaya)
Pony (Guatemala)	Coffin Bay Pony	Pony (Brazil)
Pony (Honduras)	English Riding Pony	Pony (Peru)
Trotte de andar	English Spotted Pony	Puno pony
Warm blood (Honduras)	French WB	Puruca
Warm blood (Mexico)	German WB	Serrana
	Greenbank Army	Sunicho
North America	Guy Fawkes RNP Brumby	Trocha y GR Colombiano
American Cream Draft	Horse (Papua New Guinea)	Trochador
American Miniature	Irish Sport horse	
American Walking Pony	Kaimanawa 'Wild' Horse	
Appaloosa Pony	Kosciusko Brumby	
Assateague Pony	Local Horse (Tonga)	
Broomtail	Miniature Horse	
Buckskin	Miniature Pony	
Canadian	Namagdi NP Brumby	
Canadian Hunter	Palouse	
Cayuse	Timor Pony	
Chickasaw		
Chincoteague Pony	South America	
Colorado Ranger	Anglo Normando	
Conestoga	Asno	
Cow Pony	Bagul	
Cracker	Brazilain Sports Horse	
French Coach	Brazilian Trotter	
Frencher	Caballo Deportivo Uruguayo	
German Coach	Campeiro	
Indian	Campolina	
Lac la croix Indian pony	Campolino	
Missouri Fox Trotting Pony	Cimarron	
Morocco Spotted	Criollo chileno	
Narragansett Pacer	Criollo chilote	
Newfoundland Pony	Criollo Colombiano	
Quarter Pony	Criollo Paraguaya	
Rocky Mountain	Criollo Uruguaya	
Spanish Barb	Crioulo	
St. Lawrence	Fine English Blood	
Welara Pony	Fine French blood	
	Lavradeiro	
Oceania	Llanero	
Australian Brumby	Marajoara	

Appendix 4: Regional transboundary horse breeds in the world

Africa

Bandiagara
Boer
Dongola
Hausa
Hodh
Koto-Koli Pony
Nooitgedacht Pony
West African Barb
West African Dongola

Asia

Adaev
Bhotia Pony
Chummarti
Dagestan Pony
Karabair
Kazakh
Kurdi
Mongolian
Tanghan
Tibetan Pony
Waziri
Yabu

Europe

Altai
Ardennes
Bavarian WB
Bosnain Pony
Boulonnais
Budyonny
Camargue
Comtois
Estonian Draft
Fell Pony
Finnhorse
French Saddlebred
Furioso-Northstar
Gidran
Gotland Pony
Hutsul
Kladruby
Knabstrupper
Merens Pony
Mur Island
Nonius
Noric
Norman Cob
Pinkafeld
Polish Konik

Posavina
Pottok
Silesian Nork
Tarpan
Tinker
Trakenher
Tuigpaard
Westphalian WB

Latin America & Caribbean

Azteca
Costarricense de Paso
Creole

North America

Canadian
Kanata Pony
Mustang
Sable Island Pony

South America

Criollo Argentine

Appendix 5: International transboundary horse breeds in the world

Akhal-Teke	Oldenburg
American Paint	Orlov Saddle Horse
American Saddle Horse	Orlov Trotter
American trotter	Palomino
Andalusian	Paso Fino
Anglo-Arab	Percheron
Anglo-Kabarda	Peruvian Paso
Appaloosa	Przewalski
Arab	Purebred Spanish
Barb	Quarter Horse
Belgian draft	Russian trotter
Belgian WB	Shagya Arab
Breton	Shetland Pony
Caspian	Shire
Cleveland Bay	Soviet Heavy Draught
Clydesdale	Suffolk
Colombiano	Swedish WB
Connemara pony	Tennessee Walking horse
Creole	Tersk
Dales	Thoroughbred
Danish WB	Welsh Pony
Dartmoor Pony	
Don	
Dutch WB	
Exmoor Pony	
Falabella Pony	
Fjord	
Friesian	
Hackney	
Hackney Pony	
Haflinger	
Hanoverian	
Highland Pony	
Hispano-Arabe	
Holstein	
Iberoamericano	
Icelandic Horse	
Irish Draught	
Kabarda	
Karabakh	
Karachai	
Lippizaner	
Lusitano	
Mangalarga	
Morgan	
New Forest pony	

Appendix 6: Critical and Critical-Maintained horse breeds in the world

Critical Breeds

Africa

English WB
Horse (Uganda)

Asia

Burmese
Deccani
Sri Lankan Pony
Tieling Draught

Europe

Altwurttemberg
American Miniature horse
Anglo-Arabo-Sardo
Ardenne
Avelignese Tradizionale
Bosnian
Criollo
Curly Horse
Delta
Dulmen Pony
Finnish Riding Pony
Fox-trotter
Franches-Montagnes
Karakachan
Karatschaewer
Landais Pony
Leutstettener
Maremmano
Maremmano tradizionale
Mur Island
Napoletano
Old Kladruby White
Paint Horse
Palatine Ardenne
Paso Peruano
Persano
Polo Horse
Pony of the Americas
Romanian Draft
Romanian Sport Horse
Rottaler
Samolaco
Sarcidano
Senner

Slovak Sport Pony
Slovenian Trotter
Tarpan
Tolter
Ukranian Pony
Vollblutarber
Zematukai (Modern type)

South America

Sunicho

Critical-Maintained Breeds

Asia

Misaki
Miyako
Noma
Tokara Pony
Tsushima Pony
Yonaguni

Europe

Estonian Heavy
Draught
Majorcan
Skyrose Pony
Sorraia
Zematukai

Appendix 7: Endangered and Endangered-Maintained horse breeds

Endangered breeds

Africa

Nooitgedacht Pony
European WB
Horse (Tanzania)
Namib horse
SA Miniature horse
Somali Pony
Vlampeerd

Asia

Azerbaijan
Bose-Baise Pony
Dareshuri
Elenchus
Hirzai
Jinjiang
Makra
Malakan
Turkemin
Dagestan Pony

Europe

Auxois
Black Forest
Boulonnais
Catria
Charysh
Czech Arab horse
Dutch draught horse
Dutch Lippizaner
Estonian Draft
Falabella Miniature horse
Fell Pony
Finnish WB
Frederiksborg
French Saddlebred pony
Furioso-Northstar
Gelderland horse
Giara pony
Gidran
Gotland Pony
Groningen Horse
Heavy WB (Dutch)
Heavy WB (German)

Irish Hobby
Irish Pony
Kuznet Horse
Latvian Draught
Lewitzer
Menorquina
Monte Horse
Monterufoli Pony
Narym
Northern Ardennes
Ob pony
Old Kladruby Black
Ox-Araber
Pentro
Piebald and Skewbald
Pinto
Polesian
Rapid Heavy Draft
Romanian Trotter
Russian Percheron
Salernitano
Schleswig CB
Shtumsky CB
Slovenian Haflinger
Small German Riding horse
Swedish Ardennes
Swedish CB Trotter
Tavda
Thuringian WB
Tinker
Tolfetana
Tuigpaard
Ventasso
Vladimir
Vyatka pony

South America

Criollo chileno

North America

American Cream Draft
Lac la croix Indian pony
Newfoundland Pony
Sable Island Pony

Latin America & Caribbean

Horse (Saint Kitts & Nevis)

Oceania

Kaimanawa 'Wild' Horse

Endangered-Maintained

Asia

Kiso
Minahasa

Europe

Asturcón pony
Bohemian moravian belgien
Crete
Dales Pony
Dole Horse
Eriskay
Estonian Native Horse
Garrano
Hungarian Draft
Jaca Navarra
Kerry Bog Pony
Latvian Coach Horse
Lithuanian Heavy Draft
Losina
Monchina
Nordland Horse
Pindos
Pineia
Poitevin
Pura Raza Gallega
Sokolski CB
Tori

South America

Lavradeiro

Appendix 8: Extinct horse breeds in the world

Africa

Basotho Pony
Calvinia
Cape Harness
Cape Horse
Namaqua Horse
Nefza Pony

Asia

Delibož
Hinis
Karacabey-Nonius
Nanbu
Rumelian Pony

Europe

Amurskaya
Anglo-Normand
Augeron
Banat
Barra Pony
Berrichon
Bessarabian
Bityug
Black Sea
Bulgarian Native
Burgdorfer
Busa Pony
Carrossier Normand
Charentais
Charolais
Chilkov
Chuvash
Corlais
Corse
Cremonese
Croatian Busa Pony
Cushendale
Deli-Orman
Devon Pack Horse
Dobrogeana
Dolny-Iskar
Erlenbach
Flanders
Flemish Horse
Galloway Pony

German Bessarabian
Gocan
Goonhilly
Great Horse
Hebridean Pony
Hungarian horse
Ialomita
Karelian Pony
Krk Island Pony
Loire
Long Mynd
Lovets
Maine
Manx
Minusinsk
Moldavian horse
Morvandeaux
Nivernais
Nogai
Obva
Old Don/Cossack
Onega
Pinkafeld
Pugliese
Rila Mountain
Romanian Mountain
Rostopchin
Russian Saddlebred
Saône-et-Loire
Stara Planina
Strelets
Tarbésan
Tiree
Tomsk
Transylvanian
Tuva Coach
Vardy
Vendéen
Voronezh Draft
Yorkshire Coach Horse

North America

Canadian
Chickasaw
Conestoga

French Coach
Frencher
German Coach
Narragansett Pacer
St. Lawrence

Oceania

Australian Waler

Appendix 9: Not at risk horse breeds in the world

Africa

Bahr-El-Ghazal
Bandiagara
Dongola
Egyptian
Locale
Logone pony
Sudan Country breed
West African Barb
Western Sudan Pony

Kustanai
Lichuan
Lokai
Makasar
Manipuri Pony
Marwari
Mongolian
Mongolian-Ujumqin
New Kirgiz
Nguai Noi

Budyonny
Burguette
Buryat pony
Byryatskaya
Camargue
Chumysh
Comtois
Comune
Croatian CB
Czech WB

Asia

Adaev
Bajau
Bali
Balikun
Batak
Bhotia Pony
Bima
Bose
Chaidamu
Chakou
Cheju
Darkhad
Datong
Dosanko
Flores
Galshar
Ganzi
Gayo
Guizhou
Heilongjiang
Hequ
Horse
Jawa
Jeju
Jianchang
Jilin
Jinzhou
Karabair
Kathiawari
Kazakh
Kipriakis Ektrofis
Kirgiz
Kuda-Lombok
Kuningan
Kushum

Ningqiang
Pacu Indonesia
Rajshai Pony
Sandel
Sanhe
Shan Pony
Spiti Pony
Sumbar-Sandel Arab
Sumbawa
Syrian
Taleshi
Tes
Thai pony
Tibetan Pony
Tushuri
Wenshan
Xini
Yanqi
Yomood
Yongning
Yunnan
Yunnan-Lijiang
Yushu
Zaniskari Pony
Zhongdian

Czech Riding Pony
Czech Trotter
Danish Trotter
Draver
Dutch Miniature Horse
Dutch Riding Horse/Pony
English Thoroughbred (Czech)
Esperia Pony
Finnhorse
Finnish WB trotter
Freiberger
French Saddlebred
French Trotter
German Riding Pony
German Sport horse
German Thoroughbred
German Trakehner
German Trotter
German WB
Hessen WB
Hispano-Bretón
Hutsul
Icelandic Horse (Danish)
Icelandic horse (Dutch)
Irish Cob
Irish Sport Horse
Italian Maremmano
Italian trotter
Jutland Horse
Kalmyk
Kisber halfbred
Kladruby
Knabstrupper
Kushum
Lithuanian Cart
Local Moldavian

Europe

Akhal-Teke
Altai
Bardigiano
Bashkir
Bavarian WB
Belarus Coach
Belgian Draft
Bosnain Pony
Brandenburg WB

Appendix 9: Not at risk horse breeds in the world

Małopolski	Latin America and Caribbean
Mecklenburg WB	Costarricense de Paso
Merens Pony	Criollo Militar
Mezens	
Murgese	
Nonius	North America
Noric	American Miniature
Norman Cob	Buckskin
North Swedish Horse	Canadian
Norwegian Heavy trotter	Colorado Ranger
Novoaltaiskaya	Missouri Fox Trotting Pony
Polish CB	Mustang
Polish Konik	Rocky Mountain
Posavina	
Pottok	Oceania
Rheinish German CB	Local Horse (Tonga)
Rheinish WB	
Russian Ardennes	South America
Russian Clydesdale	Asno
Russian Courser	Campolino
Russian Draft	Cimarron
Sachsen WB	Criollo Argentine
Sanfratellana	Criollo Colombiano
Sardo	Crioulo
Saxony WB	Marajoara
Schweres WB	Morochouca
Siciliano	Pantaneiro
Silesian Horse	Serrana
Silesian Nork	Trocha y Galope Reunido
Slovenian CB	Colombiano
South German CB	
Soviet Saddle	
Swedish Riding Pony	
Swedish WB Trotter	
Swiss WB	
Tory	
Trakenher	
Tuva	
Ukrainian Saddle Horse	
Upper Yenisei	
Westphalian WB	
Wielkopolski	
Wurtemberg WB	
Yakut	
Zabaykalskaya	
Zweibrucker WB	

Appendix 10: Unknown status horse breeds in the world

Africa

Abyssinan	Cabadin	Qazal
Beledougou	Cambodian	Samand
Bhirum Pony	Canik	Saqallwiya
Bobo	Chummarti	Shandan
Boer	Chyanta	Shirazi
Bornu	Cukurova	Shirvan
Chadian	Dahmaa	Shweimaa
Cheval de Nioro	Dawand	Sistani
Djerma	Dilbaz	Taejung
Dombi	Ebian	Tagaytay light horse
Fleuve	Garabarih	Tagaytay pony
Fouta	Gemlik	Tajik Riding horse
Hausa	Giawf	Tanghan
Hodh	Guanzhong	Tarai Pony
Koto-Koli Pony	Guba	Taropud
L'arabe-barbe	Haddian	Tattu
M'bayar	Heihe	Tibetian-Sikang Pony
Mogods pony	Henan Light Draught	Tooraq
Mossi	Herati	Turkish Arab
M'Par	Iyi	Uzunyayla
Poney	Jabe	Waziri
Rancher	Jaf	Xiangfen
SA Sporting Horse	Jargalant	Xilinguole
SA WB	Jata	Yabu
Sahel	Javakhuri Harness Horse	Yabu
Songhoi	Jofi	Yargha
Sulebawa	Jumli	Yiwu
Tawleed	Karacabey-Halfbred Arab	Yuta
Torodi	Keheilan	Zhangbei
Tsawana	Kerqin	
West African Dongola	Khilan	
West African Pony	Kohband	
Yagha	Kurdi	

Asia

Abeia	Lombok	
Anatolian	Maneghi	
Baguio light horse	Mazari	
Baguio pony	Megruli Horse	
Bakhtiari	Merak Sakten ta	
Baluchi	Miniature horse	
Bangladesh Native Horse	Mugalzhar	
Basseri	Mytilene Pony	
Boeta	Native Racehorse	
Bohai	New Lijiang	
Buzkashi	Omarqoub	
	Philippine Pony	
	Qatgani	

Europe

Alpine
Asino Baio Lucano
Avarskaya
Balkar
Barut
Belgian trotter
Belgium Riding Pony
Bosnian Mountain Pony
Calabrian
Camarque
Castillon
Danubian horse
Donska
Einsiedler
English WB (Latvia)

Appendix 10: Unknown status horse breeds in the world

Exmoor (Dutch)	Zangersheide	Brumbie
Finish Work Horse		Coffin Bay Pony
Finnish Small Horse	Latin America and Caribbean	English Riding Pony
Gazal	Azteca	English Spotted Pony
Glasinacki	Creole	French WB
Halfbred of Mezohegyes	Atheland	German WB
Heavy Draught (Bulgarian)	Caballo des trote	Greenbank Army
Henson	Costeño	Guy Fawkes RNP Brumby
Hungarian CB	Crillo de Hondureno	Horse (Papua New Guinea)
Hungarian Sport Horse	Cuban Trotter	Irish Sport horse
Hungarian Trotter	Galiceno	Kosciusko Brumby
Irish Pony	Media sangre	Miniature Horse
Italian Saddlebred	Mexican Pony	Miniature Pony
Konik (Dutch)	OISK	Namagdi National Park Brumby
Kumyk Pony	Patibarcino	Palouse
Kun Kinsky	Peruana	Timor Pony
Latvian Harness Horse	Pony (El Salvador)	
Lenkoran	Pony (Guatemala)	South America
Lezgian Pony	Pony (Honduras)	Anglo Normando
Lundy	Trotte de andar	Bagul
Mallorquina	WB (Honduras)	Brazilain Sports Horse
Miniature Horse (Belgian)	WB (Mexico)	Brazilian Trotter
Misko		Caballo Deportivo Uruguayo
Moravian WB	North America	Campeiro
Mulassie	Kanata Pony	Campolina
Novoalexandrivska Cart	American Walking Pony	Criollo chilote
Old Kladruby	Appaloosa Pony	Criollo Paraguaya
Pedigree Saddle Horse	Assateague Pony	Criollo Uruguaya
Pleven's horse	Broomtail	Fine English Blood
Podveleski	Canadian Hunter	Fine French blood
Poni (Lithuania)	Cayuse	Llanero
Riding Horse (Finnish)	Chincoteague Pony	Marchador
Russian (English)	Cow Pony	Morochuco Chumbivilcano
Russian Cart Horse	Cracker	Nordestino
Sabih	Indian	Paulista
Scottish pony	Morocco Spotted	Pony (Paraguay)
Siglavi	Quarter Pony	Pony (Brazil)
Skewbald and Piebald	Spanish Barb	Pony (Peru)
Slovak WB	Welara Pony	Puno pony
Slovenian WB		Puruca
Spotted		
Styrian Horse	Oceania	
Thessalia	Australian Brumby	
Torian	Australian Draught Horse	
Toriyskaya	Australian Pony	
Verkhoyanska	Australian Stockhorse	
Welsh	Australian WB	

Declaration

To the best of my knowledge and belief, the work presented in this thesis is my own as a part of double degree program from Christian Albrechts University, Kiel and Swedish University of Agricultural Sciences, Uppsala. I, hereby, declare that I have not previously submitted this material either in whole or in part for a degree at this or any other institutions. Where other sources of information have been used, they have been highly acknowledged.

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Place and Date

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Signature

Rupak Khadka
Matriculation Number: 486022