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ALIEN INVASIVE SPECIES ISSUES RELATED TO WILDLIFE AND DOMESTIC ANIMAL TRADE

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■ Definition of an alien species

A species which is not native to a region and which was introduced to that region through human activity. In this context, synonyms for « alien » include: exotic, introduced, non-indigenous, non-native, allochthonous.

Definition of an invasive species

- Invasive species are alien species that reach the final stage of an invasion process and have the capacity to spread.
- They are considered to have a highly detrimental impact in the regions concerned, not only on local biodiversity but also on socio-economic parameters, such as animal production, animal health and even public health

Invasion process

A sequence of events and processes during which an introduced species faces, and potentially overcomes, various barriers to its establishment, proliferation and spread in a new region.

**THE MOST INVASIVE SPECIES
ARE HUMAN BEINGS**

The Daisie Survey

THE DAISIE SURVEY (Delivering Alien Invasive Species Inventories for Europe) published in 2009 lists, altogether, around 11000 species that have been introduced onto the European continent alone. Their degree of aggressiveness varies, but some pose real problems

Global changes

The recent acceleration in the volume, speed and intensity of global trade and communication has been accompanied by an unprecedented increase in the frequency of species movements

Impact on infectious diseases

The duration of transport and communication is shorter than the duration of incubation period of most of the known or previously unknown infectious diseases

Facing challenges

- Climate change
- Human population growth
- Livestock population growth
- Rapid urbanisation
- Changing farming systems
- Forest encroachment
- Opening closed ecosystems
- Globalisation of trade

■ Standardised freight containers

The standardised freight container is an hidden way to introduce particularly vectors and vector-borne diseases, but even also some vertebrates

Globalisation the five Ts

- TRADE
- TRANSPORT
- TRAVEL (2 billions by air in 2008)
- TOURISM
- TERRORISM

The livestock revolution

In 2008, over 21 billion food producing animals were raised to feed a population of over 6 billion people. By 2020 this demand is expected to increase by 50%

■ Biodiversity of mammals and birds (1)

For mammals, 5416 different species have already been recognised, whereas the expected number of species is expected to be around 5500; for mammalian species we are, therefore, nearly at the end of the inventory, since 99% of the species are already known

■ Biodiversity of mammals and birds (2)

Among mammals, there are 2277 species of rodents pertaining to 481 genera. The rodents therefore compose 42 % of recognised mammal species

■ Biodiversity of mammals and birds (3)

To date the number of bats reaches 1116 recognised species, pertaining to 202 genera. Bats make up therefore 20.6% of the total number of mammal species.

Bats are flying mammals and are the source of many emerging diseases, many of them previously unknown.

■ Biodiversity of mammals and birds (4)

There are roughly 10000 species of birds pertaining to 2058 genera, among which 5712 are passerines and 3960 are non-passerines. Most of the birds are flying

Biodiversity of human pathogens

There are 1415 species of infectious organisms known to be pathogenic to humans, including 217 viruses and prions, 538 bacteria and rickettsia, 307 fungi, 66 protozoa and 287 helminths. Out of these, 868 (61%) were classified as zoonotic and 175 pathogenic species were considered to be associated with emerging diseases.

Of 175 emerging pathogens of this group, 132 (75%) were zoonotic, the vast majority of which coming from wildlife.

Wildlife and viruses

- Wildlife constitutes an important potential of already unknown pathogens both for humans and animals
- For instance the number of identified viruses is roughly 5000; it is largely underestimated
- RNAs viruses produce populations of quasi-species and are constantly evolving

Impacts of invasive alien species

- On biodiversity
- On animal health and production
- On public health
- On the environment

Impact of domestic animals trade

- Impact of the introduction of goats on Galapagos Islands on the biodiversity of native fauna
- Impact of the introduction of cattle on Caribbean Islands with heart water and the appropriate ticks for the transmission
- Well documented story of the introduction of Rinderpest in Eastern and Southern Africa end of the nineteen century and its impact on Masai population and wildlife

Impact of wildlife alien invasive species on biodiversity

- 625 (51%) of endangered species are threatened because of invasive (alien) species
- Introduction of the american grey squirrel in United Kingdom and progressive elimination of the native red squirrel
- Introduction of european red fox in Australia with detrimental effect on the native marsupials
- Release of the american mink in Europe and progressive elimination of the native european mink

■ Impact of wild alien invasive species on animal and public health

Introduction from Australia of the brushtail possum in New Zealand which is now the major reservoir of bovine tuberculosis in his new country and shows a very high population density

Impact of the introduction of wild animals

- Introduction of African horse sickness in Spain through the importation of African zebras
- Introduction of Monkeypox with African squirrels in the United States
- Introduction of highly pathogenic avian influenza H5N1 through smuggling of Eagles for falconry in Belgium
- Introduction of Bluetongue virus 8 in Northern Europe ?

■ Impact of alien invasive species on the environment

Introduction of european rabbit in Australia with highly detrimental effect on the environment

Conclusion

**A TRIBUTE TO FRANK FENNER
WHO PASSED AWAY IN NOVEMBER
LAST YEAR**