* N = the size of population
* t=point in time
* Nt=number of individuals in population at a certain time.
* B= num of birth
* D= num of death
* I= num of immigration (entering)
* E= num of emigrants (leaving)
* r= instantaneous rate of increase = Birth-Death
* b= instantaneous birth rate [ birth/ individual.time]
* d=instantaneous death rate [ death/ individual.time]

|  |  |  |
| --- | --- | --- |
| r (rate of growth) = b - d | | |
| **Heck cattle** | **Konik horses** | **Red deer** |
| 0,124 | 0,224 | 0,19 |
|  |  |  |
| (initial population) | | |
| **Heck cattle** | **Konik horses** | **Red deer** |
| 30 | 20 | 45 |
|  |  |  |
| *K* (Carrying Capacity) |  |  |
| **Heck Cattle** | **Konik Horses** | **Red Deer** |
| 400 | 1200 | 3100 |
|  |  |  |
| t *double = ln(2)/r* |  |  |
| **Heck cattle** | **Konik horses** | **Red deer** |
| 4.81 | 3,095 | 3,65 |
|  |  |  |

**Simple logistic growth equation with limited resources (food supply):**

We can apply this model to deer (Have relatively less interaction with other species)

The following assumptions were taken in consideration:

* Age, genetic and size factors were ignored.
* Fences are closed : no migration.

**The Lotka Volterra Model: interaction between large herbivores** (Cattle and horses which share almost the same territory)

and = Competition coefficients

**Model with migration effect (Simple metapopulation growth rate)**

Where:

**Pi** is the probability of local colonisation

**f** is the fraction of patches in occupied territory

Some model variations were dropped and the following assumptions were taken in consideration:

* Pe and Pi are constant rates.
* No rescue effect or time lags.
* Homogeneity of patches.