

MODELLING THE COMPETITION FROM VIRUNGA MOUNTAIN GORILLA AND GOLDEN MONKEY IN THE VOLCANOE NATIONAL PARK.

BANZI Wellars

University of Rwanda. College of Science and Technology. Department of mathematics

Email: banziwe10@yahoo.fr

Abstract: In ecological problems, different species interact with each other. Systems of differential equations are used to model these interactions. In this paper, we present a reaction diffusion system which permits to model the competition from two species: Virunga Mountain Gorilla and Golden Monkey with constant diffuse coefficients. The mountain gorilla is one of the wildlife species found in two isolated populations, one about 480 individuals among the volcanoes of the Virunga Massif at the border of Democratic Republic of Congo (DRC), Rwanda and Uganda, the other about 300 individuals in Bwindi Impenetrable National Park in southwest Uganda on the border with DRC. The golden monkey about 500 individuals is also found in the Virunga National Park. Gorillas are in competition with Golden monkey for food. The model use partial differential equations (PDEs). The equilibrium Solutions are determined and their stabilities are examined using Turing procedure. Using the community or stability matrix we prove that all nontrivial steady states result in species elimination. That is, for a long time, one of the species will disappear if nothing is done to protect them. Finally, a numerical simulation is computed using data on Gorilla and Golden Monkey dynamics. Considering the actual growth rate of Mountain Gorilla and Golden monkey respectively and the initial populations, the results show that the competition from the two species for food and living space in the same protected area will result in the extinction of Gorilla

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