Preliminary insight into seed effectiveness of western lowland gorilla (Gorilla g.gorilla)

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Plant biodiversity and forest dynamics of tropical ecosystems are strongly influenced by animals through seed dispersal, however many dispersers are declining in population size, such as the western lowland gorilla (WLG). Determining the service provided by one animal species towards its environment is a way to strengthen the willingness of land managers, such as logging companies, to conserve that species. On the way round, the conservation of that species will benefit to the maintenance of the services provided by the ecosystem itself.

Seed dispersal effectiveness (SDE) is defined as the contribution a species makes to plant fitness by enhancing its regeneration. This concept, actually measurable numerically, takes into account quantitative and qualitative components: quantity refers to the number of seed dispersed and quality refers to the probability a dispersed seed has to produce a new adult. Here we present 2-years data on the seed dispersal activity of a population of western lowland gorillas in south-east Cameroon to attempt to determine its effectiveness..

This study demonstrated that WLG fulfils the quantitative requirements for an effective seed dispersal, as they disperse many different species (52 identified species and forty or so unidentified morphotypes), some of them in high quantity (e.g.: 45.7 ± 24.96 seeds of *Celtis tesmannii*/100g of faeces; mean weight of faeces = 323.1 ± 224.35). Preliminary results suggest that gorillas can provide also a high quality dispersal for a set of species as the seed processing in the mouth does not damage the seeds (99.22% of ingested seeds remain intact) and the passage through the gut does not reduce the germination success, instead it can enhance it significantly (four out of the eight species tested; Chi-squared, $p<0.05$). The fruit processing and the long mean retention time (54.7 h ± 28.9) ensure that the seeds will be dispersed far enough to avoid density-dependent mortality commonly observed under the crown of the parent plant. WLG uses every kind of habitat type thus seeds are likely to be dispersed in microsites with suitable conditions for germination, establishment and growth. Nonetheless, there is a much higher probability that seeds would be dispersed in sites characterized by an open canopy such as treefall gaps and secondary forest in the early successional stages. This is due to the preference for open canopy nest sites where about half of the faeces are produced (65% of nest sites are found in those habitat types). Thus, seed dispersal by WLG would benefit mostly, but not exclusively, to heliophilic species, a common temperament of tropical tree including most of the commercial species.

We conclude that WLG should be an effective seed disperser for some species, especially those who require high level of light to grow during the first stages of the plant life. But more generally, WLG should contribute significantly to the forest regeneration process, biodiversity maintenance and even gene flow by dispersing at potentially long distance viable seeds of many species in different habitat types.

Conservation of WLG is therefore highly relevant to ensure ecological and commercial function of the concerned forest ecosystems, a consideration which should encourage forest managers to strengthen WLG conservations in their concerned forests.

Keywords: western lowland gorilla, seed dispersal, seed germination, forest regeneration, logging.

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