THE ROLE OF RODENTS AS POTENTIAL CARRIERS OF PARASITES ACROSS BWINDI IMPENETRABLE NATIONAL PARK BOUNDARY

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Background information

- 70% of emerging infectious diseases implicate vectors and reservoirs in their transmission cycle
- Rodents (42% of mammals) have been pointed out as reservoirs of zoonotic agents
- Rodents' success in parasite transmission is due to their flexible ecology (survive in many biotopes, breed rapidly, eat a wide variety of food)
- This ecological flexibility makes them better host for parasites (ticks, mites, fleas, Giardia etc)

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- All these parasites are pathogens of important socio economic diseases in humans & wildlife
- Interactions among humans, wildlife & rodents result into transmission of parasites
- BINP is a world heritage site, with a unique & extensive diversity, that attracts many tourists
- People around the park also supplement their existence with forest resources
- This results into maximum interaction among rodents, the forest wildlife and humans

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- For global health protection, surveillance for emerging zoonoses combined with an ecological assessment of rodent communities is critical
- Ecological data will be a basis for designing an ecosystem health approach to prevention of zoonoses
- Study will provide data on potential zoonotic parasites and common associated pathogens

Problem statement

- Veterinary & public health importance of rodents has received insufficient attention
- Domestic species have been most studied but little is known about the wild species
- Therefore there is need to:

- determine distribution and characterize movements of rodents
- determine effects of variation in habitat & landscape
- identify ecto and endo parasites carried by the rodents

Specific objectives

- To determine the distribution and relative abundance of rodent species
- To characterize the movements of rodents
- To identify ectoparasites and endoparasites carried by the rodents
- To determine the effect of some habitat and landscape variables

Research questions

- What are the species-specific habitat utilization patterns of the rodents?
- Which rodent species co-exist?
- To what extent do rodents range inside and outside the forest?
- Is the effect of habitat type or locality on rodents' species abundance significant?
- What species of ectoparasites and endoparasites are carried?
- How do habitat variables affect abundance & movements

Methods and materials

- **Study area**
  - BINP,331km2, 0°78'and 0°53'S, 29°35'and 29°50'E
  - Ruhija, Buhoma and Nkuringo
- **Traps**: Sharman & Tomahawk live traps
- **Bait:**
  - combination of maize flour, roasted powdered ground nuts, fish and sweet potatoes

Sharman trap

Tomahawk trap

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- **Trapping protocol**

- A trap web (4 transects,200m @, 80 trap stations, 120 traps) was set at forest boundary
- Two trap webs were set per study area
- Traps were inspected for 6 days and then 4 after an extension of 2 transects by 200m
- For each site, 1920 trap nights
- Traps were baited once in the evening & inspected in the morning & evening of the following day

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- Rodents captured were identified, weighed, sexed, brushed and their fecal collected

- They were marked by toe clipping & released at the point of capture

- The GPS & dominant vegetation for all trap stations were recorded

cont

- Distance moved by recaptured individuals will be determined using GIS map
- Fecal samples were preserved in formalin for microscopic diagnosis
- Ectoparasites were preserved in ethanol for identification
- Pathogen prevalence will be determined for each species

cont

- **Habitat and landscape variables:**

- Canopy cover (estimated by eye to within 5%)
- Undergrowth cover
- Over story tree height (estimated by eye to within 5m)
- Altitude or elevation & slope
- Distance from the human habituation
- Distance from the field
- Distance from the forest edge
- Distance from the water stream

cont

- **Data presentation and analysis**

- Relative abundance, Shannon Wiener Diversity Index , species richness for each habitat will be determined and compared
- Species cumulative curves will be plotted
- Community coefficients will be determined to asses habitat overlap and preference
- effect of habitat type will be analyzed with a one-way ANOVA
- A regression analysis will run to examine the determinants of rodent abundance (abundance will be regressed against the habitat variables)

cont

- Distances moved and pathogen prevalence will be compared to asses rodents as parasite carriers

Results

- A total of 371 rodents were captured
- All rodents belonged to 23 different species
- Nkuringo had the highest (19 species)
- Buhoma (12 species)
- Ruhija (11 species)

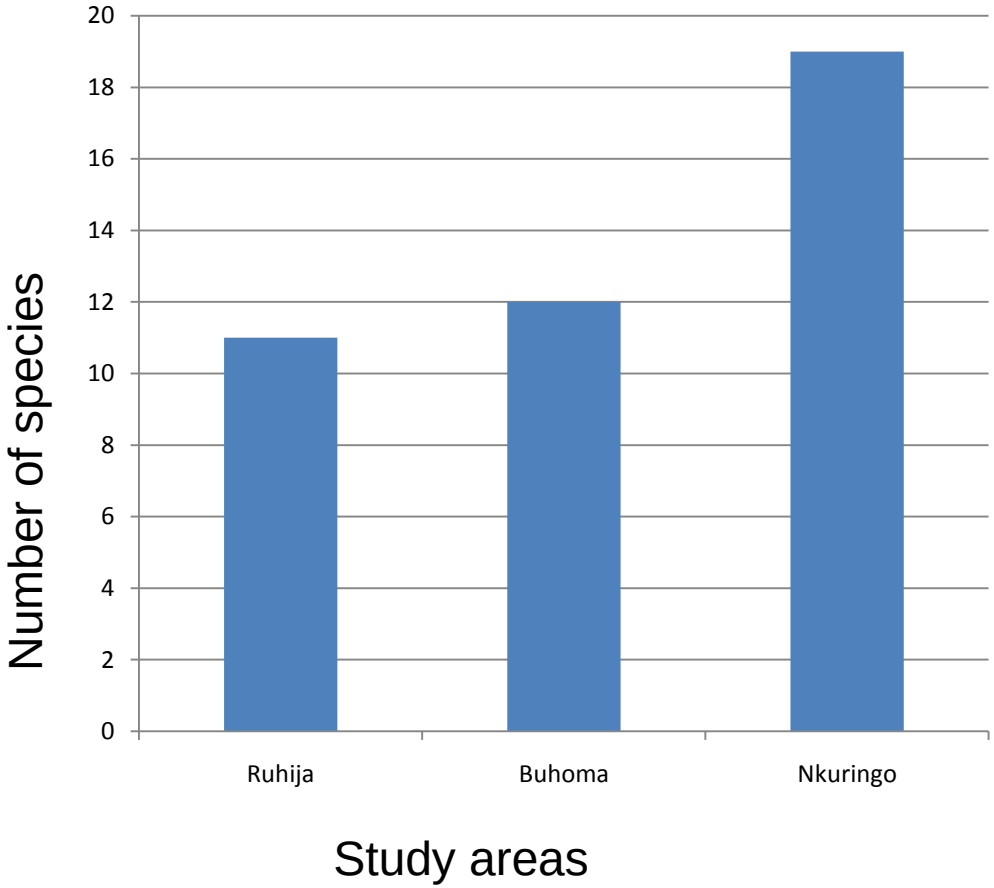

Fig*: Number of species per study area*

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Number of species captured from each study site

Species	Ruhija		Buhoma		Nkuringo	
	A	B	A	B	A	B
Praomys jacksoni	17	6	6	3	14	9
Hybomys unvittatus	4	2	0	0	0	0
Lophuromys flavopunctatus	16	28	5	7	17	11
Lophuromys woosnami	4	8	0	1	1	0
Mus bufo	5	4	1	1	10	4
Hylomyscus vulcanorum	1	1	6	0	0	1
Oenomys hypoxanthus	0	3	0	1	5	1
Lemniscomys striatus	0	5	0	0	3	3
Graphiurus murinus	0	1	1	0	0	0
Rattus rattus	0	3	0	4	2	0
Praomys sp	0	5	0	0	0	0
Malacomys longipes	0	0	7	2	2	1
Mastomys hilebrandti	0	0	0	1	0	0
Grammomys dolichurus	0	0	0	0	4	0
Hylomyscus stella	0	0	0	0	1	0
Mus triton	0	0	0	0	2	0
Mus minutoides	0	0	0	0	3	1
Lophuromys sikapusi	0	0	0	0	1	0
Dasymys incomtus	0	0	0	0	5	4
Species A	0	0	0	0	1	0
Colomys goslingi	0	0	0	0	1	0
Lemniscomys barbarus	0	0	0	0	0	4
Dendromus mystacalis	0	0	0	0	0	1
Total	**47**	**66**	**26**	**20**	**72**	**40**

A- First study site of a study area

B-Second study site of a study area

Photos of some the species captured in BINP

Lophuromys woosnami

Praomys sp

Crecitomys gambianus

Oenomys hypoxanthus

Graphiurus murinus

Hybomys univittatus

Lophuromys flavopuntatus

Lemniscomys striatus

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