# West African Observatory of Small Mammals Indicators of Environmental Change (ObsMiCE).

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**Niamey Niger 29 november to 1srt décember 2022**

# Introduction

The genus Rattus is native to Southeast Asia, and the species Rattus rattus (Linnaeus, 1758) differentiated in the Indian peninsula

However, in the case of the dispersion of commensal animals throughout the world, neither the roads, nor the rivers, nor even the seas or the oceans seem to play this role of physical barrier since their crossing is carried out thanks to the man and his technology.

On the contrary, the roads and navigation axes very often constitute privileged dispersal routes.

Thus, it seems to have been imported to the Senegalese coast by the boats of Portuguese explorers in the 15th century, then to have penetrated inland during the first half of the 17th century thanks to trade along the Senegal River.

Between 1991-2000, information concerning the black rat was collected. Between 2001-2012 the unambiguous presence was confirmed in Niger

Our hypothesis is based on a process of replacement of native rodents by invasive rodents following their arrival.

This is the case of European cities where native species have been replaced by invasive ones.

if we consider on the one hand that cities constitute atypical and complex ecological environments (Pickett et al., 2001), and on the other hand that invasive organisms are often generalists, very adaptable and excellent competitors

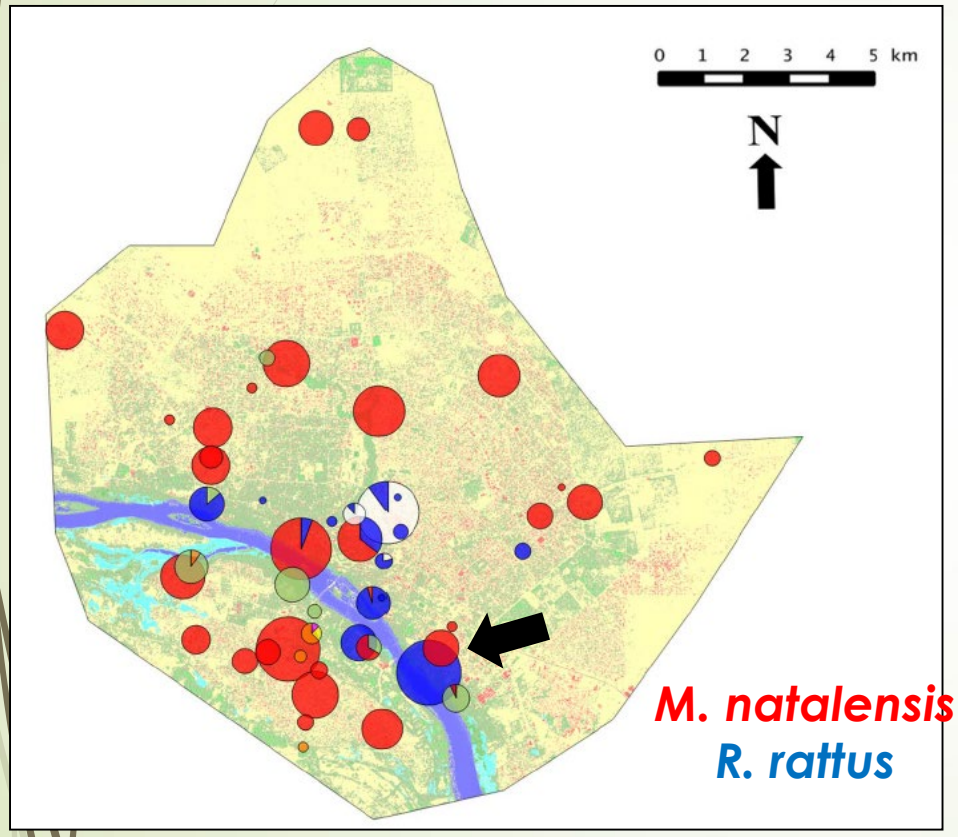
**Enemy release », du « Spill over » et du « Spill back »**

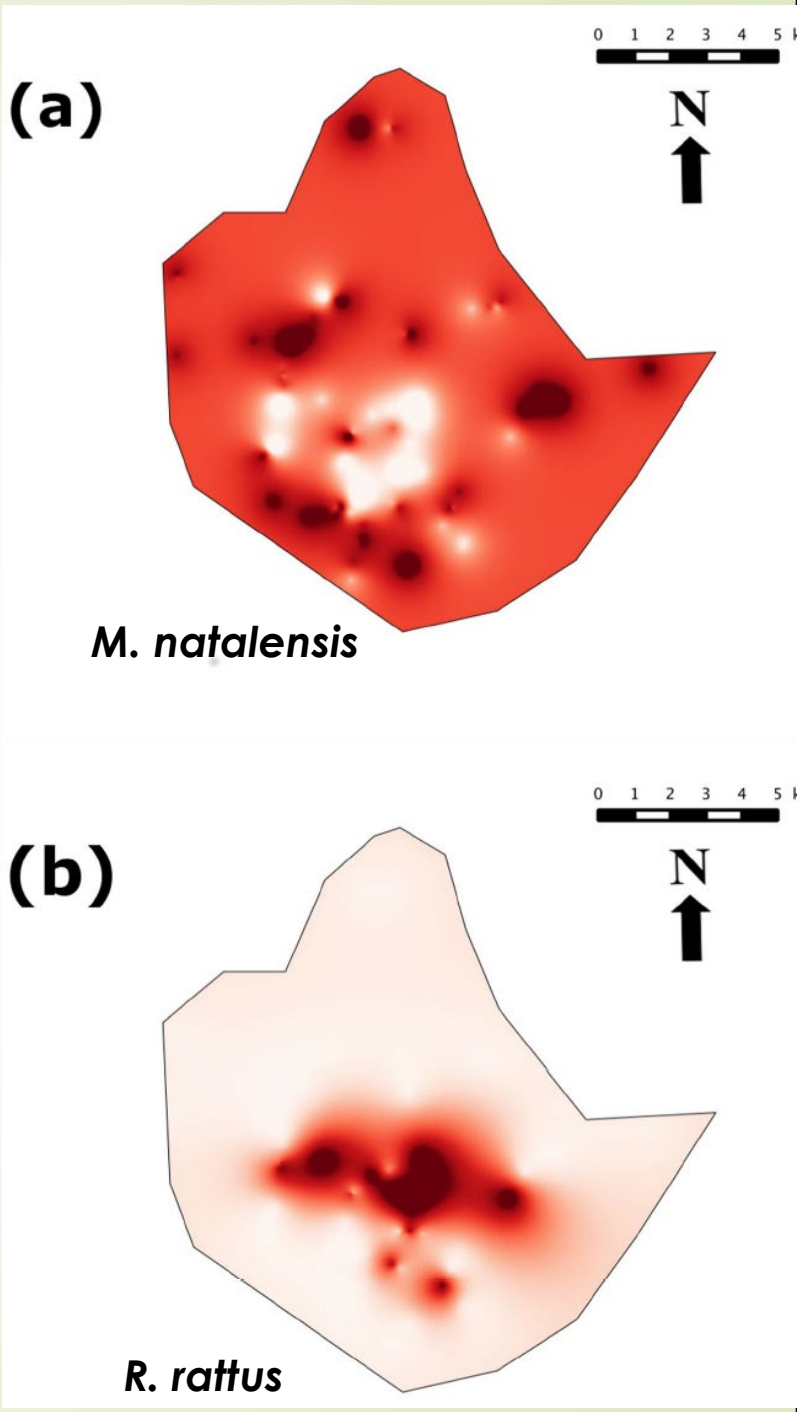
# Monitoring of a contact zone between invasive and native rodents in an urban environment:

## *Mastomys natalensis* and *Rattus rattus* at Gamkalley-Niamey"

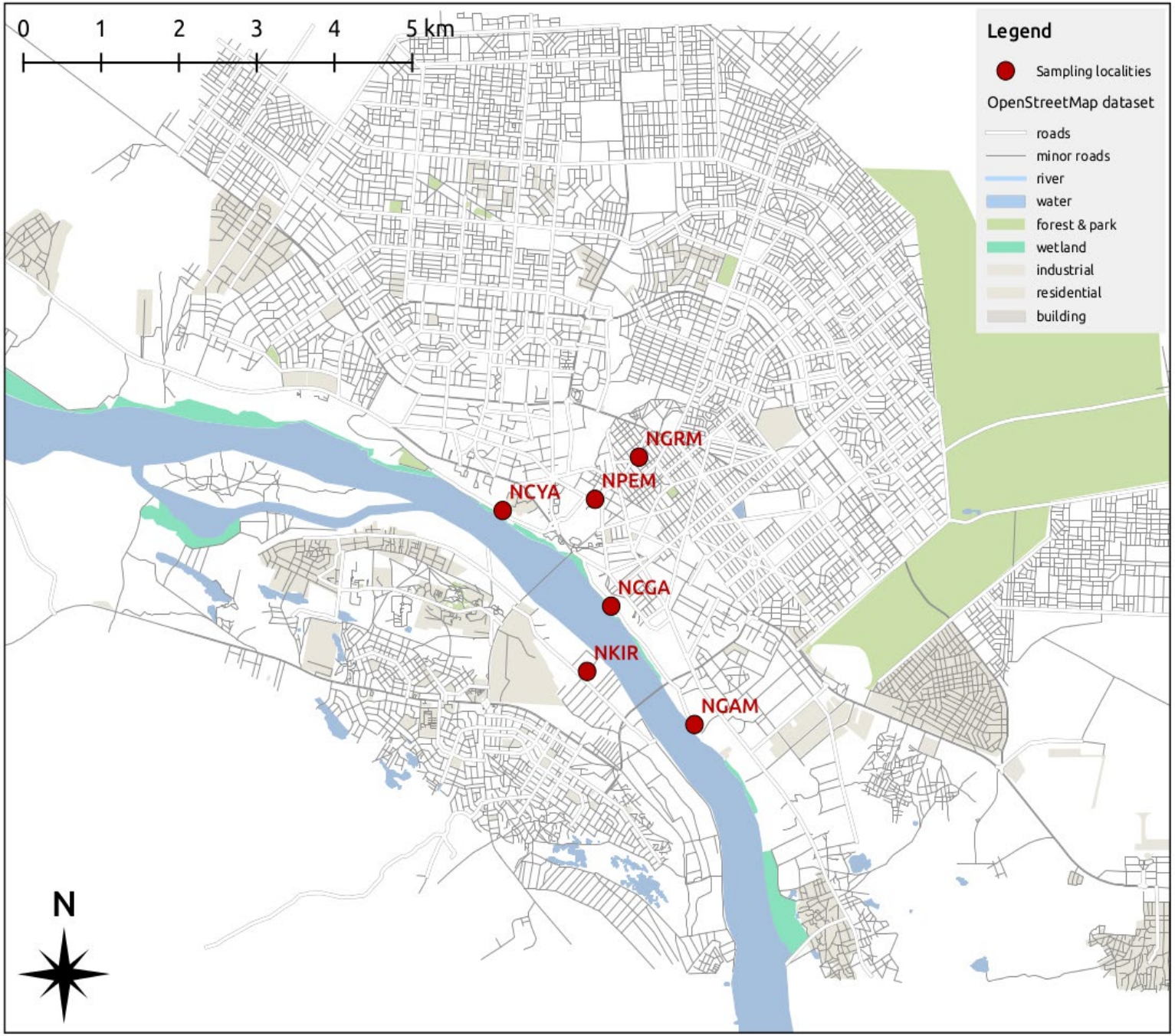
Madougou GARBA, Abdourahamane ABARA KANE & Gauthier DOBIGNY

Spatial exclusion *between M. natalensis* and *R. rattus* within the city of Niamey

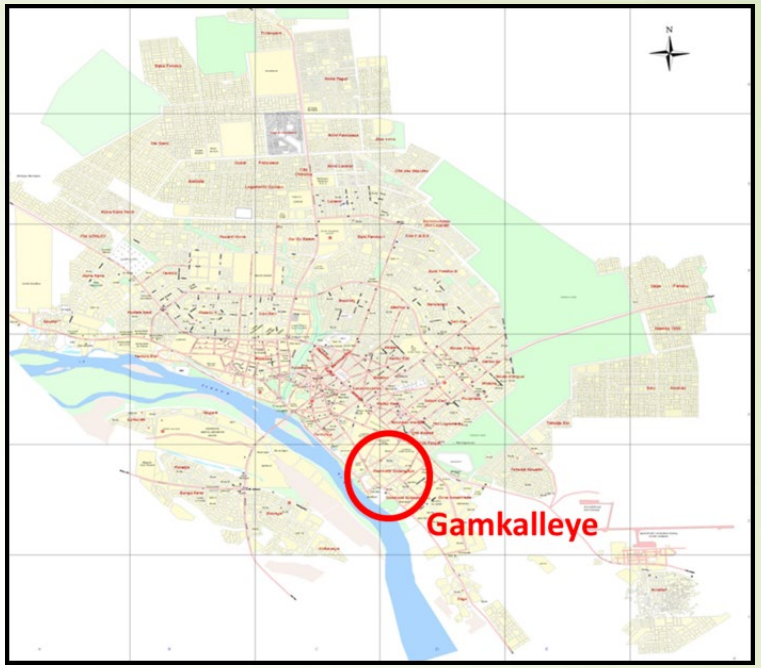



Garba et al., 2014


0
1
2
3
4
5 km
Legend
Sampling localities
OpenStreetMap dataset
roads
minor roads
river
water
forest & park
wetland
industrial
residential
building
NGRM
NPEM
NCYA
NCGA
NKIR
NGAM
N

# the Gamkalley district Niamey, Niger


Niamey was created by colonizings at the end of the 19th century..

**Gamkalley** is one of the oldest villages which will be absorbed by the growth of the city.

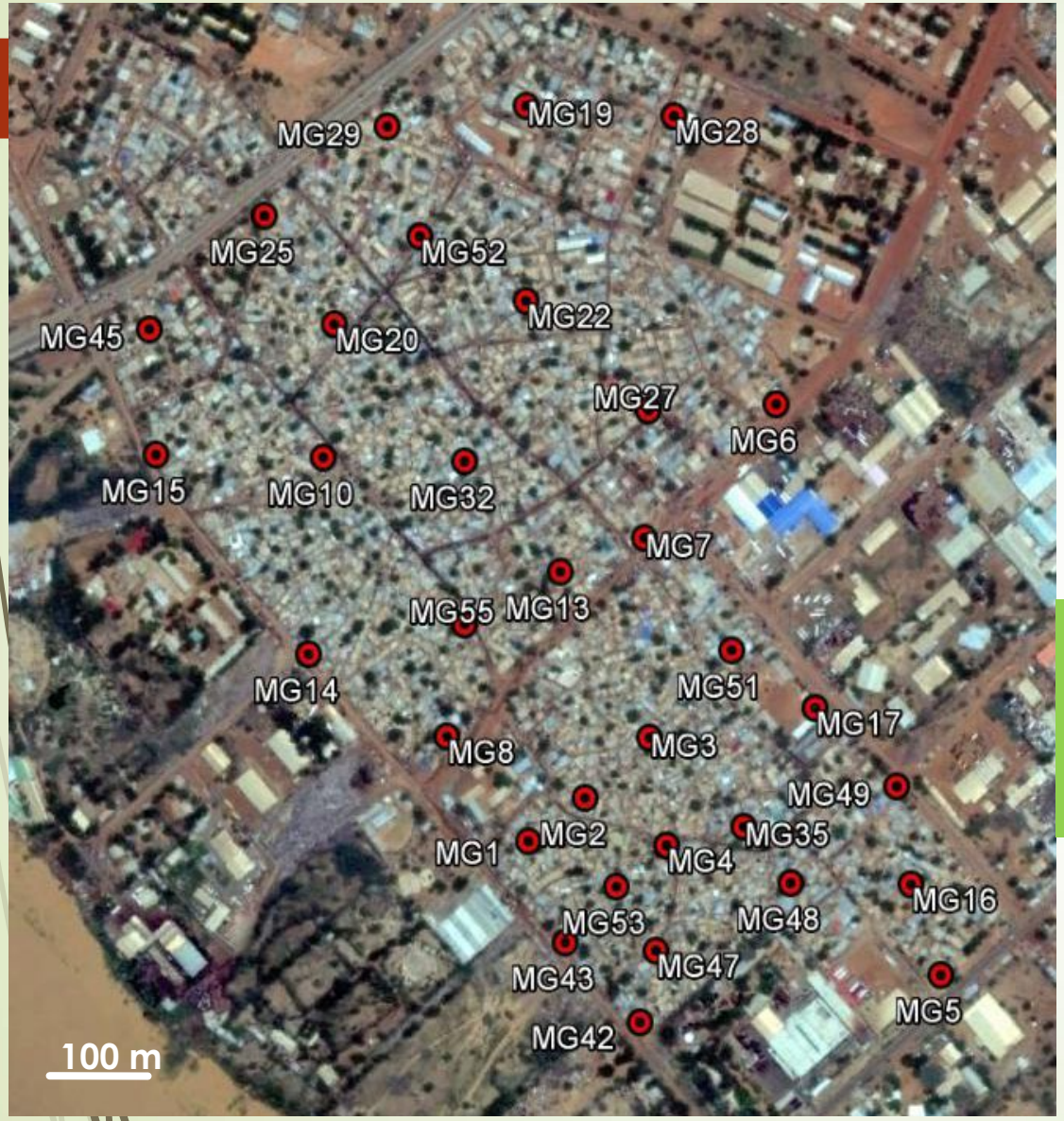
Today, it is a densely populated, very disadvantaged district, not subdivided, essentially in banco.

In **2010**, we captured only Mastomys there, while the adjacent industrial area (ex. Slaughterhouses) housed only black rats.

➔ Monitoring of a native vs invasive contact zone at the neighborhood level **from 2014-2018**

# Gamkalley district

## METHODOLOGY




October 2014

February 2015
Jun 2015
October 2015

February 2016
July 2016
February 2018

**58 sites considered**
**33 sites effectively monitored**

Mesh trap and Sherman
3-4 night-traps

Spleens, kidneys, digestive tracts

# RESULTS

**2856 Trap Nights for 7 sessions**

194 rodents and 6 shrews
154 *M. natalensis* and 40 *R. rattus*

Mastomys and Rattus mix, sometimes in the same dwellings.

Possible coexistence up to 17 months.

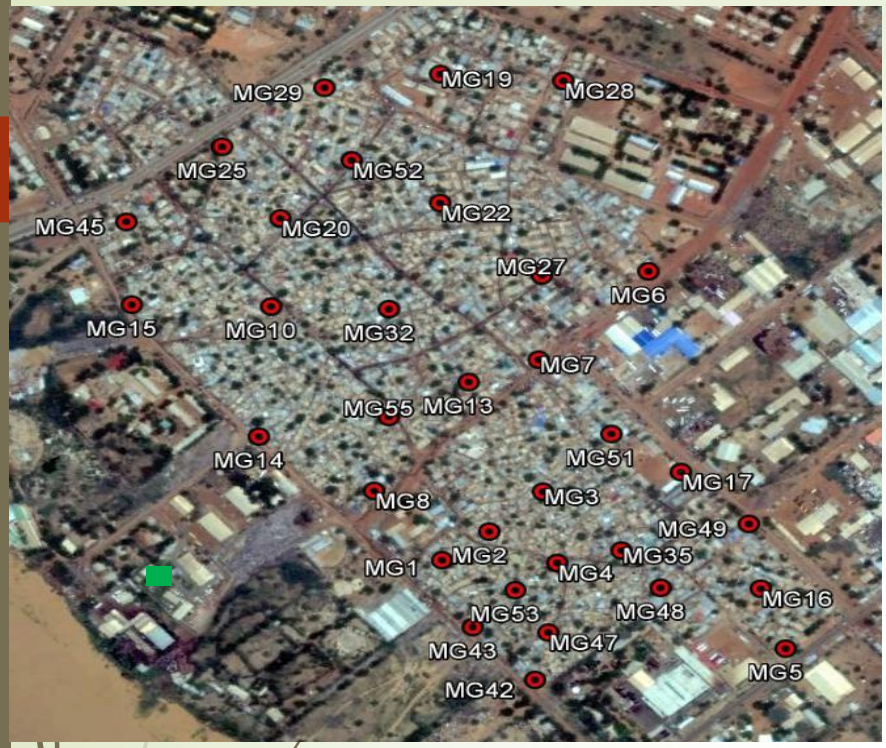
**A single site with only Rattus.**

few Rattus sites, and almost never the same ones

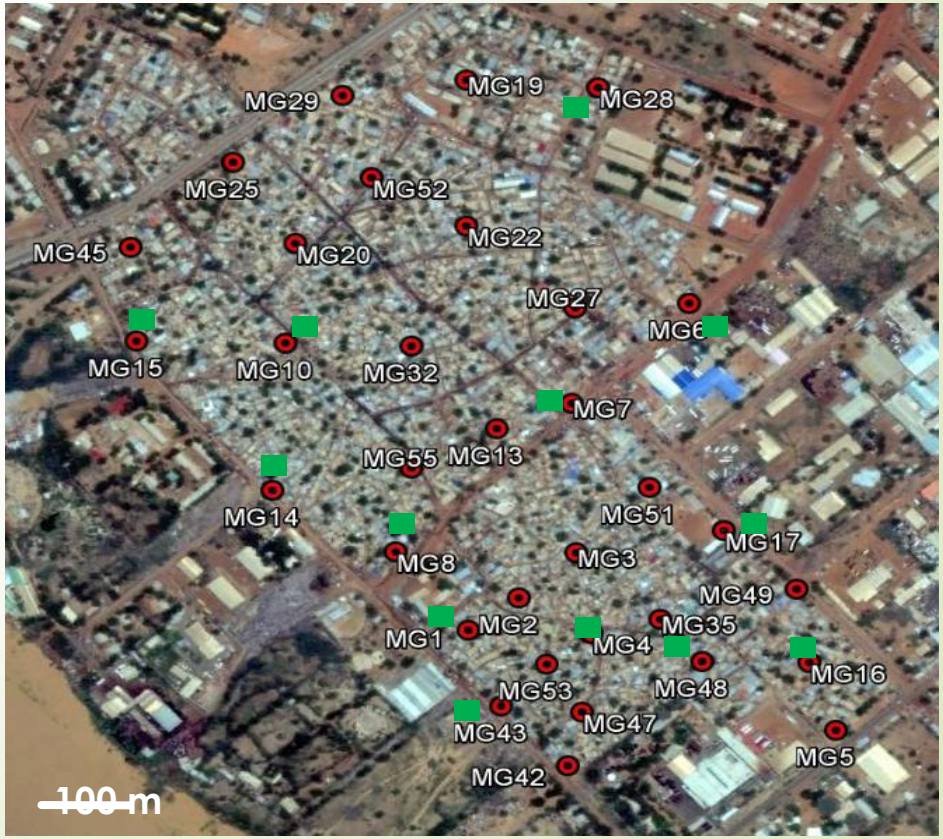
**Many sites with only Mastomys**

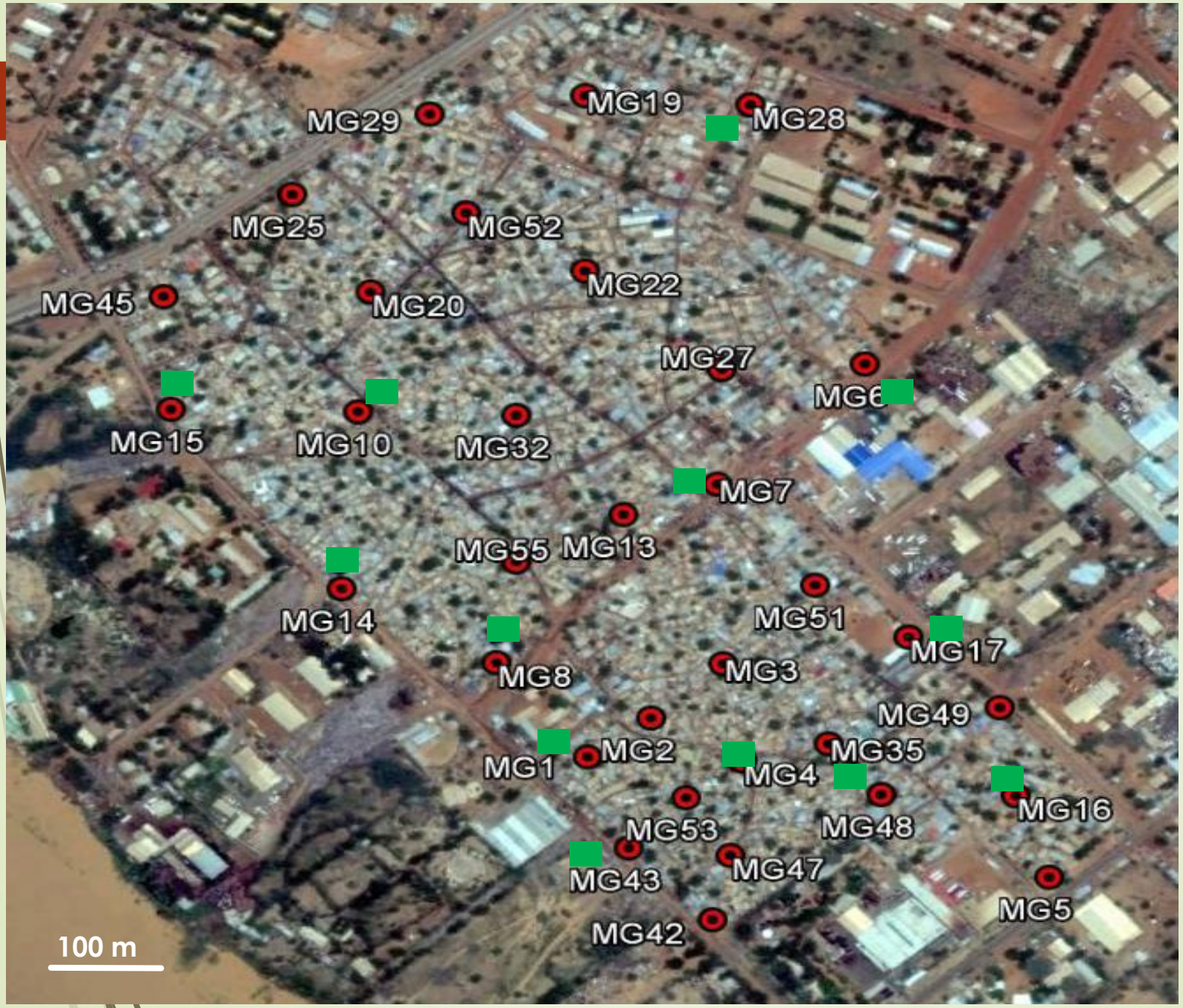
| site | lat | long | oct-14 | févr-15 | juin-15 | oct-15 | mars-16 | juil-16 | fevr-2018 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| MG1 | 13,49009 | 2,12714 | 3R+1M | na | | 1M+1C | 1R+1M | 1M | 2 R+ 5M |
| MG2 | 13,49053 | 2,12775 | | 1M | 2M | 2M | | 1M | |
| MG3 | 13,49114 | 2,12844 | | | | | | | |
| MG4 | 13,49005 | 2,12863 | 3M | | 2M | 1R | 1M+1C | 1M | 5M |
| MG5 | 13,48874 | 2,13159 | | | | | 1M | | |
| MG6 | 13,49449 | 2,12979 | | na | | na | 1M | 1R+1M+1C | |
| MG7 | 13,49315 | 2,12838 | 1R | | obs(R) | 3M | | | 2M |
| MG8 | 13,49115 | 2,12626 | 2R | | | | | 1M | |
| MG10 | 13,49396 | 2,12493 | | 1R | | | | | |
| MG13 | 13,49281 | 2,12748 | | | | | | | |
| MG14 | 13,49198 | 2,12477 | | | | 1R | | | |
| MG15 | 13,49399 | 2,12313 | | 1R | | 2M | | 2M | |
| MG16 | 13,48966 | 2,13126 | 1R+2M | 1M | | | 1M | | 1 R + 3M |
| MG17 | 13,49144 | 2,13022 | | 1R | | | 1R | 2M | |
| MG19 | 13,49748 | 2,12711 | | | | | | | |
| MG20 | 13,4953 | 2,12505 | | | | na | na | na | |
| MG20bis | 13.49545 | 2.12525 | na | na | na | | 2M | | |
| MG22 | 13,49553 | 2,12711 | | | | | | | |
| MG25 | 13,49639 | 2,1243 | 1M | 1M | | 2M | 1M | | |
| MG27 | 13,49443 | 2,12842 | 2M | | | 1M | | | |
| MG28 | 13,49731 | 2,12852 | 2R | | 10R | 4R | | 2R | 1 R |
| MG29 | 13,49728 | 2,12562 | | | | | | | |
| MG32 | 13,49392 | 2,12645 | | | | | | | |
| MG35 | 13,49024 | 2,12946 | 1M | | | | 1R+1M | | |
| MG42 | 13,48825 | 2,12835 | 1M+1C | | | | | 6M | |
| MG43 | 13,48906 | 2,12754 | 1C | | | | | 1R | |
| MG45 | 13,49525 | 2,12306 | 6M | 6M | 3M | 1C | | | |
| MG47 | 13,48898 | 2,12852 | | | | | 9M | 2M | 4M |
| MG48 | 13,48967 | 2,12997 | | | | | 4M | 2M | |
| MG49 | 13,49065 | 2,1311 | | | | | 2M | 10M | |
| MG51 | 13,49202 | 2,12932 | 2M | | 1M | 1M | | | |
| MG52 | 13,49618 | 2,12597 | 6M | 4M | 3M | 1M | 5M | 4M | |
| MG53 | 13,48963 | 2,12992 | | | | | | | |
| MG55 | 13,49228 | 2,12645 | 2M | 2M | | 2M | 3M | 2M | |

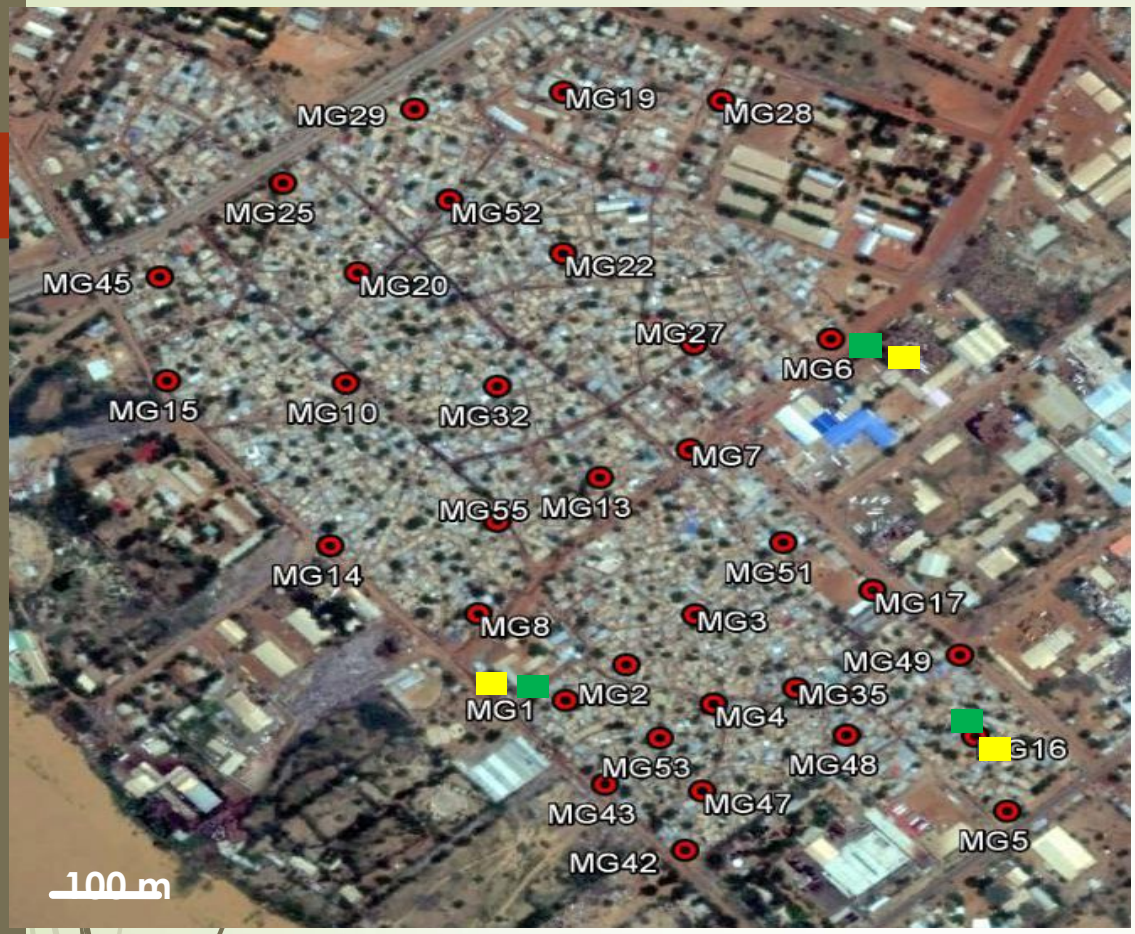
# In 2010 the rat was present only at the slaughterhouse




Between **2014 and 2018 the rat invaded the whole neighborhood.** The green dots symbolize the concessions where it was captured at least once during the **7 sessions**, i.e. 13 concessions out of the 33 monitored.




MG29
MG19
MG28
MG25
MG52
MG45
MG20
MG22
MG27
MG15
MG10
MG32
MG7
MG55
MG13
MG14
MG51
MG17
MG8
MG3
MG49
MG1
MG2
MG35
MG4
MG16
MG53
MG48
MG43
MG47
MG5
MG42
100 m




MG 6 2016 : 2 R +5 M+ C

MG 16 2014 : 1 R +2 M

MG 16 2016 : 1 R +3 M

MG 1 2014 : 1 R +3 M

MG 1 2016 : 1 R +1 M

100 m

MG 1 2018 : 2 Rattus +5 M

## CONCLUSION

**No replacement of M. natalensis by R. rattus observed at this space and time scale.**

Mastomys natalensis / Rattus rattus interactions to be studied on a scale finer spatial and/or longer temporal scale?

# Suggestion for the future:

Tracking Gamkalleye rodents with a time step larger (e.g. one per year?)
but by integrating more sites (twice?)

**Examples of questions that can be addressed:**

* Test of the hypothesis of the replacement of M. natalensis by R. rattus in an urban Sahelian environment

* Samples epidemiological studies (transfer of pathogens/parasites, role of parasites in the invasion of an M natalensis area by the black rat, etc.)

* Samples ecological studies (e.g. evolution of the fine spatial organization of urban populations of M. natalensis via population genetics).

# Thank you