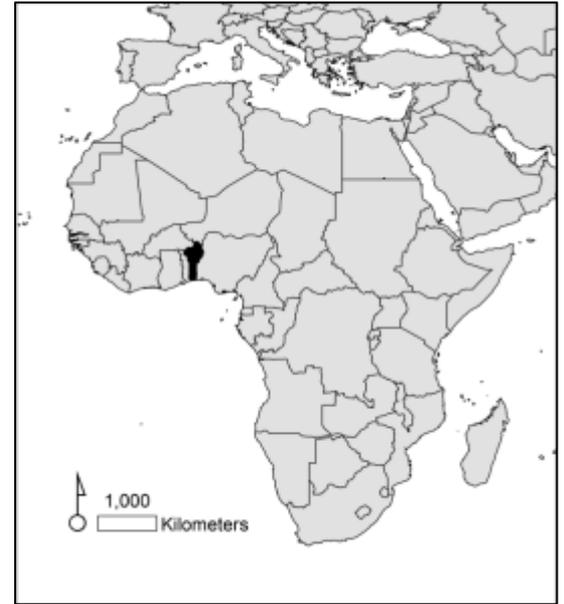




RISK MODELLING FOR AN INVASIVE TICK IN BENIN



Eva M. De Clercq, Maxime Madder, Agustin Estrada-Pena, Sophie O. Vanwambeke



Rhipicephalus (Boophilus) microplus

- Pest
 - Short life cycle
 - Acaricide resistance
 - » High burden: Anemia, ...
- Disease vector
 - *Anaplasma marginale*
 - *Babesia bovis* & *B. bigemina*
- Imported from Brazil in 2006





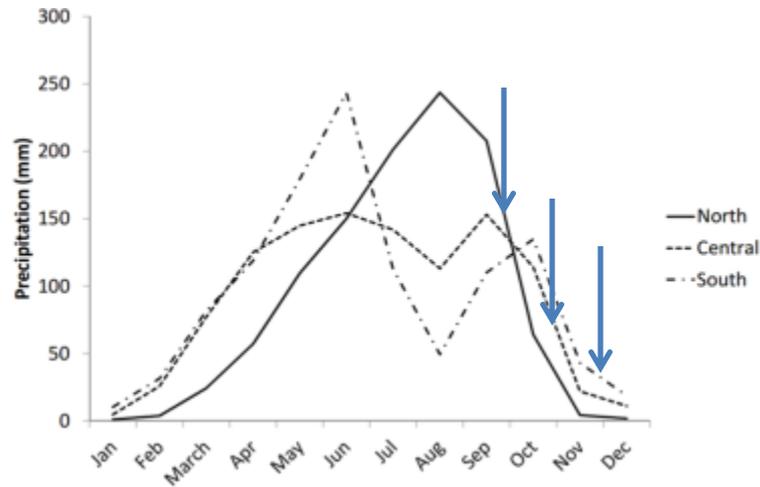
TICKRISK Objectives

- **Assessment of the feasibility and usefulness of using modern geo-technology on smartphones by local stakeholders to collect epidemiological information**
- **Production of an environmental suitability map for *R. microplus* in West Africa using data on land surface temperature and NDVI**



Field data collection

- 104 farms in 2011
 - Live ticks from cattle (2-4)
 - Capillary blood on filter paper
- September-December



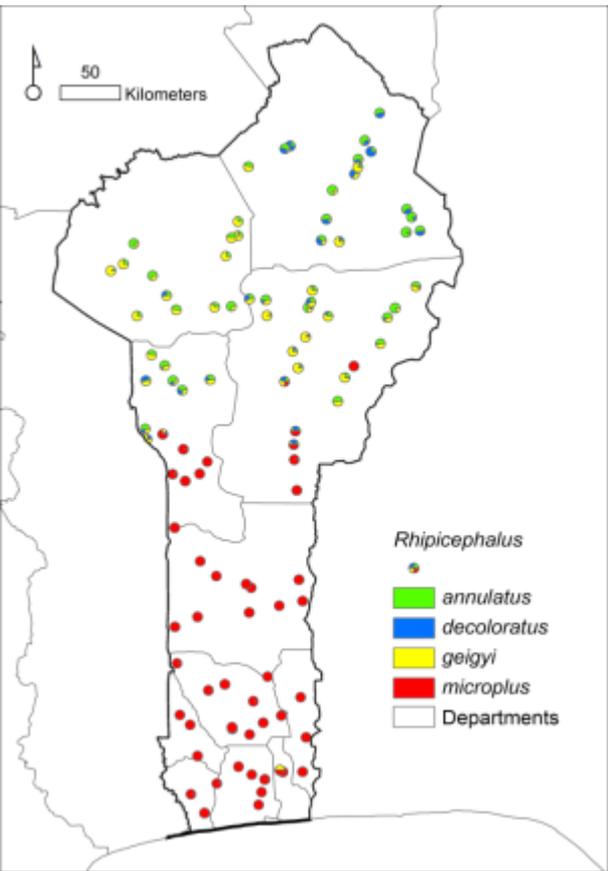
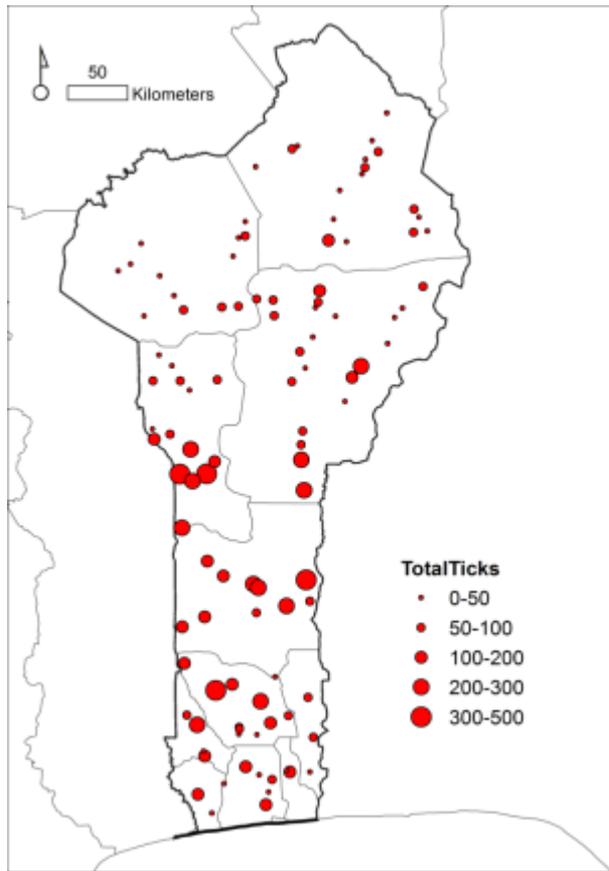
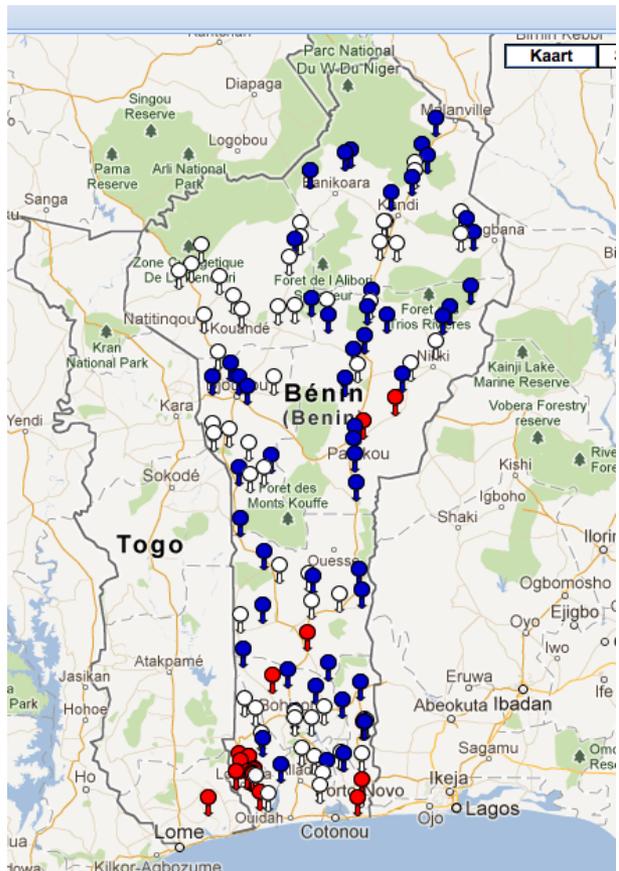


Data collection - feasibility





Current distribution of *R.(B.)* ticks





Usefulness of geo-technology

“Paper” workflow

- Filling paper forms by field workers
- Sent to the national laboratory
- Entering information in file by technicians
- Ticks + filled forms sent to coordinator center
- Identification of ticks in coordinator center
- Entering and updating files by coordinator

- No coordinates 19%
- Correct 10%
- Transform:
 - (Y,X) 17%
 - (-X,Y) 30%
 - Typing errors 24%
 - 7 <> 2, 6/9 <> 0, 3 <> 5



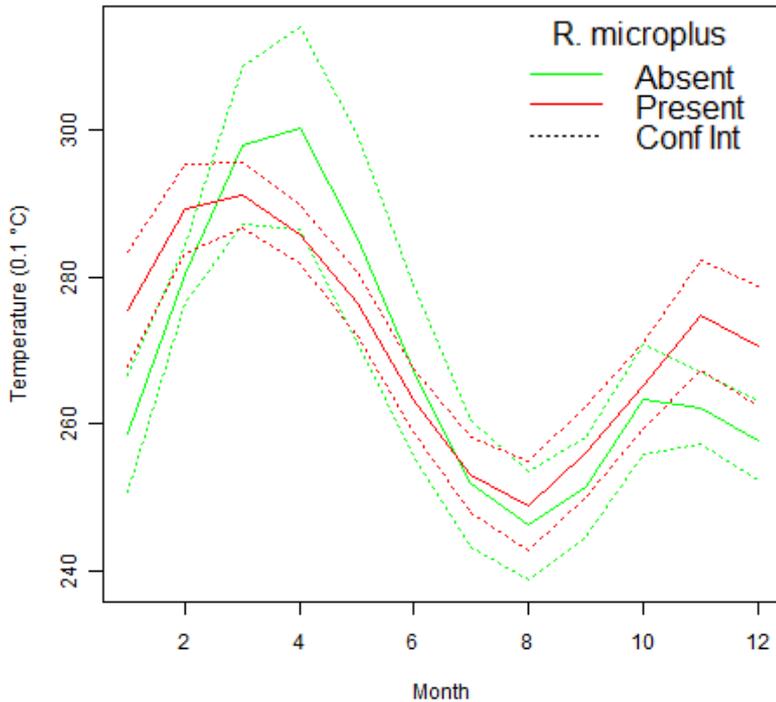
TICKRISK Objectives

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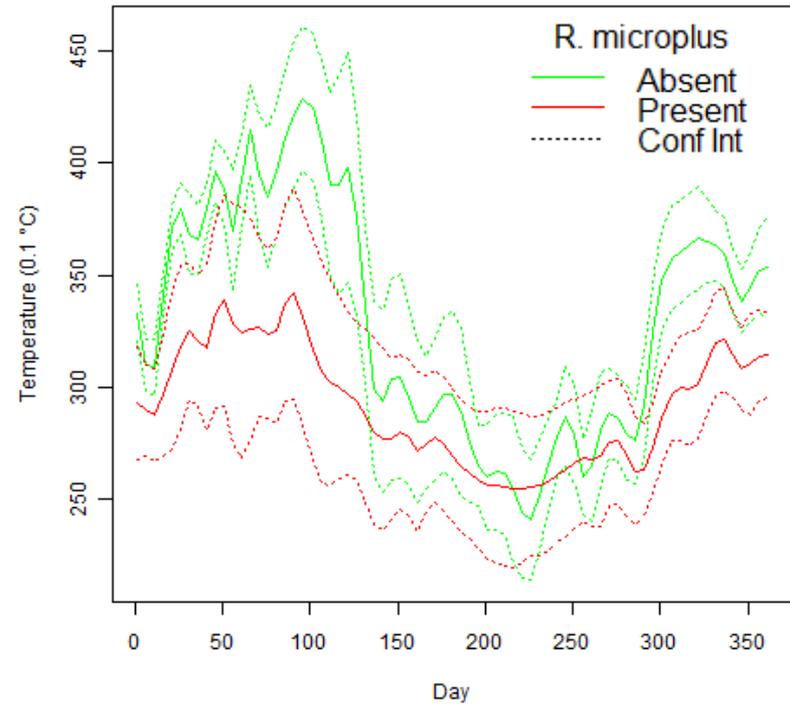


Absence/Presence ~ Temperature

Worldclim



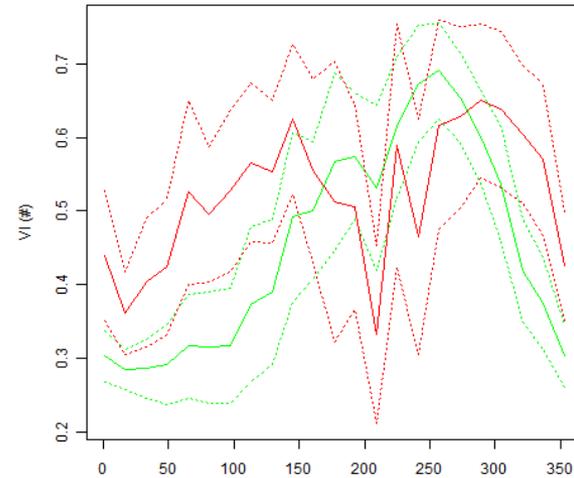
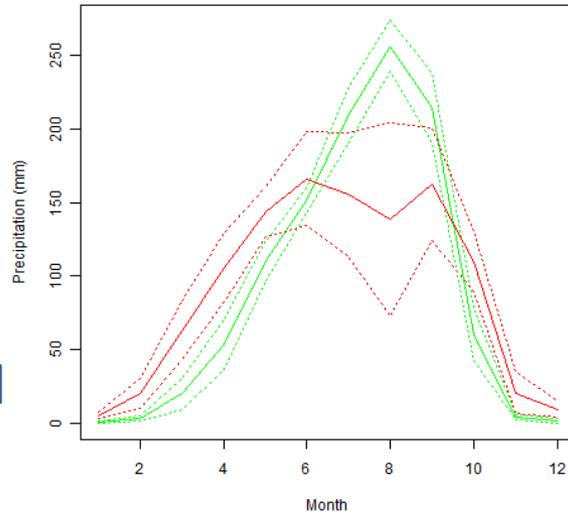
MODIS LST Day





Absence/Presence ~ Precipitation

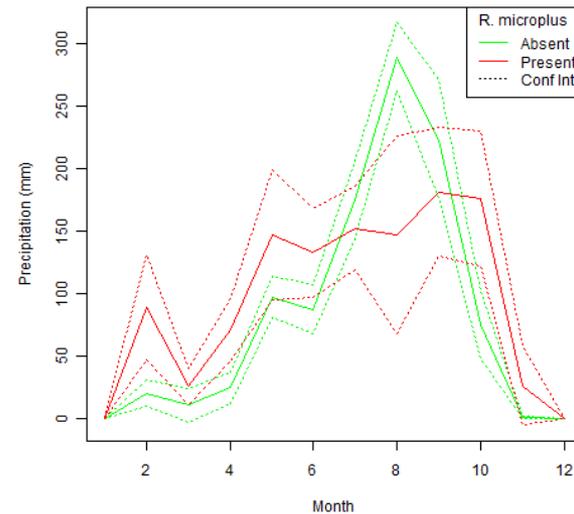
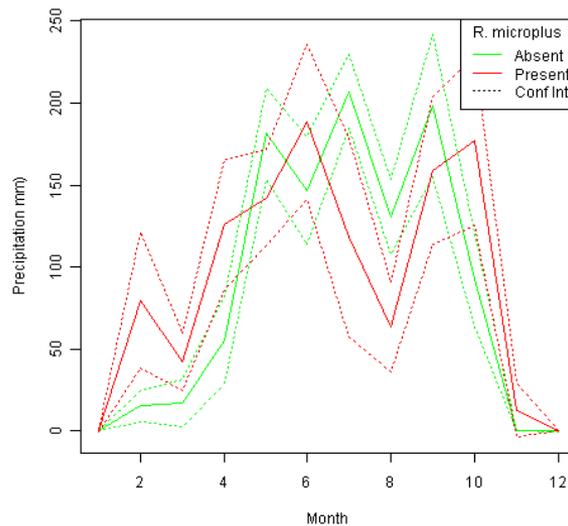
WORLDCLIM



R. microplus
— Absent
— Present
... Conf Int

**NDVI
MODIS**

RFE

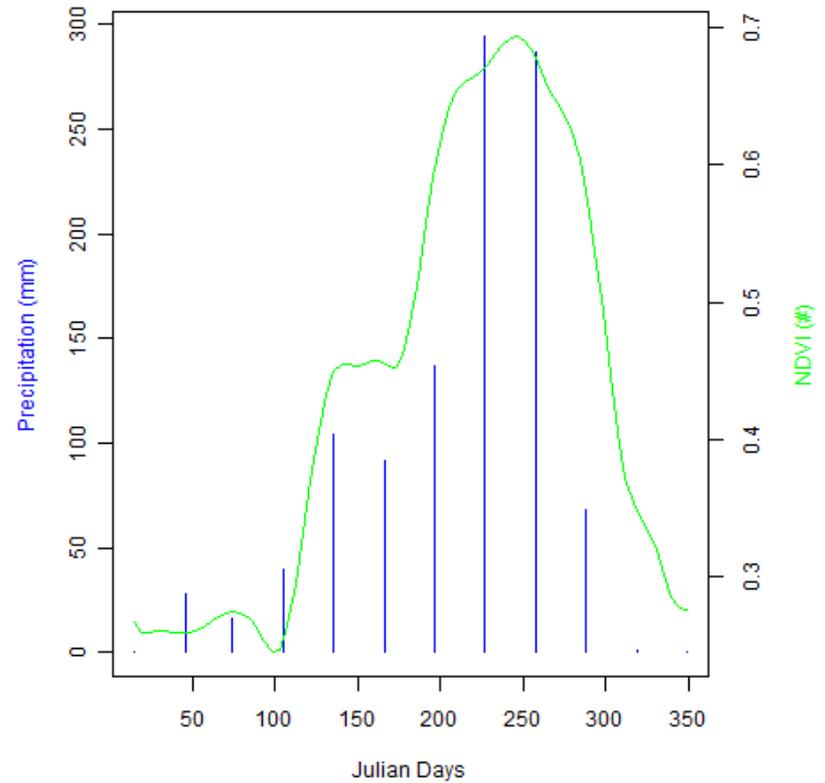
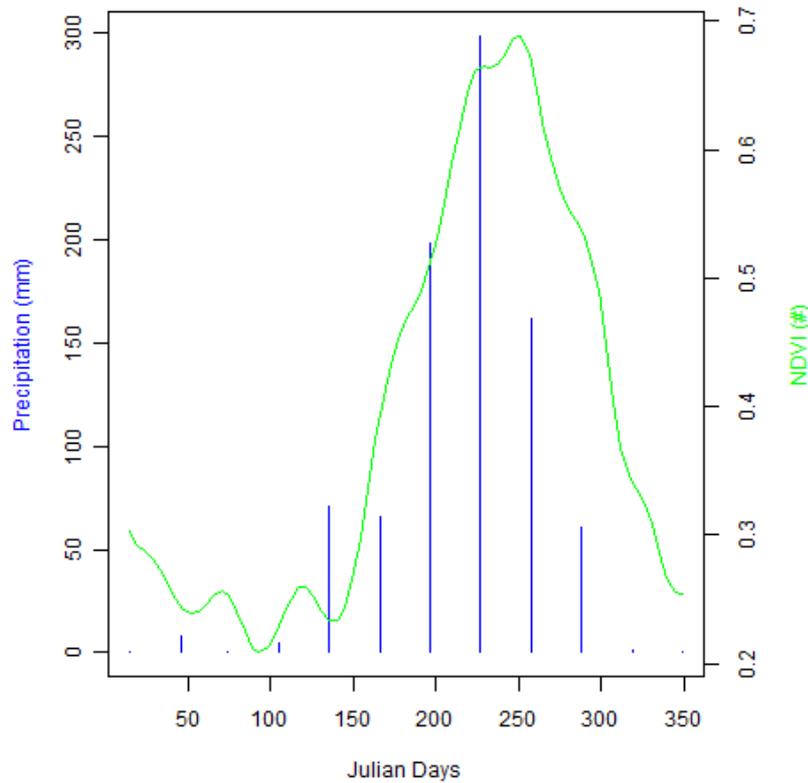


TRMM



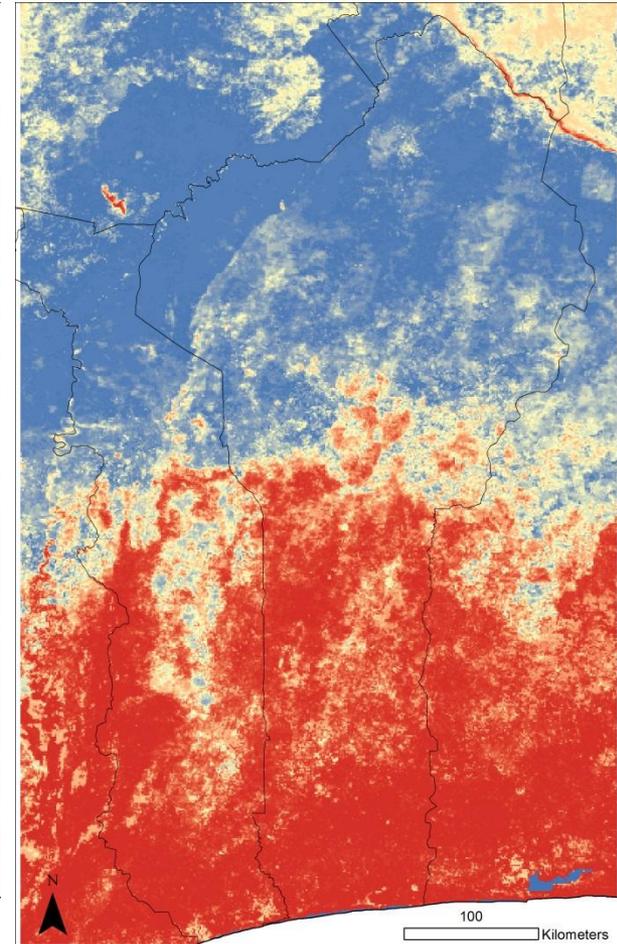
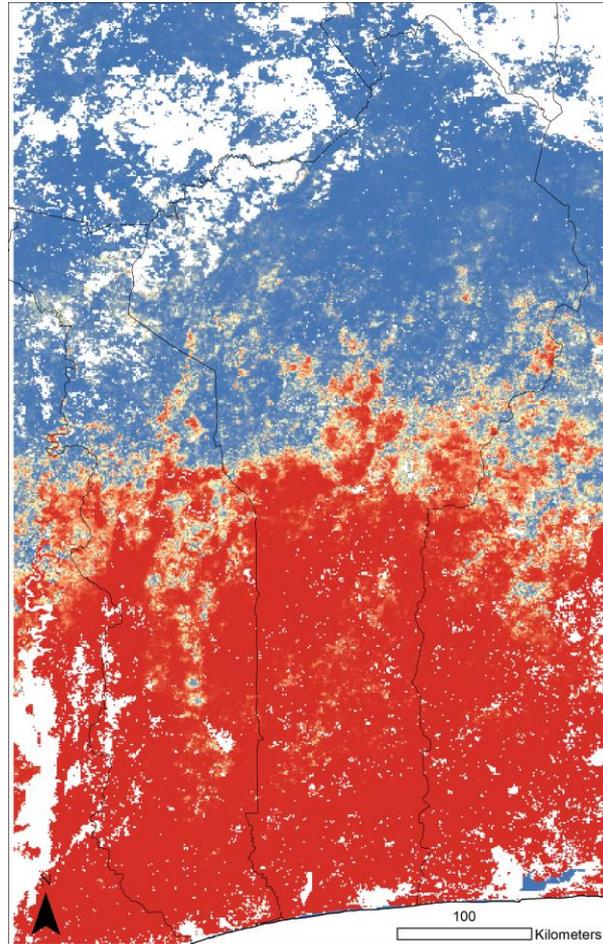
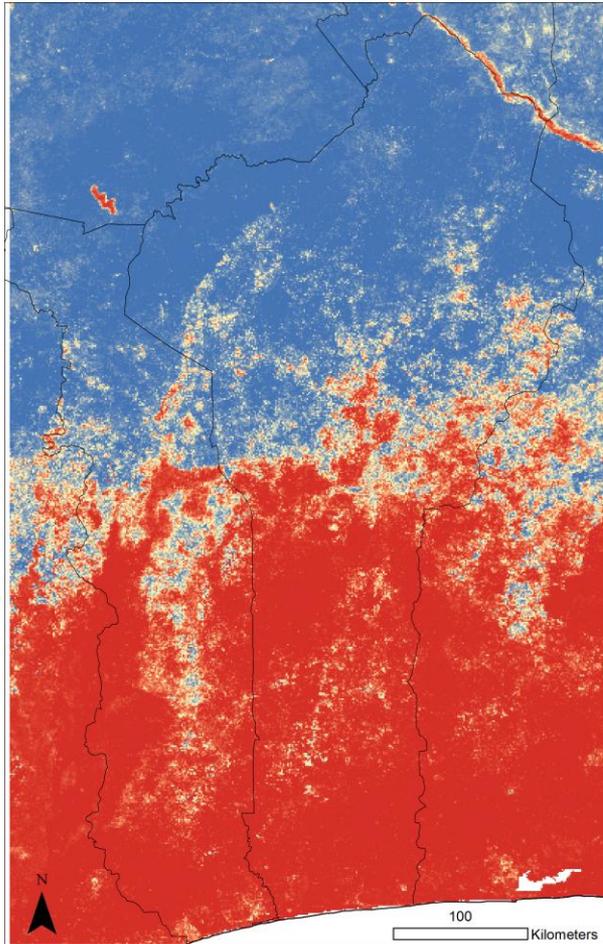


Precipitation ~ Vegetation





Models: GLM, NLDA, RF





Important variables

Worldclim

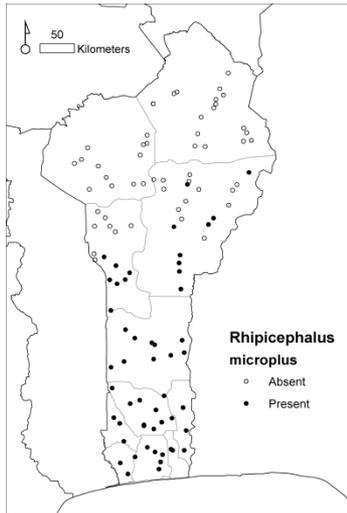
- GLM
 - Precipitation seasonality (Bio15)
 - Isothermality (Bio03)
 - Temperature seasonality (Bio 04)
- NLDA
 - Mean Diurnal Temperature Range (Bio02)
 - Precipitation of Dryest Month (Bio14)
 - Annual Precipitation (Bio12)
- RF
 - Mean Diurnal Range (Bio02)
 - Max Temperature of warmest Month (Bio05)
 - Temperature seasonality (Bio04)

MODIS

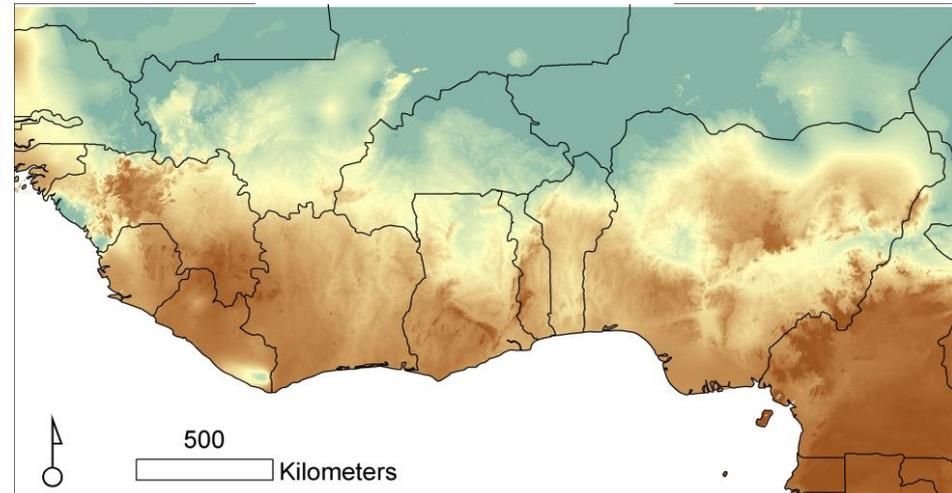
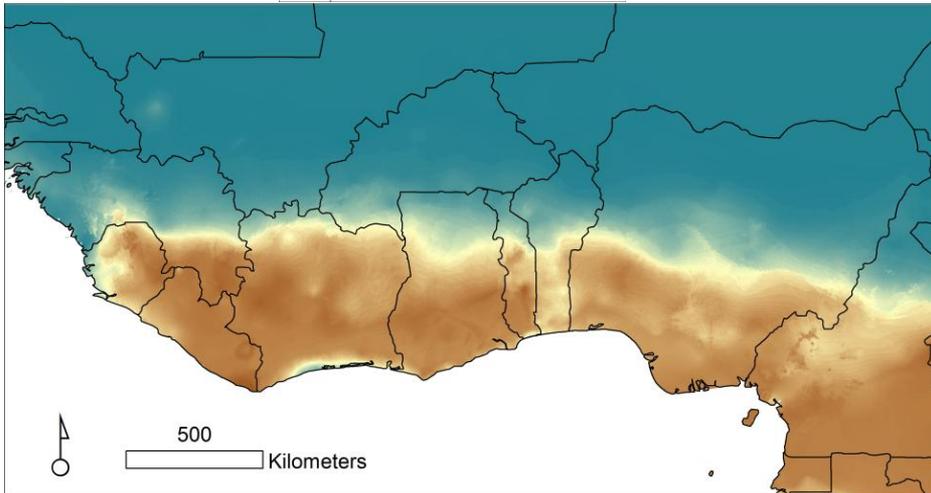
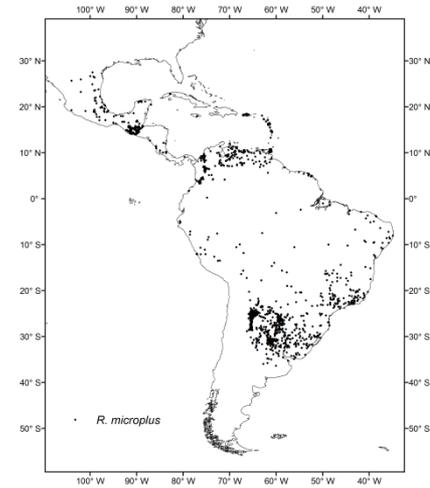
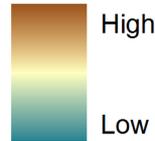
- GLM
 - LST A0
 - LST A1
 - NDVI A1
- NLDA
 - LST A0
 - LST A1
 - NDVI A1
- RF
 - LST A0
 - LST A1
 - NDVI A1



Risk map for West Africa



Climate suitability





Acknowledgements

- An 18 month project



- 3 published papers
- 5 conferences
- 7 MSc students
- 2 PhD students
- 4 network workshops



... has been a fruitful collaboration!

