

Assessment of plague risk factors related to rodent fleas in Moramanga District

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- **Plague** : zoonotic disease caused by “*Yersinia pestis*”. Rodent is the main reservoir and transmitted on human by their fleas.



Rate of infection :
molecular analysis



Risk factors related
to fleas ?

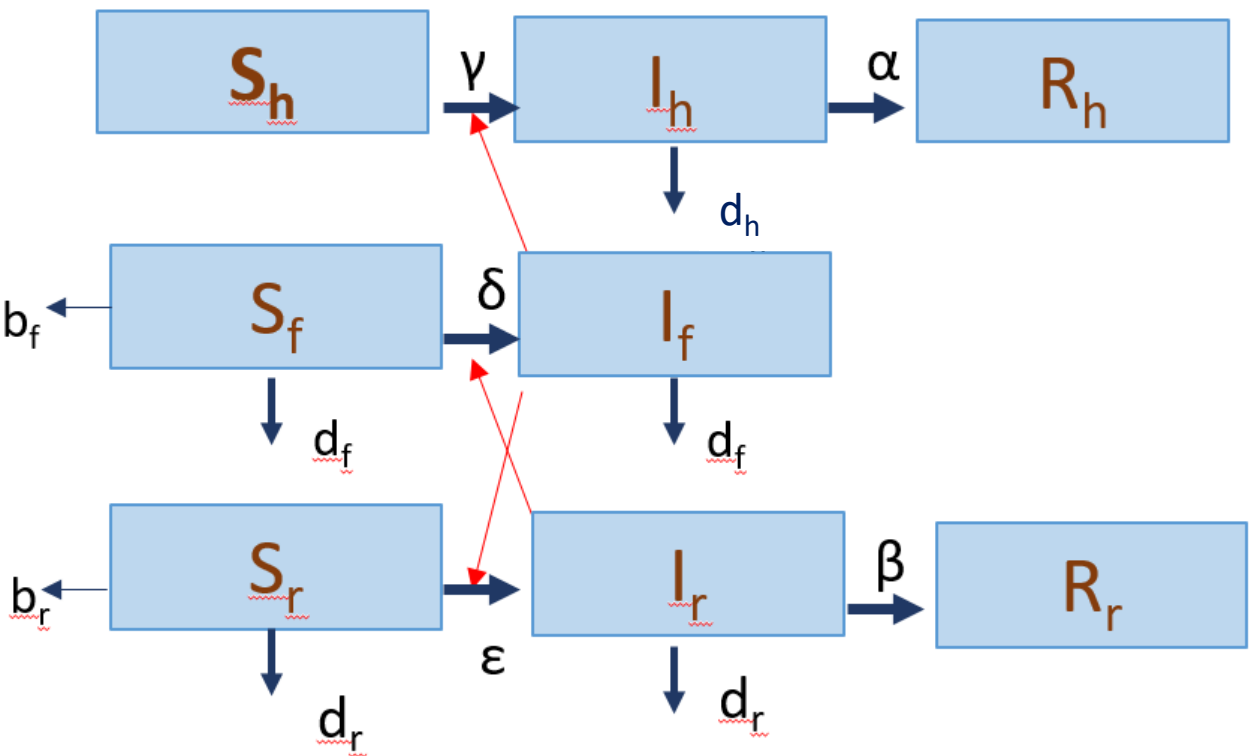
- Statistical model: What are the risk factors for plague infection in fleas?
- Mechanistic model: How do fleas maintain the transmission of the plague?
- Acknowledgment: Cathucia, Rila, sister for reading, all E²M² participants.

1. Statistical model : What are the risk factors for plague infection in fleas?

- Data : collect of fleas on the rodent captured in Forest of Moramanga.
- Response variable “y” : fleas is infected or not (positive/negative).
- Potential predictors “x” : T°, species fleas and host, habitat.
- Family : Binomial
- Link : Logit
- R code :


```
glmer(Res_PCR~Temp+Saisonalite+Speciesf+Speciesh+(1/Habitat),family=binomial,data=BDD Ankazobe)
```
- Hypothesis : the infection of fleas is associated by this factors (T°, saisonality, species fleas, host or habitat) (Yes/ No).

2. Mechanistic model : How do fleas maintain the transmission of the plague?



States :

- S_h : Suceptible humain
- S_f : Suceptible fleas
- S_r : Suceptible rodent
- I_h : Infection humain
- I_f : Infection fleas
- I_r : Infection rodent
- R_h : Recover humain
- R_r : Recover rodent

Process :

- d_f : death humain
- b_f : birth fleas
- d_f : death fleas
- b_r : birth rodent
- d_r : death rodent
- δ : transmission coefficient fleas
- ε : transmission coefficient rodent
- γ : transmission coefficient human
- β : recovery rate rodent
- α : recovery rate human

Next Steps :

- Make a study in different area (urban).
- To compare the factors risk between the different area.
- To propose a better response before each season for that the cases of plague each year decrease.

Misaotra tompoko! 😊