A multi-agent model of entomovectoring for fruit fly management in Senegal

Esther Gnilane DIOUF

Thesis Director : Pr Saliou NDIAYE

Co-director: Dr Cyril PIOU

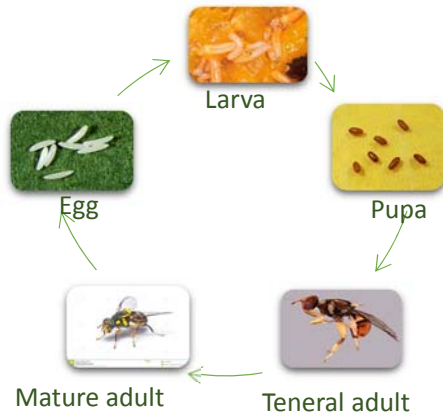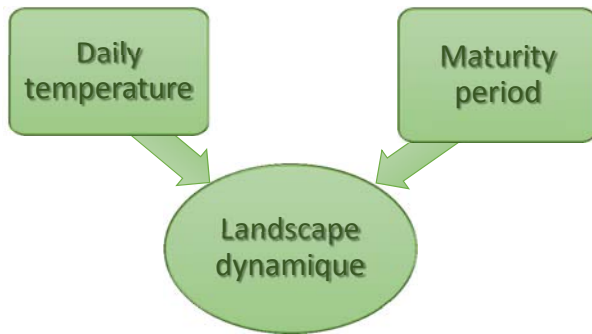**Supervisor** : Dr Thierry BREVAULT

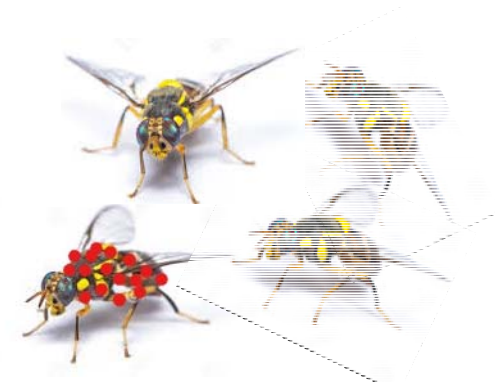Dakar, March 02 2021

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Question

Under which conditions would entomovectoring be effective to protect a set of mango orchards in Senegal?

Estimate fruit production losses according to
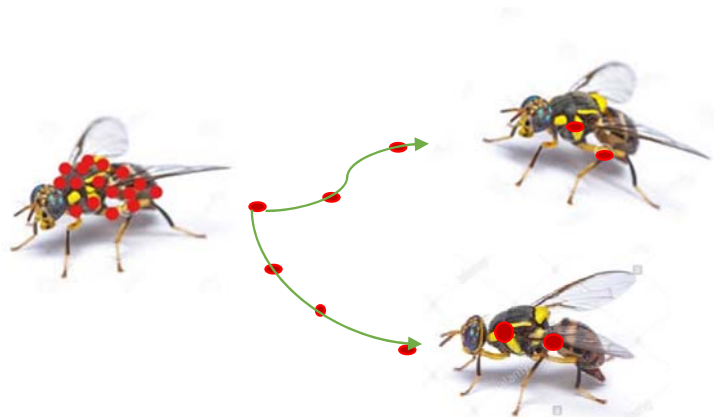(number of released individuals, release date,
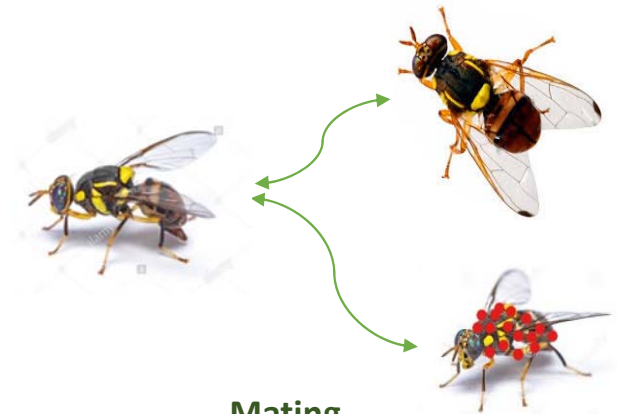frequency, site, pulse)

Modelled processes

Daily temperature, Maturity period → Landscape dynamique

Larva, Pupa, Egg, Mature adult, Teneral adult

Development and mortality

Premating behavior
(lek, partner choice)

Pathogenic transmission and mortality

Egg laying
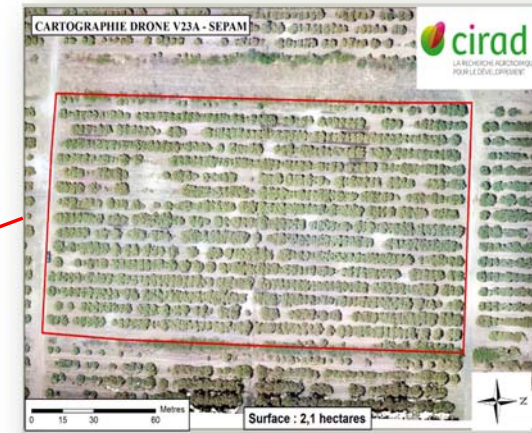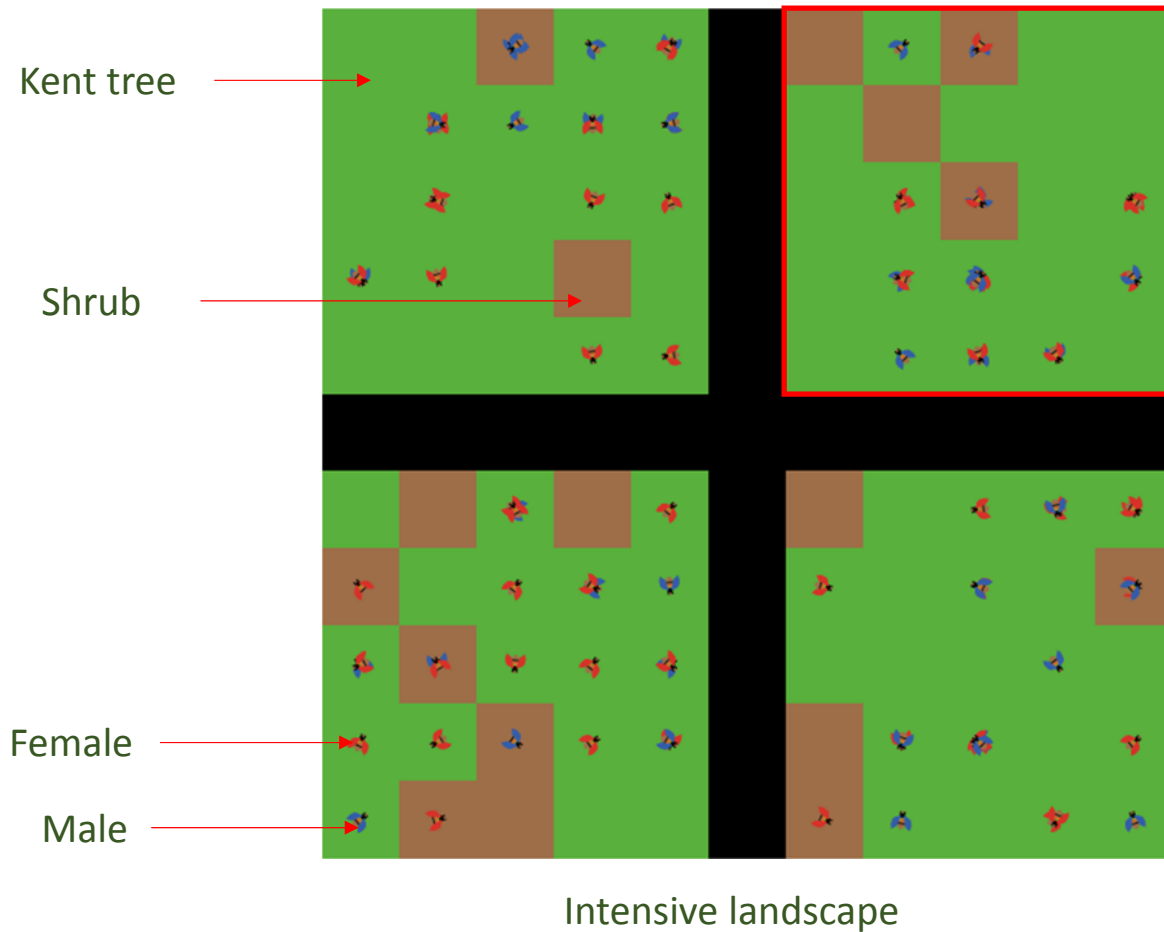

Mating

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Initialization

Kent tree

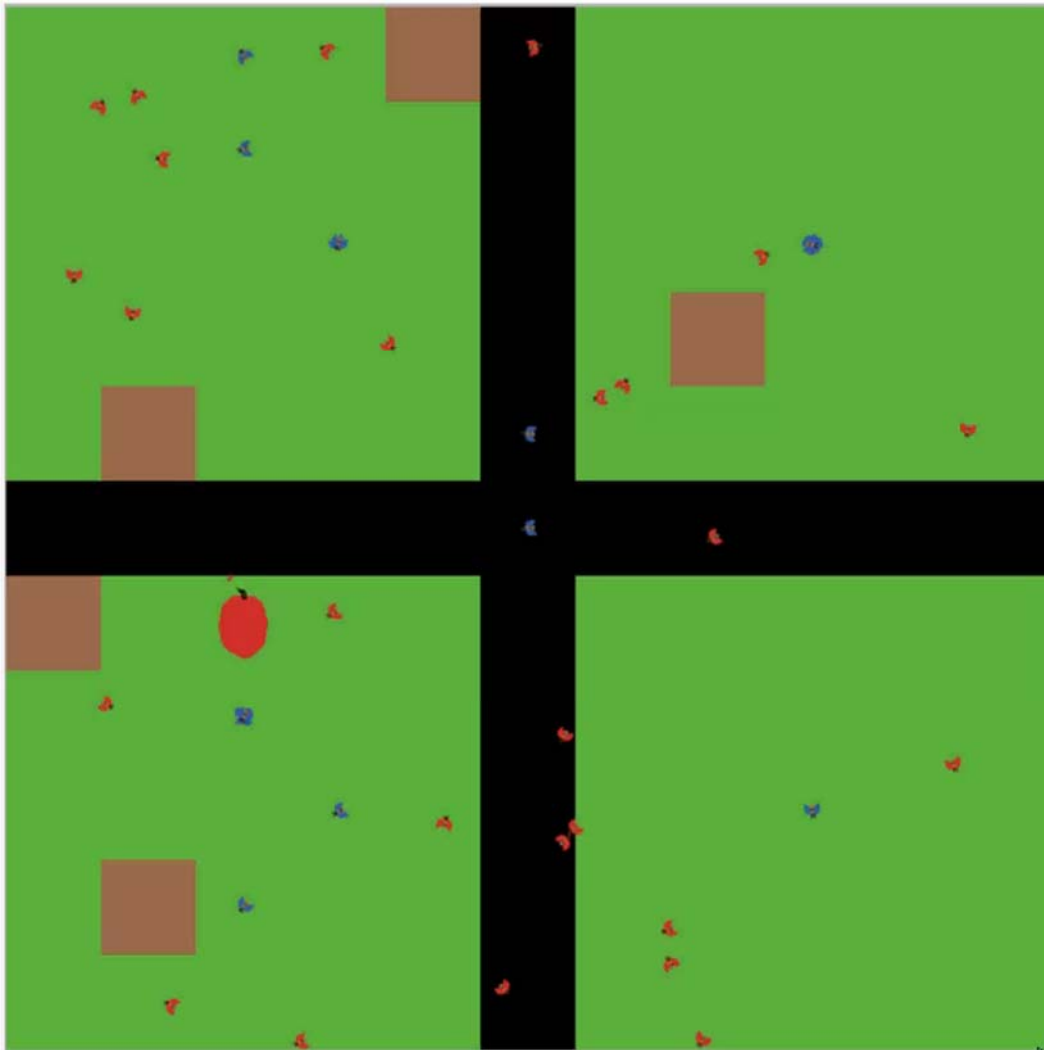Shrub

Female

Male

Intensive landscape

- Patch acceptance: 116 eggs
- Initial fly number: 100
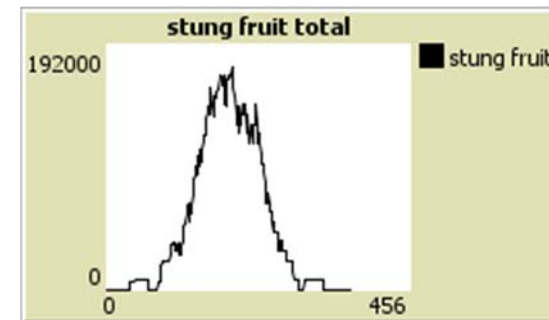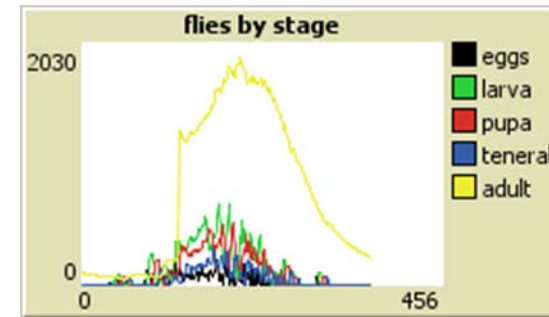- Ratio female/male: (1:1) (Yonow et al.2004)

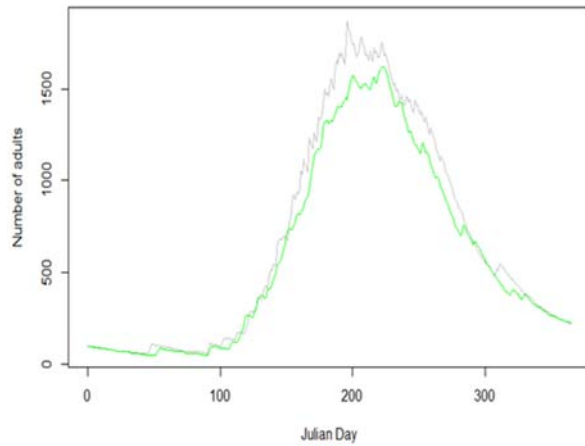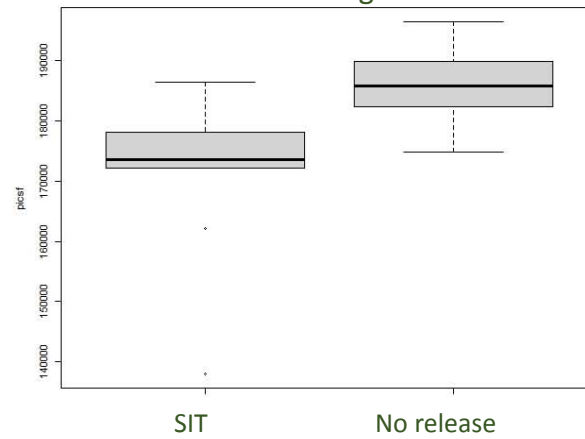Simulation platform: Netlogo

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Simulation example

Model outputs example
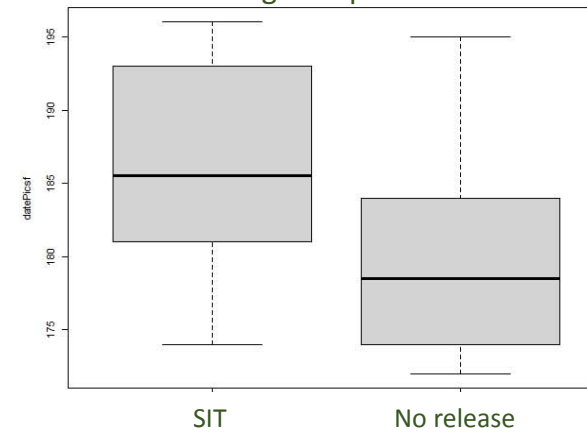
Results 1/2

1. No release / sterile male release
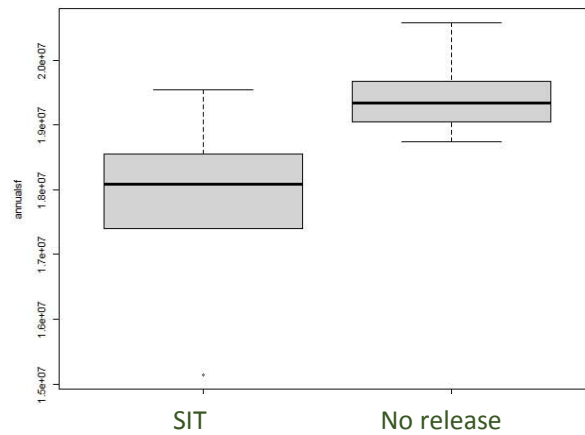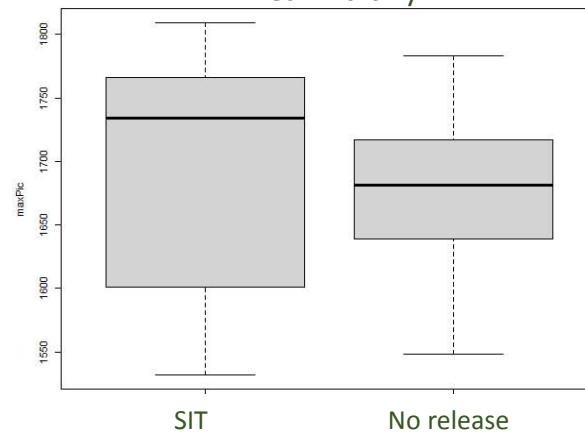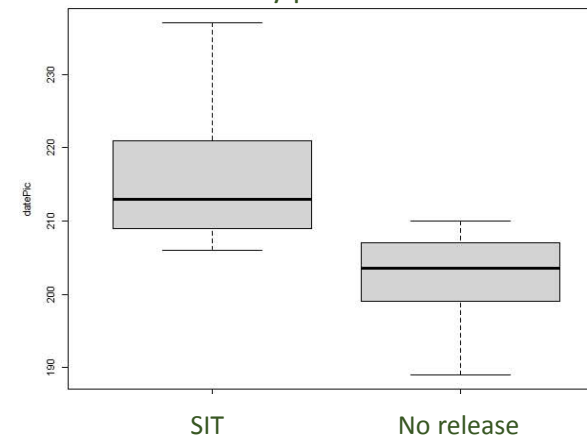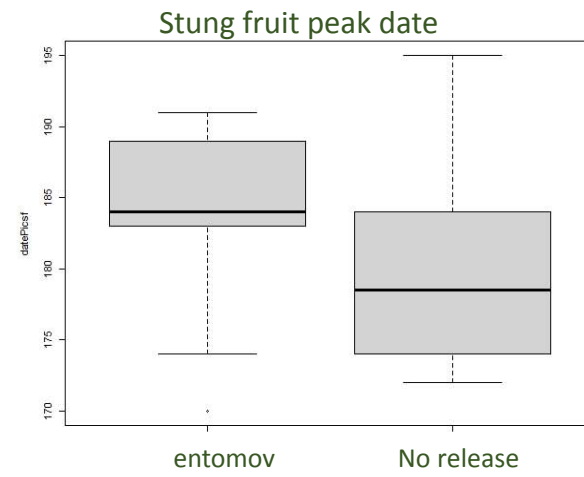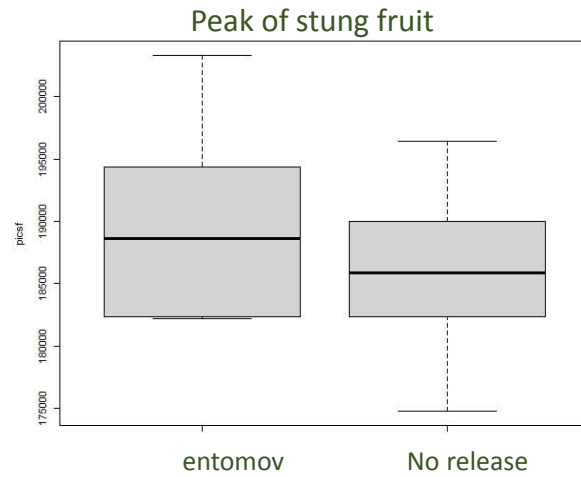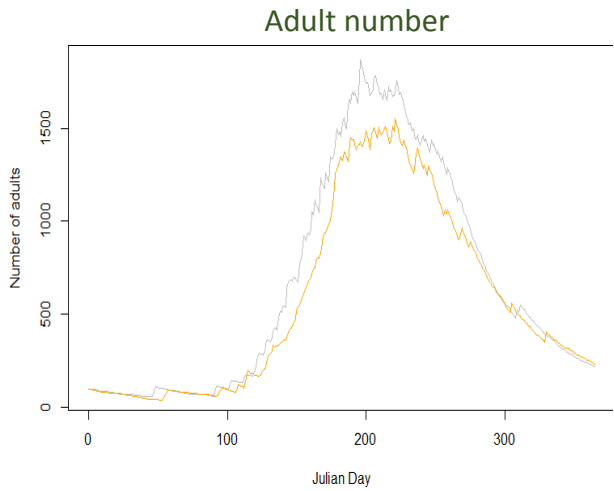
Results 2/2

2. No release / sterile infected male release
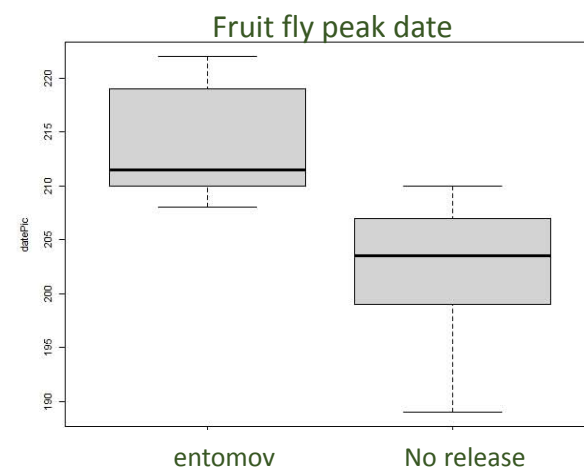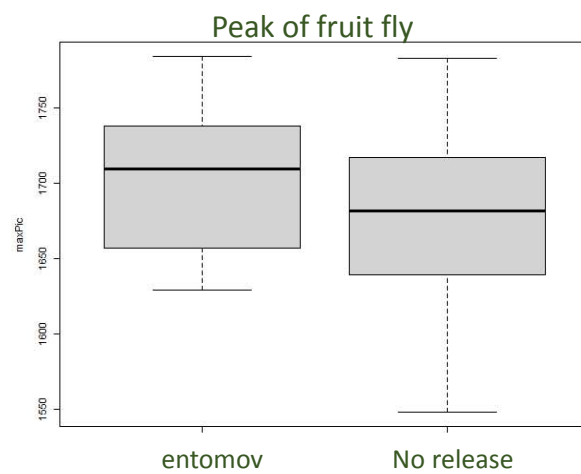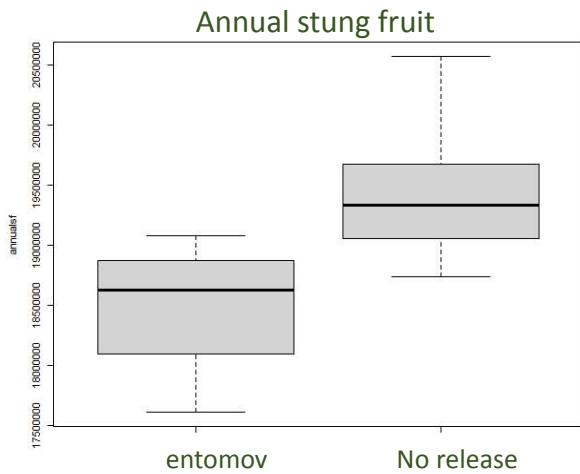
Conclusion

❑ Fly population decrease

❑ Results are more homogenous in the case of a sterile male release
(for the moment, no special interest of entomovectoring)