Impacts of Tropical Deforestation and Fragmentation on Mosquito Community Dynamics

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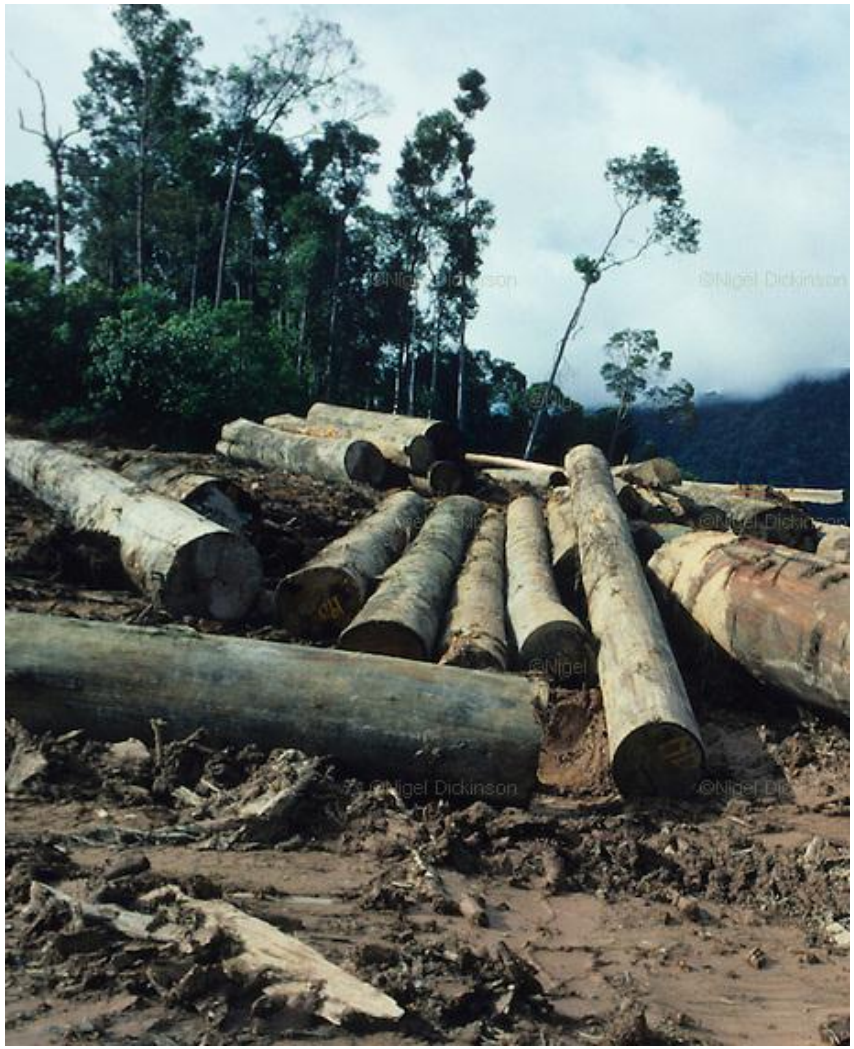
NATURAL ENVIRONMENT RESEARCH COUNCIL

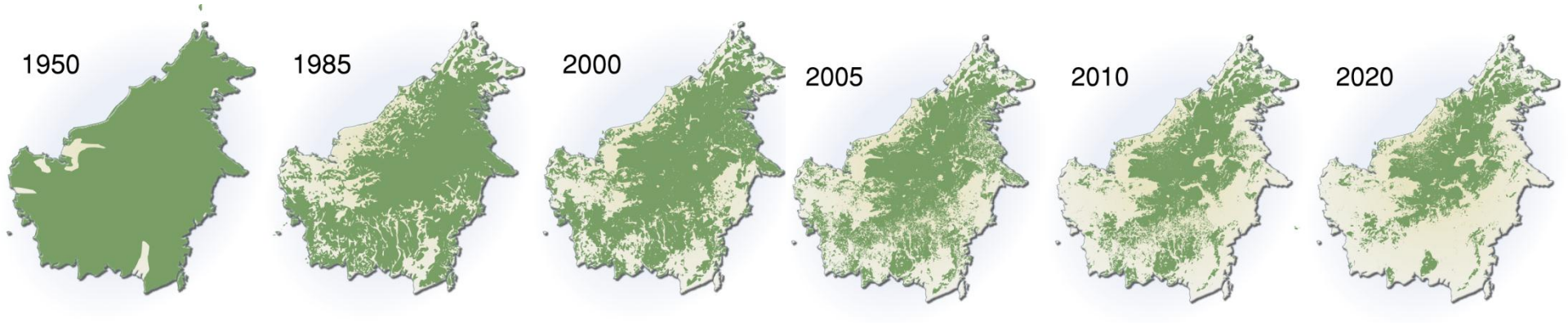
Land Use Change



- Land use and land cover changes modify:
  - temperature
  - relative humidity
- Affects mosquito:
  - survival
  - density
  - distribution

Deforestation in SE Asia

- It is predicted that South-east Asia could lose up to three quarters of its original forest and 42% of its biodiversity by 2100 (Sodhi *et al.* 2004).
- Malaysia is one of the top fourteen deforesting countries, losing 250,000 ha or more annually (McMorrow & Talip 2001)



Bradshaw *et al.* 2008

Research Question

- What is the effect of land use change on:
  - Abundance
  - Community composition
  - Biting times

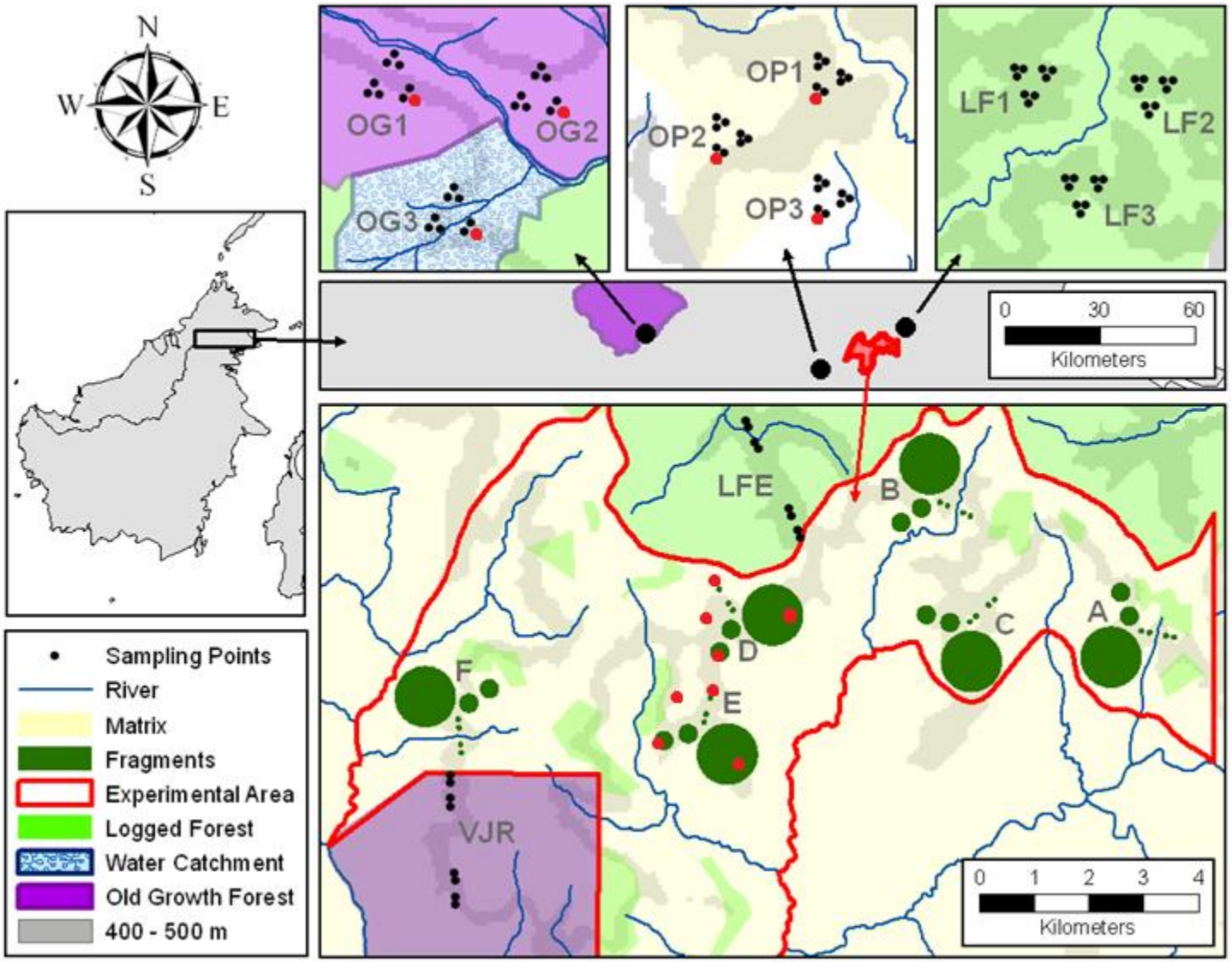
  of mosquitoes in Sabah, Malaysia

Old growth forest

Logged forest

Oil palm plantation

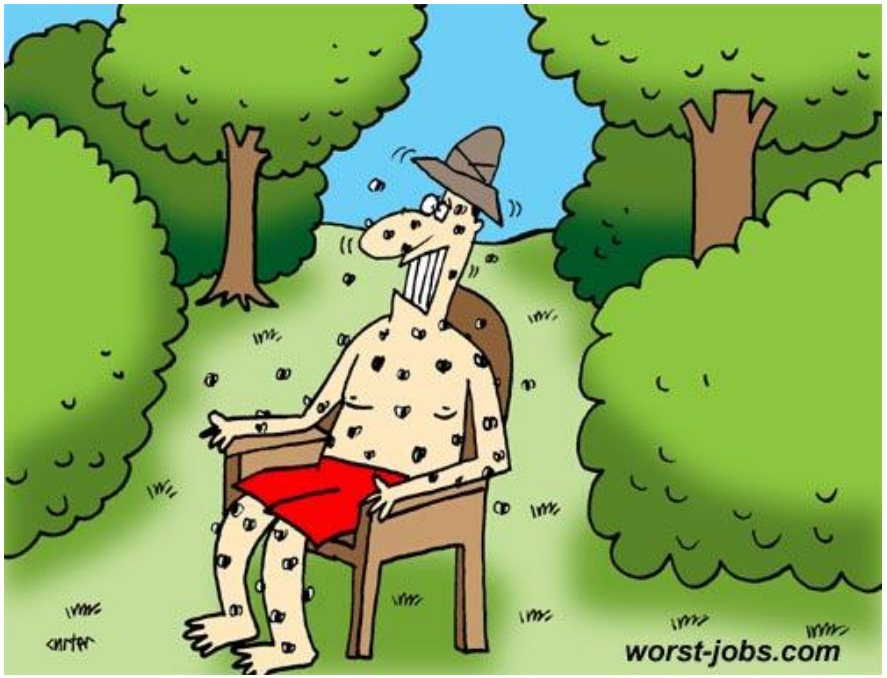
Field site (S.A.F.E. Project)



Ewers *et al.* 2011

Bare leg catches

- Human landing catches (5-11pm)
- 92 night collections within oil palm plantations, old growth forest and logged forest
- To collect anthropogenic crepuscular mosquitoes
- Red torch light to seek out mosquitoes

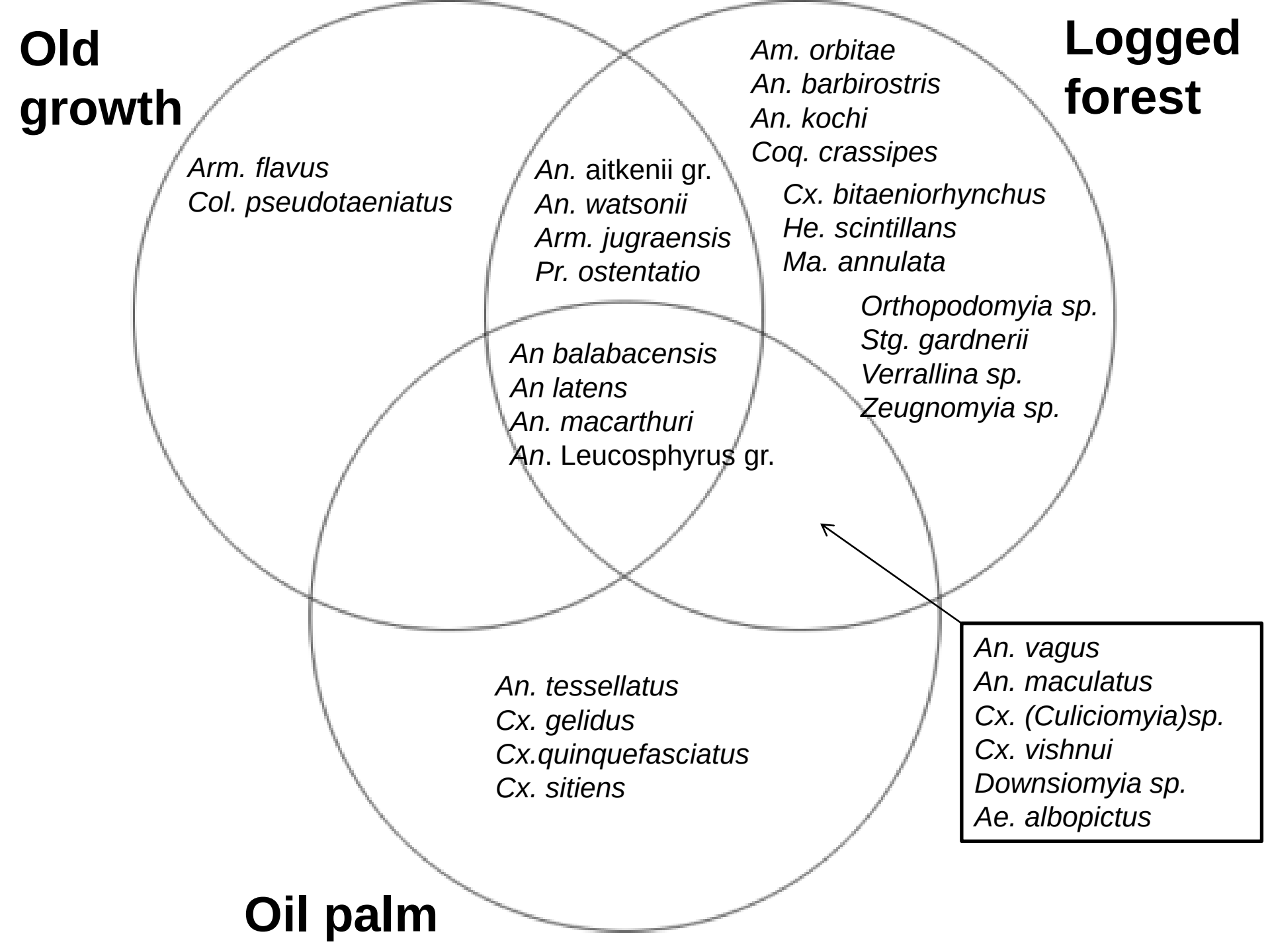


Species collected

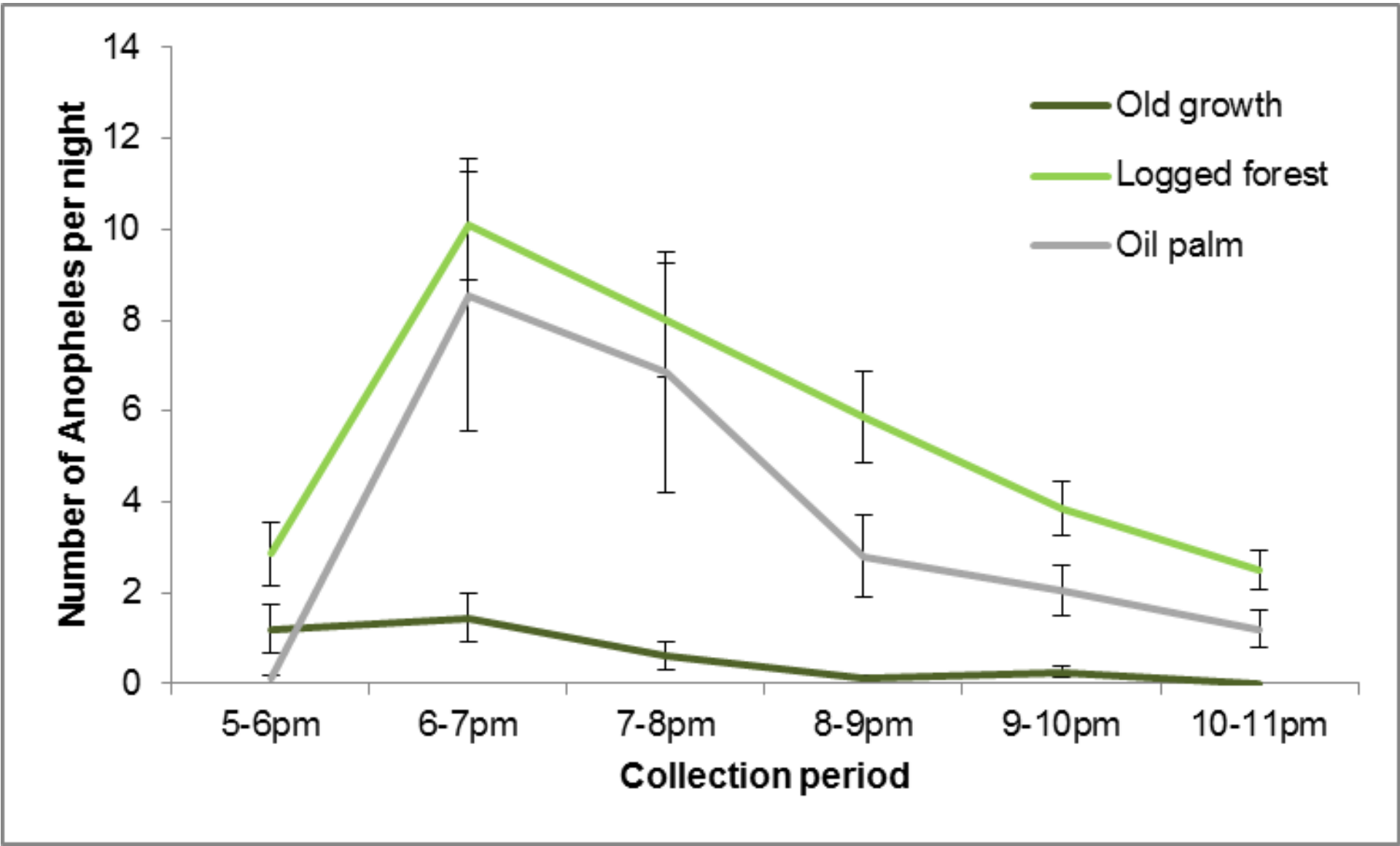
- 2245 mosquitoes collected
- Old growth= 11 species
  - 7 *Anopheles* species (83% of catch)
  - 4 Culicine species
- Secondary forest= 31 species
  - 11 *Anopheles* species (99% of catch)
  - 20 Culicine species
- Oil palm= 16 species
  - 8 *Anopheles* species (86% of catch)
  - 8 Culicine species

Species collected

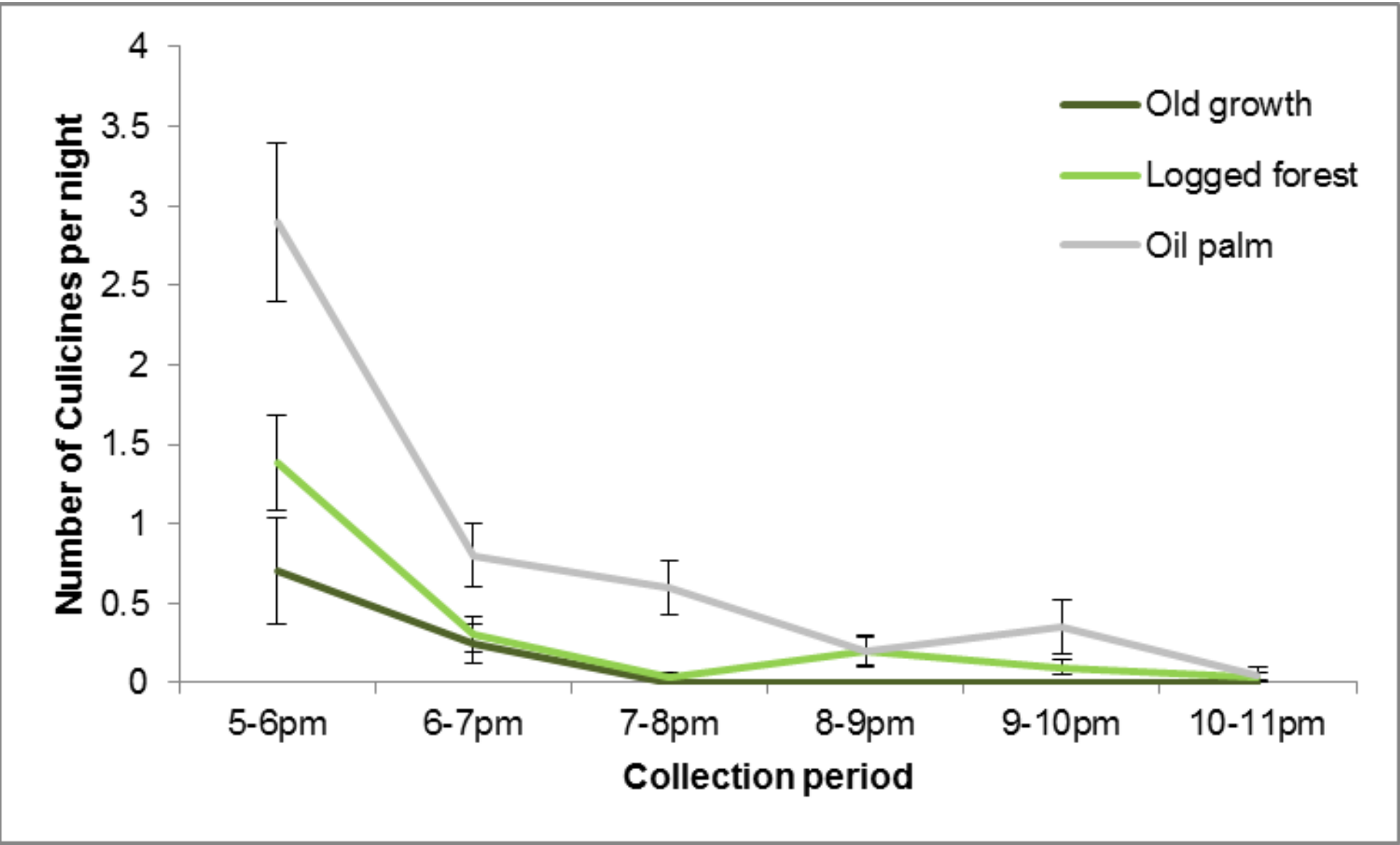
	Old growth		Logged		Oil palm	
Species	Number	%	Number	%	Number	%
An. balabacensis	13	18.1%	1272	76%	356	71.3%
An. Leucosphyrus group	6	8.3%	152	9.1%	9	1.8%
An. aitkenii	5	6.9%	70	4.2%	0	0.0%
An. macarthuri	1	1.4%	45	2.7%	26	5.2%
An. maculatus	0	0.0%	7	0.4%	25	5.0%
An. latens	32	44.4%	28	1.7%	2	0.4%
Ae. albopictus	0	0.0%	6	0.4%	46	9.2%
Cx. quinquefasciatus	0	0.0%	0	0.0%	12	2.4%
Arm.jugraneus	4	5.6%	5	0.3%	0	0.0%


Old growth
Logged forest
Arm. flavus
Col. pseudotaeniatus
An. aitkenii gr.
An. watsonii
Arm. jugraensis
Pr. ostentatio
Am. orbitae
An. barbirostris
An. kochi
Coq. crassipes
Cx. bitaeniorhynchus
He. scintillans
Ma. annulata
Orthopodomyia sp.
Stg. gardnerii
Verrallina sp.
Zeugnomyia sp.
An balabacensis
An latens
An. macarthuri
An. Leucosphyrus gr.
An. vagus
An. maculatus
Cx. (Culiciomyia)sp.
Cx. vishnui
Downsiomyia sp.
Ae. albopictus
An. tessellatus
Cx. gelidus
Cx.quinquefasciatus
Cx. sitiens
Oil palm

Biting times (*Anopheles*)



Biting times (Culicines)



Conclusions

- Large number of mosquitoes in logged forest & oil palm
- Each area has a different community composition
- Peak biting time 6-8pm for *Anopheles* in logged forest & oil palm
- *Anopheles* from the Leucosphyrus group were present in all areas

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