

Bat Reproduction in Karst Areas and its Conservation Implications

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Bat Reproduction

Distinctive

life histories:

Longevity, low litter sizes, late sexual maturation

Monoestry and one young / litter the norm

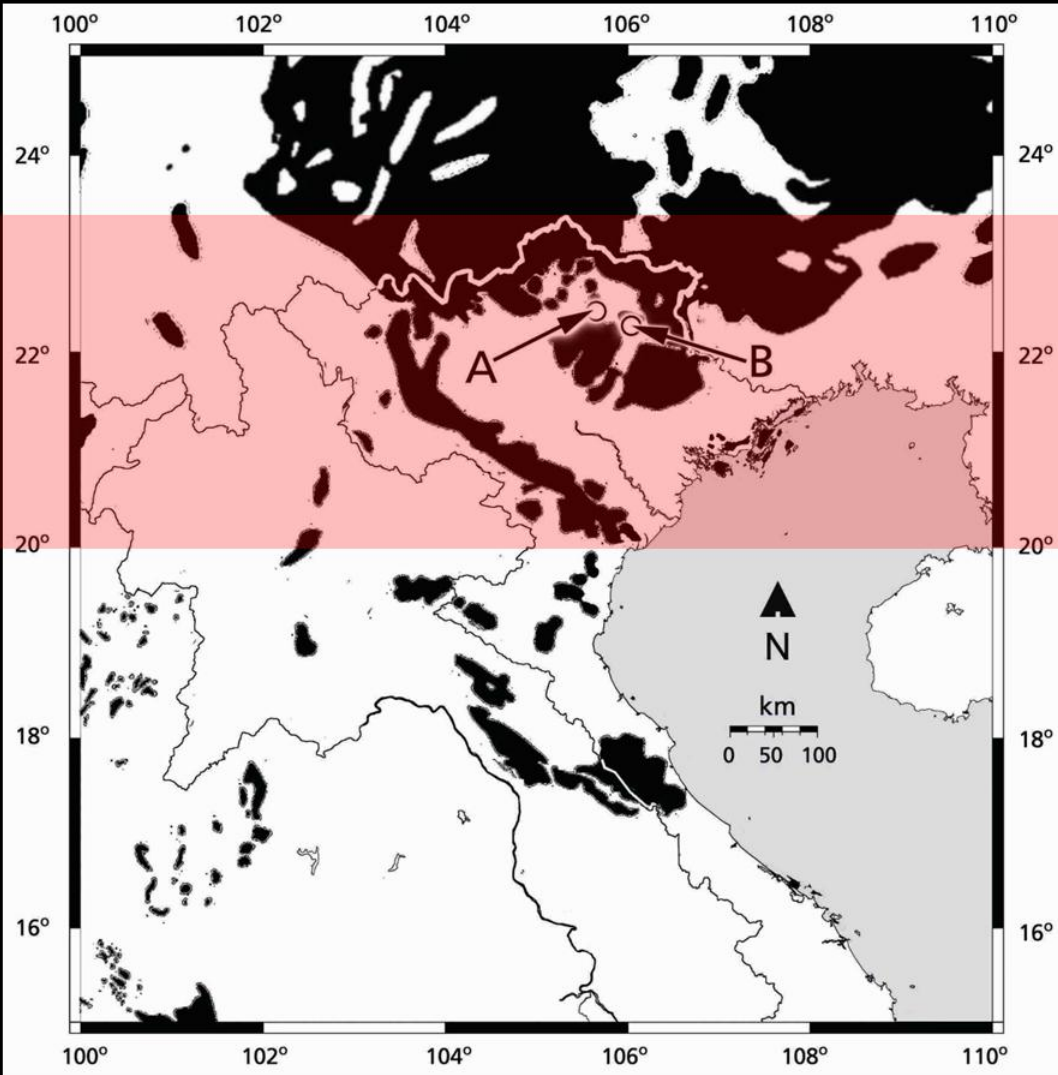
Polyestry common in pteropodids



**Low annual reproduction rate =
Susceptibility to population losses**

**Cave-dwelling species most
vulnerable to human disturbance**

Vietnamese Karst & Bats



Karst occurs mostly in north, ca. 60,000 Km²

>104 bat species known from Vietnam = 1/3 of national mammal fauna

>73 bat species >20°N,
3/4 roost in caves / crevices

N. Vietnam: 18 - 23°N

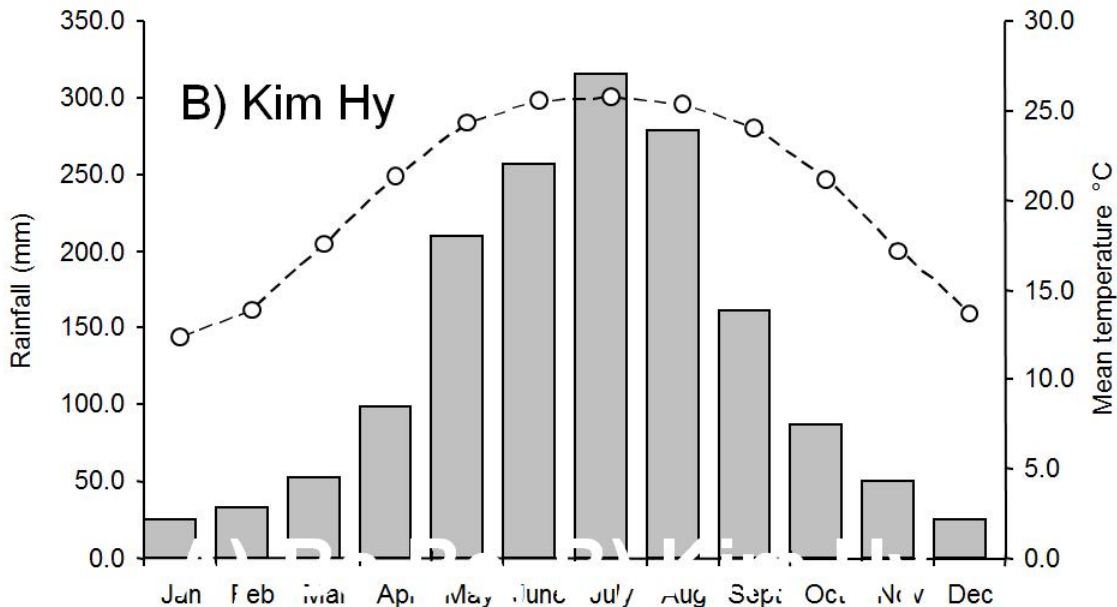
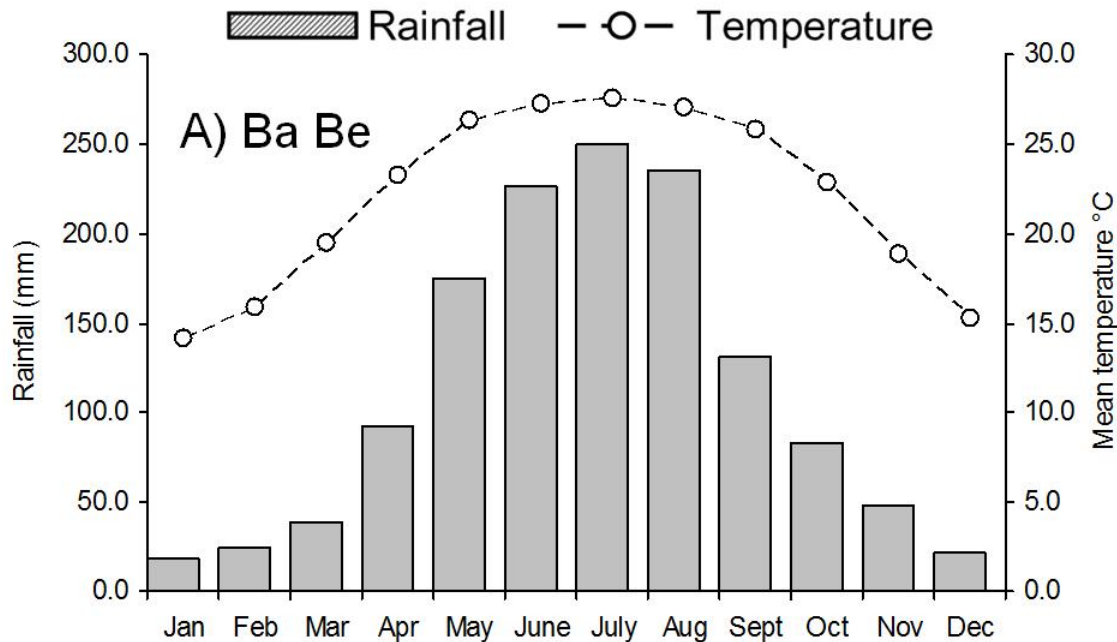
Tropical Monsoon

**Hot Wet Season:
May – Sept**

Conservation

**Timing of pregnancy,
lactation & weaning
unknown**

**Critical stages for
population recruitment**



SAMPLING

Period: Mar, 2006 to Jan, 2008 (23 months)

Sum: 136 nights, monthly mean 11.3 nights

RESULTS

3,005 bats of 28 species and 4 families captured

= 2/3 of bat fauna at Kim Hy (28/42) and Ba Be (19/30)

Only species with unequivocal evidence of reproductive phenology included (pregnancy - lactation – juvenility)

Reproductive Assessment

Sex	Status	Diagnostic Criteria
Male	Juvenile	Presence of cartilage by trans-illumination
	Immature	No obvious testes
	Mature	Testes obvious
	Reproductively Active	Testes large +/- or epididymis full

Reproductive Assessment

Sex	Status	Diagnostic Criteria
Female	Juvenile	Presence of cartilage by trans-illumination
	Nulliparous	No visible nipples, or , only rudimentary nipples No development in public nipples, or, these are of same size

Rhinolophidae: 7 species (n=429)



R. paradoxolophus



R. macrotis



R. pearsoni / yunnanensis



R. affinis



R. sinicus



R. pusillus

Hipposideridae: 7 species (n=696)



H. armiger



H. larvatus



H. pomona



C. frithii



H. lylei



A. stoltzkanus



H. cineraceus

Vespertilionidae: 12 species (n=320)



M. chinensis



M. siligorensis



M. muricola



M. ricketti



M. cineraceus



H. harpia



M. cyclotis



M. eleryi



H. pulveratus



H. cadornae



P. javanicus



Ia io

Summary

Insectivorous bats (26 species)

Reproductive synchrony

Critical reproductive periods

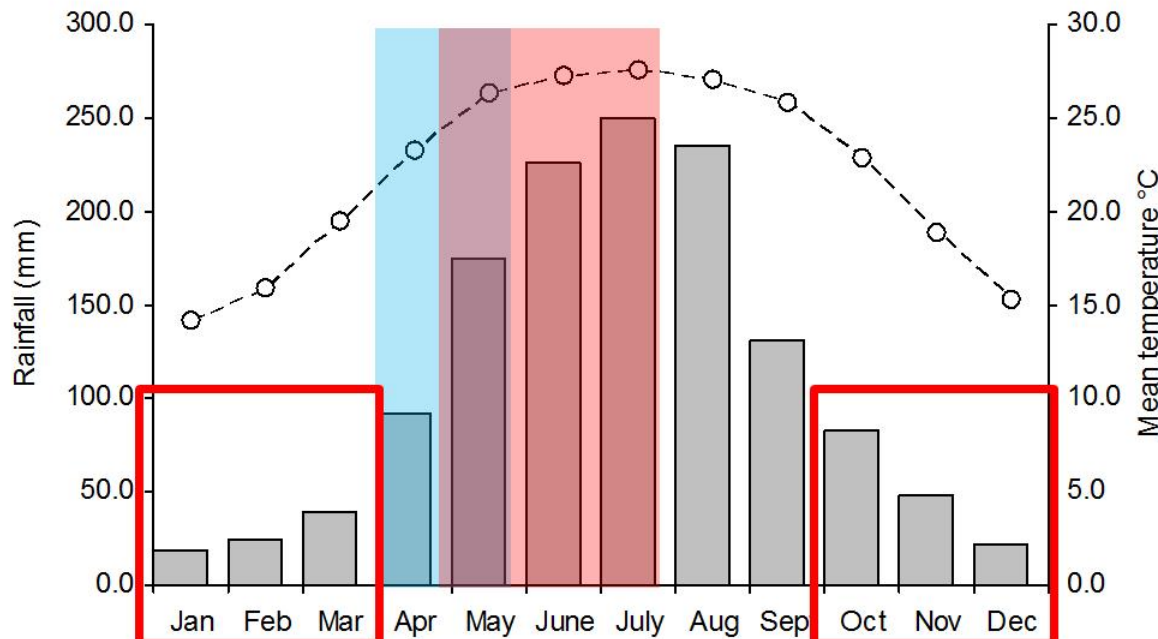
CONFIRMED

Birth peak:

Apr – May

Juveniles:

Weaned in late July



**Bat activity declines
in cold dry winter**

**Insect biomass
in H. Kong @ 22°N**

**Peaks in summer
Declines in winter**

Pteropodidae



Eonycteris spelaea



Rousettus leschenaultii

Summary: Cave-dwelling fruit bats (2 species)

Reproductive synchrony

CONFIRMED

Critical reproductive periods

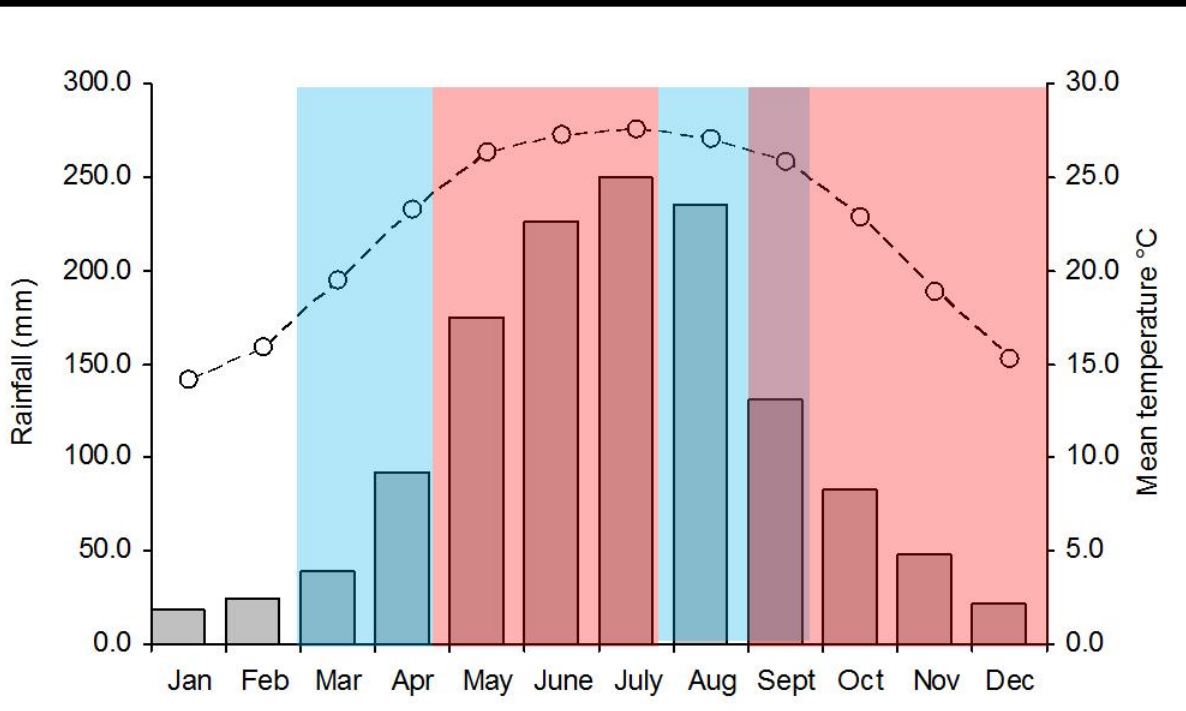
Birth peaks: Mar - Apr & Aug - Sept

Juveniles: May - Jul & Sept - Dec

Activity (capture rates)

Increase from 2nd qtr. onwards

End of year peak



Cause - effect still unclear as both bats are diet generalists & little documented on fruiting - flowering phenology in Vietnam

DISCUSSION

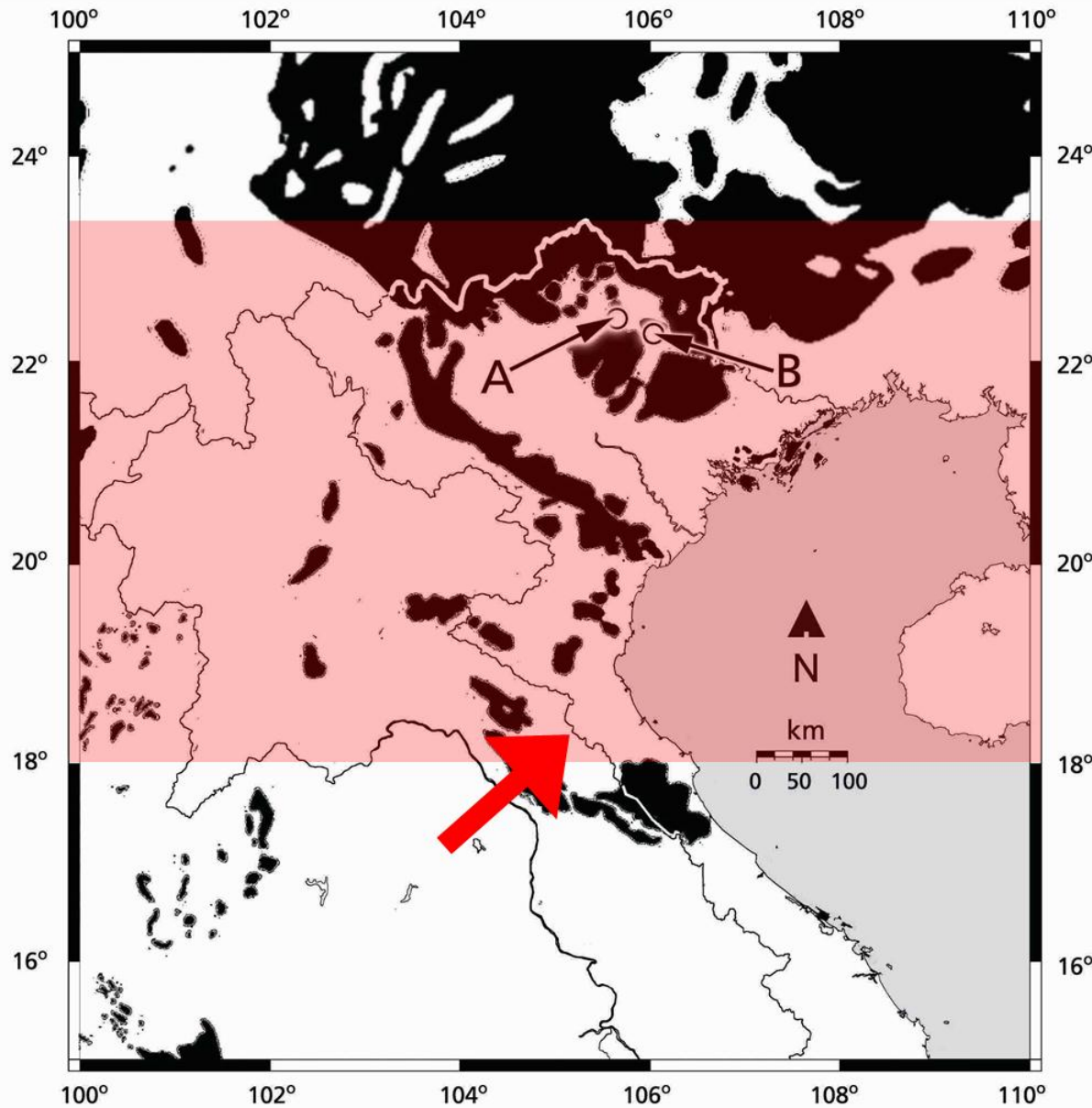
**Site-Based
Conservation?**

**Wider
applicability?**

**Global Climate
Change?**

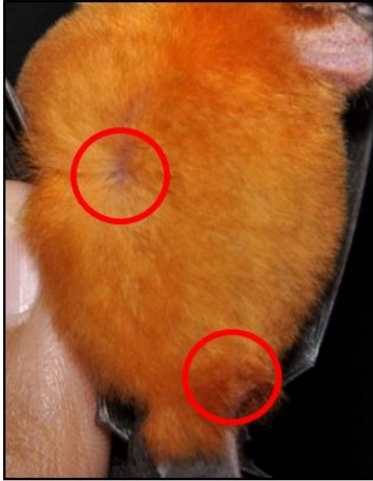
Public Health?

(Rabies, Hendra virus
SARS-like coronavirus)



Reproduction Assessment

Five major reproductive categories



Non Reproductive **Early Pregnancy**

Pregnant



Lactating



Post Lactating