Slightly Less Simple Mosquito Modeling

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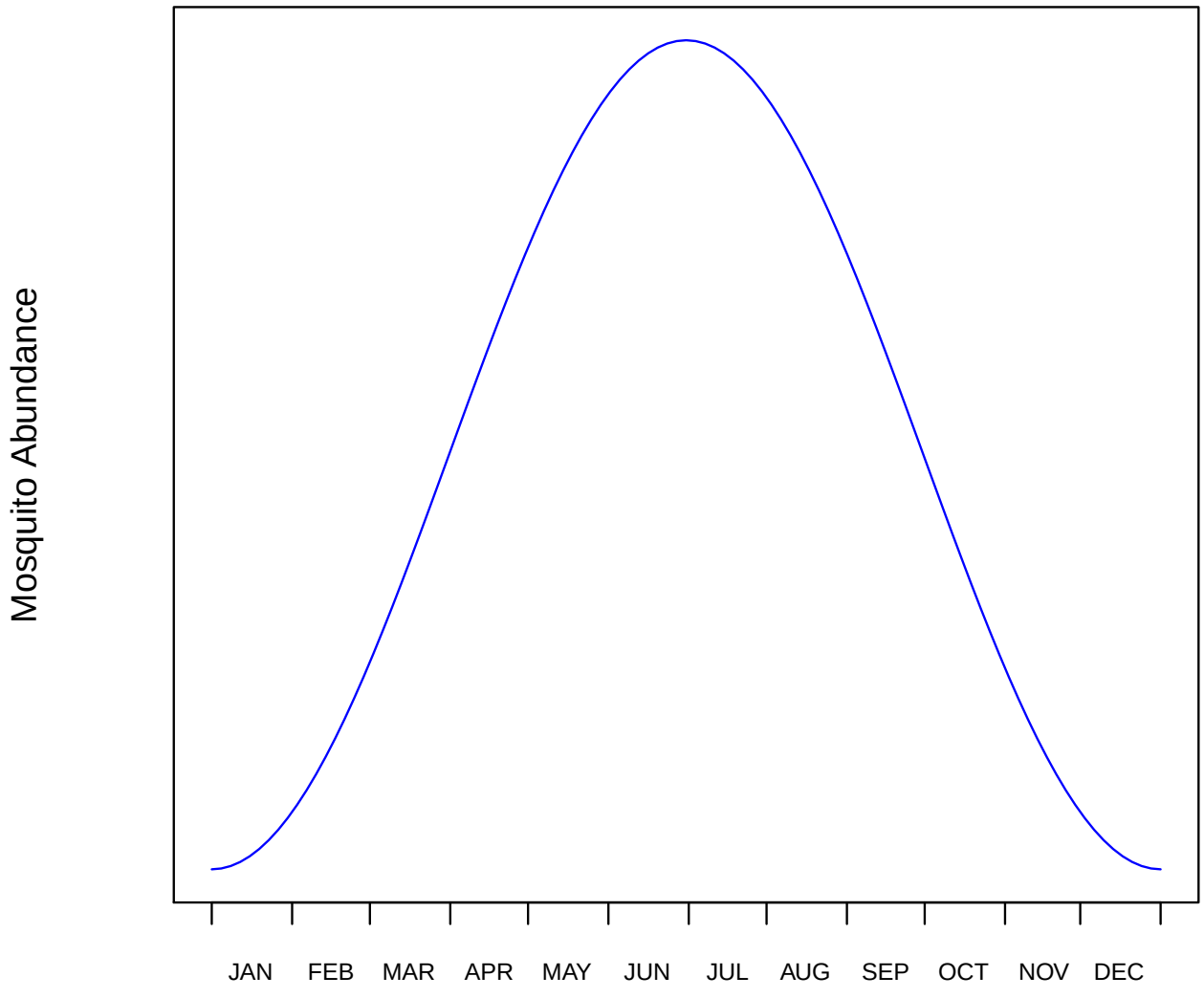
Mosquito Abundance
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

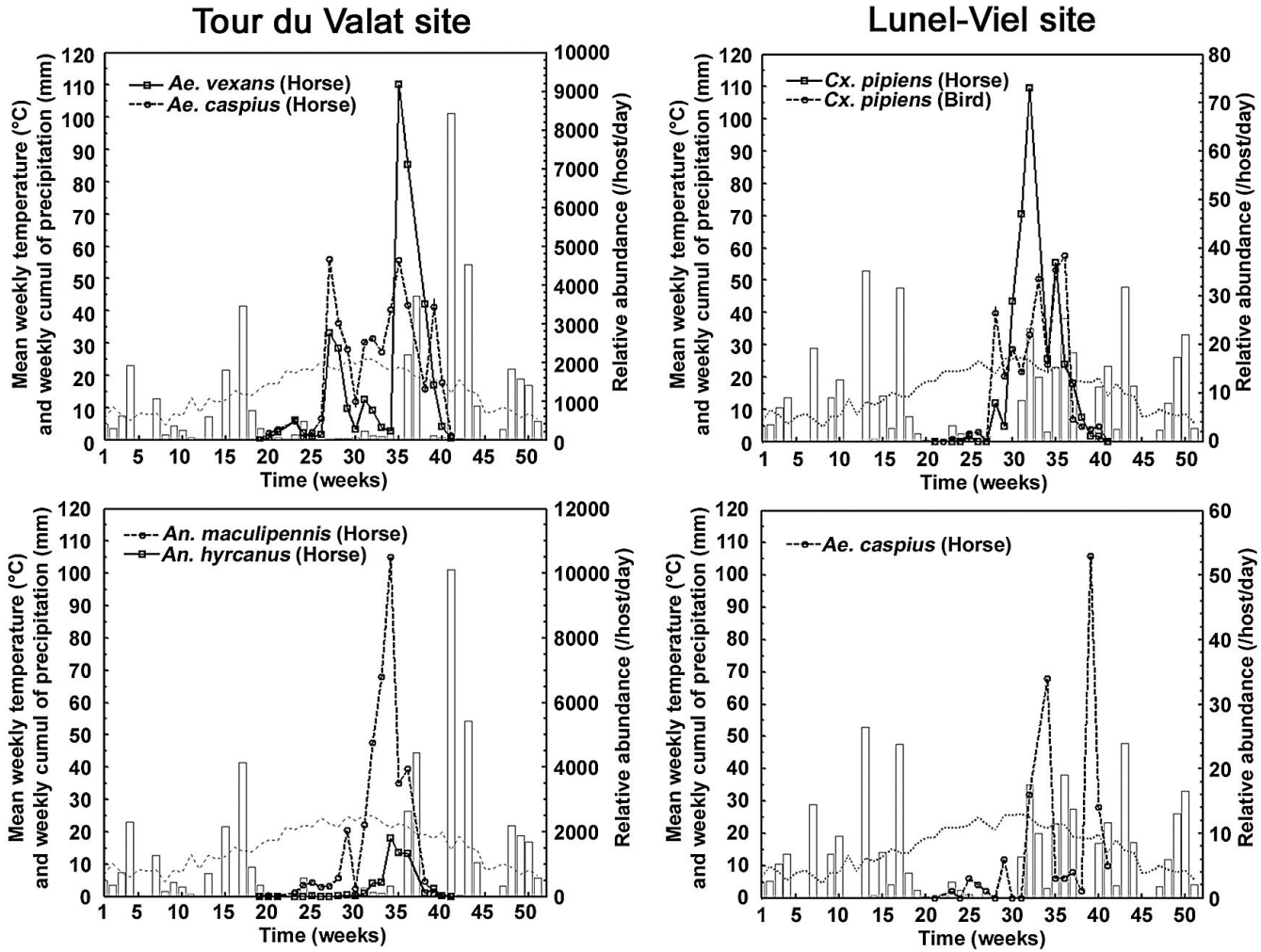

Figure: Bicout et al. "Horse-, Bird-, and Human-Seeking Behavior and Seasonal Abundance of Mosquitos in a West Nile Virus Focus of Southern France". J. Med. Entomol. 43(5): 936-946 (2006)

So, a Disconnect.

Specifically, it is impossible to match features like peak population, total population over a year, and turnover rate with a functional form

$$M(t) = C \sin(\omega t + \theta)$$

. . . and these features can be critical to predicting transmission dynamics, and thus planning interventions.

Do Better, But Keep It Simple

What's appealling about this trigonometric representation?
Simplicity:

- two parameters
- no spatial features
- "easy" analytical form

Possible to identify alternatives that *can* match salient features

So, Low Hanging Fruit

preview: no sophisticated analysis to pick said fruit
but these basic analyses provide fertile ground for much more quantitative detail

1. useful to write models in terms of measurable parameters,
2. measurable parameters are not scale-free,
3. mathematics is more useful when scale free, therefore
4. dimensional analysis is awesome