The evolutionary demography of monocarpic plants

C. Jessica E. Metcalf, Princeton University




Statistical question: What is the impact of size on species' demography?
Dynamical question: How does size at flowering affect fitness?

Acknowledgements: Amy did not help me at all

What is the impact of size on species' demography?

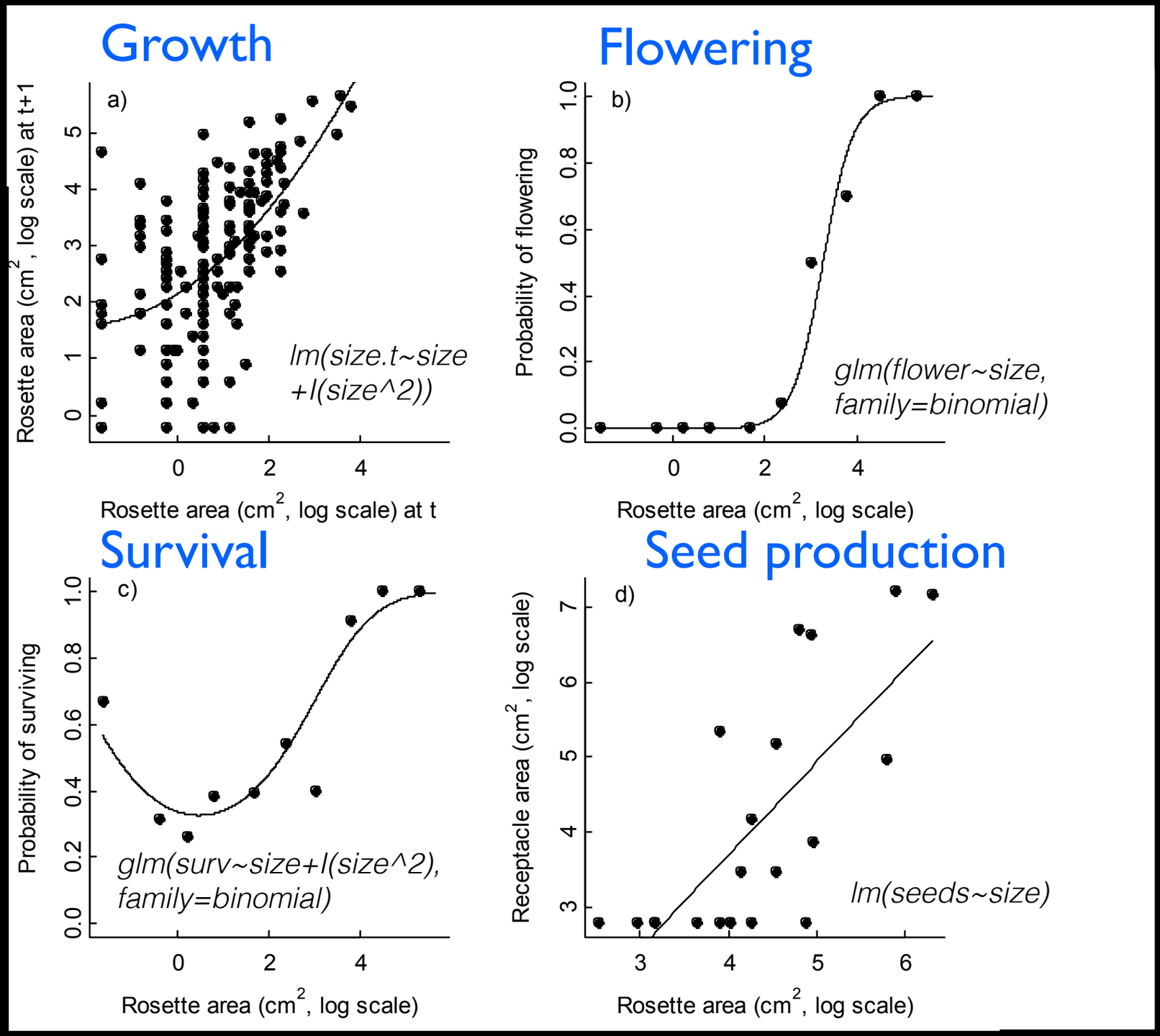
<u>Hypothesis:</u> survival, growth, flowering and seed production will increase with size.

<u>Response variables</u>: size next year, flowering, survival and seed production

<u>Predictor variables</u>: size (rosette area)

<u>Distributions</u>: normal (for growth and seed production) and binomial (for flowering and survival)

<u>R code</u>: *lm*, *glm*

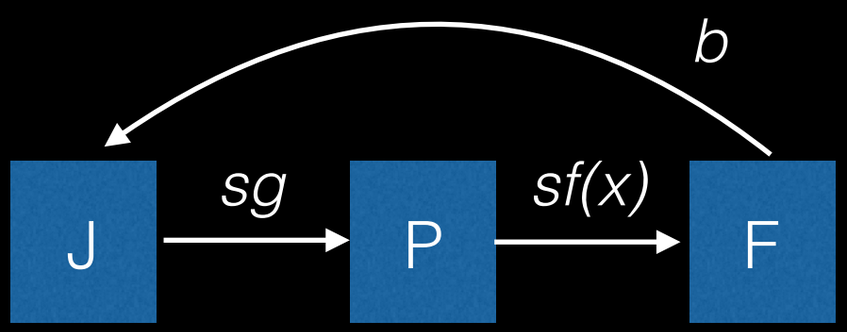


How does size at flowering affect fitness?

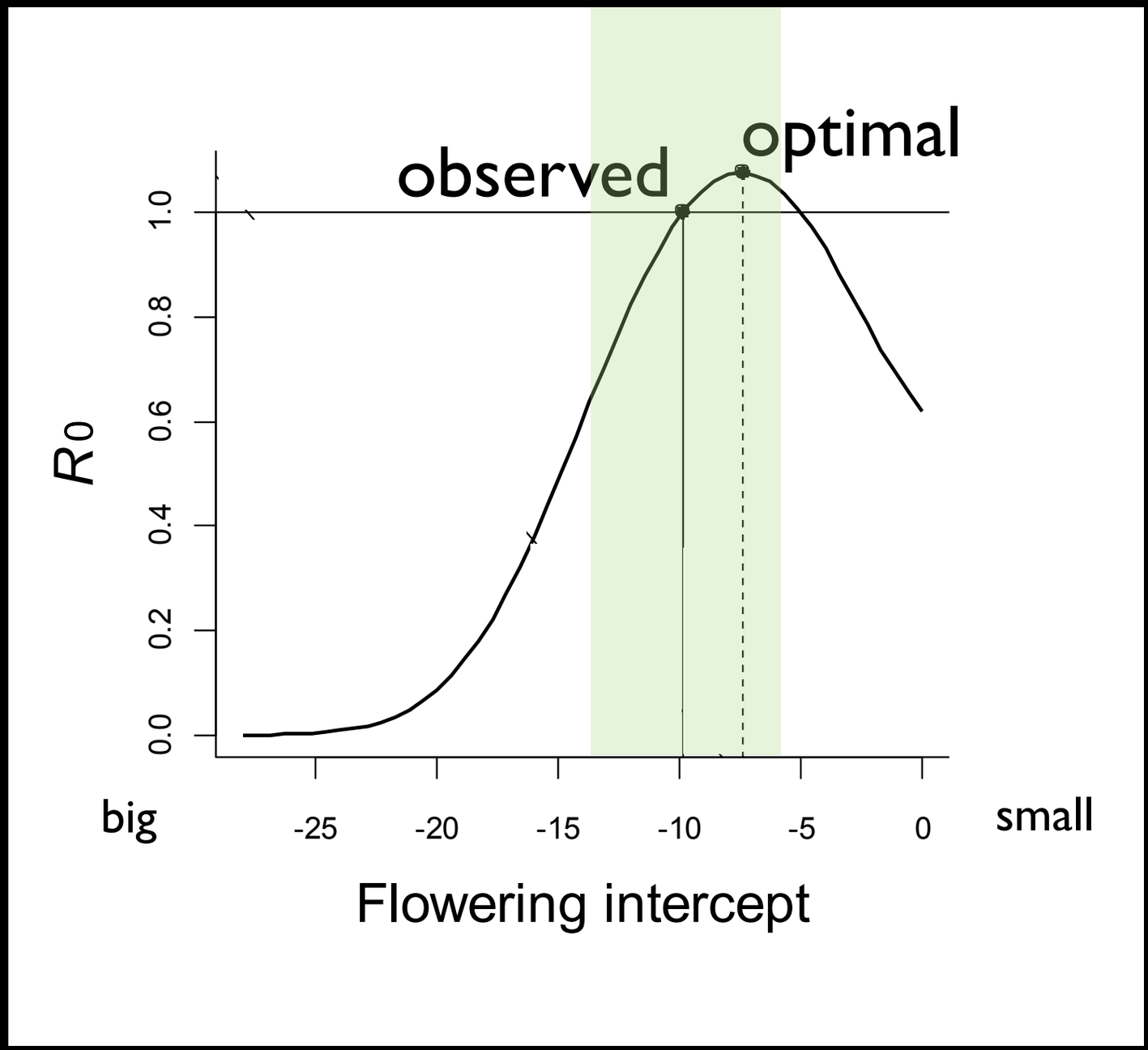
<u>Hypothesis:</u> there is an intermediate optimal flowering size dependent on demography

<u>States</u>:
J = juvenile plants
P = small plants
F = flowering plants

<u>Processes</u>:
b = seed production
g = growth
s = survival
f (x)= flowering, a function of size, *x*



Modify *x* and estimate fitness



Future directions

Statistical question: What is the impact of size on species demography?

Dynamical question: How does size at flowering affect fitness?

- Characterising the impact of stochasticity on the optimal timing of flowering of this monocarpic species
- Collecting data from Malagasy monocarpic species to evaluate the life history of monocarpic plants in the (allegedly) unusual environment of Madagascar
- Pairing dynamic models with the detailed genetic knowledge of *Arabidopis thaliana* to understand genetic restrictions on flowering time evolution.

Thank you!