Today

- Poisson data generating processes
- Study design: part of the DGP
- Scope of inference

Common DGP models

Normal Lognormal: ln(y)	Poisson	Binomial Bernoulli: n=1
$y_i \sim \text{Normal}(\mu_i, \sigma)$	$y_i \sim \text{Poisson}(\mu_i)$	$y_i \sim \text{Binomial}(\mu_i, n)$
	$\text{alternative}\ \mu : \lambda$	$\text{alternative}\ \mu : p$

Key properties:

y: -∞ to ∞, continuous *μ*: -∞ to ∞, continuous	*y*: 0 to ∞, discrete, integer *μ*: 0 to ∞, continuous	*y*: 0 to n, discrete, integer *μ*: 0 to 1, probability

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Poisson

- Code the DGP
- Simulation to show variance = mean

Poisson GLM

Poisson
+
Log link

$$y_i \sim \text{Poisson}(\mu_i)$$

$$\log(\mu_i) = \beta_0 + \beta_1 x_i$$

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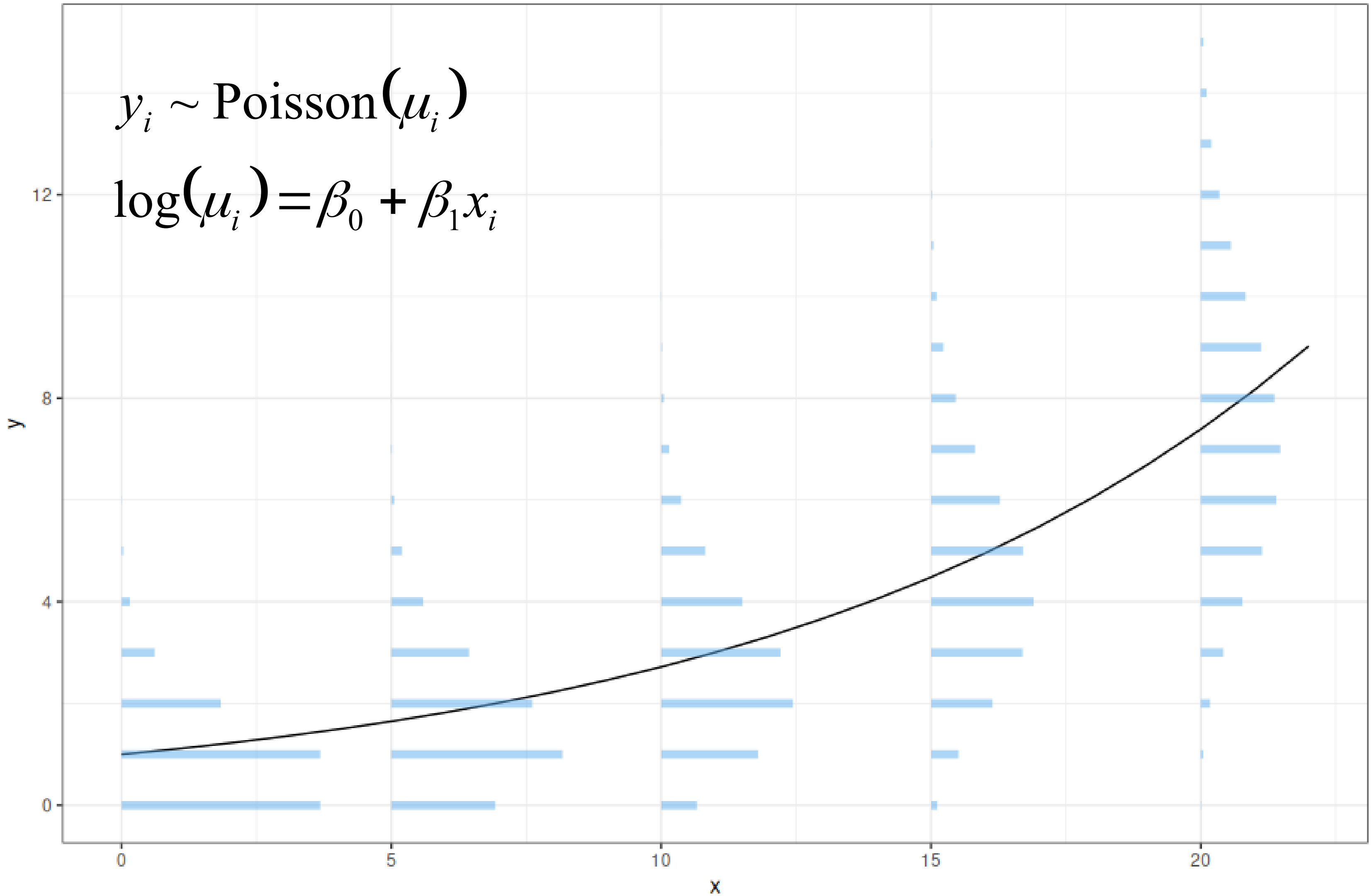
y: 0 to ∞, discrete, integer
μ: 0 to ∞, continuous

Poisson GLM



$y_i \sim \text{Poisson}(\mu_i)$
$\log(\mu_i) = \beta_0 + \beta_1 x_i$
y
x
0
4
8
12
0
5
10
15
20

Poisson scenario

- Ant species richness
- Declines with latitude
- Possible DGPs?
- Possible study designs?

Scope of inference

- What statistical population do you want the study to generalize to?
- Generalization is determined by study design and assumptions we're willing to accept (wrt data $\rightarrow$ population)
- Causal or descriptive?
- Randomization, replication, control
- Structure in space and time