

Biomass by diameter

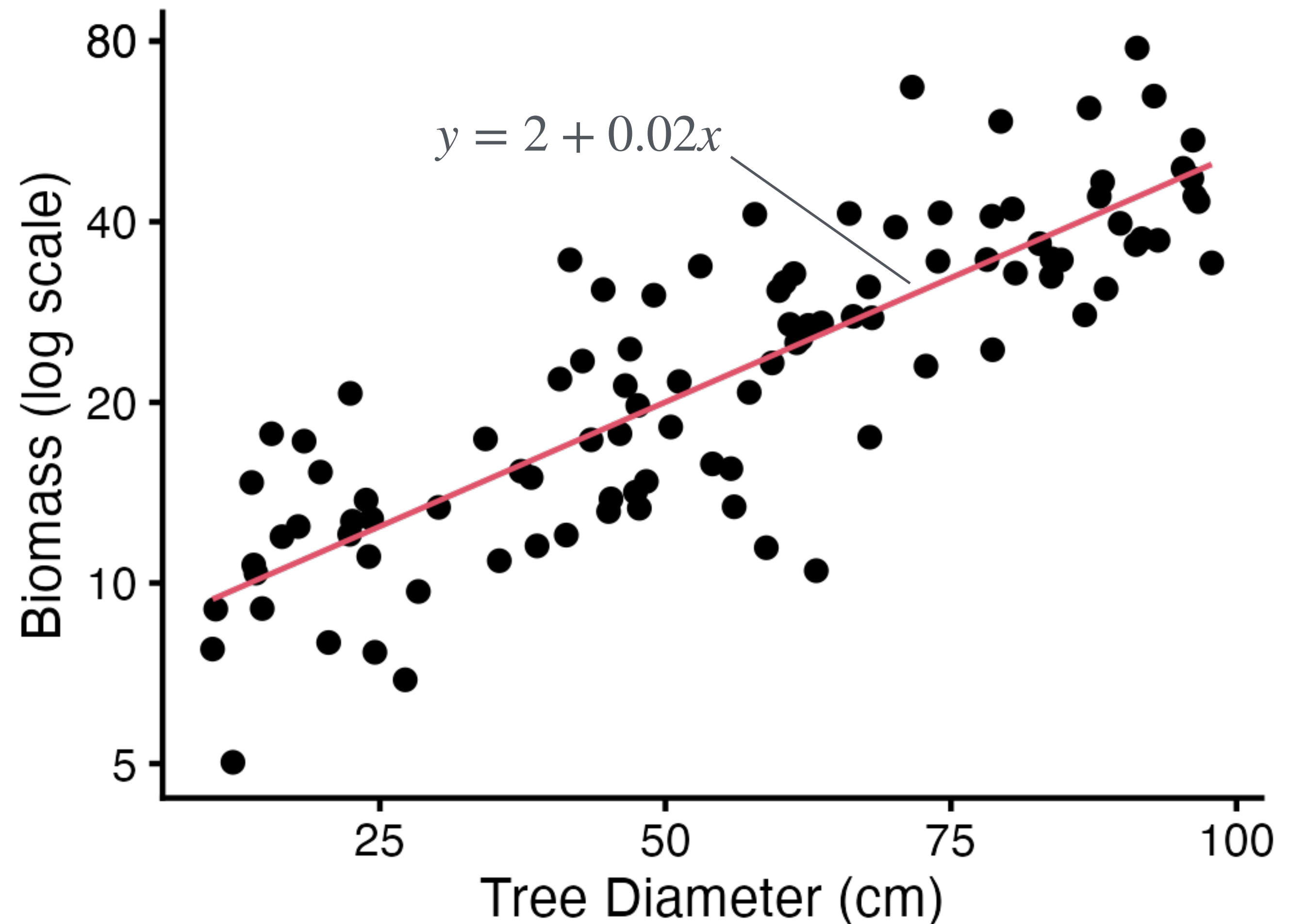
Example of non-linear relation

Option 1: log-transform y

```
df = data.frame(diameter, biomass)
stan_fit = stan_glm(log(biomass) ~ diameter,
  data = df)
```

Option A: Assign y a log-normal likelihood

```
rt_fit = ulam(alist(
  biomass ~ lognormal(mu, sigma),
  mu <- a + b*diameter,
  a ~ normal(0, 2),
  b ~ normal(0, 1),
  sigma ~ exponential(1)),
  data = df, chains = 4, cores = 4)
```



Power-law relations

Log-log regressions

- Several biological relations take the form of power-law relations

$$y \propto ax^b$$

- These appear for different reasons:
 - West et al. (1997) attempt to link scaling laws to fractal relations at different scales
 - Every time a proportional increase leads to a consistent proportional change (like in species-area relations)

