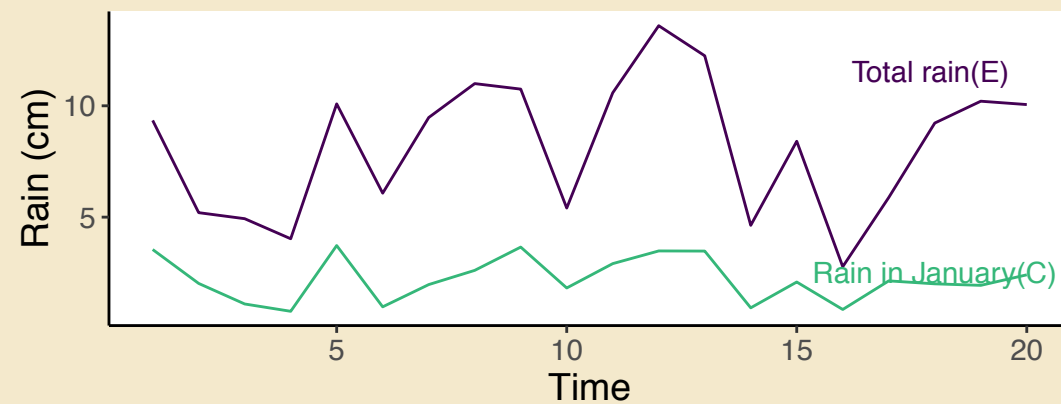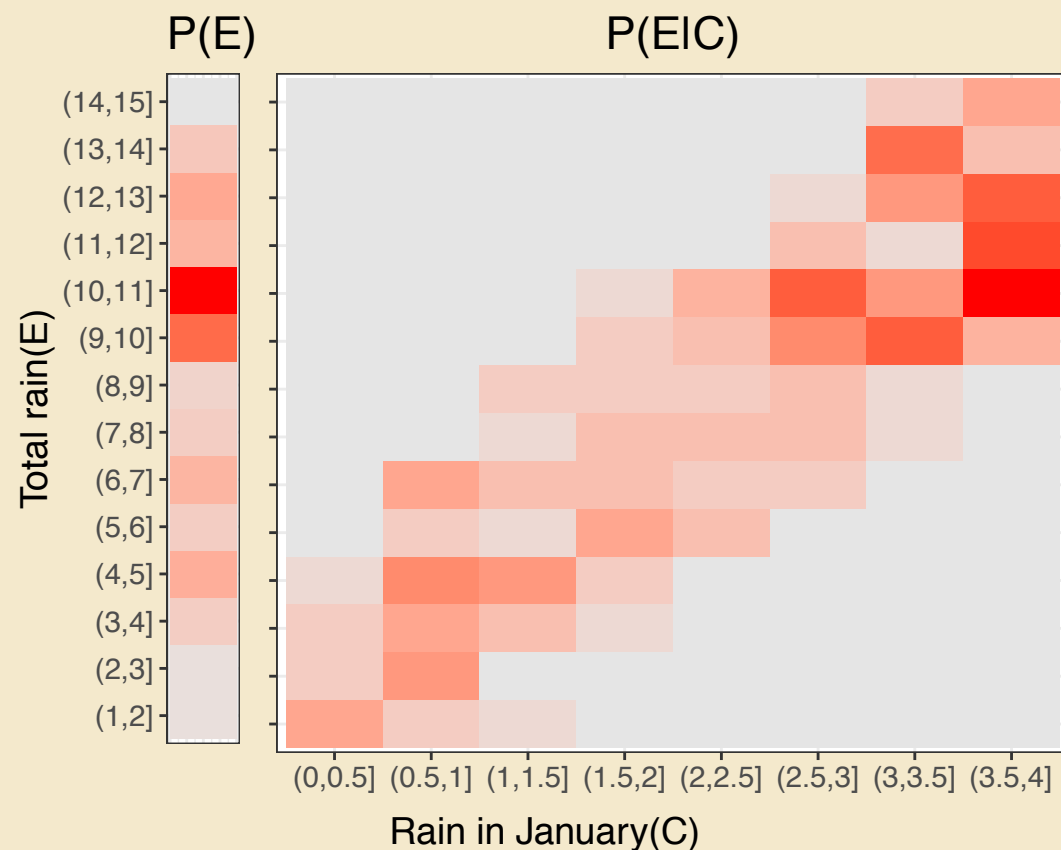# Information

Environment and Cue

Environment determines reproduction

Germination may utilize cues, or be unrelated to cues.

The mutual information (MI) measures how much information is gained about an environment from a cue bycomparing the conditional probability P(E|C) to the marginal probability P(E)
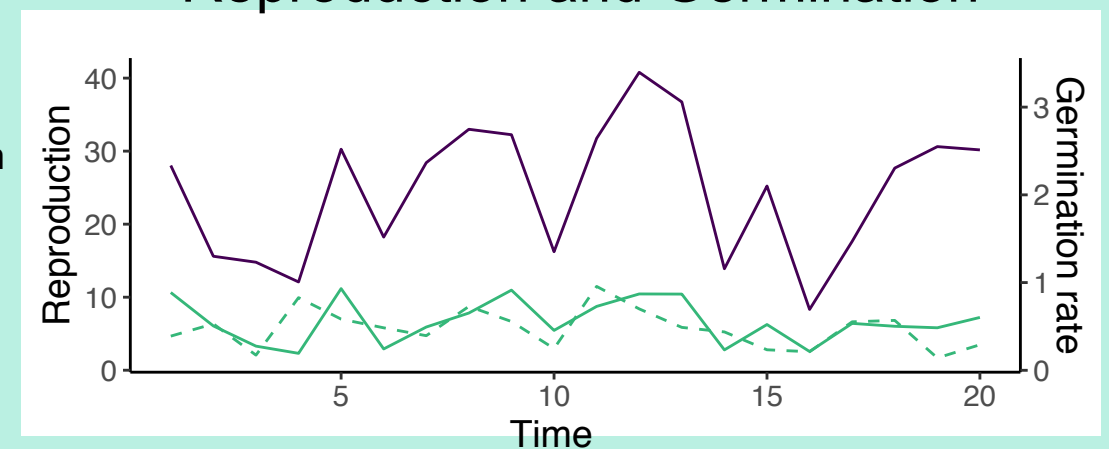
The MI is an upper bound on Δρ

Fitness

Reproduction and Germination

The fitness value of information (Δρ) measures the fitness gain (in per-capita growth units) when a population detects and utilizes information in a cue.

Behavioral and physiological processes allow species to detect, rpocess, and store information. Population dynamics integrate the costs and benefits of information detection, processing, and storage.