BIO 4AE3

25 Sep 2023

THRESHOLDS.

. (host density) threshold.

IF transmission is density-dependent.

(i.e. incidence = βSI)

doesn't apply if [~~not~~ freq. dep = $\beta \frac{SI}{N}$]

F-D $\beta \cdot 1 \cdot \frac{S}{N}$: $S = 100$ → $S = 50$

D-D. $\beta \cdot 1 \cdot S$ $S = 100$ ind/km^2 ↳ 50 ind/km^2

. STOCHASTIC thresholds.

depends on the SIZE of the pop, not the DENSITY.

. ~~host~~ parasite persistence
host persistence

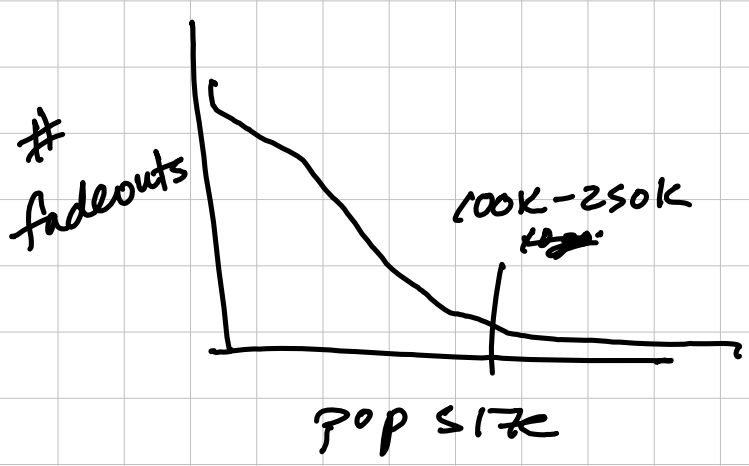
CRITICAL COMMUNITY SIZE

host pop size (numbers, not density) required to maintain a parasite

→ measles

$$\frac{S^*}{N} = \frac{1}{R_0}$$

cycles



host regulation.

Q can parasites regulate a host population?

(hold its pop density below the carrying capacity)

↳ regulation may be better than extinction for pest control

→ steady, low equilibrium

MACROPARASITES.?

↳ lab experiments.

1987: Heligsomoides polygyrus (mouse). 90% reduction in pop size

BIOCONTROL works

Opuntia cactus. — non-native in Australia

Cactoblastis moth.

myxomatosis in Australian rabbits. 1950s.

calicivirus

HUMANS.

- outbreaks
Black Death 25%-50%
Yersinia pestis.