Survivorship curves

Everything dies, but on different schedules

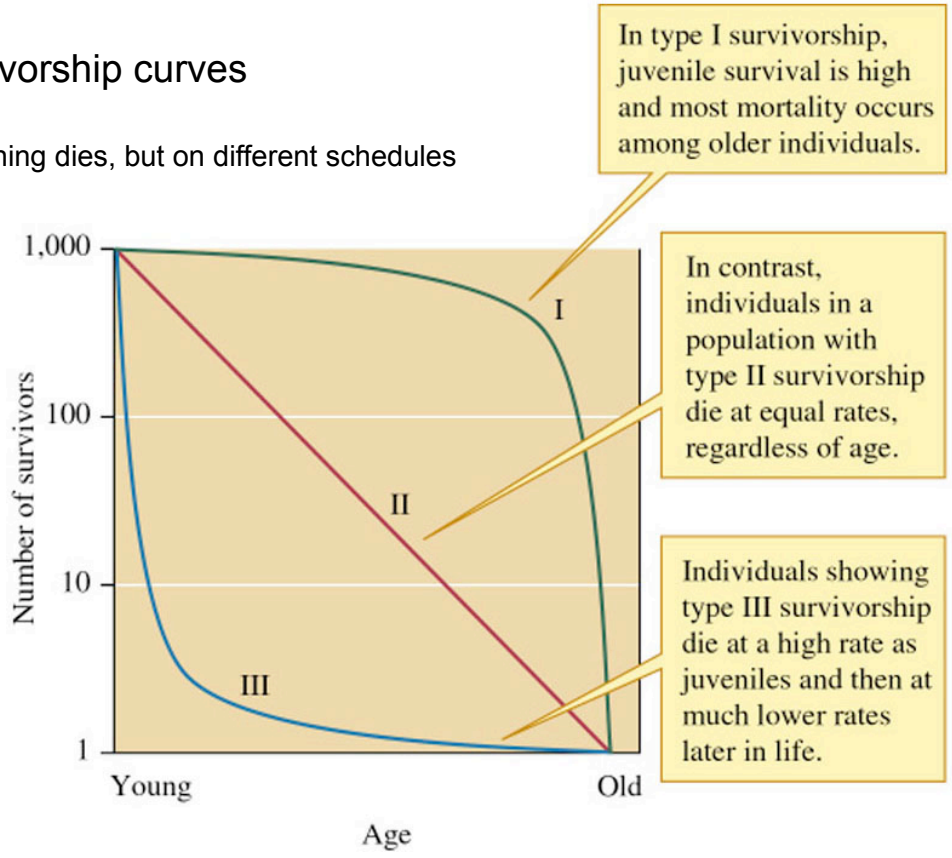


Table 10.1

Combining survivorship with seed production by *P. drummondii* to estimate net reproductive rate, R_0

Age (days) x	Number surviving to day x n_x	Proportion surviving to day x l_x	Average number of seeds per individual during time interval m_x	Multiplication of l_x and m_x $l_x m_x$
0–299	996	1.0000	0.0000	0.0000
299–306	158	0.1586	0.3394	0.0532
306–13	154	0.1546	0.7963	0.1231
313–20	151	0.1516	2.3995	0.3638
320–27	147	0.1476	3.1904	0.4589
327–34	136	0.1365	2.5411	0.3470
334–41	105	0.1054	3.1589	0.3330
341–48	74	0.0743	8.6625	0.6436
348–55	22	0.0221	4.3072	0.0951
355–62	0	0.0000	0.0000	0.0000

0
299
306
313
320
327
334
341
348
355

Data from Leverich and Levin 1979.

Each individual leaves an average of 2.4177 offspring.

$R_0 = \sum l_x m_x = 2.4177$

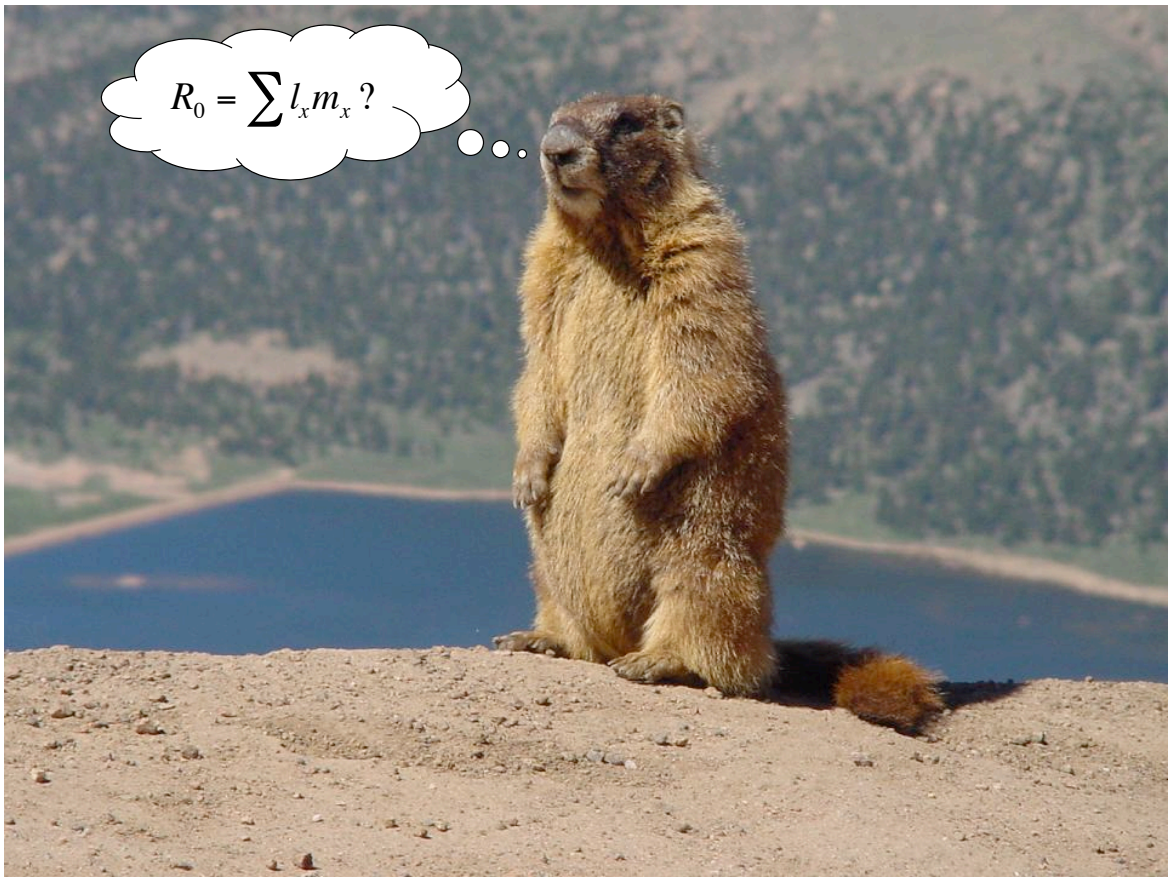
$T = \frac{\sum x l_x m_x}{R_0}$

The value of R_0, which is greater than 1.0, indicates that this population of *P. drummondii* is growing.

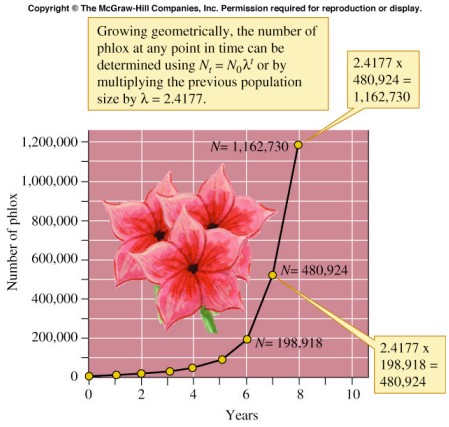
Summing the final column yields R_0, the net reproductive rate per individual.

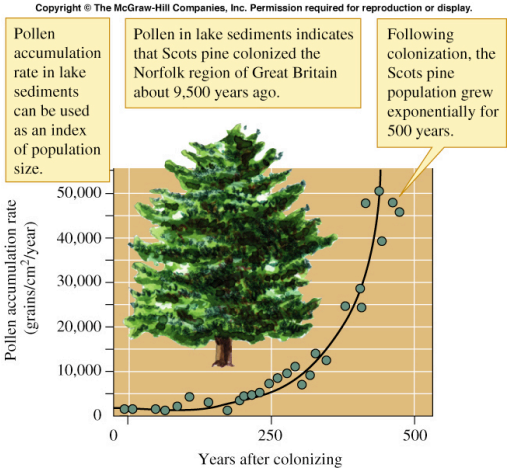
Life table

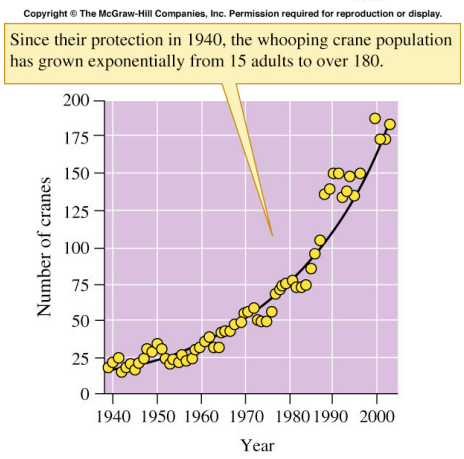
What are the units of R_0?
What are the units of T?



Exponential growth

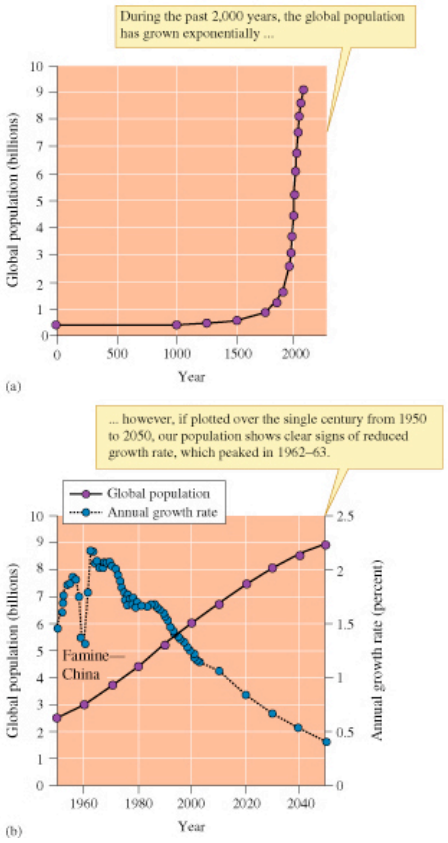




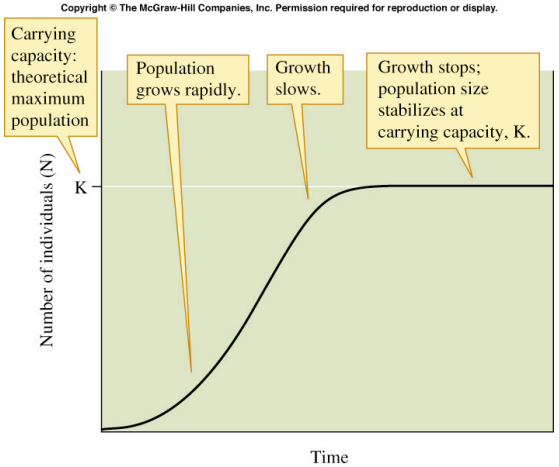


Human population

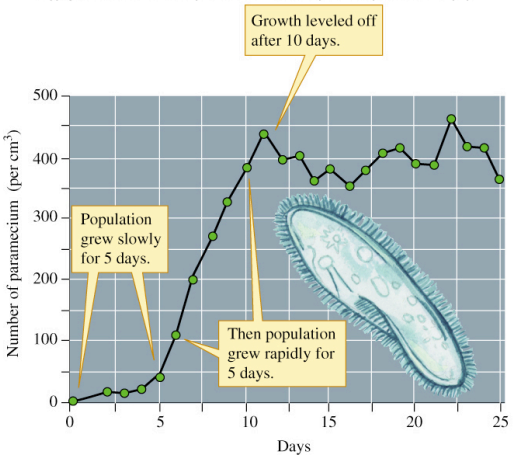
Where will it stop…



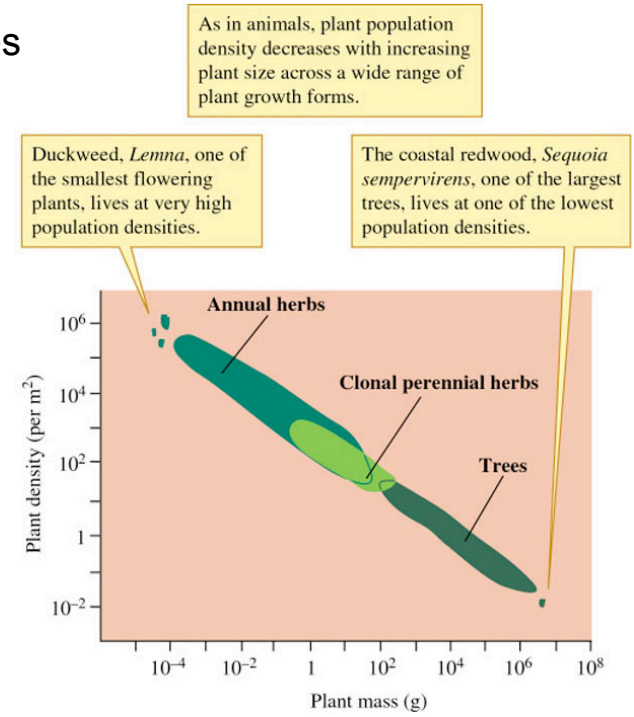
Gotta stop somewhere - logistic growth



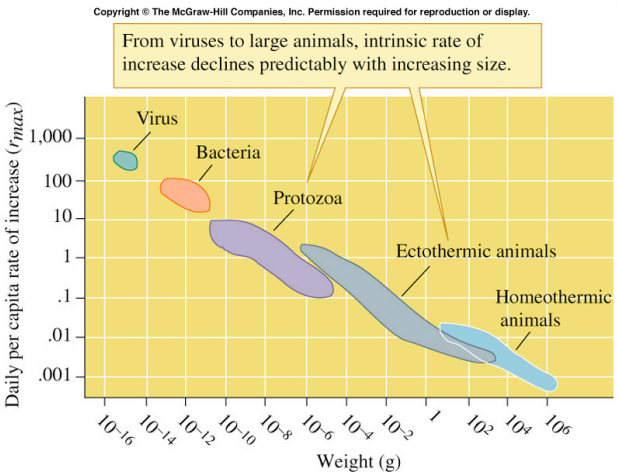
What influences *K*?

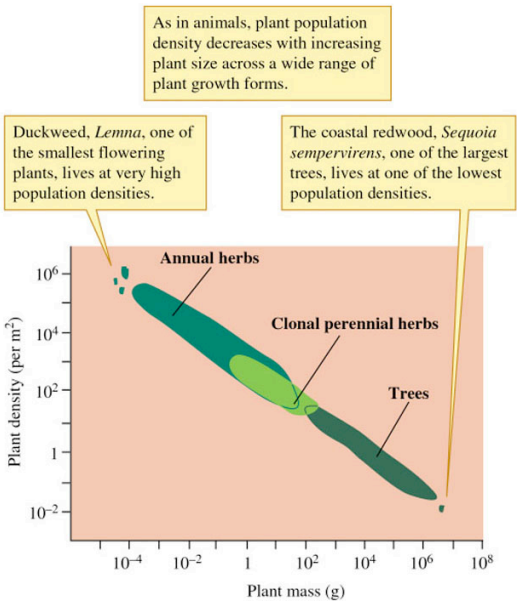


Damuth's rule
Population size decreases with body size

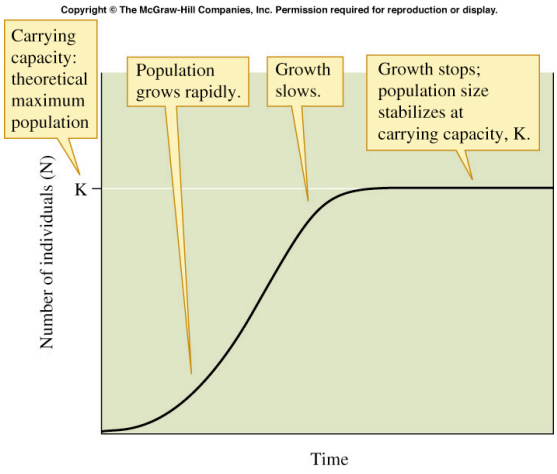


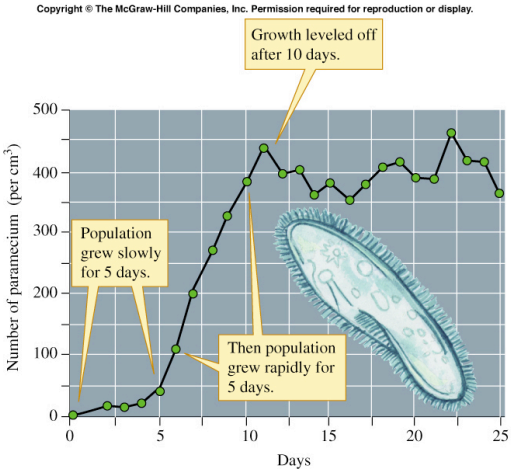
r_{max} changes with size too





Why do natural populations fluctuate?



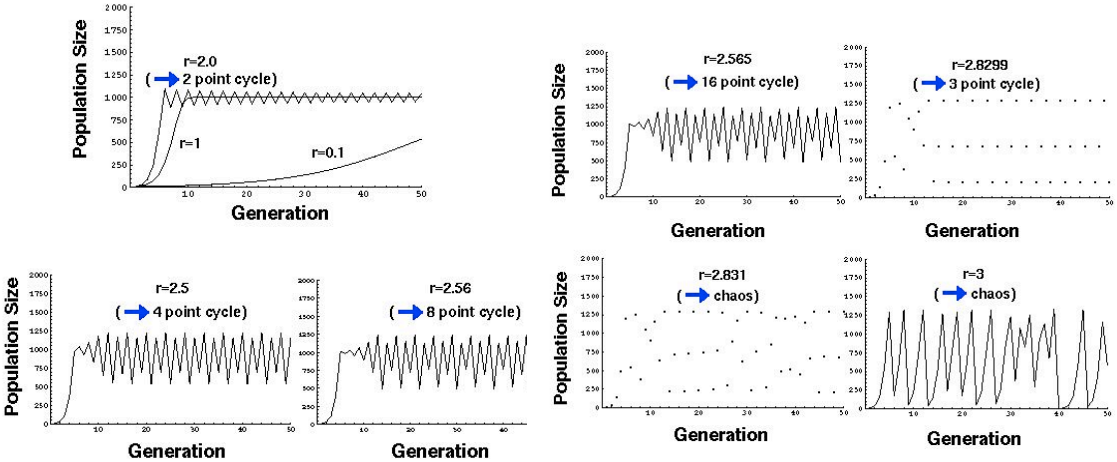


CHAOS?

(Lord) Robert May
(1974 Science)

Discrete logistic models

VERY sensitive to r_{max}



Sensitivity to initial conditions