

A brief distraction.....

What is an expansion factor?

Fixed Radius Plot



1/10th acre

5 trees

1/10th acre

5 trees X 10

= 50 trees/acre

Variable Radius

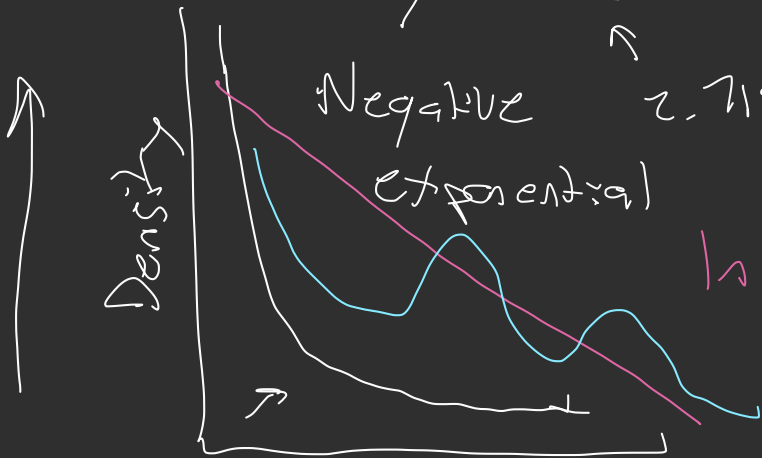


$$y = a e^{\beta(-x)}$$

$$x^2 \quad -x^2$$

Negative 2.71828

exponential



$$\ln y = \ln a + \ln \beta(-x)$$

$$y' = a + \beta(-x)$$

intercept

slope

coefficient

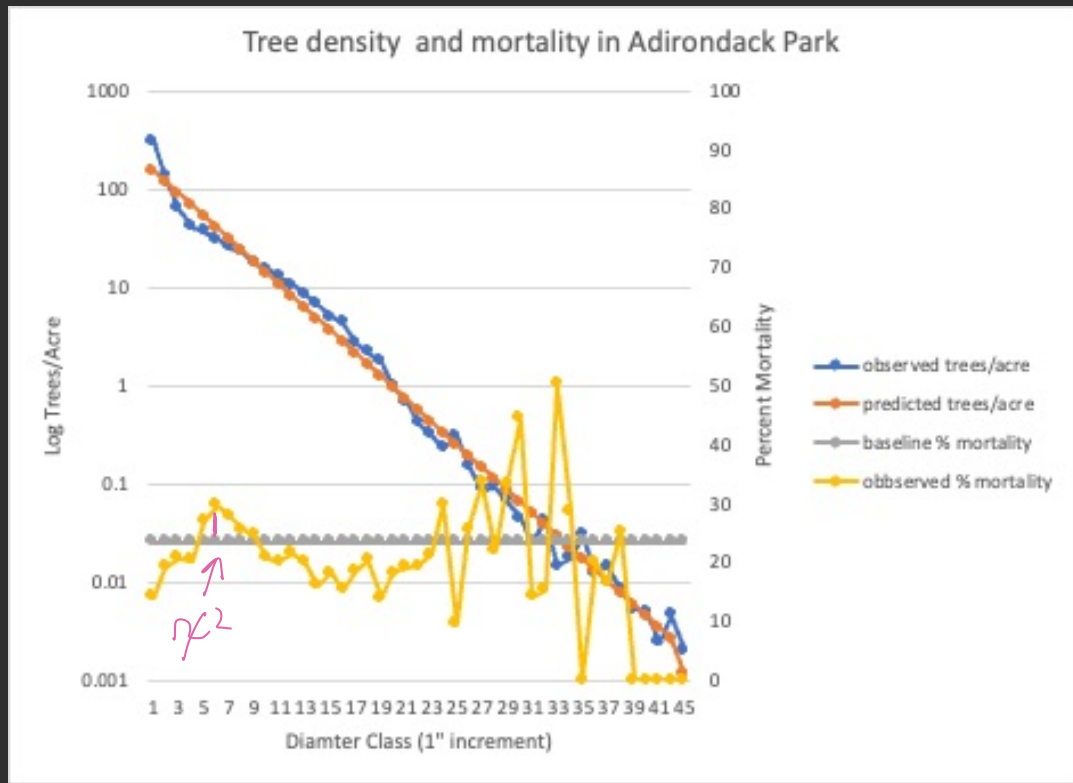
baseline % mortality

β it

limits at $x \rightarrow 0, y = \infty$

$x \rightarrow \infty, y = 0$

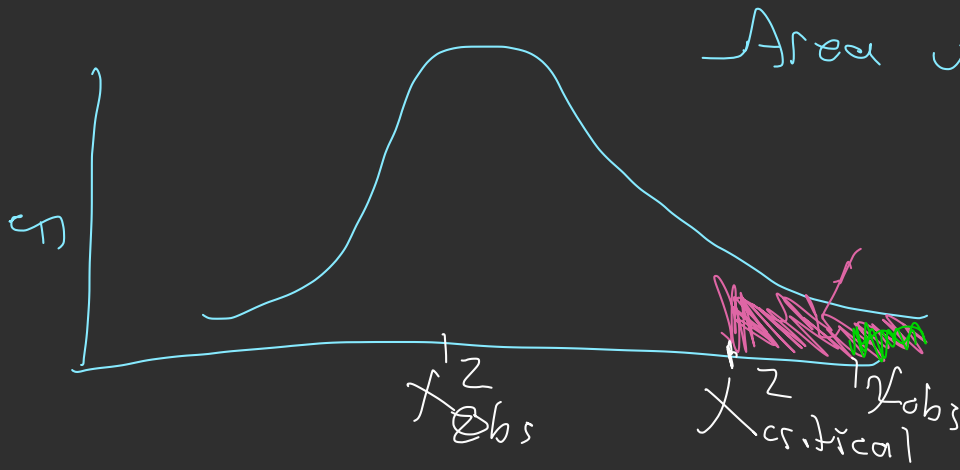
Is observed
mortality
different
than
predicted
mortality?



$H_0 = \text{Observed mortality} = \text{predicted mortality}$
baseline mortality

$H_A = \text{obs mort} \neq \text{predicted mort}$
obs % mort baseline % mort

$$\chi^2 = \frac{(\text{obs} - \text{predicted})^2}{\text{predicted}}$$



Area under curve = \int or
100% of the data

$\alpha =$ critical value
0.05

If obs z^2 is
> critical z_c
then significant

\rightarrow % of the
most extreme
portion of the
distribution of
data

Type I Errors

→ Rejecting the

null hypothesis when

the null hypothesis

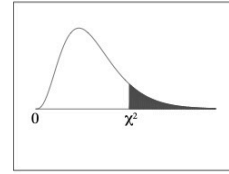
is actually true.

→ Multiple comparisons, the probability of

Type I errors ↑

$$\alpha_{\text{adjusted}} = \frac{\alpha_{0.05}}{\# \text{ of comparisons}}$$

Chi-Square Distribution Table



The shaded area is equal to α for $\chi^2 = \chi^2_{\alpha}$.

if $\chi^2_{\text{obs}} > 7.879$
 ... sig
 < 7.879
 ... N.S.

df	$\chi^2_{.995}$	$\chi^2_{.990}$	$\chi^2_{.975}$	$\chi^2_{.950}$	$\chi^2_{.900}$	$\chi^2_{.100}$	$\chi^2_{.050}$	$\chi^2_{.025}$	$\chi^2_{.010}$	$\chi^2_{.005}$
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750

$$\alpha_{\text{adjusted}} = \frac{0.05}{45} = 0.0011$$

Back to insect population dynamics.....

What regulates insects in forests?

1. Abundance of predators \rightarrow Death rates
↳ Disease
2. Available resources \rightarrow Birth rates

Different

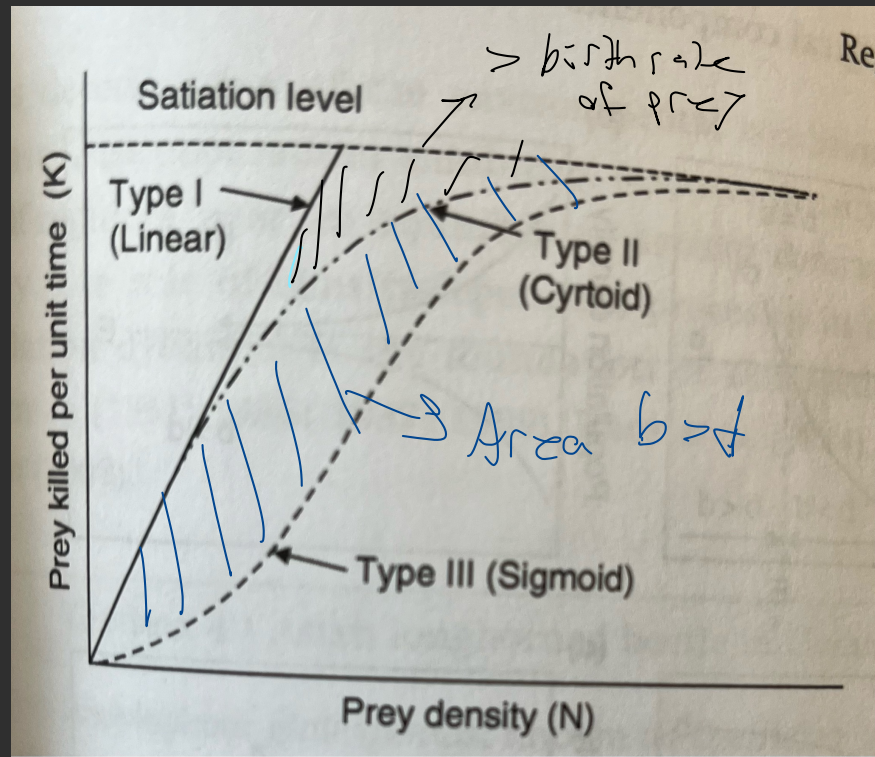
Predators

respond differently

Type I = Ambush
predators
(spiders)

Type II = Arthropods
and parasites

Type III = Birds



Prey = forest insects

