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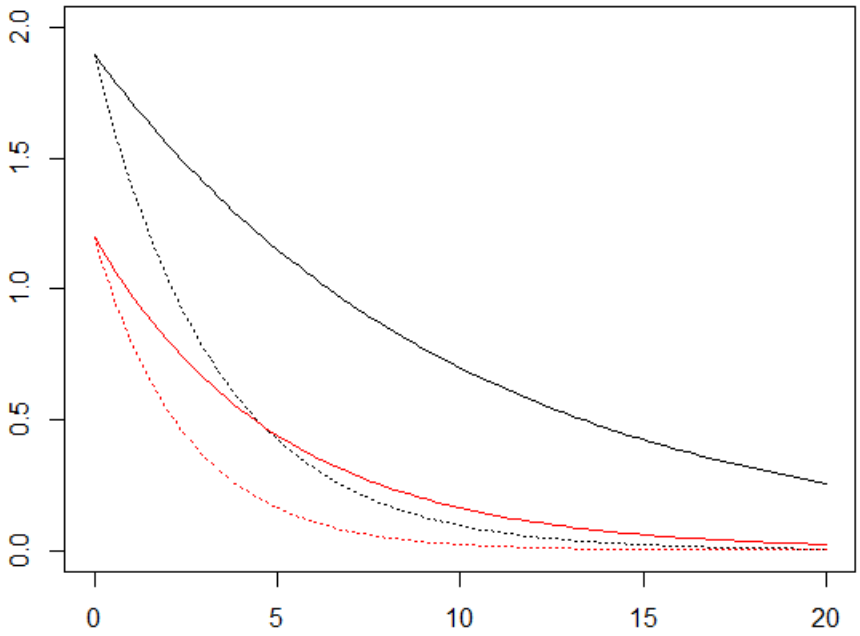
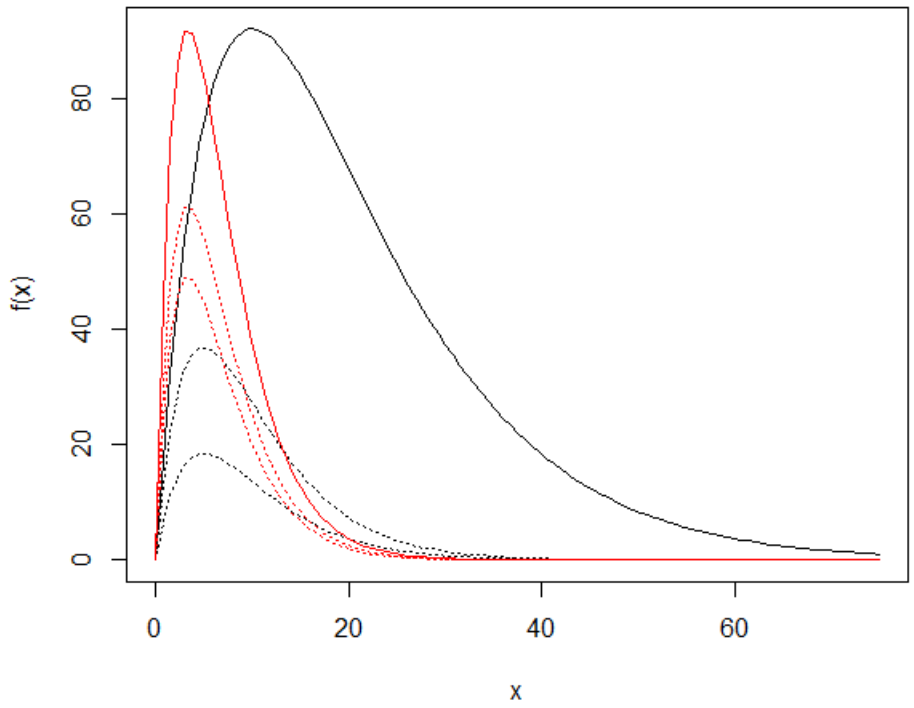
Worked with: Andrew Gordon, Juliana Berube, Jessica Bonin

Lab 5

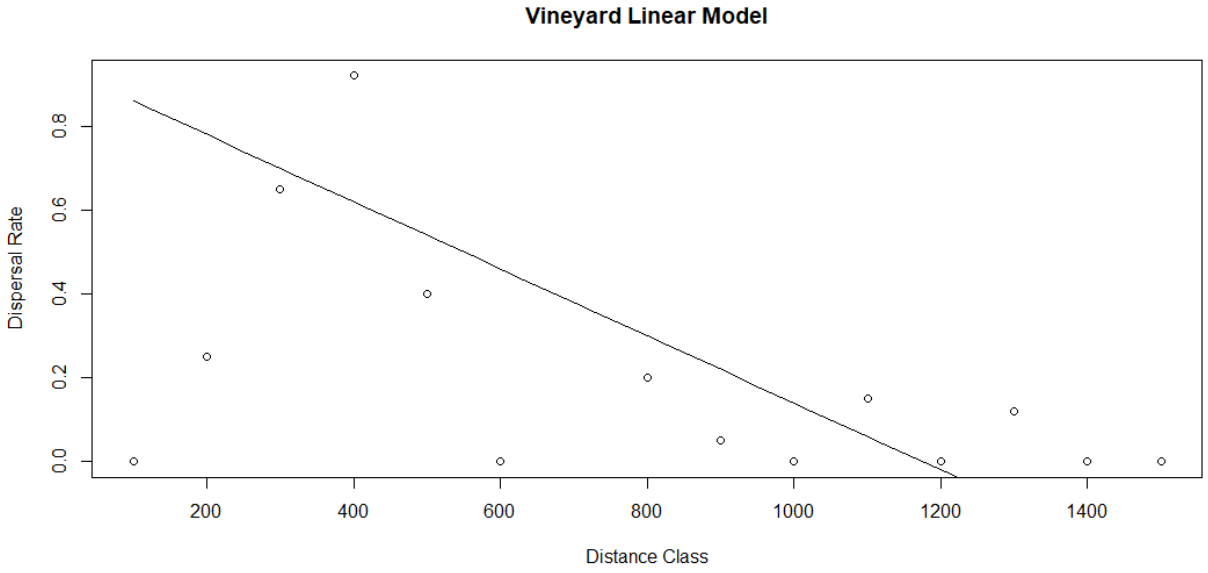
1. exp_fun = function(x, a, b)
   {
    return(a*exp(-b*x))
   }



2.
3. Changing the a parameter changes where on the y axis the curve starts.
4. As you increase the value of b the curve becomes more pulled towards 0 on both axes, making the curve deeper.

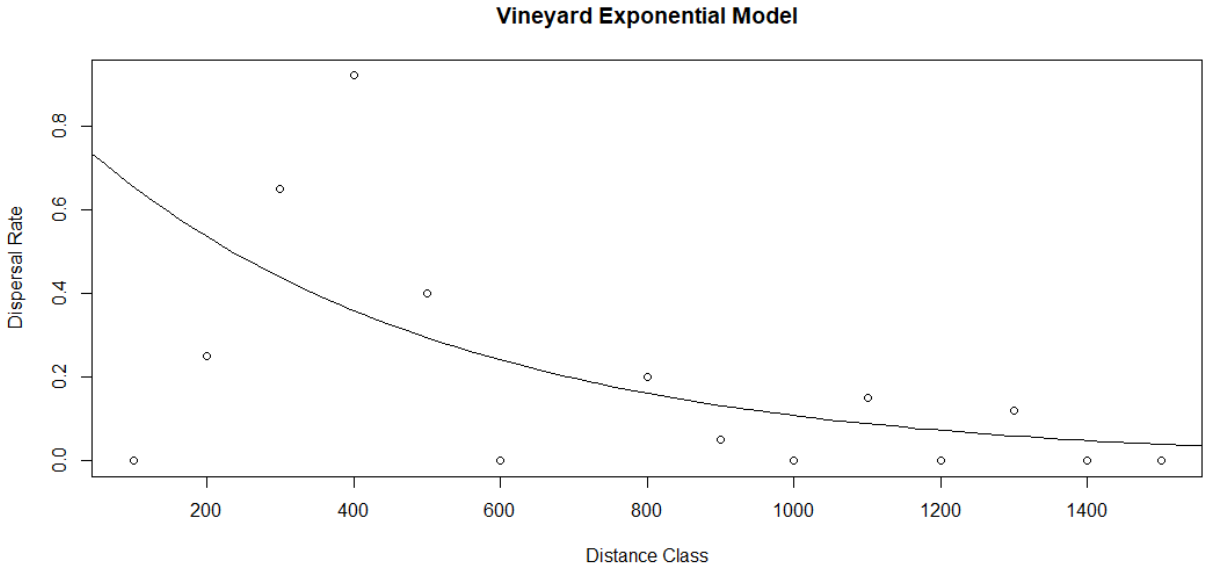


5.
6. As the value of a increases, the tightness of the curve decreases. As the value of a increases, the rate of decline after the maximum y value increases.
7. As the value of b increases, the value of x at which the maximum y value is located decreases.
8. We chose the value of x1 to be 800 as it visually seemed to be the midpoint of the data range and y1 to be 0.3 for the same reason. We had to play around with the slope for a while to land on -0.0008 after Andrew calculated an estimate of 0.0003 after picking values within the range.



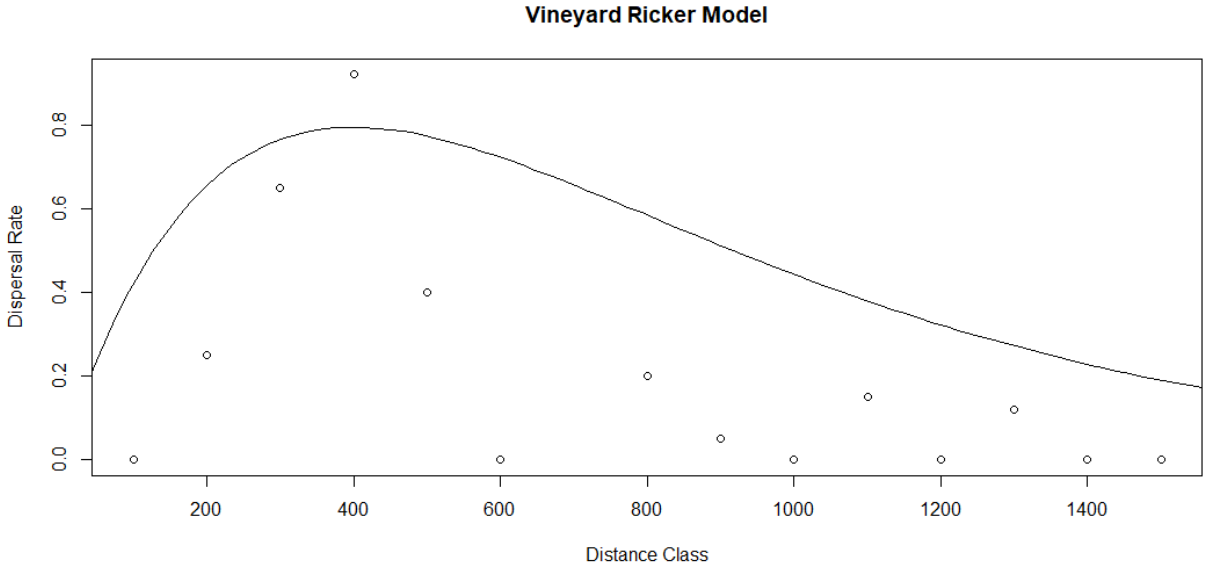
9.

10. We set a=0.8 and b=0.002. We chose the value of a based roughly where we wanted the exponential function to start. Our first attempts at defining a value of b gave us just horizontal lines. We looked back at what we had observed in the previous questions about exponential functions and decided to try much smaller numbers based on the knowledge that as the value of b increases, the depth of the curve increases. We eventually landed on 0.002.



11.

12. We set the value of a=0.0054 and b=0.0025. We calculated the value of b based on wanting the top of the curve to be at an x value of 400. To calculate the value of a we decided that we wanted the top of our curve to be at 0.8. With the value of b and set height we were able to calculate a.



13.

14. linear_predicted_vec= line_point_slope(dat_dispersal$dist.class, 800, 0.3, -0.0008)
    resids_linear= linear_predicted_vec - dat_dispersal$disp.rate.ftb

    exp_predicted_vec= exp_fun(dat_dispersal$dist.class, 0.8, 0.002)
    resids_exp= exp_predicted_vec - dat_dispersal$disp.rate.ftb

    ricker_predicted_vec=ricker_fun(dat_dispersal$dist.class, 0.0054, 0.0025)
    resids_ricker= ricker_predicted_vec - dat_dispersal$disp.rate.ftb

    resids= data.frame(resids_linear, resids_exp, resids_ricker)
    resids

15.