CWD Fitting Results

August 23, 2021

CWD Model

The model below is obtain from Miller et. al. (2006) [1].

$$\begin{aligned} \frac{dS}{dt} &= a - S(\beta I + \gamma E + m) \\ \frac{dI}{dt} &= S(\beta I + \gamma E) - I(m + \mu) \\ \frac{dE}{dt} &= \varepsilon I - \tau E \end{aligned} \tag{1}$$

S	the number of susceptible deer
I	the number of infected deer
E	the mass of infectious material in the environment
a	the per capita birth rate
β	transmission rate
μ	per capita CWD mortality rate
m	per capita natural morality rate
γ	indirect transmission
ϵ	per capita rate of excretion of infectious material by infected animal
τ	mass specific rate of loss of infectious material from the environment

Table 1: Description of the model parameters

a	β	μ	m	γ	ϵ	τ
4.48307	0.002446	2.617254	0.103202	0.206146	0.150344	0.135785

Table 2: Fitted parameters

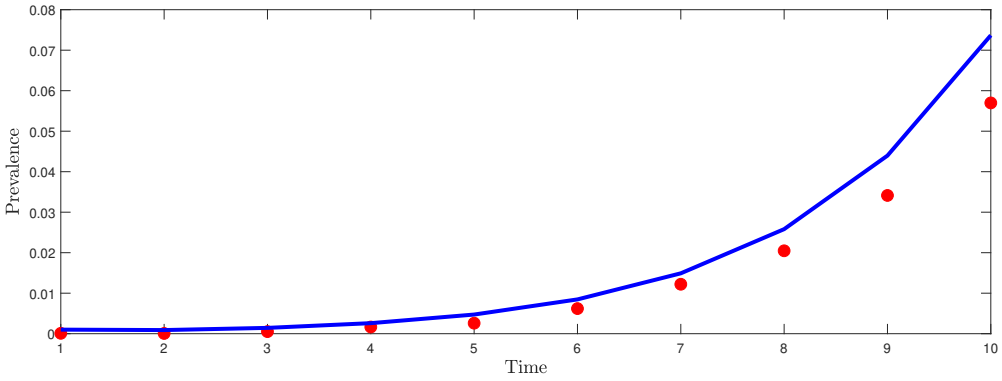

Figure 1: Ten days

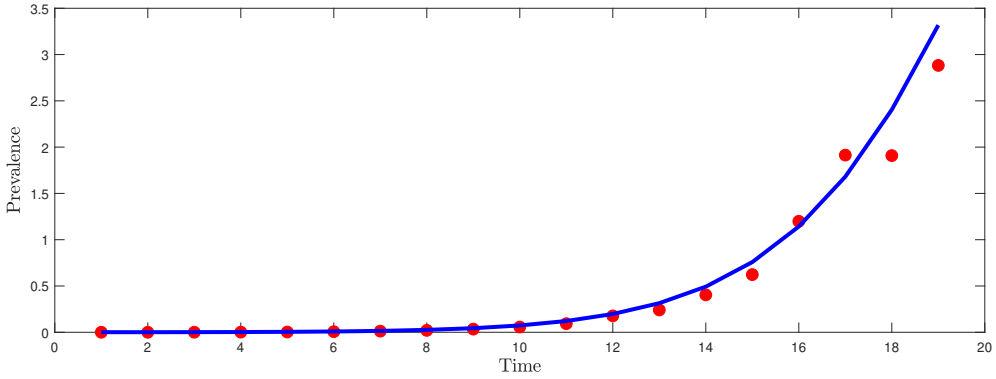

Figure 2: Full data set

References

[1] Michael W Miller, N Thompson Hobbs, and Simon J Tavener. Dynamics of prion disease transmission in mule deer. Ecological Applications, 16(6):2208–2214, 2006.