MPulleyM2Q2

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1. Come up with a biological example of data that has a binomial distribution. Your example MUST be based on a scientific paper. You need to add the citation of the paper that you based your distribution on! Remember, you need an n and a p.

   I am examining the prevalence of Chyridomycosis in Stream Frogs in Tropical Queensland. The study found a probability of disease prevalence in adult stream frogs between 0.0075 to 0.001 depending on the species. I will use a $p = 0.001$. Over the course of the study 765 adult frogs were evaluated for the disease, so I will use 765 as the sample size.

   WOODHAMS, DOUGLAS C., and ROSS A. ALFORD. "Ecology of Chytridiomycosis in Rainforest Stream Frog Assemblages of Tropical Queensland." Conservation biology 19.5 (2005): 1449–1459. Web.

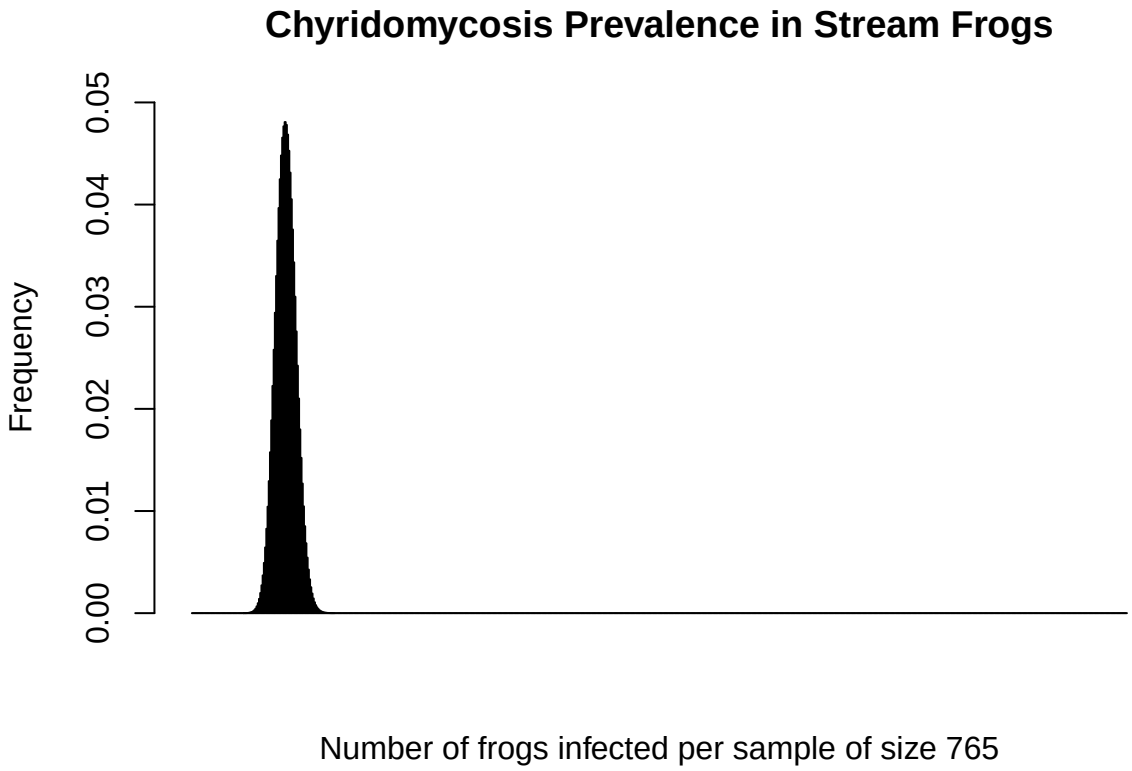
2. Calculate and plot the PMF for all potential results.

```
n=765
x = 0:n
p = 0.1

my_pmf = dbinom(x,n,p)
sum(my_pmf)
```

```
## [1] 1
```

```
newplot<-barplot(my_pmf, col = "steelblue", ylim=c(0,0.05), main="Chyridomycosis Prevalence in Stream F
```



3. Calculate the expected value.

The expected value is 76.5.

```
EV<-sum(my_pmf*x)
EV
```

```
## [1] 76.5
```

4. Based on your biologically example, simulate a single study, and calculate the maximum likelihood estimate.

The estimated MLE is 0.1098039.

```
set.seed(43)
sims1 = rbinom(n,1,p)
MLE = sum(sims1)/n
MLE
```

```
## [1] 0.1098039
```

5. Come up with a biological example of data that has a Poisson distribution. Your example MUST be based on a scientific paper. You need to add the citation of the paper that you based your distribution on! Calculate and plot the PMF

This paper estimates number of aphids on a potato plant. The mean number of aphids is 536.

Anscombe, F. J. "On Estimating the Population of Aphids in A Potato Field." Annals of applied biology 35.4 (1948): 567–571. Web.

```r
n=536
x = 0:(2*n)
lambda =  536

pois_pmf = dpois(x,lambda)

sum(pois_pmf)
```

```
## [1] 1
```

```r
newplot<-barplot(pois_pmf, col = "steelblue", main="Number of aphid on a potato plants", xlab="Number o
```