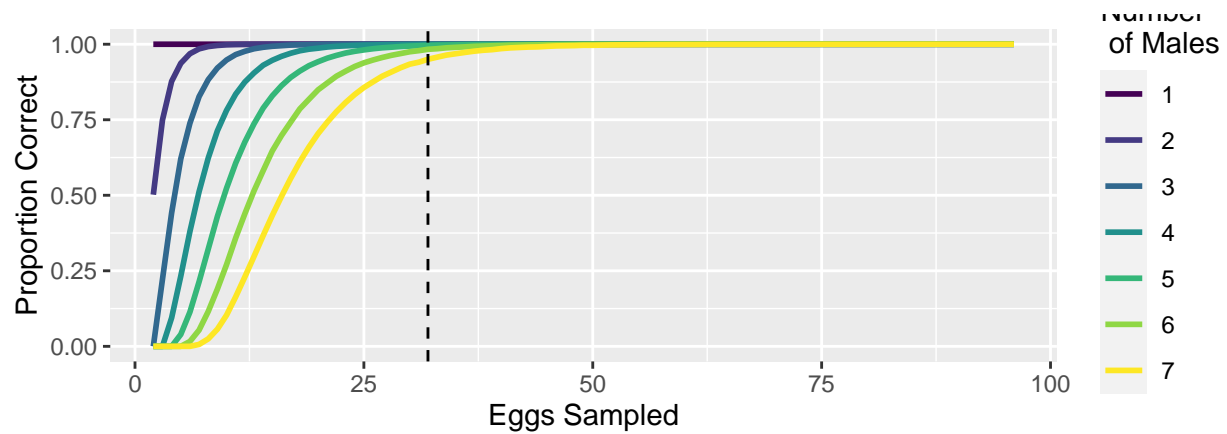# Power Analysis

Vic Quennessen

Power analysis

Question 1: How many hatchlings should be sampled from a nest to robustly estimate the number of males that contributed to it?

assuming random fertilization

```
source('eggs_to_sample.R')

eggs_to_sample(n_eggs = 100, max_hatchlings = 96, max_males = 7,
               breeding = 'random', n_sims = n_sims)
```

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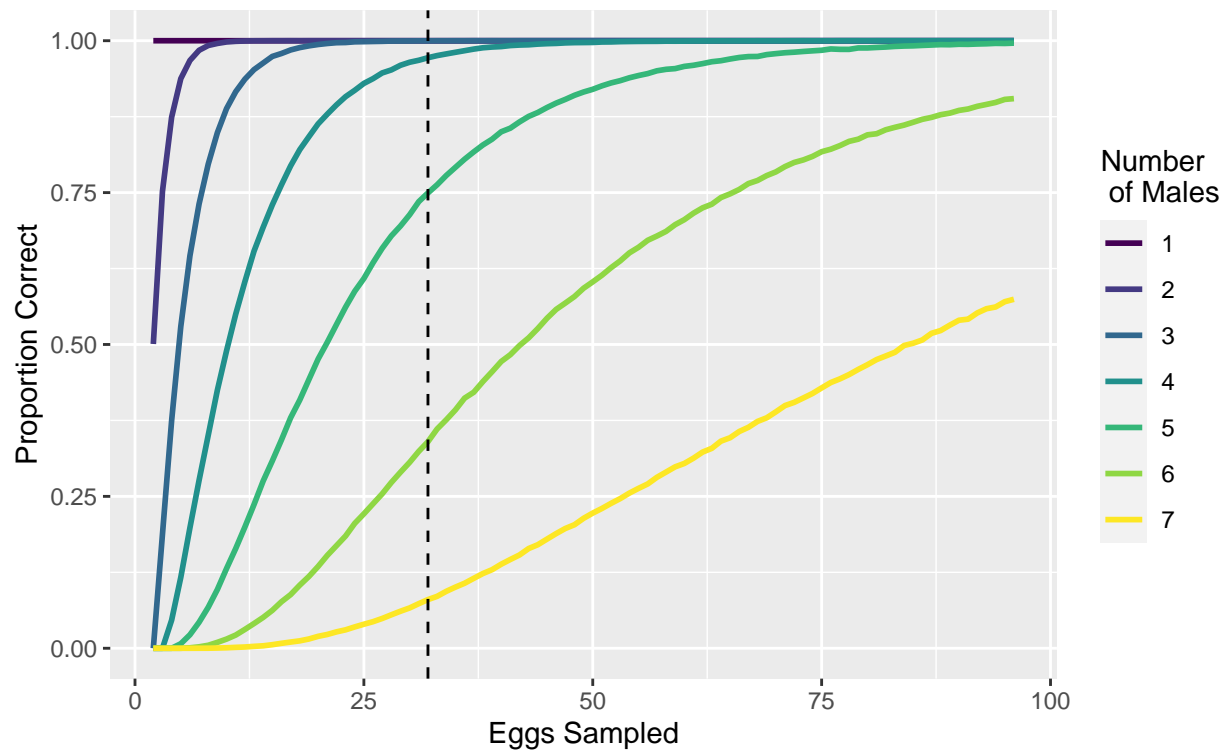


```
##
## [[2]]
##    Number of Males Confidence
## 1                1    1.00000
## 2                2    1.00000
## 3                3    1.00000
## 4                4    0.99967
## 5                5    0.99584
## 6                6    0.98323
## 7                7    0.95012
```

assuming exponential decay in fertilization (1/2, 1/4, 1/8, etc.)

```
source('eggs_to_sample.R')

eggs_to_sample(n_eggs = 100,
               max_hatchlings = 96,
               max_males = 7,
               breeding = 'exponential',
               n_sims = n_sims)
```

[[1]]


```
##
## [[2]]
##   Number of Males Confidence
## 1               1    1.00000
## 2               2    1.00000
## 3               3    0.99980
## 4               4    0.97199
## 5               5    0.74946
## 6               6    0.33999
## 7               7    0.08010
```
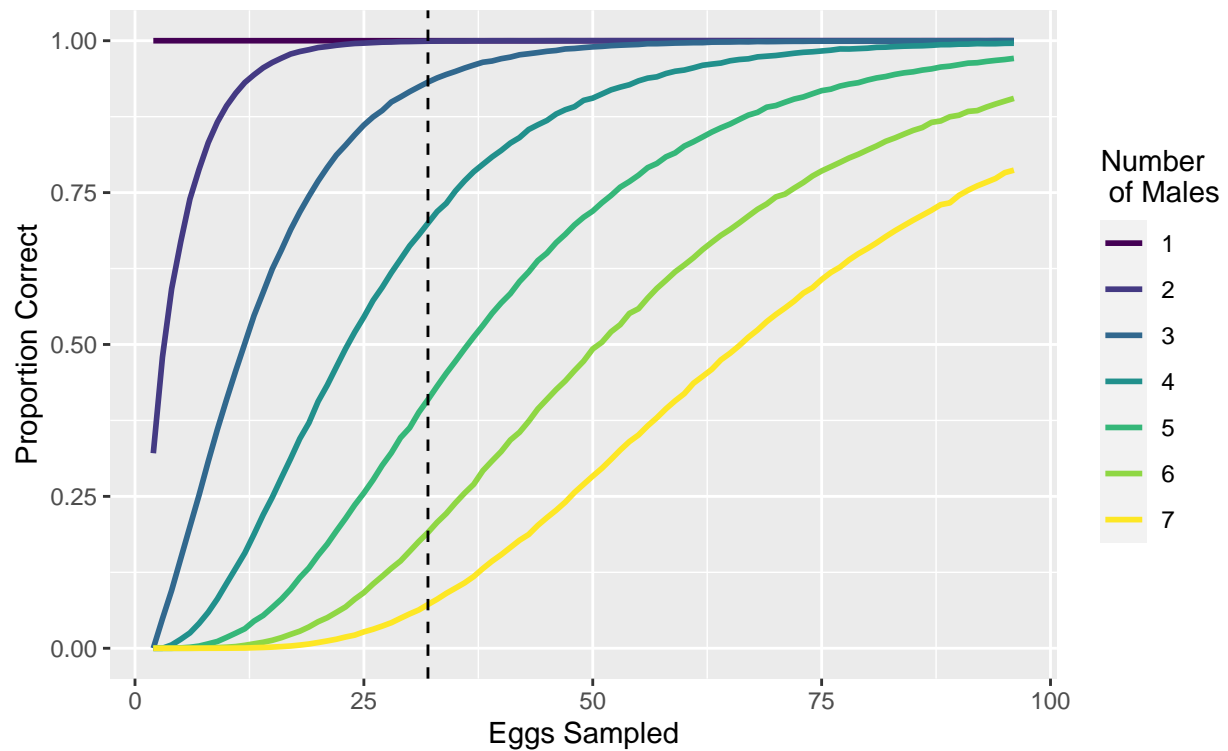
assuming one dominant sire

```r
source('eggs_to_sample.R')

eggs_to_sample(n_eggs = 100,
               max_hatchlings = 96,
               max_males = 7,
               breeding = 'dominant',
               n_sims = n_sims)
```

[[1]]


```
##
## [[2]]
##   Number of Males Confidence
## 1               1    1.00000
## 2               2    0.99923
## 3               3    0.93185
## 4               4    0.69965
## 5               5    0.40927
## 6               6    0.19051
## 7               7    0.07197
```
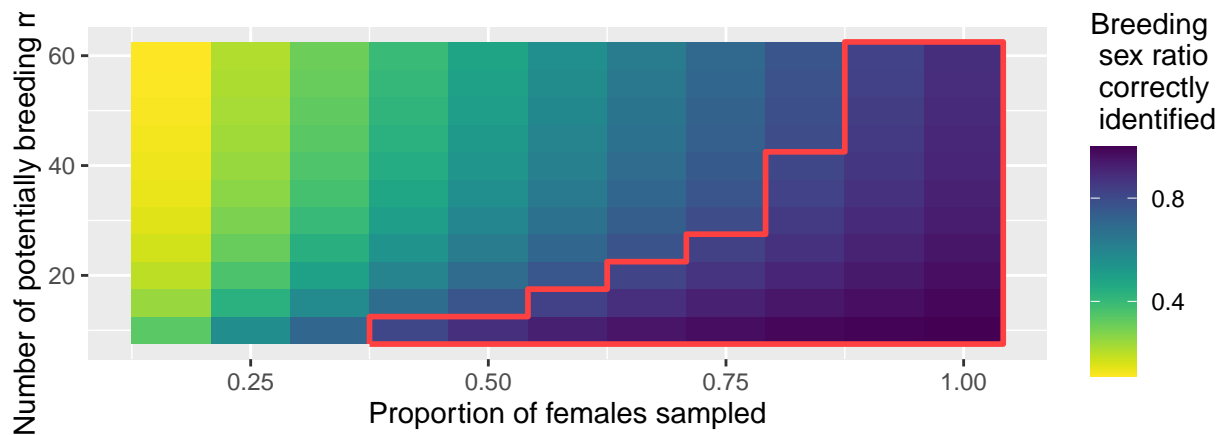
Question 2: How many females and nests should be sampled to get a robust estimate of the number of breeding males, and therefore the breeding sex ratio?

assuming random fertilization

```
source('sample_all_nests.R')

sample_all_nests(max_n_males = 7,
                 max_n_females = 10,
                 minF = 10,
                 minM = 10,
                 maxF = 60,
                 maxM = 60,
                 breeding = 'random',
                 nsims = n_sims)
```
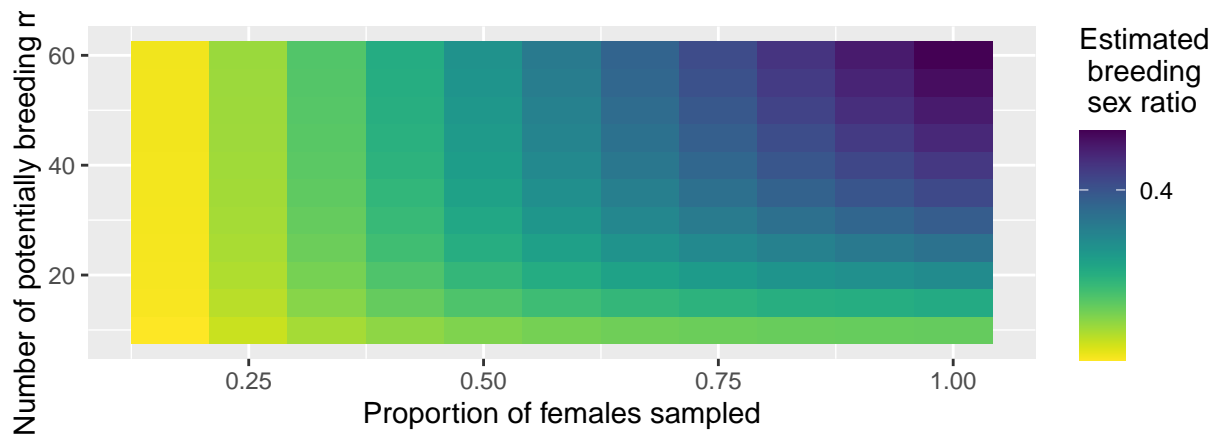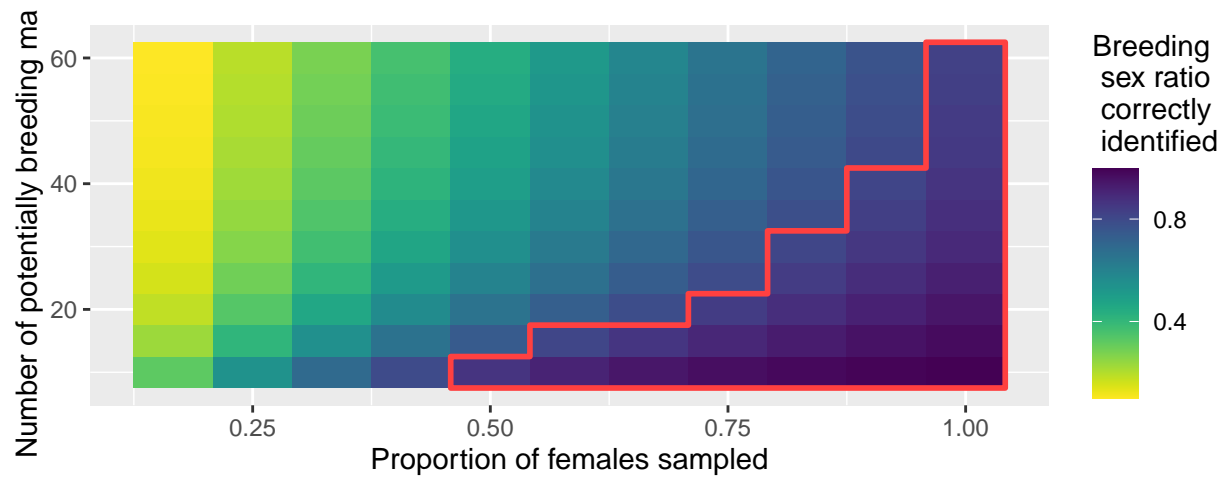
```
## [[1]]
```



```
##
## [[2]]
```


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assuming exponential decay in fertilization (1 nest, 1/2, 1/4, 1/8, etc.)

```
source('sample_all_nests.R')

sample_all_nests(max_n_males = 7,
                 max_n_females = 10,
                 minF = 10,
                 minM = 10,
                 maxF = 60,
                 maxM = 60,
                 breeding = 'exponential',
                 nsims = n_sims)
```
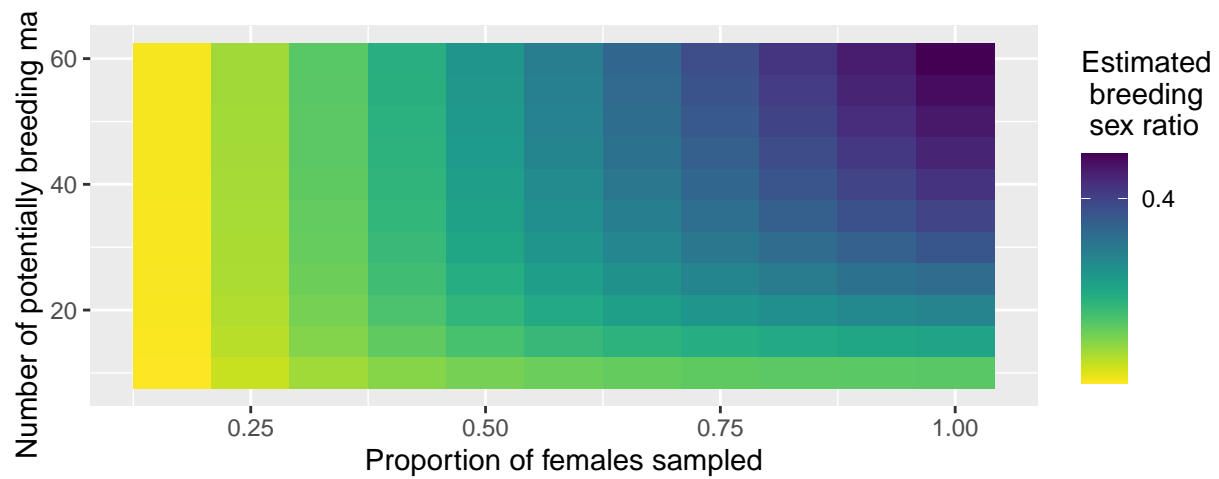
[[1]]

##
[[2]]

assuming one dominant sire
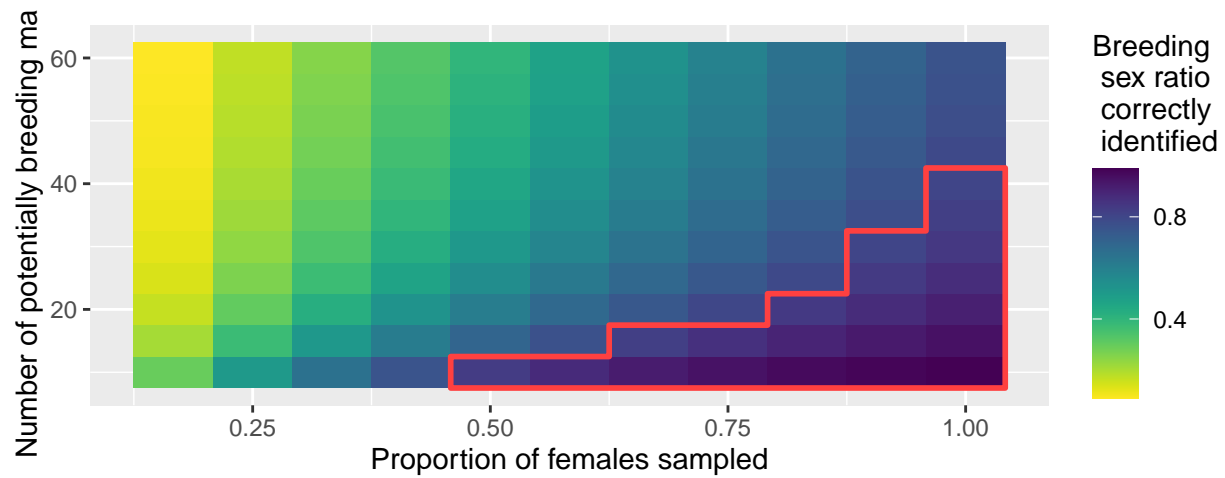
```
source('sample_all_nests.R')

sample_all_nests(max_n_males = 7,
                 max_n_females = 10,
                 minF = 10,
                 minM = 10,
                 maxF = 60,
                 maxM = 60,
                 breeding = 'dominant',
                 nsims = n_sims)
```

[[1]]

##
[[2]]