3 (a)

The density function for the Weibull is

$$f(x|\alpha, \lambda) = \alpha\lambda x^{\alpha-1} \exp(-\lambda x^{\alpha})$$

with survival function

$$S(x|\alpha,) = \exp(-\lambda x^{\alpha}).$$

We retain 20,000 posterior samples after a burn-in of 5000. There didn't seem to be any issues regarding convergence.

I use four different sets of priors:

1. $p(\alpha) \propto 1/\alpha$, $p(\lambda) \propto 1/\lambda$
2. $\alpha \sim Ga(1, 1)$, $\lambda \sim Ga(1, 1)$
3. $\alpha \sim Ga(1, 1/10)$, $\lambda \sim Ga(1, 1/10)$
4. $\alpha \sim Ga(50, 50)$, $\lambda \sim Ga(50, 50)$

My preferred set is number 1, since this is non-informative while still not producing an improper posterior. Set 3 is also fairly non-informative, but is a proper prior. Sets 2 and 4 both give priors means to 1 for both parameters, but differ greatly in the prior variance (2 has much larger variance relative to 4).

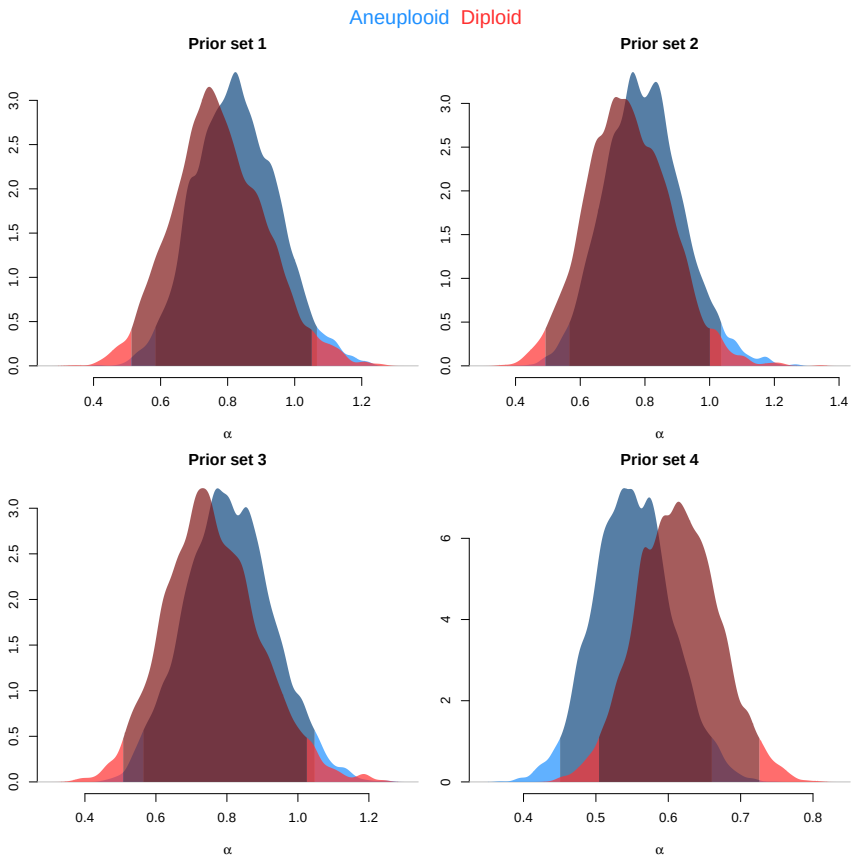
From the figures, only prior set 4 gives much different results than the other 3, which is expected since set 4 is intended to be highly informative.

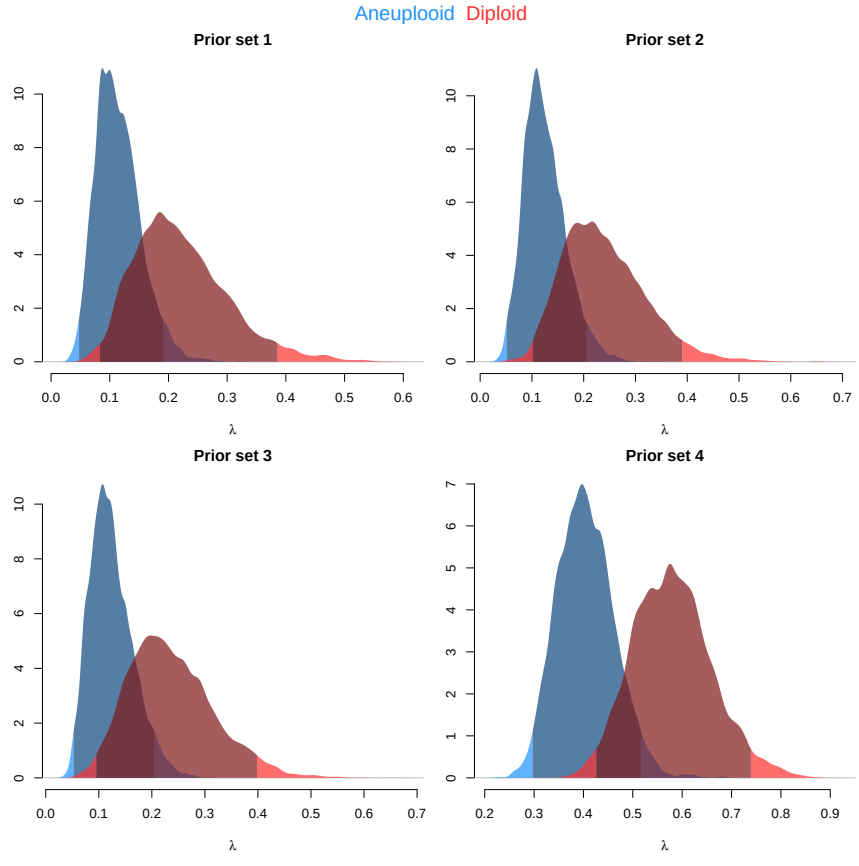
The posterior for α is each ploidy group is very similar across all prior sets (note the degree of overlap in the distributions). It may be reasonable to conclude that the value for α is common across the two groups.

The following table provides a numerical summary for the posteriors in each ploidy group under prior set 1.

Profile	Param	mean	var	hpd	
Aneuploid	α	0.827	0.015	0.584	1.066
	λ	0.114	0.001	0.047	0.191
Diploid	α	0.774	0.018	0.513	1.050
	λ	0.221	0.006	0.083	0.385

Table 1: Posterior summaries under prior set 1.


Aneuplooid Diploid
Prior set 1
Prior set 2
Prior set 3
Prior set 4
α


Aneuplooid Diploid
Prior set 1
Prior set 2
Prior set 3
Prior set 4
λ