Cheatgrass: stopping an unwanted invader [Q1 – Q10]

Cheatgrass (*Bromus tectorum*) is a non-native (invasive) plant in North American grasslands. It can become so dominant in suitable habitats that almost all other plant species disappear. As a biodiversity manager, you want to find ways of preventing it becoming common in your grasslands.

You believe that certain native plant species might be better than others at preventing cheatgrass from dominating habitats. You have decided to set up experiments to test species that have **never been tested in this way before**. In these controlled experiments, you will test the effect(s) of 4 other plant species and will have a total of 5 different treatment groups (cheatgrass grown alone, cheatgrass v species A, cheatgrass v species B, cheatgrass v species C, and cheatgrass v species D).

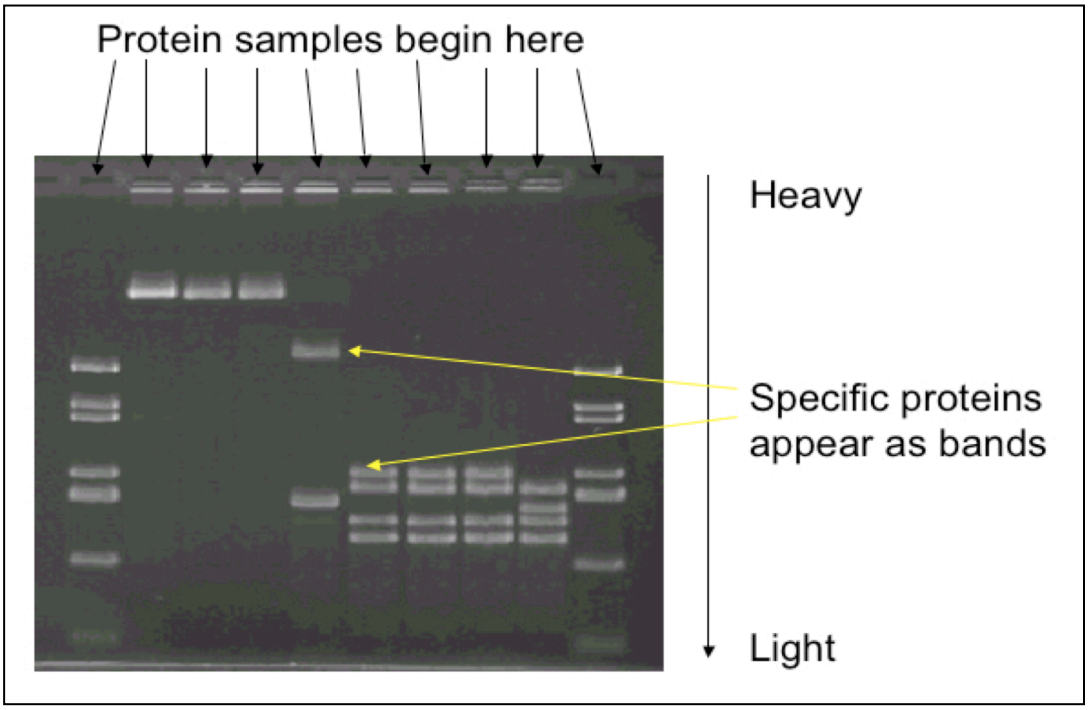
You will provide the same volume of water to all treatment groups (every day for 6 months) and eventually compare average (mean) cheatgrass growth rate (cm/month) in the different groups.

Grass sickness [Q11 – Q18]

Grass sickness is a disease that kills hundreds of horses every year, but the cause remains unknown. Some think that damage to the brain (and nervous system) could be involved in a similar way as in Parkinson's and Alzheimer's disease. In both those diseases, oxidative damage occurs when toxic, reactive oxygen molecules damage proteins and DNA. **Oxidative damage occurs to different proteins in all individuals over time (for many reasons) but on a lesser scale in those not affected by neurodegenerative diseases.**

You have been given brain neuron samples from a variety of horses that died of grass sickness as well as from a variety of horses that died of natural causes and had never previously been affected by neuron-related diseases. **You will compare oxidative damage in protein samples from neurons of horses that died from grass sickness with those of horses that died of natural causes to see if any patterns emerge.**

Gel electrophoresis separates individual proteins by running an electric current through a gel to which the whole protein sample has been added. Proteins affected by oxidative damage will appear as distinct bands because you will include a fluorescent label that only attaches to them, and makes them glow (see diagram overleaf).

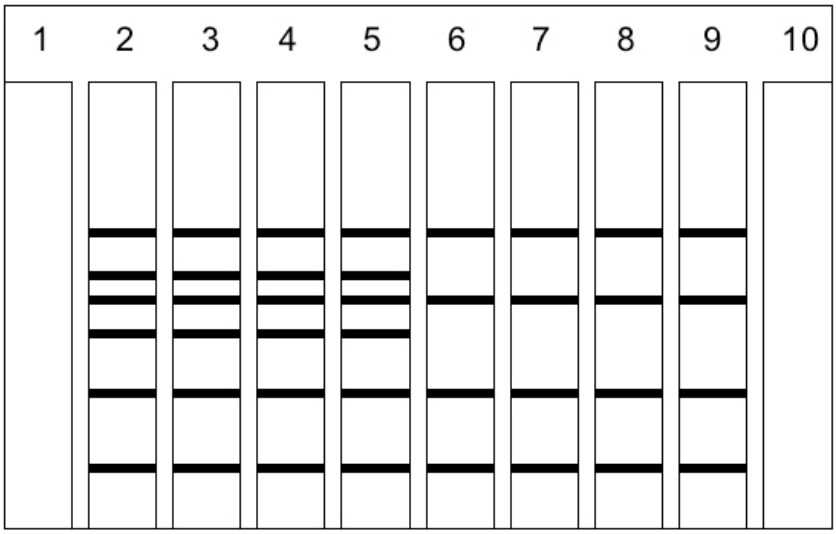


Q12 Table: Choose either Version A, B, C, or D

Version	Decision 1: How many different brain neurons should be sampled?	Decision 2: How many different protein samples should be taken from each brain neuron?	Decision 3: How many different gels should be run for each protein sample?
A	1	1	4
B	2	2	1
C	4	1	1
D	4	4	4

Q13 Figure: Use this figure to answer Q13

1=???, 2,3,4,5= Grass Sickness, 6,7,8,9= Natural Causes, **10=???**



Q15 Figure: Use this figure to answer Q15

1= Negative Control, 2,3,4,5= Grass Sickness Horses

6,7,8,9= Natural Causes Horses, 10= Positive Control