* Case study – change in camouflage in response to snow colour
  + Organisms that change their fur colour in different seasons
  + Snowshoe hare – has part of distributions that remain brown throughout the whole year
  + Climate change – use photoperiod – might end up white in the black background when there is no snow – affect fitness
  + Mismatch between snow colouration and fur colour – 7% decline
  + Genomic base
  + Lots of people use photoperiod – melatonin related
  + Change in photoperiod – physiological response to melatonin – fixed – no plasticity
  + Area on west coast – they don’t change colour – stay brown
  + Exomes – expressed parts of genomes – have mRNA and tRNA
  + 4 different locations
  + Correspond to geography except one part of the genome
  + If there has been divergence selection between brown and white, should see large Fst
  + 1 area with high Fst – strong divergent selection – in contrast with other parts of the genome
  + Match the outlier with agouti gene – corresponds with colour
  + Seasonal upregulation of the gene only in the white hare
  + Look at expression of the agouti gene when they are white, intermediate, and brown
  + Genomics from other rabbit species – constructed phylogenies
* “Fitness landscape” – distribution of traits that are related to fitness – not always normal
  + Can be bimodal
  + Can visualise how multiple traits relate to fitness
  + Localised adaptive peaks when dealing with trade-offs, localised fitness
* Effective population size – selection is more effective when the popular size – random genetic drift increases in small population so selection doesn’t play that much role – Fishers theory
  + Adaptive change involves mutation and selectin acting on those mutations – more effective in large population
* Frogs
  + Different colour frogs depending on evolution
  + Right shifting balance theory – relaxation of selection – pop size is small enough that random genetic drift generates new polymorphism
  + These frogs have intermediate values – different colour variation – weird because it should be useless as if the colours are constant, they all scare predators
  + No differences in genetic variation across the samples
  + Site 2 and 3 – selection pressure is low – consistent with right shifting model – pop size with genetic drift that gives rise to polymorphism colour
  + It’s not allopatric speciation and then hybridisation
  + Stripy moves to the intermediate range – genetic drift generates lots of colour polymorphisms – one of those are selected for and became colour variation that we see in the high evolution
  + So – the stripy ones are doing better at the bottom (selected for) – in the mid-range where there are less predators, genetic drift causes lots of colours – the dotted are selected for in the top range – can create new species
  + Mechanism that causes variation