* Genomic approaches being used to understand the genetic processes that are underpinning adaptation to climate and adaptive potentials – identify particular SNPs that are associated with climate and characterise local adaptation with respect to climate change
* Information on how connected the populations are on the landscape
* Look at likelihood of adaptive variance and how fast they can be distributed across the landscape
* Quantitative genetics – most traits are consequences of many genes
* A lot of application of quantitative genetics for adaptive potential
* Climate is changing rapidly because of human impacts
* In order to avoid extinction in population levels, individuals have 3 options
  + Move to favourable habitats – need to understand landscape connectivity
  + Plasticity – extend individuals can cope
  + Adaptation – adaptive potential in which selection can act upon – its importance tends to be ignored
* Narrow sense heritability – what you inherent from your parents – no epistasis interactions
* Breeder’s equation: R = h2S
  + Limitation is knowing additive genetic variation – tough to get these data for long-lived organisms
* Climate change is expected to bring more variability – directional form of selection to deal with heat stress
* Say heat tolerance and desiccation – need to understand the response of particular population – the mean response – plastic responses
  + If get intergenerational data – can get heritability and evolvability
  + Quantitative genetics are helpful but hard to get the data from wild population
* Australian drosophila and look for adaptive potential for stress
  + Three different species – different distributions
  + Cold tolerance vs desiccation resistance – xxxxxxxxxxxxxx
  + Additive genetic component increases – evolvability increases
  + Main message – species that cover more latitudinal range has greater additive genetic variability – greater adaptive potential
* Large robust tropical pops lack Va for handling stress
  + Form of phylogenetic
  + Eg. drosophila comes from common ancestor that lacks adaptation potential for heat stress – no selection on that stress – just remains as it is
  + Pleiotropy – locus that has different functions – constraints on change - might be an explanation of low potential for tropical pops – reduce phenotypic plasticity
  + DNA decay – temperate zone has whole bunch of sequences and SNPs – some do better in cold some in hot – if have deleterious mutation will be selected out of the populations
    - In the tropics less climatic fluctuation – mutation accumulates because not deleterious – reduce adaptive variance that are there historically
  + Global diversity is in the tropical regions – but they are having less adaptive potential
* Phenotypic plasticity – is involved with small interfering RNAs, epigenetics, gene regulation, etc.