

Project Proposal: Detecting tracts of introgression

Problem: Locating segments of the genome that have recently moved from one species into a close relative.

Systems that would be ideal: An ideal system would have an area of recent secondary contact after a period of spatial isolation (e.g., a species that recently invaded an area where a close relative is established). Introgression should then be recent, meaning tracts of introgressed DNA will be large. Inference would be easiest if other isolated populations persist elsewhere. E.g.:



There are species of *Drosophila*, *Anopheles*, and *Arabidopsis* that almost certainly satisfy these criteria.

Project steps:

- 1) Identify fixed differences/allele frequency differences between species using isolated populations.
 - i. Align sp1 (isolated) w/ sp2 (isolated)
 - ii. Pare down to non-identical regions
 - iii. Compare to other w/in species samples to see if diffs are fixed.
 - iv. Create dictionary of alleles & positions
- 2) Simulate introgression.
 - i. Cut chunks from sp1 and put them in sp2 background
- 3) Scan genomes of sp1 & sp2 in same location & look for alleles that belong to the 'wrong' species.
- 4) Looking for introgression using allele frequency differences would require more work. Probably set up a probability threshold for e/ SNP

Project Proposal: Text-based RPG

Goal: Create an interactive role-playing game that runs through the terminal.

Project steps:

- 1) Initializing the game enters the player into a while loop; while their points remain above some value, they remain "alive" in the game.
- 2) Players will be faced w/ decisions in a series of if statements. For example, "A troll approaches you. Do you attack, offer him a drink, or walk away?"
- 3) Some decisions will result in situations where the user will have to complete a task. These might include:
 - i. Fighting, which will include rolling different die types using a rand function.
 - ii. Writing a limerick. Game will not move on unless text meeting the rules of a limerick is entered.
- 4) Game will end with death (loss of all points due to bad decisions/rolling poorly during conflicts/bad limericks/etc) or glory.