Day 1 - Practical

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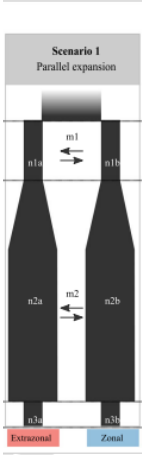
General Instructions:

Download all files from the Day 1 shared folder. Make a copy on your computer and in your Google Drive. Make sure your Google Colab is working properly by following the instructions in the file README_Colab.

Practical Exercise 1:

Explore all options for demographic events in PopPlanner.



Try to build scenario 1 (the most complex) in PopPlanner using a single migration rate starting in the present.

Build possible scenarios for the species you are working with. Export your scenarios as PNG images.

Discuss your models and your thoughts/difficulties in groups.

Practical Exercise 2:

Use PopPlanner to conceive scenarios with 30 samples divided into either one, two or three populations.

Visualize at least 2 simulations from each scenario. For that, copy the command and add to the end of it: -T >> trees.tre

Open the created file (or export it to the terminal with the command "cat trees.tre" and copy the trees in FigTree.

Are the trees in each simulation and in each scenario visually different? How? Now change the θ values and see how the number of segregating sites behaves.

Discuss your results and your thoughts/difficulties in groups.

Practical Exercise 3:

- Scenario 1:

./ms 270 1000 -s 1 -t 0.280081 -I 2 160 110 -n 2 1.875624 -en 0.001289 1 35.544203 -en 0.001289 2 79.531376 -em 0.001289 1 2 1.263896 -em 0.001289 2 1 1.919980 -eg 0.017061 1 38.360445 -eg 0.017061 2 43.970864 -em 0.017061 1 2 0.301733 -em 0.017061 2 1 3.967323 -eg 0.127240 1 0 -eg 0.127240 2 0 -ej 0.293251 1 2

- Scenario 2:

./ms 270 1000 -s 1 -t 0.197474 -I 2 160 110 -n 2 1.881221 -en 0.000138 2 13.295751 -em 0.000138 1 2 3.076617 -em 0.000138 2 1 3.641901 -eg 0.010041 2 23.017965 -em 0.010041 1 2 2.368179 -em 0.010041 2 1 0.699033 -eg 0.130037 2 0 -ej 0.756109 1 2

Scenario 3:

./ms 270 1000 -s 1 -t 0.388039 -I 2 160 110 -n 2 1.378919 -em 0.000606 1 2 3.543538 -em 0.000606 2 1 1.884716 -em 0.006555 1 2 1.994695 -em 0.006555 2 1 3.124491 -ej 0.237054 1 2

Copy the commands in PopPlanner and try to visualize what is being simulated (you can change the Max Time if you need).

Is it difficult to see the scenario in PopPlanner? Do you have any thoughts about why simulations show like that?

Now visualize the segregating sites and the trees using -T >> trees.tre. Can you see a difference in the output of these simulations compared to the simulations from Exercise 2?

Add trees from different scenarios into FigTree and see if you can see any similarities or differences.