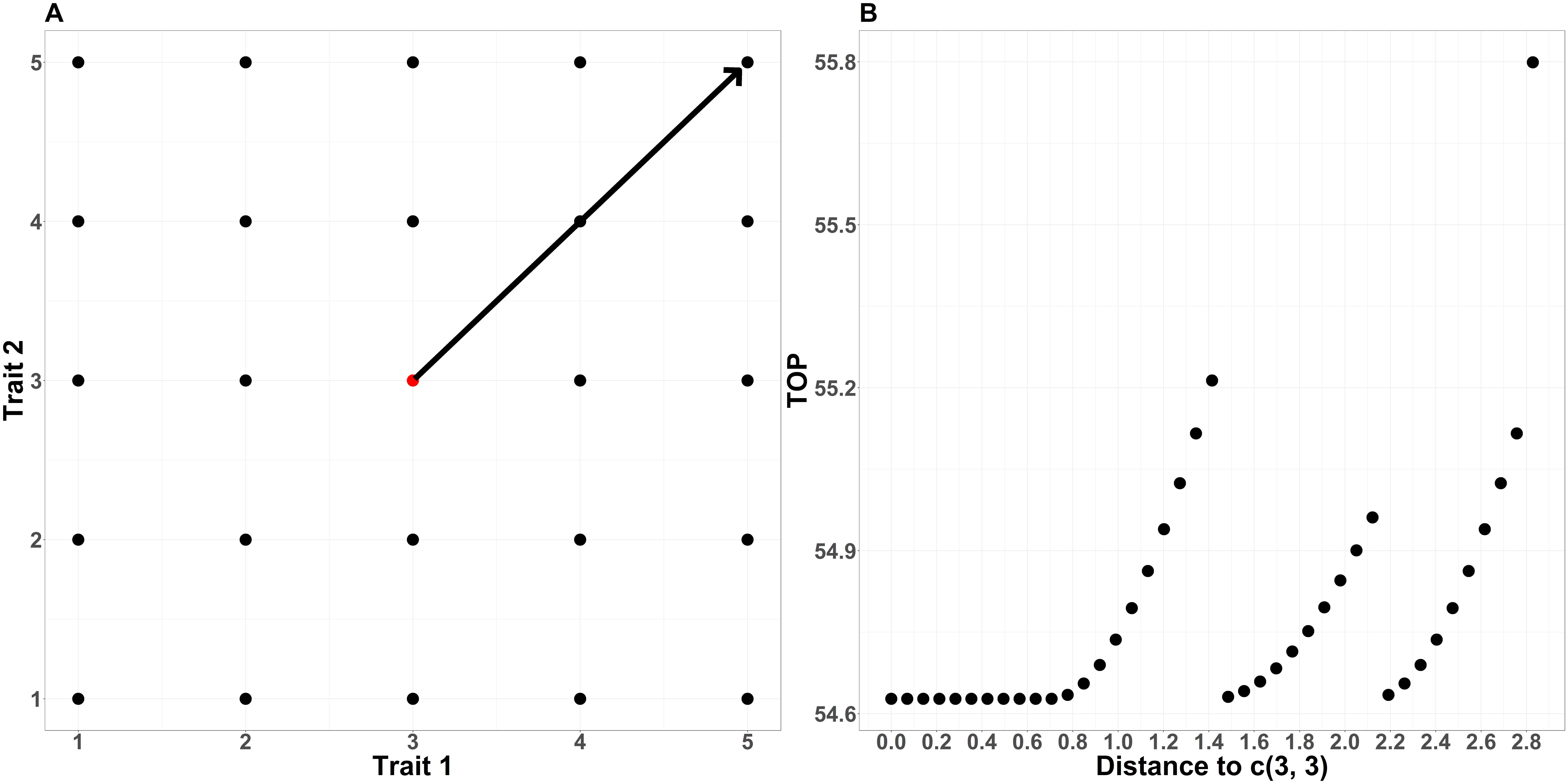
**Appendix 1**

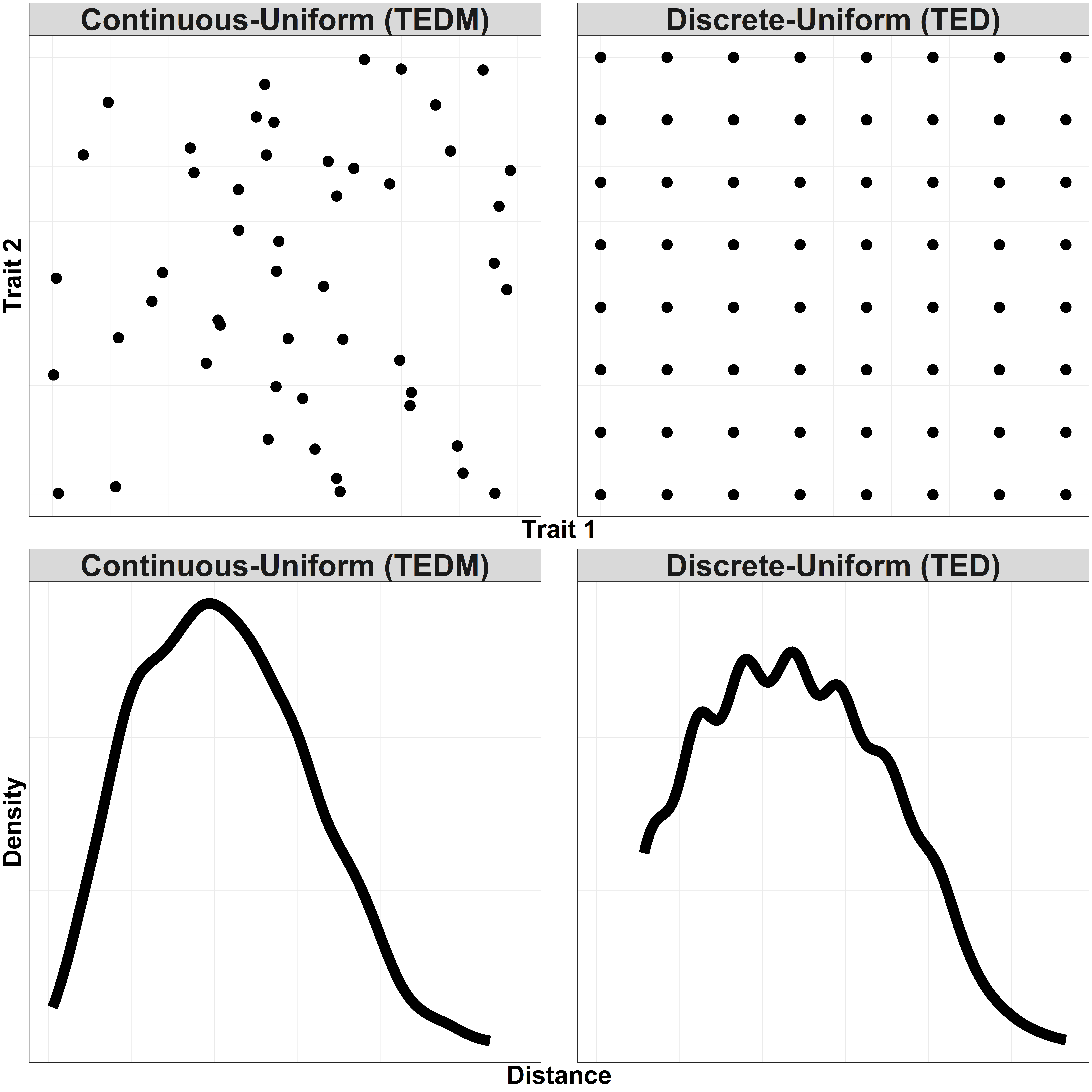
**Appendix 1: Hidden TOP property**



**Figure A1:**top-layer shows a trait space with three convex-hull layers. The red point moves towards the top-right, which initially leads to an expansion of the inner convex-hull but later shrinks when this point merges with the next convex-hull layer. Bottom**-**left shows evenly spaced individuals in a two-dimensional trait space with the red point being the individual at the centre of the trait space. We move this individual from the centre to the top-right corner in steps of 0.05 with **TOP** computed for each step. Right plot shows the relationship between **TOP** and distance made by the blue point to its origin.

**Appendix 2: Motivation for TEDM**

Consider a one-dimensional trait space where evenness is defined “as all individuals in this trait space have the same chance of carrying the trait in question”, then points randomly distributed within this trait space would achieve maximum evenness provided the chance of these points carrying the trait remains constant. In other words, points from a uniform distribution will achieve maximum evenness. While one could argue that the reference trait matrix used for the TED is uniform but discrete (figure A2), its resulting distance distribution is discrete as well with peaks defined by the distance of the points to one another.

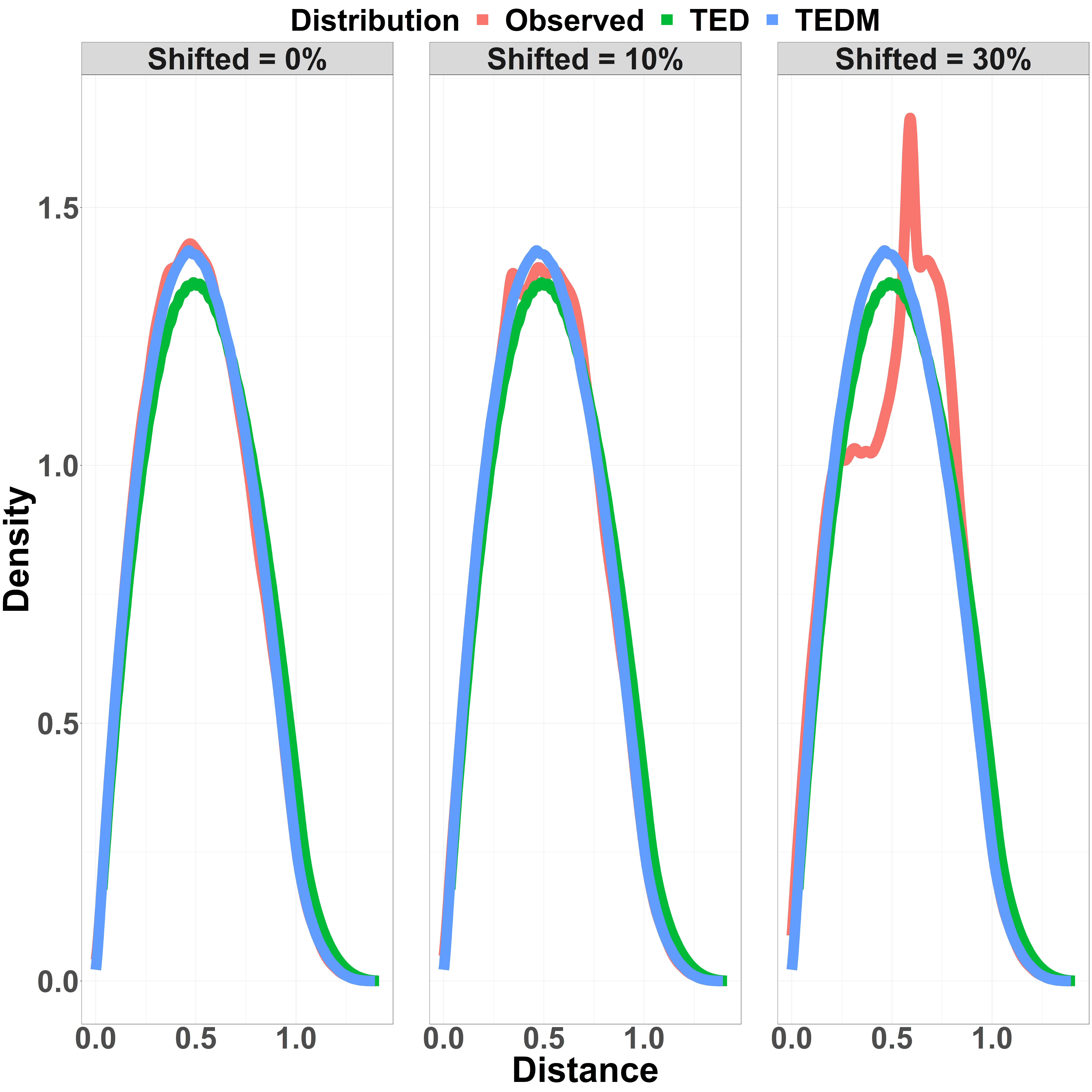


**Figure A2:**Top row shows fifty randomly simulated individual trait values from a two dimensional trait space. Bottom row shows the density plot of the Euclidean distances of the simulated traits.

A comparison of any observed trait data with this reference implies comparing a discrete distance distribution with potentially continuous distance distribution which is not consistent.

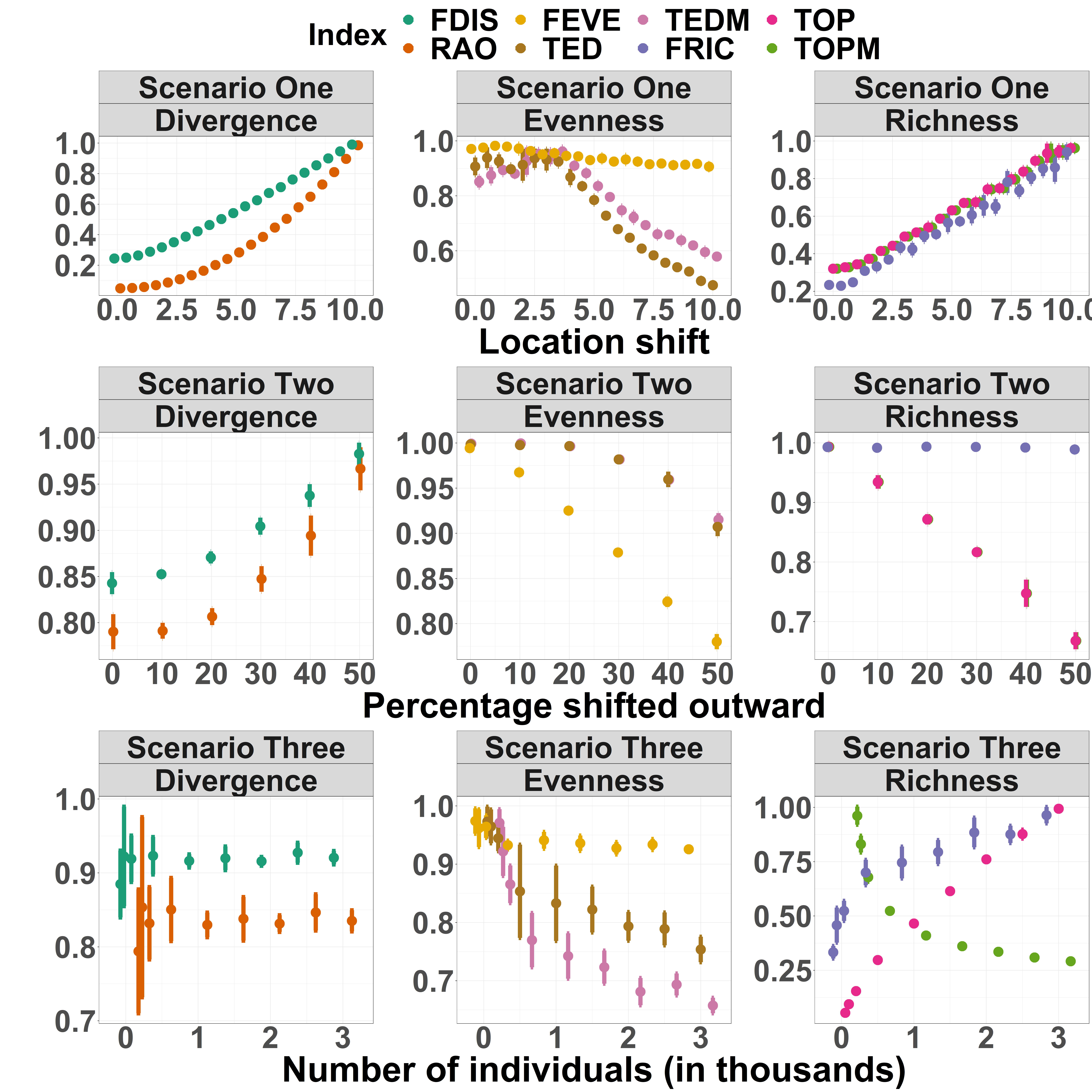
Furthermore, the uniform distribution, discrete or continuous, is nothing but points randomly distributed in a cube or square with constant probability. Therefore, a comparison of an observed trait space with a uniform distribution will involve comparing aspects of the cube or square not covered by individuals’ in the observed area. To avert this, one could project the convex-hull of the observed traiton the uniform distribution and retain only individuals within this convex-hull. This ensures that evenness in the observed trait space is compared to evenness in a uniform distribution within its own convex-hull.

**Appendix 3: Distance distribution in simulation scenario two**



**Figure A3:**Density distribution of the simulated data (observed), and the generated reference matrices for TED and TEDM after shifiting 0 – 30% of individuals at the center of the trait space.

**Appendix 4: Variability of indices in scenarios considered**



**Figure A4:**Variability of Indices in scenario one, two and three. Plot shows mean and standard deviation(sd) across five replicates scaled to lie within 0 and 1. The point shows the mean of the five replicates while the length of the line across this point depicts the variability around the mean (mean+sd and mean-sd).