ENAS 991: Assignment 2
(Writeup)

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(F)

The Lewis law is not strictly satisfied by the stomatal curve, but is closely correlated with the latter having a slightly lower slope.

From the shape distribution, it is quite clear that the randomly generated points exhibit a very distinctive pattern as compared to the rest; they have a broader distribution across the shape values, while for the other three, the shape parameters mostly lie in the range 0.8 to 1.2.

A similar trend can be observed in the neighbor distribution as well; the random points have a broader distribution, while the others tend to have mostly between 5 and 7 neighbors.

And in the Lewis plots, the random points again constitute a very steep increase in area with increasing number of neighbors.

Hence, the distribution of stomal locations on the base of the leaf are certainly NOT random.

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The Lewis plots of stomata are closer to those of the disks than the points generated from the Lloyd algorithm, with the latter exhibiting a slightly higher slope indicating a greater increase in average area of cells with increasing number of neighbors.

The same trends are noticeable in the shape distribution as well as the neighbor distribution, where points from Lloyd have a distinctive peak frequency, while the peaks in the stomatal and disk distributions are less pronounced.

Hence, the distribution of stomatal cells is most closely correlated with the positioning of disks in a tightly packed 2D space.

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Although not very clearly distinctive, the observations suggest that the distribution of stomatal cells (in this case) is mainly driven by the need for high packing efficiency, similar to the jam-packed disks. It is not randomly positioned, and even placement is a slightly less of a driving force in its distribution (because if this were not true, the distribution of the cells would have resembled Lloyd-derived points better).