

November 19th, 1935

Dear Clapham,

The measure of dispersion you suggest is the Poisson index of dispersion divided by the degrees of freedom. I certainly think it might be a useful measure of variability of plant density within the area sampled. If the area of each sample were increased and the difference in density remained the same, I should expect the excess over unity to increase proportionately to the area of the sample. This would occur when ^{the} a true, or ideal, or expected, density varied little within each sample square, but it would not increase so rapidly if the squares were big enough to include any considerable fraction of the variation in ideal density. Indeed, if one considers the case in which the ideal density varies very rapidly about a fixed average so that each square contains a large number of possible sites of different eligibility, one would get back to a Poisson distribution, the real heterogeneity being undetected because it was averaged out within each sample square. This, I take it, is the opposite of your practical case.

In the choice of words, I suppose the main thing is to think what most people will readily make of the word used. Now, I believe a great many will regard "dispersion" as a natural opposite to "clumping", and so would think that "under dispersion" meant more than 'chance clumping'. From this point of view Ashby's use of the term seems more natural. For him, I suppose, over dispersion would mean some degree of approach to a geometrical lattice giving subnormal variation; in fact he is thinking of the dispersion of individual plants, and you of numbers of plants in different samples. It looks as though some quite explicit, if elaborate, form of statement would be needed, rather than any short-cut phrase like 'under dispersion' until the possible types of situation which may arise are widely recognised, when short technical designations will certainly be advantageous.