The stratified random method of vegetation sampling is objective and efficient, in terms of sample-set distributions, for floristic classifications (Westfall & Malan 1986). However, the commonly used random number tables and calculator-generated random numbers often require number abbreviation and manual recording of the numbers, which can be time-consuming. But these inconveniences are insignificant when compared with the time taken to measure the location of random sample sets and express their location in terms of the latitude and longitude co-ordinates of degrees, minutes and seconds. The PHYTOLOC program was developed to generate random numbers for sample set location in terms of random co-ordinates and, in addition, to express these co-ordinates as latitudes and longitudes in degrees, minutes and seconds, thereby saving considerable time and effort.

The program is written in Basic and runs on a Sharp PC 1500 computer. Use is made of a consecutively numbered 4 mm transparent grid map overlay which is related to any working scale, in terms of sample set spacing and size (Rutherford & Westfall 1986). Grid overlay registration with a base map is according to the zero co-ordinates of the overlay with the intersection of minimum latitude and longitude of the study area on the base map, as well as with the zero x-axis of the overlay with the minimum latitude of the base map. Inputs required for the program are:

(i) maximum latitude of the study area in decimal degrees;

(ii) minimum latitude of the study area in decimal degrees;

(iii) minimum longitude of the study area in decimal degrees;

(iv) difference in millimetres, between minimum and maximum latitudes, at the given working scale;

(v) mean distance in millimetres, between 1 minute longitudes at the minimum latitude;

(vi) mean distance in millimetres, between 1 minute longitudes at the maximum latitude;

(vii) number of sample sets required, estimated by 10 SU + (0,25 × 10 SU) where SU is the number of stratified units. This should generally allow for omissions due to transitions and proportionality;

(viii) upper limit (integer), within the study area, of the x-axis of the grid overlay, and

(ix) upper limit (integer), within the study area, of the y-axis of the grid overlay.

The program generates and prints random numbers for the x- and y-axes of the grid overlay and computes and prints the equivalent values in degrees, minutes, seconds and decimal fractions of seconds for longitude and latitude respectively. Convergence of longitude is also taken into account. Each set of co-ordinates, representing a potential sample site, is numbered consecutively. In addition the means and standard deviations of the x- and y-arrays are computed to show the statistical distribution of potential sample sites. Co-ordinates are transferred to the base map using the grid overlay and the printout can be used for field allocation of latitude and longitude to the field data sheets. These co-ordinates can also be used on larger-scale maps for more precise field location of sample sites.

For valid categorization and analysis of floristic units, based on multivariate data, a minimum of four sample sets are required, although a single sample set is mappable at the given working scale. Consequently for a single floristic division of a stratified unit a minimum of eight sample sets would be required. However, for statistical comparisons of univariate data such as biomass or number of taxa, sample-set number should be proportional to area (Elliott 1983). It is, therefore, suggested that a sampling intensity of 2,5% of the potential sampling sites (i.e. total number of co-ordinate interceptions) within a stratified unit should be maintained to ensure proportionality. This is approximately commensurate with the relationship of study area to sample number (Rutherford & Westfall 1986) but modified by vegetation heterogeneity in terms of number of stratified units.

A non-random set of sample sites could, therefore, be required to fulfil the categorization and analysis requirements for stratified units with less than a total of 320 interception points. The additional non-random sample sites can be selected objectively by:

(i) using best fit of additional sample sets for areas equal to those of eight or less interception points (i.e. 100% sampling intensity), and

(ii) using additional random sample sets, to ensure representation of vegetation variation, for areas equal to those with between 8 and 320 interception points. (i.e. > 2,5% but < 100% sampling intensity).

Additional random sample sets can be obtained together with the relevant co-ordinates, if required, by the same procedure, but with each relevant stratified unit registered separately on the 4 mm grid.

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