List of indices

Stand density index [1]:

\[ SDI = N \cdot \left( \frac{25}{dbh_g} \right)^{-1.605} \]  

(1)

where dbh_g = quadratic mean diameter (cm), N = number of trees per hectare.

Crown closure [2]:

\[ CC = 100 \cdot (1 - e^{-CPA}) \]  

(2)

where CPA = crown projection area per hectare (ha).

Näslund function [3] for height-diameter relationship:

\[ h = \frac{dbh^2}{(a+bdh)^2} + 1.3 \]  

(3)

where h = tree height (m), dbh = tree diameter at breast height, (cm) a and b = parameters of the equation.

Pielou-Mountford index of non-randomness [4,5]:

\[ \alpha = \frac{1}{\pi} \left( \frac{N}{P} \right) \sum_{i=1}^{N} \omega'_i \]  

(4)

where n = number of sample points, N = number of trees in a sample plot, P = sample plot area (m²), \( \omega'_i \) = quadratic distance from sample point to the nearest tree (m).

Clark-Evans index of aggregation [6]:

\[ R = \frac{1}{0.5 \sqrt{\frac{N}{P} + 0.0514 \cdot \frac{u}{N} + 0.041 \left( \frac{u}{N} \right)^2}} \sum_{i=1}^{N} r_i \]  

(5)

where \( r_i \) = distances between two nearest neighbors (m), N = number of trees in sample plot, P = plot area (m²), u = perimeter of sample plot (m).

Diameter differentiation index [7]:

where rd = ratio between larger and smaller diameter of all nearest neighboring trees in a stand.

Height differentiation index [7]:

\[ TM_h = \frac{1}{n} \sum_{i=1}^{n} (1 - rh_{ij}) \]  

where rh = ratio between larger and smaller height of all nearest neighboring trees in a stand.

Arten-profile index [8]:

\[ Ap = -\frac{\sum_{i=1}^{m} \sum_{j=1}^{3} p_{ij} \ln(p_{ij})}{\ln(3, m)} \]  

where m = number of tree species, \( p_{ij} \) = proportion of basal area of trees of \( i \)th tree species in \( j \)th stand layer.

Total diversity index [9]:

\[ B = \left\{ 4[\log(m) \cdot (1.5 - Z_{\text{max}} - Z_{\text{min}})] + 3 \left( 1 - \frac{h_{\text{min}}}{h_{\text{max}}} \right) + \left( 1 - \frac{r_{\text{min}}}{r_{\text{max}}} \right) + [1 - \log(HCB_{\text{min}})] + \left( 1 - \frac{CD_{\text{min}}}{CD_{\text{max}}} \right) \right\} \]  

where m = number of tree species, \( Z_{\text{max}} \) = maximum tree species proportion, \( Z_{\text{min}} \) = minimum tree species proportion, \( h_{\text{min}} \) = minimum tree height in the stand (m), \( h_{\text{max}} \) = maximum tree height in the stand (m), \( r_{\text{min}} \) = minimum tree spacing (m), \( r_{\text{max}} \) = maximum tree spacing (m), \( HCB_{\text{min}} \) = minimum height to crown base (m), \( CD_{\text{min}} \) = minimum crown diameter (m), \( CD_{\text{max}} \) = maximum crown diameter (m).

2. Crookston, N.L.; Stage, A.R. Percent canopy cover and stand structure statistics from the Forest Vegetation Simulator; 1999;
3. Naslund, M. Skogsförsöksanstaltens gallringsförsök i tallskog; Swedish Institute of Experimental Forestry, 1937; Vol. 29;.

