Journal of Ecology and the Natural Environment Vol. 2(11), pp. 259-260, November 2010
Available online at http://www.academicjournals.org/jene
ISSN 2006- 9847 ©2010 Academic Journals

Short Communication

Adaptive success index: A criterion for identifying most important species

Diogo S. B. Rocha*, Leilton S. Damascena and Flávio França

*Departamento de Ciências Biológicas, Laboratório de Taxonomia Vegetal, Universidade Estadual de Feira de Santana (UEFS), Bahia, Brasil.

Accepted 11 October, 2010

This article introduces the Adaptive Success Index (ASI) as a criterion for deciding which species are actually important in a given list of species either based on the Importance Value Index (IVI) or on the Cover Value Index (CVI).

Key words: Adaptive Success Index (ASI), Importance Value Index (IVI), Cover Value Index (CVI).

INTRODUCTION

Phytosociology is the analysis of co-inhabitance, structure and constitution of groups of plants as well as the processes that favor continuity or change within a group of plants in time-space (Martins, 2004). Description of communities through phytosociology has evolved along with ecology towards a quantitative approach. Attributes such as dominance, frequency and covering are parameters used in order to describe communities in numbers (Moreira, 2007).

Importance Value index (IVI) and Cover Value Index (CVI) only classify species according to their importance, failing to present useful criteria when it comes to assessing the importance of a group of species within a given community. In addressing this problem, this work aims at proposing criteria that can be used to classify species that present more significant adaptive success within a community.

Assuming that IVI is the result of adding three relative parameters – Density, Dominance and Frequency, the result is inversely proportional to Pielou's J' equability, which assesses heterogeneity. IVI is inversely proportional to J' because if the first is very high it means vegetation is more homogeneous (Müeller-Dombois and Ellemberg, 1974). Adaptive Success Index is based on the premise that species within the most successful group are more adapted to the environment under study.

*Corresponding author. E-mail: diogosbr@gmail.com.

Enunciation

Adaptive Success Index (ASI_{ivi}) is reached through the ratio between the Importance Value Indexes (IVI) of each species and the triple of the equability (*J'*) in the sampled area. *J'* is multiplied by three because the IVI is the result of the sum of the three relative values.

$ASI_{ivi} = IVI_i/(3J')$

Where: IVI_i is the importance value index of the '*ith'* species.

Species presenting an ASI value equal or above the average ASI were considered to be the most successful ones ecologically, which is the simple arithmetic average of the ASI for each species in the sampled area.

Average $ASI_{ivi} = \Sigma ASI_{ivi}/n$

Where n is the number of species.

Considering that the IVI uses the frequency of the sampled species in its construction, this fact is directly influenced by the size of the sample (Moreira, 2007). We propose an alternative to use the Adaptive Success Index (ASI) based on the Cover Value Index (CVI).

In this case the Adaptive Success Index will be calculated through the ratio between the CVI and the double of the value of J' since the CVI value is the sum of these two relative values.

$ASIc=IVC_i/(2J')$

Species presenting an ASIc above or equal to average ASIc were considered to be the most successful ones ecologically, which is the simple arithmetic average of the ASIc.

Average $ASI=\Sigma ISAc/n$

Where n= number of species.

CONCLUSION AND USES

Adaptive success indexes, particularly the one based on the vegetation cover, can provide the analyses of vegetation indexes with a quantitative approach on the contribution of vegetation structure to reflectance values. This analysis might prove fundamental to the classification of vegetation and to the understanding of ecological dynamics.

Since ASI classifies the most important species based on their importance indexes (IVI and CVI), significant contribution of a species to the construction of local vegetation physiognomy can be accessed.

ASI can contribute to comparisons among different areas, hence helping classify vegetation through floristic composition. One can compare groups formed by species with more significant adaptive success among areas under study along with grouping analysis and infer on the similarity among certain areas.

REFERENCES

Martins FR (2004). O Papel da fitossociologia na conservação e na bioprospecção. Anais do 55º Congresso Nacional de Botância: Simpósios, Palestras e Mesas-Redondas. Sociedade Botânica do Brasil e Universidade Federal de Viçosa, Viçosa, Edição em CD-R.

Moreira CM (2007). Avaliação de métodos fitossociológicos através de simulações de amostragens numa parcela permanente de cerradão, na Estação Ecológica de Assis, SP. Msc. Escola Superior de Agricultura Luiz de Queiroz, Piracicaba, SP.

Müeller-Dombois D, Ellemberg H (1974). Aims and methods of vegetation analysis. New York: Wiley, p. 574.