Società Italiana di Agronomia
XLIX Convegno Nazionale

Gestione sostenibile dei sistemi colturali
Bari, 16-18 settembre 2020

Point-quadrat *vs* Phytosociological Method to Assess the Pastoral Value of Dry Grasslands in NW Alps

Ginevra Nota[1], Marco Pittarello[1], Simone Ravetto Enri[1], Michele Lonati[1] and Giampiero Lombardi[1]

[1] Università di Torino, Dip. Scienze Agrarie, Forestali e Alimentari; ginevra.nota@unito.it

Introduction

The pastoral value (PV) is a synthetic index summarizing forage yield and quality for livestock. It is largely used in rangeland management to determine sward carrying capacity. The computation of PV is based on a specific survey procedure (i.e. point-quadrat method) conceived by Daget & Poissonet (1971)[1]. This method allows an accurate estimate of the abundances of the main species in the sward, whereas it underestimates the overall species richness as occasional species can be missed. On the other hand, the Braun-Blanquet phytosociological method (1932)[2] allows to precisely determine species richness, whereas the estimation of species abundances is rather subjective because they are visually determined. The objective of this research was to evaluate the suitability of the phytosociological method to assess the PV, when compared to the point-quadrat method.

Materials and Methods

The study was carried out in dry grasslands (*Festuco-Brometea*) in the NW Italian Alps (45°08'50"N 7°07'07"E). In 2014, 140 vegetation surveys were performed using both the point-quadrat and the phytosociological method. To compute the PV, the Species Relative Abundances were calculated from the point-quadrat data, while the Braun-Blanquet classes were converted to a percentage value **(Figure 1)**. A cluster analysis was used to identify different grassland types. Then, paired t-tests were performed to assess the differences in species richness and PV between the two survey methods.

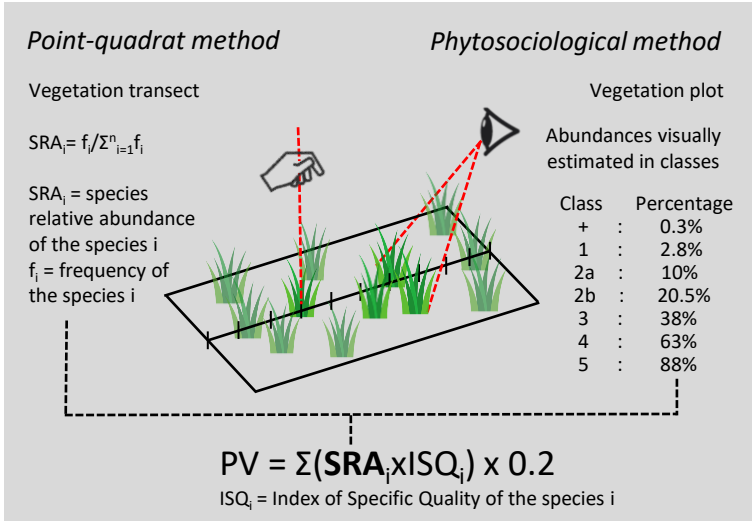

Figure 1 – Computation of Pastoral Value (PV)

Results

As expected, the phytosociological method recorded higher values of species richness than the point-quadrat one **(Table 1)**. The PV did not significantly differ between the two methods for all the grassland types, except for the *Bromus erectus* one **(Table 1)**. In this grassland type, the difference in PV was related to a systematic underestimation of the abundance of *Bromus erectus* (ISQ=1.5) with the phytosociological (on average, 39%) compared to the point-quadrat method (28%).

Table 1 – Paired t-tests for species richness and pastoral values between the point-quadrat and the phytosociological methods

	N	Point-quadrat method	Phytosociological method	Paired t-test
		mean ± es	mean ± es	p-value
Species richness	**140**	**15.3 ± 0.36**	**36.8 ± 0.68**	**<0.001**
Pastoral Value of grassland types				
Brachypodium rupestre type	8	17.2 ± 1.65	16.1 ± 1.52	0.28
***Bromus erectus* type**	**54**	**20.5 ± 0.62**	**17.6 ± 0.65**	**<0.001**
Chrysopogon gryllus type	7	12.3 ± 1.47	10.5 ± 1.32	0.10
Festuca ovina type	13	16.4 ± 1.12	15.4 ± 1.17	0.17
Stipa pennata type	58	6.2 ± 0.47	6.7 ± 0.48	0.05

Conclusions

The point-quadrat and the phytosociological methods provided similar estimation of PV in most of the dry grassland types. In the phytosociological surveys, the abundance visual estimation could have been facilitated by the open vegetation structure and short herbaceous layer of dry grassland communities. However, the underestimation of the dominant species (*Bromus erectus*) with the phytosociological method caused an underestimation of PV in the *B. erectus* grassland type.
Future studies should compare the computation of PV also in other grasslands, such as in more productive and mesophilic ones. Indeed, the greater height and density of the sward might influence the abundance visual estimation, and the difference in the estimate of high-quality forage species might cause remarkable variations in PV.

[1]Daget P., Poissonet J. 1971. Une méthode d'analyse phytologique des prairies. Annales agronomiques, 22(1): 5-41
[2]Braun-Blanquet J. 1932. Plant sociology. McGraw-Hill Book Company, New York and London. 1st Ed

This research was funded by the EC-LIFE program, project LIFE12 NAT/IT/000818 'Xero-grazing'