

Miscellaneous notes

VARIOUS AUTHORS

IMPROVING THE RESOLUTION OF FLORISTIC/HABITAT PATTERN CORRELATIONS ON PHYTOSOCIOLOGICAL TABLES

INTRODUCTION

One of the aims of causal-analytical vegetation research is to analyse the reaction of plant groups to a combination of habitat factors. In particular, it is important to recognize the factors that are primarily responsible for floristic differentiation (Mueller-Dombois & Ellenberg 1974). Tabular portrayal of vegetation-habitat relationships is an effective means of realizing this objective. Traditionally, habitat factors in the form of itemized symbols are appended above the floristic classification without any attempt at clustering on the basis of similarity (Bredenkamp 1975; Robinson 1976; Van der Meulen 1979; McDonald 1983; Van Rooyen 1983; Westfall 1985). Presentation of habitat data in this format may be termed 'passive' since these data require no additional manipulation. Interpretation in this context, however, can be difficult and cumbersome. An improved method of portraying habitat correlations, whereby 'diagnostic' groups of habitat factors are juxtaposed above floristic units, is described here. This involves a more 'active' type of habitat classification.

METHODS

In the Braun-Blanquet phytosociological approach, as described by Westhoff & Van der Maarel (1973), Werger (1974) and Mueller-Dombois & Ellenberg (1974), the cover-abundance of plant species in stands of vegetation is presented in two-way tables with columns representing stands (relevés) and rows representing species. Columns are re-arranged so as to group relevés having similar species and rows are re-arranged to group species occupying similar relevés.

By treating habitat factors as species on a presence/absence basis, they can be re-arranged within the framework of a floristic classification to form diagnostic groups of habitat/environmental factors.

The PHYTOTAB computer package (Westfall *et al.* 1982) was used to structure a floristic table for the grasslands of the Sabie area, Eastern Transvaal Escarpment. Thirteen syntaxa (including nine communities) were elicited from 37 relevés. In a separate table, habitat and structural data rows pertaining to each relevé were superimposed on the floristic classification and re-arranged into groups occupying similar relevés. In this way, habitat groups were highlighted in the same fashion as species groups (Table 1).

RESULTS AND DISCUSSION

The habitat groups provide a ready means of identifying and 'labelling' the different syntaxa. For example, the

Gladiolus densiflorus–*Loudetia simplex* Short Closed Grassland (Community 45) is found on the Escarpment Lower Slopes in the Transitional Mistbelt between 1 112 m and 1 233 m elevation on level terraces in Land Type Ab33b (Table 1). Conversely, the *Cliffortia repens*–*Loudetia simplex* Short Open Shrubland (Community 46) is found on the Escarpment Upper Slopes on fairly rocky sites of Land Type Ab36a (Table 1). These examples are taken from Deall (1985).

The habitat groups may also be useful for highlighting specific factors influencing floristic differentiation. For example, the *Wahlenbergia huttonii*–*Eragrostis racemosa* Low Closed Grassland (Community 49) is differentiated by the *Acrotome hispida* species group (Table 1: 10). Such differentiation is probably largely influenced by the red clay soils derived from Oaktree Dolomite (Table 1).

The advantages of 'active' as opposed to 'passive' classification of habitat for correlation with floristic classifications are manifold:

- 1, 'noise' is more easily observed;
- 2, pattern is better defined and therefore interpretability is enhanced;
- 3, pattern is not obscured by parameters with small class intervals;
- 4, gradients can, if necessary, be indicated by means of class intervals;
- 5, tables can, if necessary, be constructed independently of floristics;
- 6, there is practically no limit to the number of habitat-factor/class-interval combinations that can be used.

The portrayal of habitat factors in this manner is a convenient visual aid, facilitating rapid environmental interpretation of floristic classifications.

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TABLE 1.—Floristic classification and habitat correlation in Grassland of the Humid Mistbelt, Sabie Area (from Deall 1985)

Community number	45				46		47			48					49				
	A		B																
Relevé number	1	1	1	1	6	6	8	7	7	8	7	7	7	8	8	8	9	9	9
Total species per relevé	5	8	9	6	3	2	4	1	3	2	7	8	6	5	8	9	3	0	1
Habitat factors	3	2	2	4	4	4	3	5	3	4	3	3	2	3	4	4	4	3	4
	2	7	2	0	6	0	1	1	8	4	9	9	8	0	1	0	4	5	1
Transitional Mistbelt	+	+	+	+															
Escarpment Lower Slopes	+	+	+	+															
1 112–1 233 m elevation	+	+	+	+											+	+			
Land type Ab 33B	+	+	+																
Level slope (0–3,49 degrees)	+	+						+				+							
Land type Ab 36A				+	+	+		+											+
Short Open Shrubland					+	+													
5–34% rock cover					+	+		+	+										
Escarpment Upper Slopes					+	+		+											+
Nelspruit Granite	+	+	+		+	+		+											
Lowveld Sour Bushveld	+	+	+	+	+	+		+							+	+	+	+	+
1 356–1 478 m elevation								+		+	+	+	+	+					
Fairly deep soil (490–1 000 mm)								+		+		+	+						
Land type Ac 88A								+	+	+	+	+	+	+					
Upland Terrace								+	+	+	+	+	+						
Black B horizon		+						+		+		+							
Black A horizon		+			+	+		+		+	+	+	+						
Loamy sand A horizon						+						+							
Oaktree Dolomite															+	+	+	+	
Clay B horizon		+													+	+	+		
Red A horizon															+	+	+	+	

(1) Differential species of the *Gladiolus densiflorus*–*Loudetia simplex* Short Closed Grassland (Community 45)

<i>Indigofera</i> sp. (Fb)	1	3	3	2																
<i>Gladiolus densiflorus</i> (Fb)	4	1	2														2	2		
<i>Lopholaena disticha</i> (Fb)	1	2	2																1	
<i>Aster comptonii</i> (Fb)	2	2																		
<i>Selago atherstonei</i> (Fb)				2	2															

(2) Differential species of the *Cliffortia repens*–*Loudetia simplex* Short Open Shrubland (Community 46)

<i>Lobelia decipiens</i> (Fb)					3	3							3						
<i>Cliffortia repens</i> (Sh)					3	3													
<i>Styppieochloa gynoglossa</i> (Gr)					3	3													
<i>Senecio oxyriifolius</i> (Fb)					3	2													
<i>Helichrysum mimetes</i> (Fb)					3	3													
<i>Pycreus muricatus</i> (Cy)					3	3													

(3) Differential species of the *Tetraselago natalensis*–*Monocymbium cerasiiforme* Low Closed Grassland (Community 47)

<i>Microchloa caffra</i> (Gr)							2	2	2										
<i>Tephrosia elongata</i> (Fb)							1	3											

(4) Differential species of Communities 46–47

<i>Tetraselago natalensis</i> (Fb)					4		2	3	2										
<i>Mohria caffrorum</i> (Pt)					2	2	2		2										
<i>Eriospermum burchellii</i> (Fb)						3		2		3									
<i>Rhynchelytrum 'complex'</i> (Gr)						2				3									
<i>Pellaea viridis</i> (Pt)					2				2										

(5) Differential species of Communities 45–47

<i>Diospyros lycioides</i> (Tr)	2	2			2				1										2
<i>Trichopteryx dregeana</i> (Gr)						2			2										
<i>Helichrysum panduratum</i> (Fb)							2						1						

+ Denotes presence. Digits 1–9 in matrix denote Domin-Krajina cover-abundance values. Growth forms: Tr = tree; Sh = shrub; Ln = lianoid; Fb = forb or herb; Cy = sedge; Gr = grass; Pt = fern.

TABLE 1.—Floristic classification and habitat correlation in Grassland of the Humid Mistbelt, Sabie Area (from Deall 1985) (continued)

Community number	45				46		47			48					49				
	A		B												A		B		
Relevé number	1	1	1	1	6	6	8	7	7	8	7	7	7	8	8	8	9	9	9
	5	8	9	6	3	2	4	1	3	2	7	8	6	5	8	9	3	0	1
Total species per relevé	3	2	2	4	4	4	3	5	3	4	3	3	2	3	4	4	4	3	4
Habitat factors	2	7	2	0	6	0	1	1	8	4	9	9	8	0	1	0	4	5	1

(6) Differential species of the *Rendlia altera*–*Monocymbium ceresiiforme* Low Closed Grassland (Community 48)

<i>Alloteropsis semialata</i> subsp. <i>eckloniana</i> (Gr)	2			3	3	2	2			
<i>Commelina</i> sp. (Fb)				2	3	2	2			
<i>Senecio erubescens</i> (Fb)				1	3	2				
<i>Senecio gerrardii</i> (Fb)				2	2	1				
<i>Nidorella auriculata</i> (Sh)				2		1				
<i>Athanasia calva</i> (Fb)				2		2				
<i>Helichrysum</i> sp. (Fb)					3	4				
<i>Drosera</i> sp. (Fb)					3		2			
<i>Helichrysum cephaloideum</i> (Fb)					2		3	3		
<i>Euphorbia striata</i> (Fb)							3	1		
<i>Polygala hottentotta</i> (Fb)			2			1		2		

(7) Differential species of Communities 47–48

<i>Kyllinga alba</i> (Cy)		2	3	2	3	3	3	2		2
<i>Rendlia altera</i> (Gr)				5	3	6	9	2		
<i>Tolpis capensis</i> (Fb)			2	1	3	2		1		

(8) Differential species of Communities 46–48

<i>Selago muddii</i> (Fb)	2			2	2	4		2	3		
<i>Harpochoa falx</i> (Gr)	2	2		1	1		2	6			
<i>Koeleria capensis</i> (Gr)	2		4		4	7		8			
<i>Trachyandra saltii</i> (Fb)	2		3		1			2	2		
<i>Hypoxis filiformis</i> (Fb)	2			2		3	3	4			
<i>Stiburus alopecuroides</i> (Gr)	2		6			1		2	2		
<i>Panicum ecklonii</i> (Gr)	2		4	2	3				3		
<i>Stachys nigricans</i> (Fb)	3		2				2				

(9) Differential species of Communities 45–48

<i>Hemizygia subvelutina</i> (Fb)	2	3		3	4	3		3	2	2	3			
<i>Athanasia acerosa</i> (Fb)	1	3	3	1				2	1	5	5	4		

(10) Differential species of the *Wahlenbergia huttonii*–*Eragrostis racemosa* Low Closed Grassland (Community 49)

<i>Acrotome hispida</i> (Fb)									3	2	3	2	
<i>Hyparrhenia hirta</i> (Gr)									4	3	4	3	
<i>Wahlenbergia huttonii</i> (Fb)									3	3	2	2	
<i>Sporobolus</i> 'complex' (Gr)				3					4	3	2	4	
<i>Brachiaria subulifolia</i> (Gr)									2	3	3		
<i>Digitaria apiculata</i> (Gr)									3		2	2	
<i>Eriosema cordatum</i> (Fb)									2		2	2	
<i>Hibiscus aethiopicus</i> var. <i>ovatus</i>										2	2	2	
<i>Pearsonia aristata</i> (Fb)											3	2	
<i>Sonchus integrifolius</i> (Fb)										1		3	
<i>Helichrysum subulifolium</i> (Fb)									2			2	
<i>Tristachya leucothrix</i> (Gr)			2							1	3	2	
<i>Senecio latifolius</i> (Fb)						3				1	3	2	2
<i>Triumfetta welwitschii</i> var. <i>hirsuta</i> (Fb)										3		2	3

(11) Differential species of the *Hypoxis multiceps*–*Wahlenbergia huttonii*–*Eragrostis racemosa* Variant (49A)

<i>Scabiosa columbaria</i> (Fb)									4	2		
<i>Hypoxis multiceps</i> (Fb)									3	3		
<i>Gladiolus</i> sp. (Fb)									2	2		
<i>Rhynchosia totta</i> (Ln)									2	2		

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TABLE 1.—Floristic classification and habitat correlation in Grassland of the Humid Mistbelt, Sabie Area (from Deall 1985) (continued)

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	A		B																
Relevé number	1	1	1	1	6	6	8	7	7	8	7	7	7	8	8	8	9	9	9
	9	9	9	3	6	6	8	7	7	8	7	7	7	8	8	8	9	9	9
	5	8	9	6	3	2	4	1	3	2	7	8	6	5	8	9	3	0	1
Total species per relevé	3	2	2	4	4	4	3	5	3	4	3	3	2	3	4	4	4	3	4
Habitat factors	2	7	2	0	6	0	1	1	8	4	9	9	8	0	1	0	4	5	1

(12) Differential species of the *Parinari capensis* subsp. *capensis*—*Wahlenbergia huttonii*—*Eragrostis racemosa* Variant (49B)

<i>Raphionacme elata</i> (Fb)																2	3	
<i>Sphenostylis angustifolia</i> (Ln)																	3	3
<i>Piloselloides hirsuta</i> (Fb)							2										1	2

(13) Differential species of Communities 46–49

<i>Becium obovatum</i> (Fb)					2	2		2	3	5	2	4			3			3
<i>Indigofera sanguinea</i> (Fb)								4			2	2			3	3		2

(14) Differential species of Communities 45–49

<i>Haplocarpha scaposa</i> (Fb)	2	2			3	4	2	3	3	2	3			3	2	3	4
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G.B. DEALL and R.H. WESTFALL

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