Pour une approche multitaxonomique quantitative, comparative et contextualisée

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Point de vue

- Point de vue essentiellement "Biologie de la conservation"

- Plus précisément, érosion de la biodiversité « ordinaire »

- Analyse de cette érosion avec des métriques comparables à celles utilisées pour les espèces menacées d'extinction (IUCN) (préférée à d'autres approches: cf. Gosselin 2012)

Exemple: catégorie Vulnérable de l'IUCN

An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer

Point de vue

• Pour BGF: tendance quantitative liée à des gradients de gestion plutôt que tendances temporelles

Approche quantitative

$$Y \sim Pois[\exp(a + b * X)]$$

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As an illustration, here we chose:

$$\Delta X_{"typical"} = 5\,\mathrm{m}^2/\mathrm{ha} \quad \text{for basal area}$$

$$\varphi = 0.2,\ \beta = 0.95$$

Approche quantitative

	Basal area	Tree genus richness
Negligible effect	Forest Bryophytes Forest Herbs Forest Woody species	Forest Bryophytes Forest Herbs Forest Woody species Peri-forest Woody species
Non negligible effect (-)	Peri-forest Herbs Non-forest Herbs Peri-forest Woody species	-
Non negligible effect (+)	-	-
Not enough info.	-	Peri-forest Herbs Non-forest Herbs

(☺ 49 stands)

Barbier et al. (2009), For. Ecol. Manag.

Approche quantitative vs significativité stat

Number of cases where the impact of these 2_dendrometric parameters on species richness of 6 understory vegetation ecological groups was…

	Non significant effect	Significant effect
Negligible effect	**7**	**-**
Non negligible effect	-	2
Not enough info.	**2**	**-**

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Approche quantitative => comparative

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Approche comparative entre taxons

et entre « gradients de gestion »

Table 5
Analysis of the multiplicative effect of a given variation of selected ecological parameters on the species richness of the ecologi

Model acronym	Bryophytes	Herbaceous		
	AF	AF	PF	NF
G.Pi	1.01^{00} [0.94;1.08]	1.18 [1.00;1.38]	0.96 [0.67;1.37]	0.97 [0.63;1.41]
G.Qu	0.99^{00} [0.93;1.06]	1.06^{0} [0.91;1.22]	0.85 [0.62;1.14]	0.81 [0.58;1.08]
G.Un	1.03^{00} [0.99;1.07]	0.83^{**} [0.75;0.92]	$0.62^{***,-}$ [0.48;0.79]	$0.40^{***,-}$ [0.29;0.53]

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* Utilisation de formes linéaires de modèles, avec vérification par p-value.

* Essai dans certains cas de formes non linéaires.

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* Attention portée à la multicolinéarité

Indicateurs de biodiversité: de quelle biodiversité dans quel contexte?

Variable in the model	Negative non-negligible effects	Positive non-negligible effects
C	h.HL at slope=0.5 & E/W aspect	h.LL at slope=0.5 & S aspect
	h.NF at slope=0.5 & N aspect	
	h.HL at slope=0.5 & N aspect	
	h.HL at Reaction=5	
	h.NF at Reaction=4.5	
	h.HL at Reaction=4.5	
	h.LT at Reaction=4.5	
	h.HL at Elevation=770m	

Variable in the model	Negative non-negligible effects	Positive non-negligible effects
rs	h.HL	w.LT
	h.HL at slope=0.5 & E/W aspect	h.MF on flat terrain
	h.NF at slope=0.5 & N aspect	w.MF at slope=0.5 & E/W aspect
	h.HL at slope=0.5 & N aspect	w.LT at slope=0.5 & N aspect
	h.HL at Reaction=5	h.MF at Reaction=5.5
	h.HL at Reaction=4.5	w.MF at Reaction=4.5
	h.HL at Elevation=1120m	w.LT at Reaction=4.5
	h.NF at Elevation=770m	**w.LT at Elevation=1460m**
	h.HL at Elevation=770m	h.MF at Elevation=770m
	h.LT at Elevation=770m	w.MF at Elevation=770m

Relations entre biodiversité et « gradients de gestion »: stable d'un contexte à l'autre?

Mean (Standard deviation) across 16 ecological groups of vascular plants (successional, light, temperature) of the difference of the mean log response of species richness to a substantive variation in the indicator between both ends of each gradient

Variable	N-S aspect	+1380m elevation
C	0.1 (0.05)	*0.04 (0.13)*
C.fir	**0.11 (0.05)**	*0.04 (0.15)*
C.spruce	**0.17 (0.1)**	*0.05 (0.12)*
C.othersp	-0.03 (0.08)	0 (0.06)
G.BT	0.04 (0.06)	*0.03 (0.13)*
G.VBT	0.04 (0.1)	0.02 (0.05)
G.MT	0.1 (0.08)	*0.05 (0.18)*
G.ST	***0.12 (0.18)***	-0.03 (0.09)
G.fir	0.05 (0.05)	*0.02 (0.12)*
G.spruce	***0.14 (0.15)***	*0.04 (0.17)*
G.othersp	*-0.04 (0.17)*	*-0.03 (0.17)*
G	0.06 (0.07)	*0.02 (0.13)*
RS	*0.09 (0.18)*	***0.12 (0.38)***
Dominance.G	-0.04 (0.07)	*0.01 (0.19)*
Dominance.C	0.02 (0.06)	*-0.02 (0.14)*

Zilliox & Gosselin, Soumis.

Discussion

- Approche essentiellement empirique et quantitative
- Intérêt d'une approche quantitative et contextualisée
- Travail prévu dans GNB (réunion) pour définir ensemble ce que sont les "variations non-négligeables" des paramètres liés à la gestion forestière
- Intégration via modèle de simulation (projet GeForHet)

Discussion

- A intégrer dans une approche multi-modèle? De comparaisons multiples?

  (y compris pour approche négligeabilité/non-négligeabilité)?

- A compléter/améliorer par approche plus mécaniste (SEM, expérimentation, physiologie…)

References

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