

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)

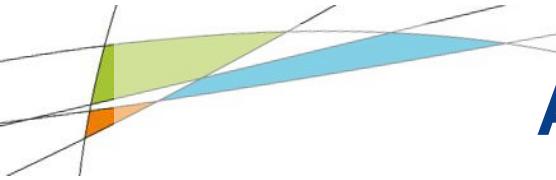


Exemple: catégorie Vulnérable de l'IUCN

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

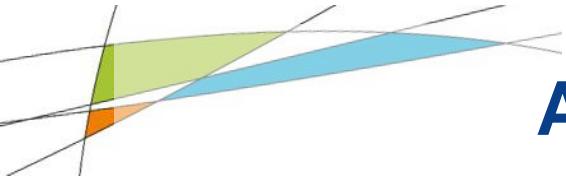
Point de vue

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



Approche quantitative

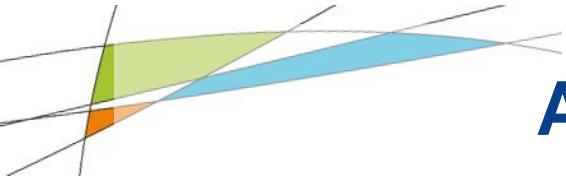
$$Y \sim Pois[\exp(a + b * X)]$$



Approche quantitative

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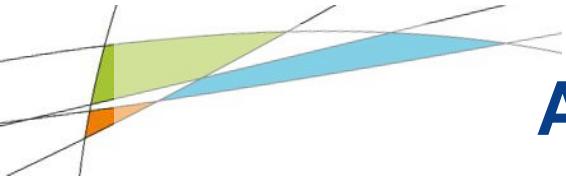
$b \Delta X_{typical} \in [\varphi; \varphi]$ \Leftrightarrow negligible estimate



Approche quantitative

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

$$P(\Delta X_{typical} \in [\varphi; \varphi] \geq \beta \Leftrightarrow \text{negligible effect}$$



Approche quantitative

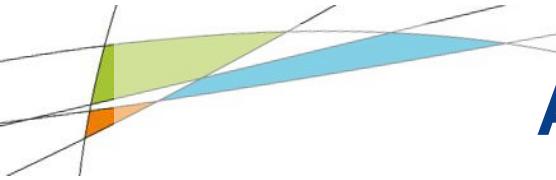
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$$P(\Delta X_{typical} \in [\varphi; \varphi] \geq \beta \Leftrightarrow \text{negligible effect}$$

As an illustration, here we chose:

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

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



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

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...

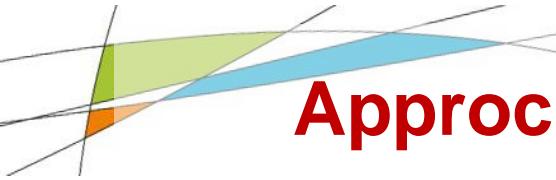
	Non significant effect	Significant effect
Negligible effect	7	-
Non negligible effect	-	2
Not enough info.	2	-

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



Approche quantitative => comparative

	Basal area	Tree genus richness
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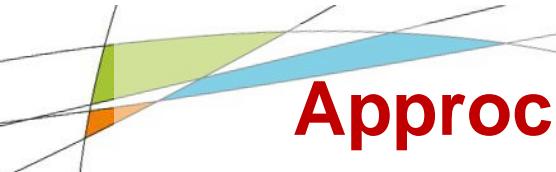


Approche comparative entre taxons et entre « gradients de gestion »

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]



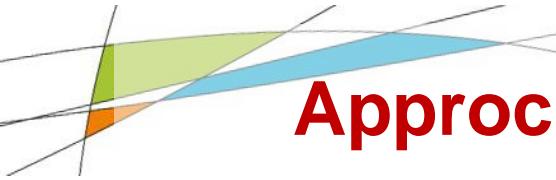
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- * Utilisation de formes linéaires de modèles, avec vérification par p-value.
- * Essai dans certains cas de formes non linéaires.



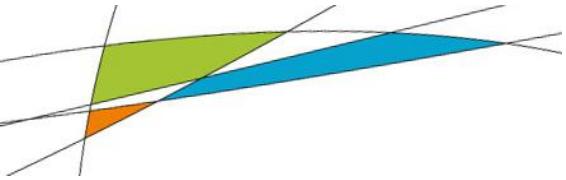
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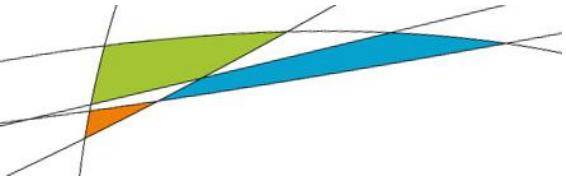
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* Attention portée à la multicolinéarité



Indicateurs de biodiversité: de quelle biodiversité dans quel contexte?

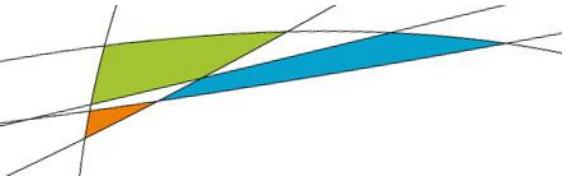


Variable in the model

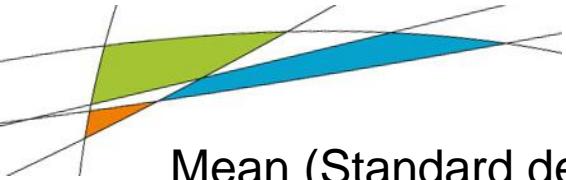
Variable in the model	Negative non-negligible effects	Positive non-negligible effects
C	h.HL at slope=0.5 & E/W aspect h.NF at slope=0.5 & N aspect h.HL at slope=0.5 & N aspect h.HL at Reaction=5 h.NF at Reaction=4.5 h.HL at Reaction=4.5 h.LT at Reaction=4.5 h.HL at Elevation=770m	h.LL at slope=0.5 &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

Variable in the model

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

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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