

Rapport - Article scientifique

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This manuscript was compiled on April 16, 2025

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lépidoptères | communautés | variation temporelle | variation spatiale

A. Nos questions de recherche.

A.1. Question principale : Quels sont les changements dans la biodiversité des espèces de lépidoptères dans le temps et dans l'espace au Québec ?

Questions spécifiques (1 sur la variation temporelle et 2 sur la variation temporelle+spatiale) : ### **Variation temporelle** : Comment la diversité des espèces de lépidoptères a-t-elle évolué au fil des années?

Variation temporelle et spatiale : -Comment la répartition des espèces de lépidoptères varie dans le temps? carte avec différentes couleurs pour chaque bloc de 25 ans ou 50 ans avec différentes textures (4 cartes dans une avec heat map) -Comment la répartition de Vanessa cardui change dans le temps et l'espace?

À faire : 1. changer les noms de colonnes de la table de données brutes pour que ca soit plus compréhensible 2. ajouter des étapes dans la fonction nettoyage_data : pour enlever TXX:XX:XX de dwc_event_date et ajuster ca dans verification_data 3. S'assurer que obs_value réfère à quelque chose en particulier (presence, abondance, et ajuster les données de ca, ex. 11 111) 4. Dans la table secondaire date, voir à ce que chaque ligne soit unique (ex. site de 1 à 10 (donc de 10 lignes de combinaison de lat et lon unique) et dans table primaire à site_id on retrouverait chaque ligne avec 1 à 10) 5. Dans la table primaire on aurait les colonnes : nom_scientifique (observed_scientific_name), date (dwc_event_date), abondance (obs_value en filtrant seulement pour abondance dans obs_variable) et site_id et ? 6. Changer le nom de certains targets (ex. data_final et ULTIME_database)

Updates: 2. réglé dans la fonction type_colone, rete en caractères 3. problème de 11111 réglé

À faire cette semaine (jusqu'à mardi soir 8 avril) : -Corriger l'étape 2 de 'À faire' -Revoir le 11 111, qu'est ce qu'on fait avec et qu'est-ce qu'on fait avec l'abondance dans nos analyses? -Clarifier le site_id (faire le df pour le site_id) -Injecter les données -S'assurer que SQL et targets fonctionnent (et que le Markdown aussi) -Ajouter une ligne de retrait de base de données lepidoptères dans le script de SQL -Identifier clairement nos questions de recherches -Penser à ce qu'on veut présenter comme figures -Commencer à écrire le texte dans le Rapport -Il faudrait vraiment créer des sous-dossiers dans notre dossier de projet ProjetBIO_500 et mieux structurer tout ça, ça va aider à faire la dépendance du Rapport.Rmd dans le pipeline des targets! Pour ça, on devrait se baser sur le code par après que le prof nous a fourni pour compiler le RMarkdown dans targets. -Rajouter une colonne genre

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Fig. 1. Placeholder image of a frog with a long example caption to show justification setting.

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Figure

fig : frog

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eqn : example

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$$\begin{aligned}(x+y)^3 &= (x+y)(x+y)^2 \\ &= (x+y)(x^2+2xy+y^2) \\ &= x^3+3x^2y+3xy^2+x^3.\end{aligned}$$

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1. Belkin M, Niyogi P (2002) Using manifold structure for partially labeled classification. *Advances in Neural Information Processing Systems*, pp 929–936.
2. Bérard P, Besson G, Gallot S (1994) Embedding riemannian manifolds by their heat kernel. *Geometric & Functional Analysis GAFA* 4(4):373–398.
3. Coifman RR, et al. (2005) Geometric diffusions as a tool for harmonic analysis and structure definition of data: Diffusion maps. *Proceedings of the National Academy of Sciences of the United States of America* 102(21):7426–7431.