TOPIQ database

A tool to evaluate functional response of forest ecosystems to human disturbances

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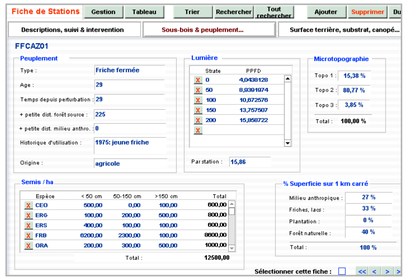
TOPIQ
TRAITS OF PLANTS IN QUÉBEC

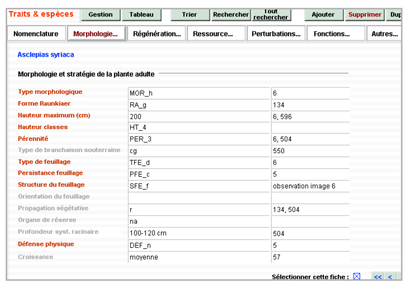
TOPIQ is a relational database organised around 3 main tables linked by unique indentifiers. This ecological database contains information on plants morphology, dispersion, regeneration strategy and resource caption of more than 400 vascular plant species of southern Québec. A total of 41 fields are documented, of which 23 are completed and validated.

TOPIQ database facilitates field samples management and analysis. **TOPIQ** may be used to link species traits to diverse environmental or field data tables. It offers new possibilities in the study of human impacts on vegetation processes.

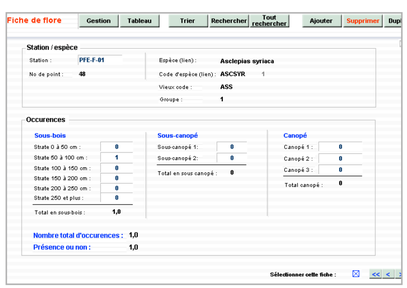
Environmental data

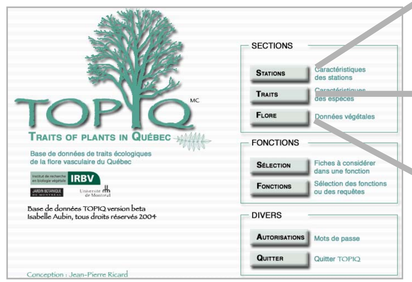


Species traits



Field samples





A method to construct plant functional groups

Emergent groups - 1 matrix

Group of species possessing a set of common traits and a similar behaviour

Species x traits matrix
↓
Gower similarity coefficient
↓
Ward type ascending hierarchical classification
↓
Choice of number of groups
↓
Groups

A second step analysis is necessary to relate these groups to an environmental variable

Aubin, I., Ouellette, M.H., Legendre, P., Messier, C. & Bouchard, A. Understory flora development in an old field-deciduous forest succession: evaluation using a plant trait based approach.

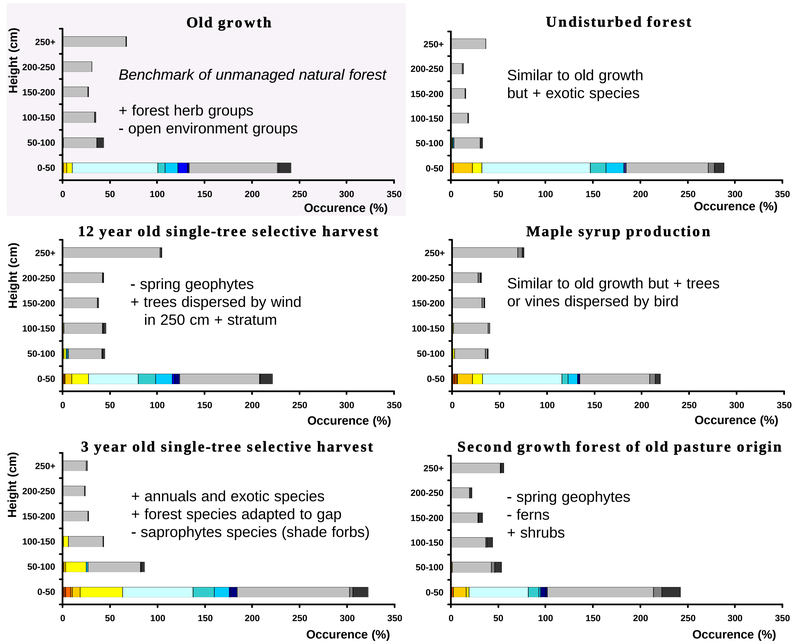
Plant functional group approach

Plant functional groups are groups of species that have evolved and developed convergent life history strategies, by presenting similar processes of resource allocation among their various vital functions in relation to the environment.

This approach provides a synthesized portrait of the plant community, facilitates the characterisation of complex ecosystems and offers the possibility of inter-regional comparisons that could reveal patterns of organization that would be difficult to detect with a taxonomic approach.

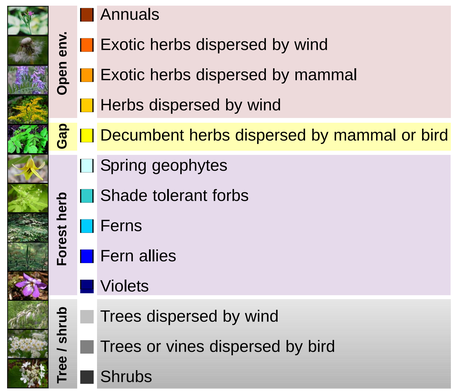
Study case

How resilient are northern hardwood forests to human disturbance?



Aubin, I., Gachet, S., Messier, C. & Bouchard, A. 2007. How resilient are northern hardwood forests to human disturbance? An evaluation using a plant functional group approach. Ecoscience. 14 (2).

Plant functional groups



Approach: Understory plant functional groups and structure were used as indicators of the ecological integrity of sugar maple forests facing a range of human disturbances.

Discussion: The understory vegetation assemblage was found to be relatively stable among all human disturbances. However, our results suggest some issues of possible long-term conservation concern given a continuation of human disturbances: (1) an increase of open environment species, including exotic species; (2) a decrease of spring geophytes; (3) a decrease of certain shade tolerant forbs; and (4) a modification of understory structure by the development of a dense sapling stratum.