EFFET DU SOL ET DES PLANTES VOISINES SUR LES COMMUNAUTÉS ECTOMYCORHIZIENNES ET LA PHYSIOLOGIE DES PLANTES : CAS DU SAPIN EN FORÊT BORÉALE

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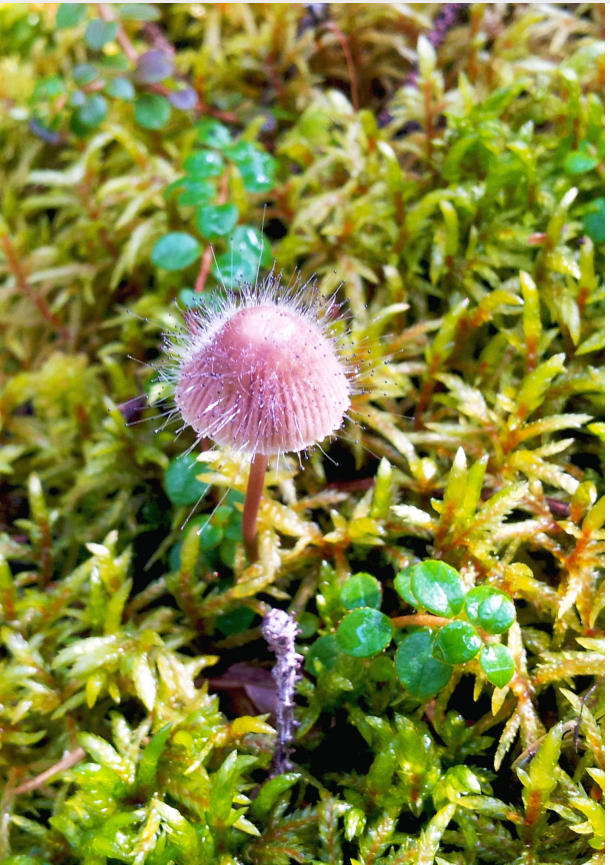
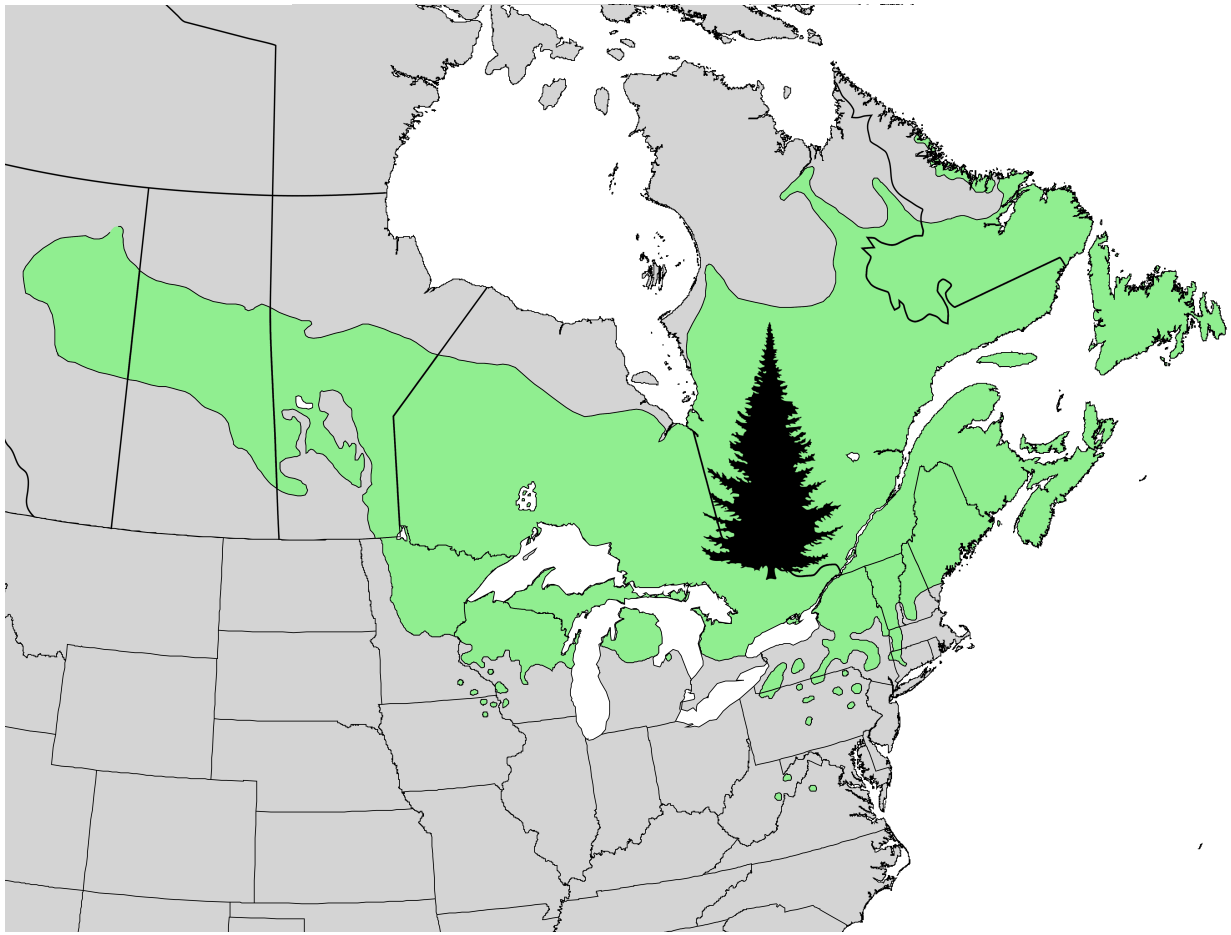
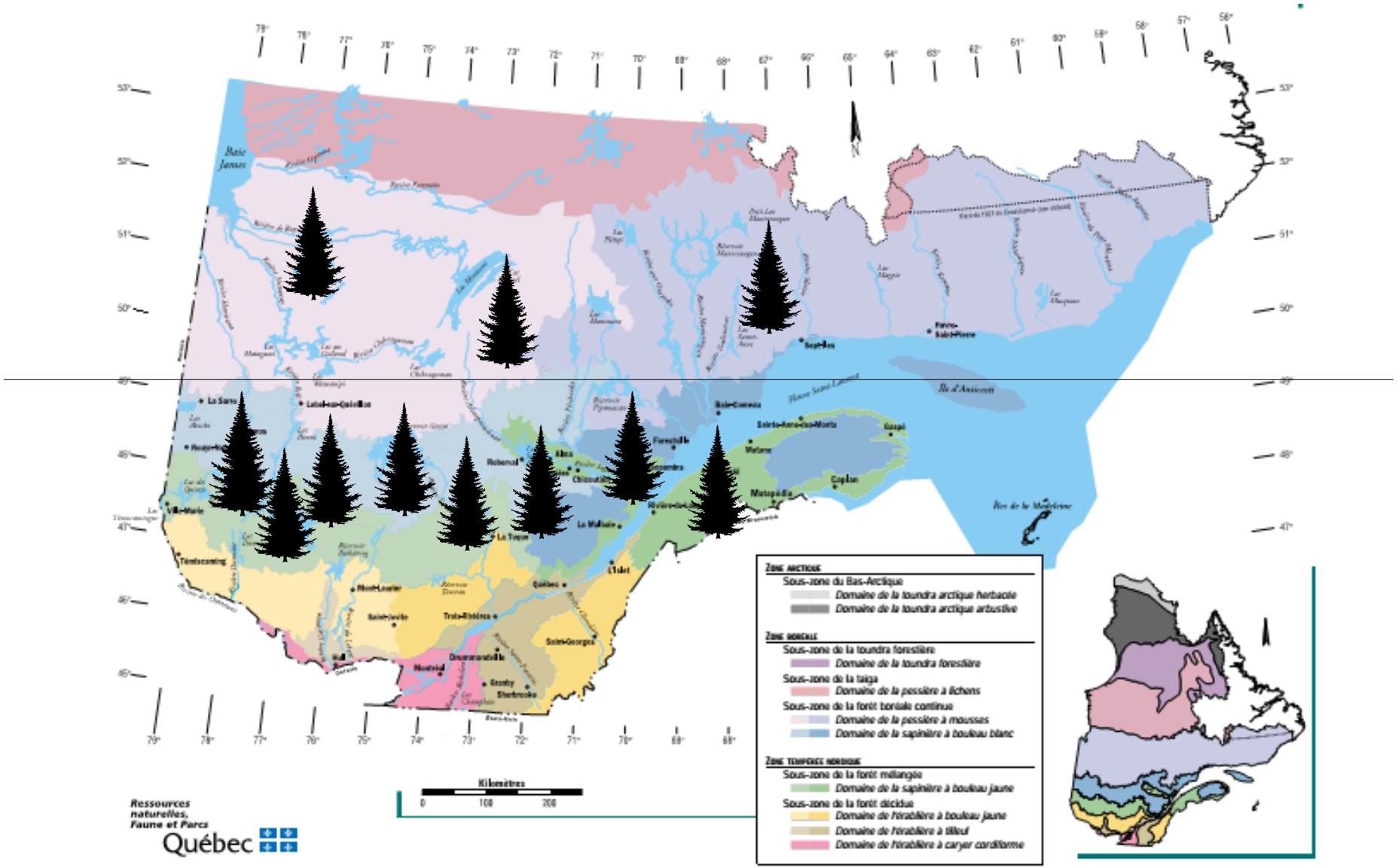


Mycorhizes 2019 – 30 octobre 2019

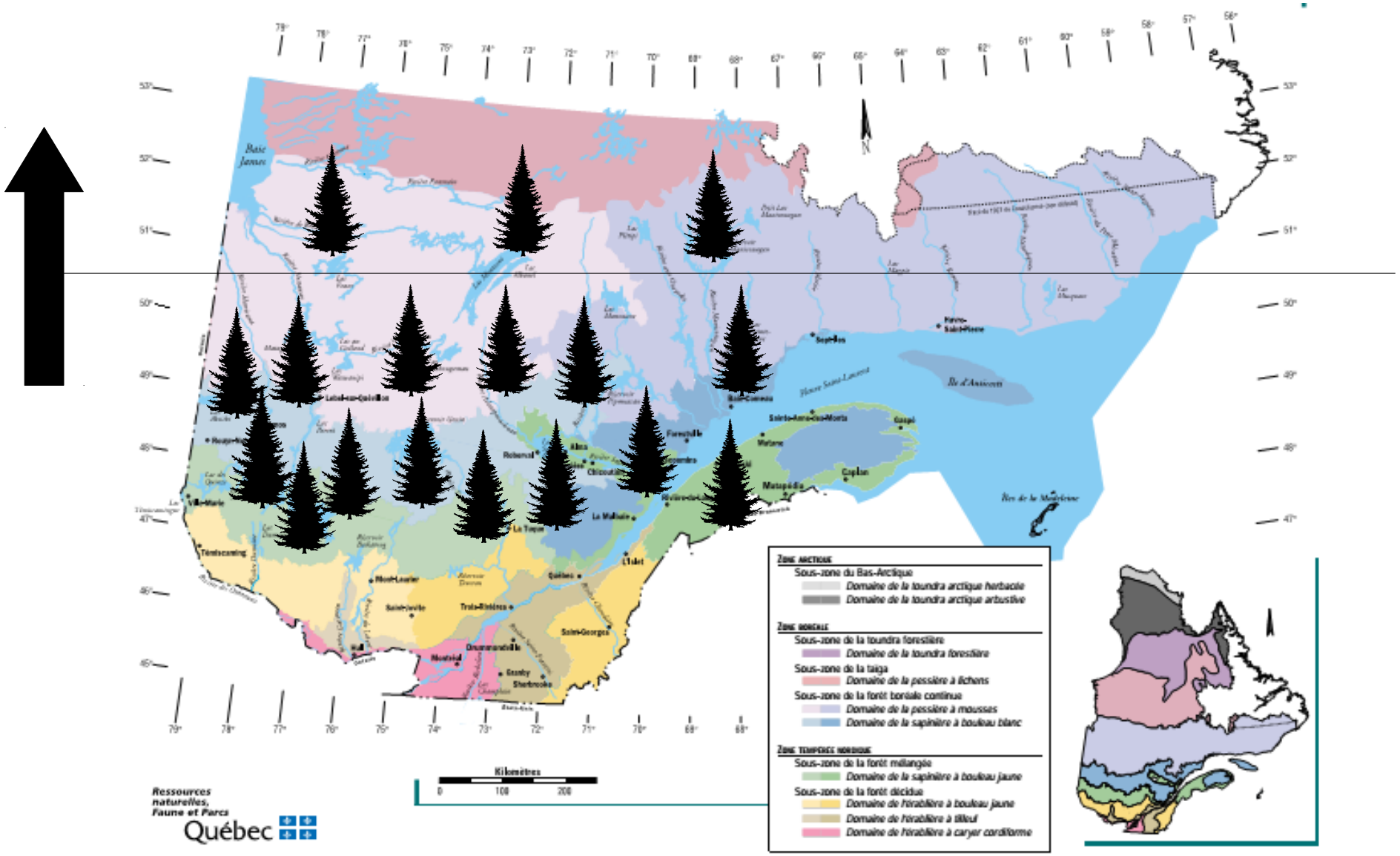
LE SAPIN BAUMIER (*ABIES BALSAMEA*)



CHANGEMENTS CLIMATIQUES ET ECOTONE



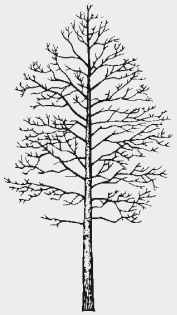
CHANGEMENTS CLIMATIQUES ET ECOTONE


Baie James
Lac Mistassini
Lac Albanel
Lac Mistassini
Lac Ashuapmushuan
Lac Chibougamau
Lac Gouin
Lac Manouane
Lac Pikauba
Lac Kénogami
Lac Saint-Jean
Lac Bouchette
Lac Mégantic
Lac Aylmer
Lac Memphrémagog
Lac Brome
Lac Boivin
Lac Magog
Lac Massawippi
Lac Pohénégamook
Lac Témiscouata
Lac Pémichangan
Lac Dufresnoy
Lac Matane
Lac Matapédia
Lac Metabetchouan

CHANGEMENTS CLIMATIQUES ET ECOTONE

49°N

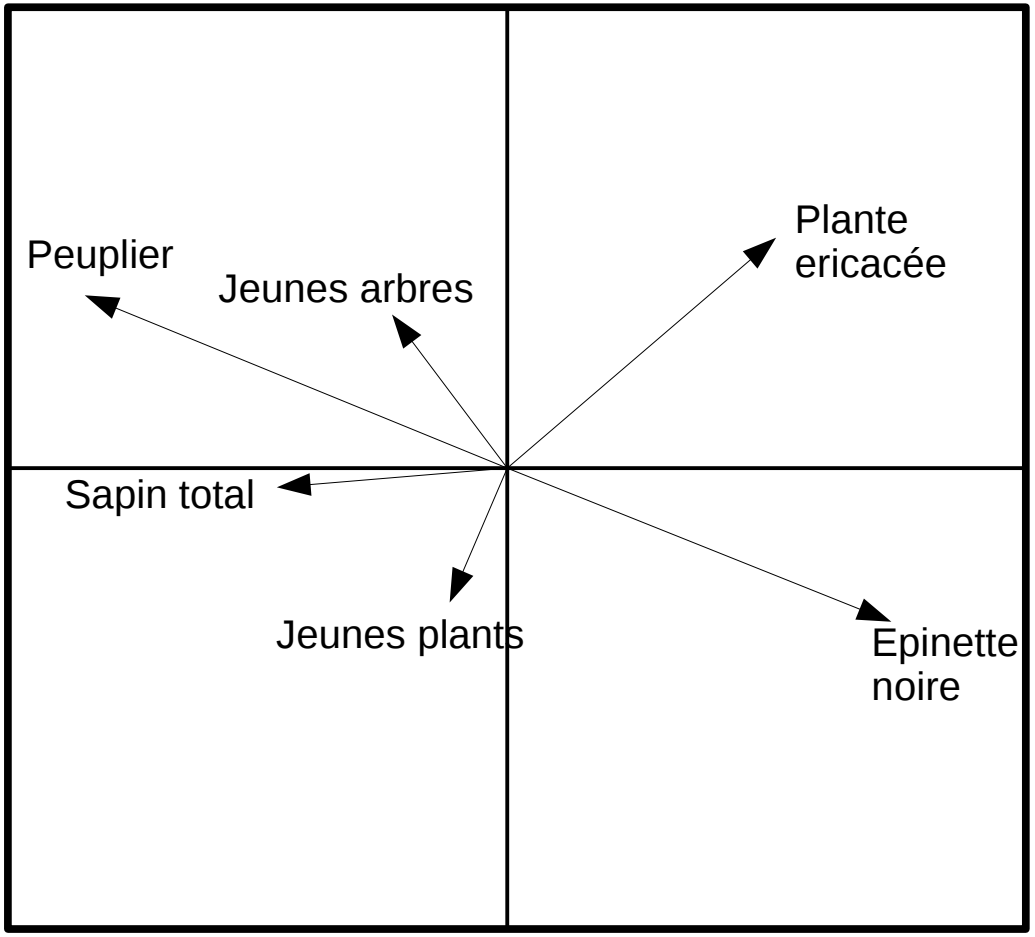
CHANGEMENTS CLIMATIQUES ET ECOTONE



49°N

SAPIN BAUMIER

PESSIÈRE À MOUSSE

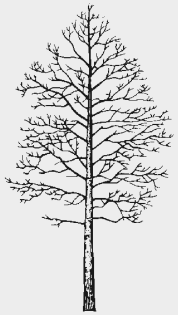


D'après Arbour et Bergeron 2011

SAPIN BAUMIER

PESSIÈRE À MOUSSE

49°N



Conditions climatiques et édaphiques similaires

Conditions biotiques différentes

- sous-bois
- sol organique (nutriments, pH...)

MYCORHIZES

FORÊT BORÉALE

Ectomycorhizes

Espèces de la strate arborée

Rôle dans la nutrition, la croissance, l'établissement des espèces, la dynamique...

Booth et Hoeksema, 2009, Hasselquist et al. 2015, Smith et Read 2008

MYCORHIZES

FORÊT BORÉALE

Mycorhizes éricoïdes

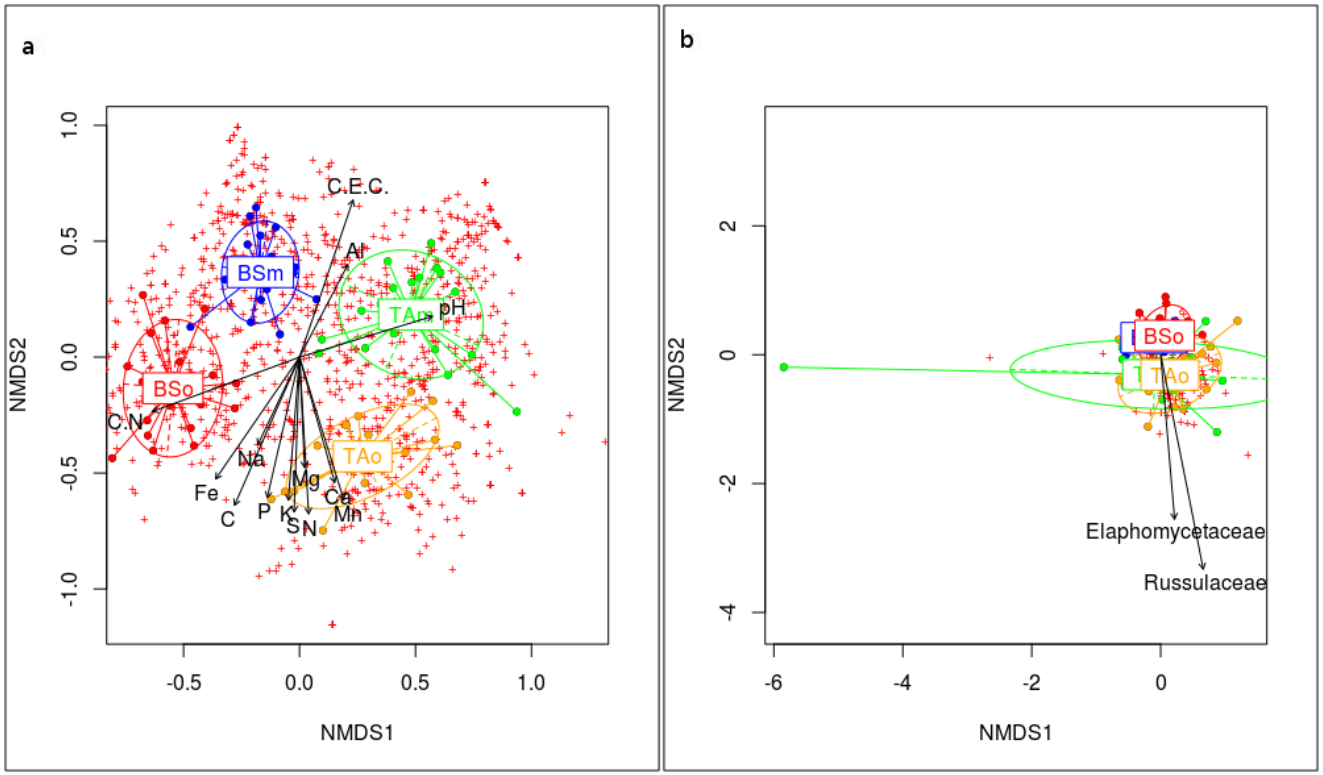
Certaines plantes de la famille des éricacées (*Rhododendron spp*, *Kalmia spp*, *Vaccinum spp*…)

Peuvent avoir un effet négatif sur le taux de mycorrhization mais aussi modifier les communuatés mycorhizienne associée aux plantes à proximité

Kohout et al. 2011, Kennedy et al. 2018, Walker et al. 1999

MYCORHIZES

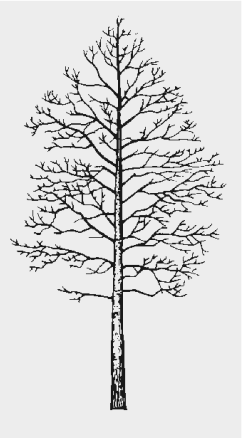
PESSIÈRE À MOUSSE



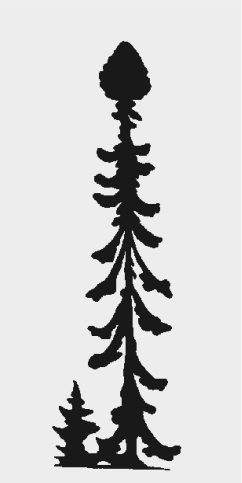
Graphique NMDS montrant les différences de structure des communautés a) fongique et b) ectomycorhizienne en fonction du peuplement dominant, BSO = épinette noire, sol organique, BSM = épinette noire, sol minéral, TAO = peuplier, sol organique, TAM = peuplier, sol minéral

Nagati et al. 2018

HYPOTHÈSES

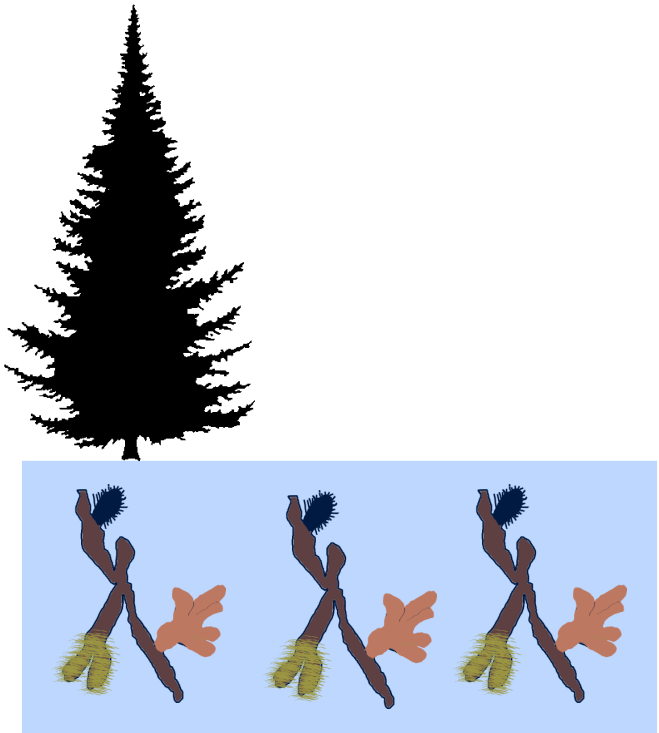


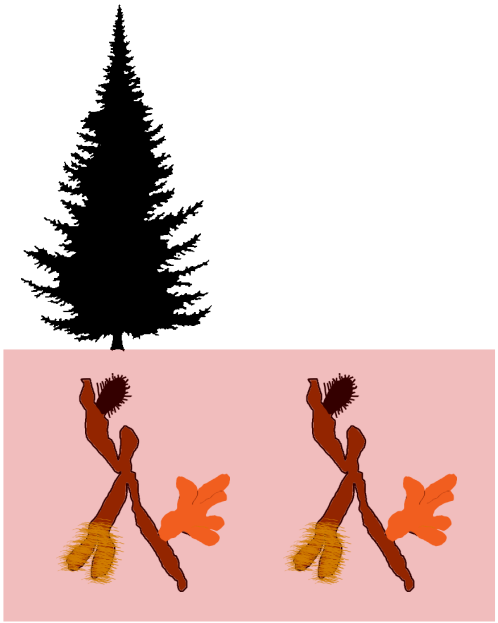
TA

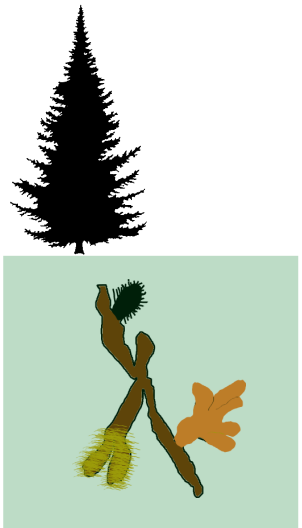


BS

BSE

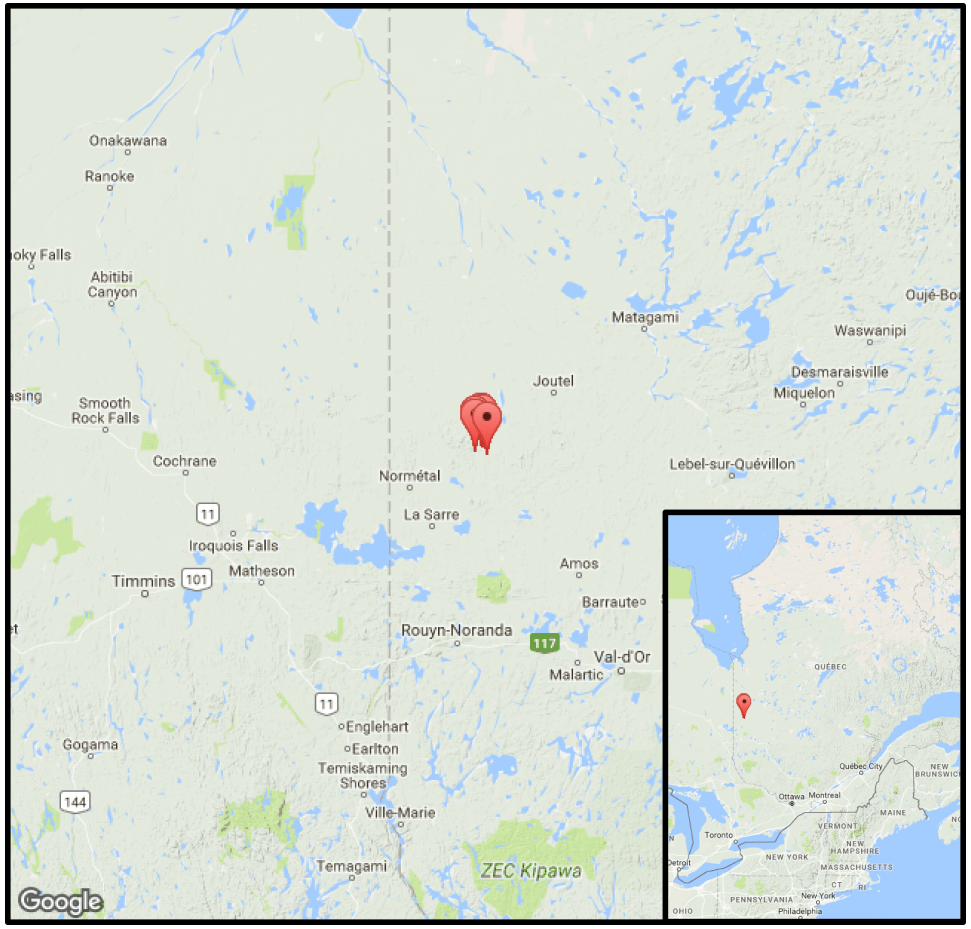


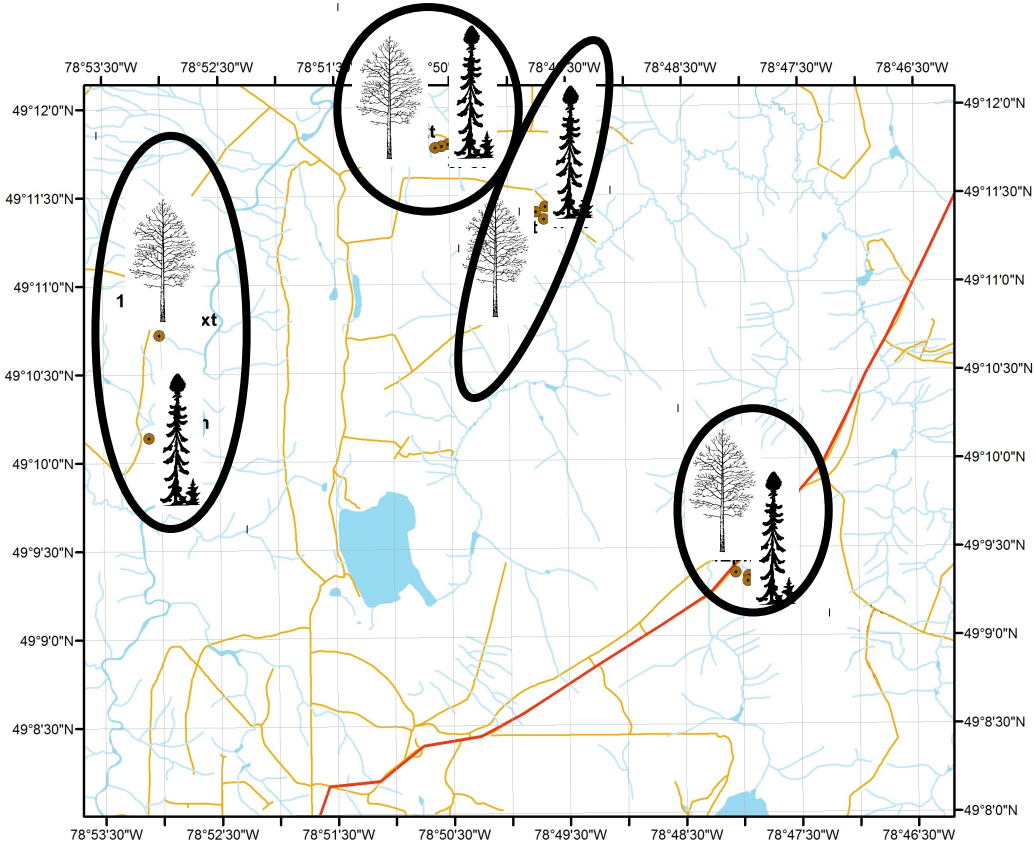




SITES À L'ÉTUDE

2 peuplements * 4 sites, plaine argileuse de l'Abitibi-Témiscamingue et du Nord-du-Québec





MÉTHODES

JEUNES PLANTS

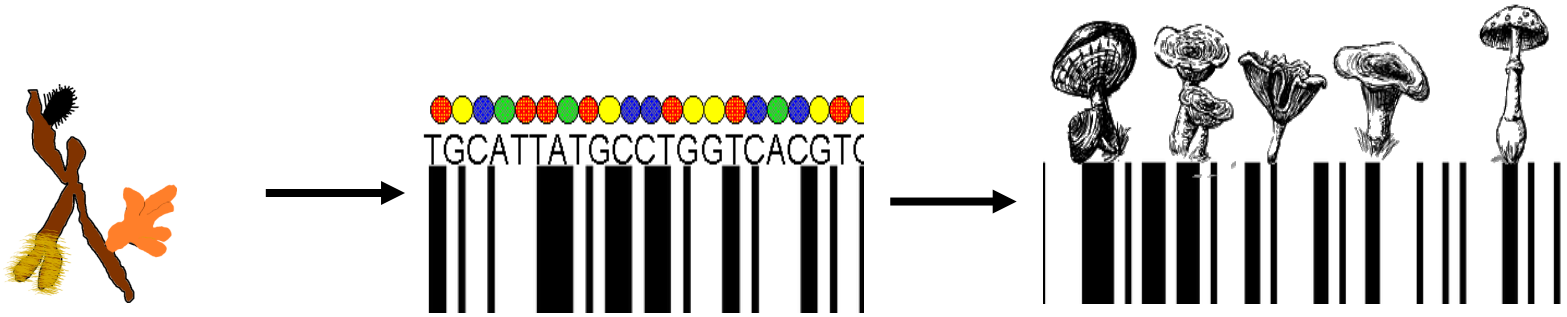
5 sapins * 4 sites * 3 modalités (2 peuplements + présence éricacées)

Croissance latérale et apicale

Taux de nutriments dans les aiguilles (N, P, K, Mg et Ca)

MÉTHODES

JEUNES PLANTS

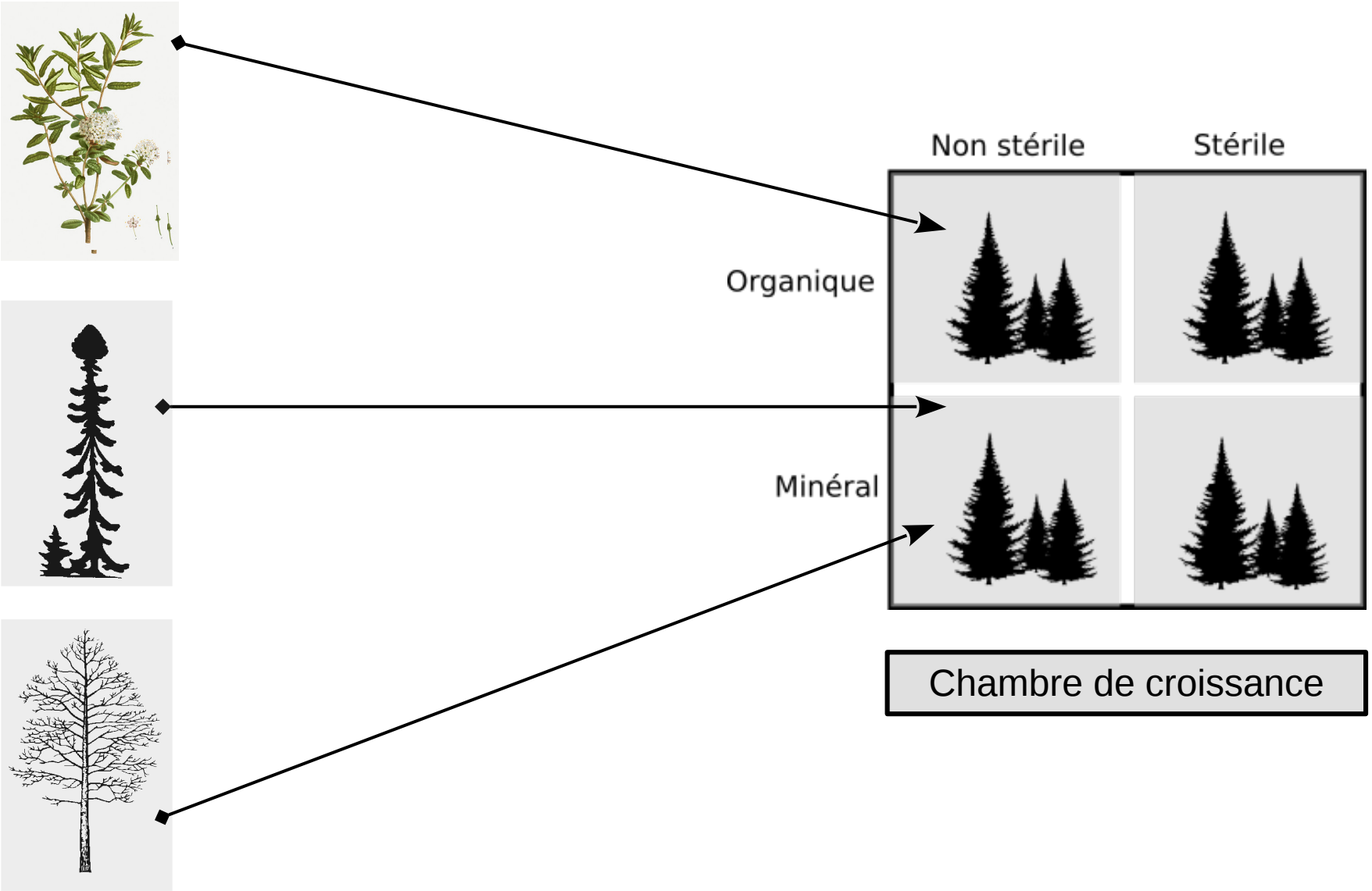


Comptage du nombre de mycorhizes sur 3*10 cm de racine

Métabarcoding de 50 mycorhizes par sapin

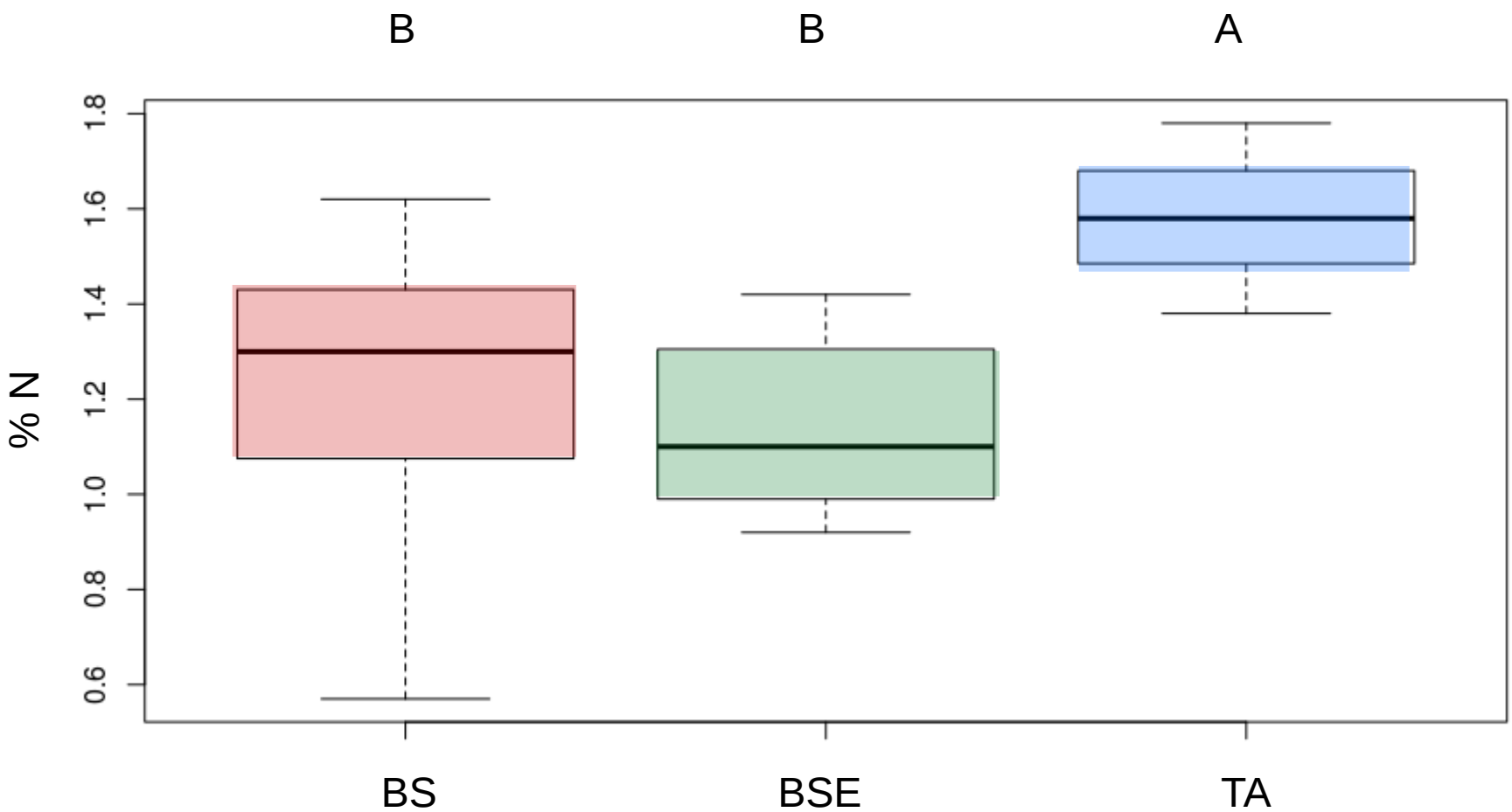
MÉTHODES

PLANTULES



RÉSULTATS

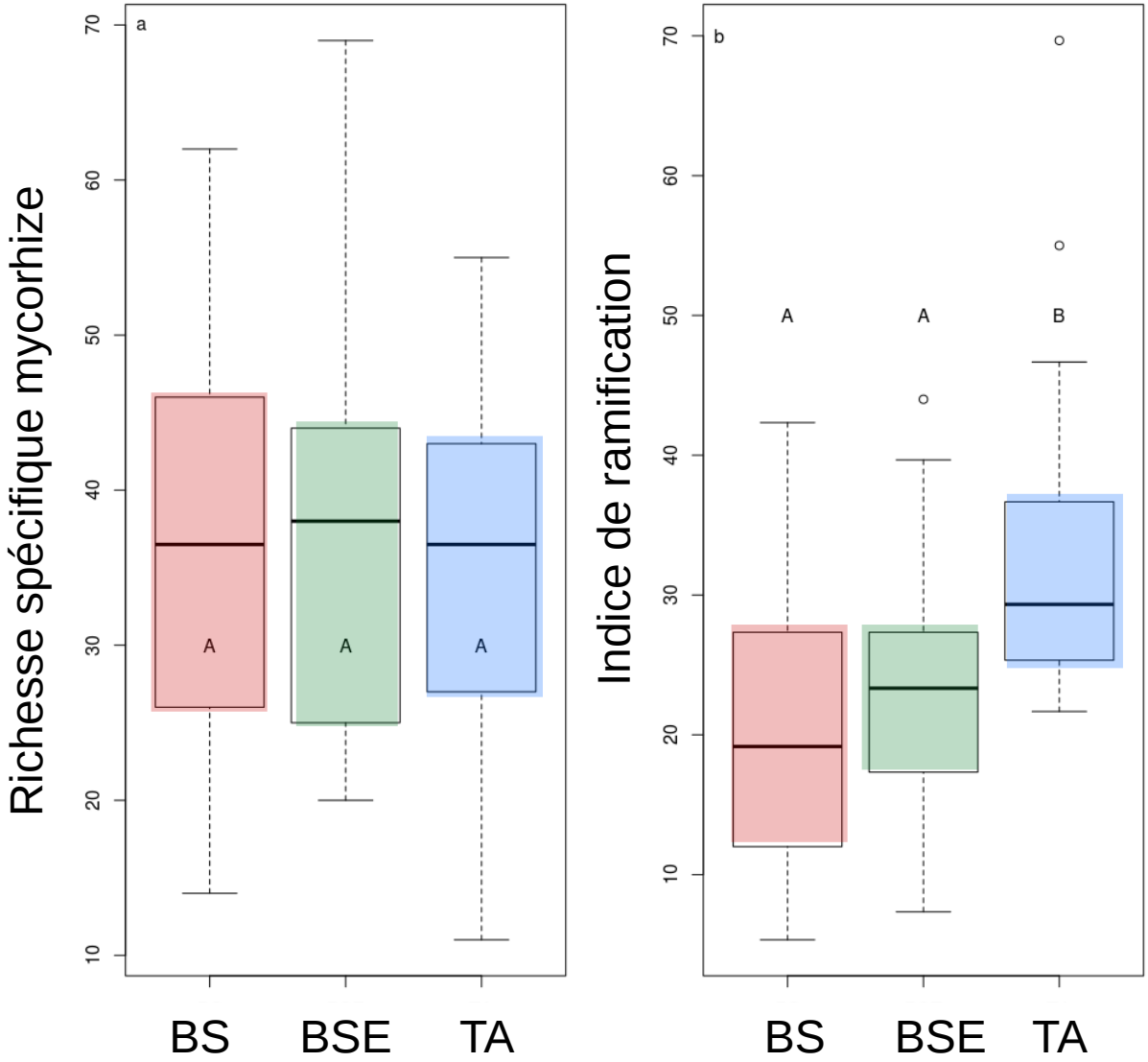
JEUNES PLANTS



Nagati et al. 2019

RÉSULTATS

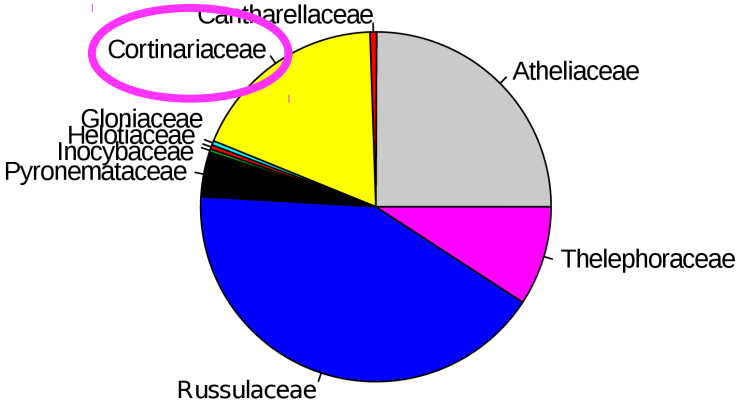
JEUNES PLANTS



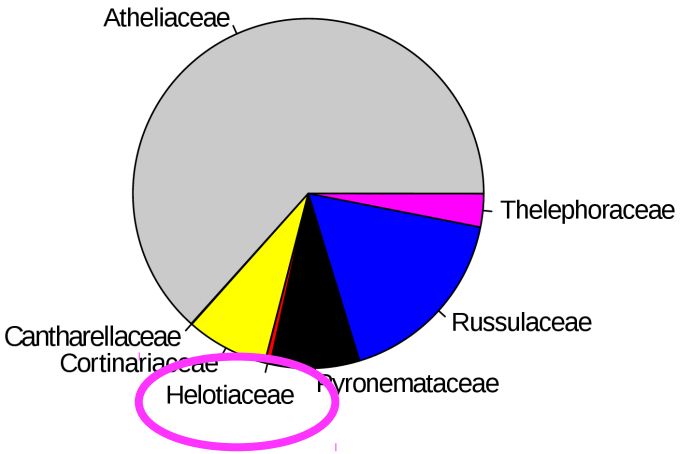
Nagati et al. 2019

Abondances des taxons ECM racines de sapin

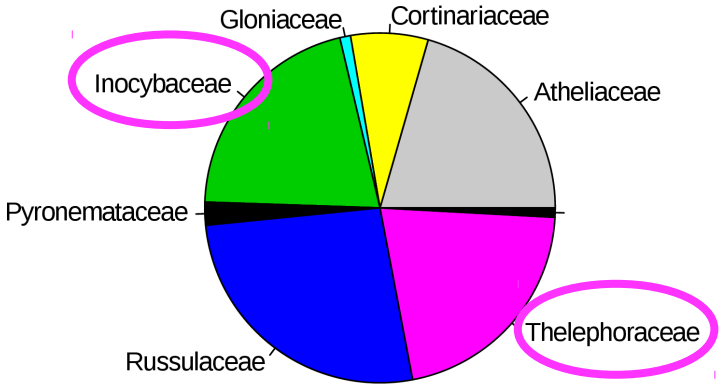
Abundance of EMF families of fir saplings under BS



Abundance of EMF families of fir saplings under BSE



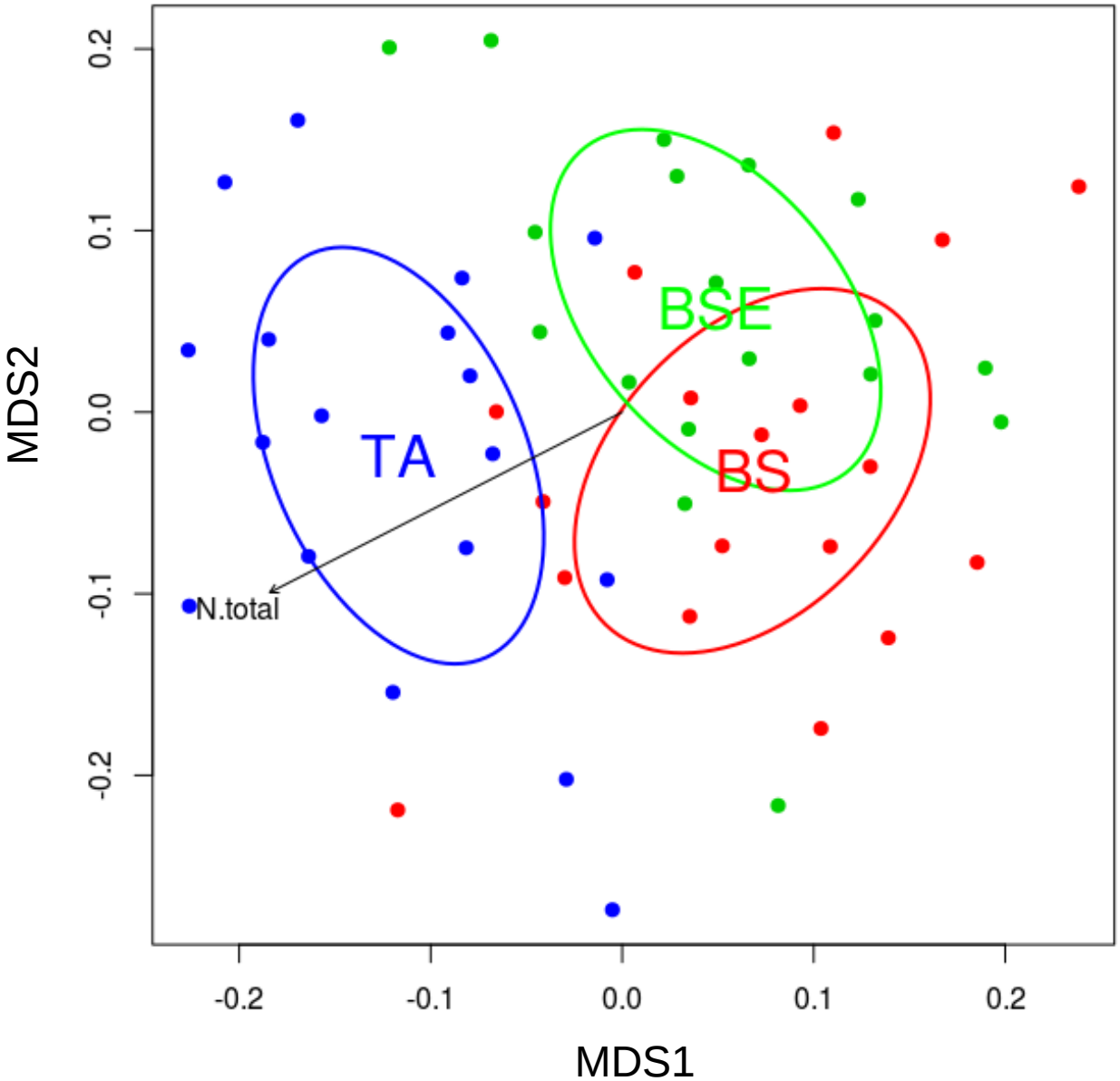
Abundance of EMF families of fir saplings under TA



Nagati et al. 2019

RÉSULTATS

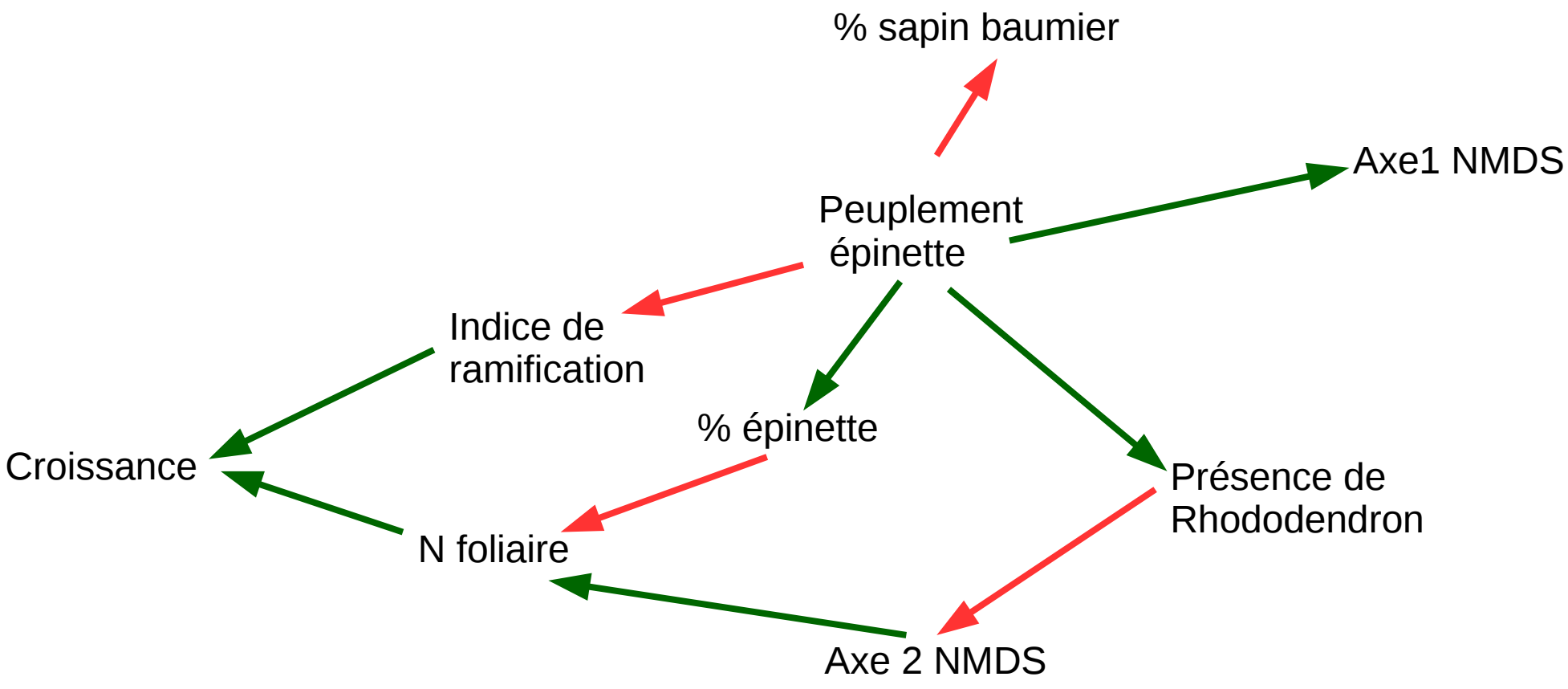
JEUNES PLANTS



Nagati et al. 2019

RÉSULTATS

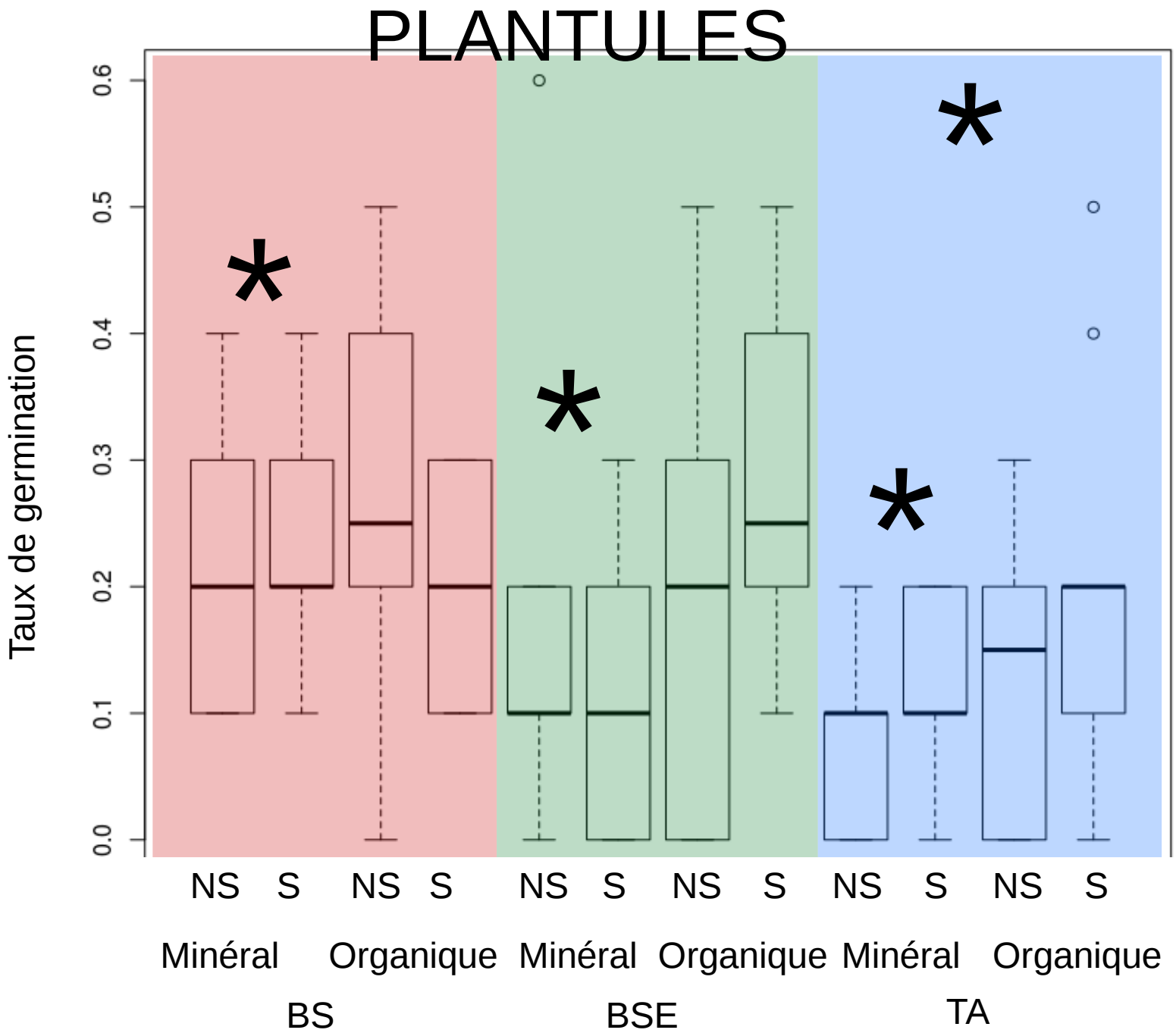
JEUNES PLANTS



Graphique direct acyclique montrant les résultats d'une analyse de piste, les liens en rouge démontrent une correlation négative et les liens en vert une correlation positive.

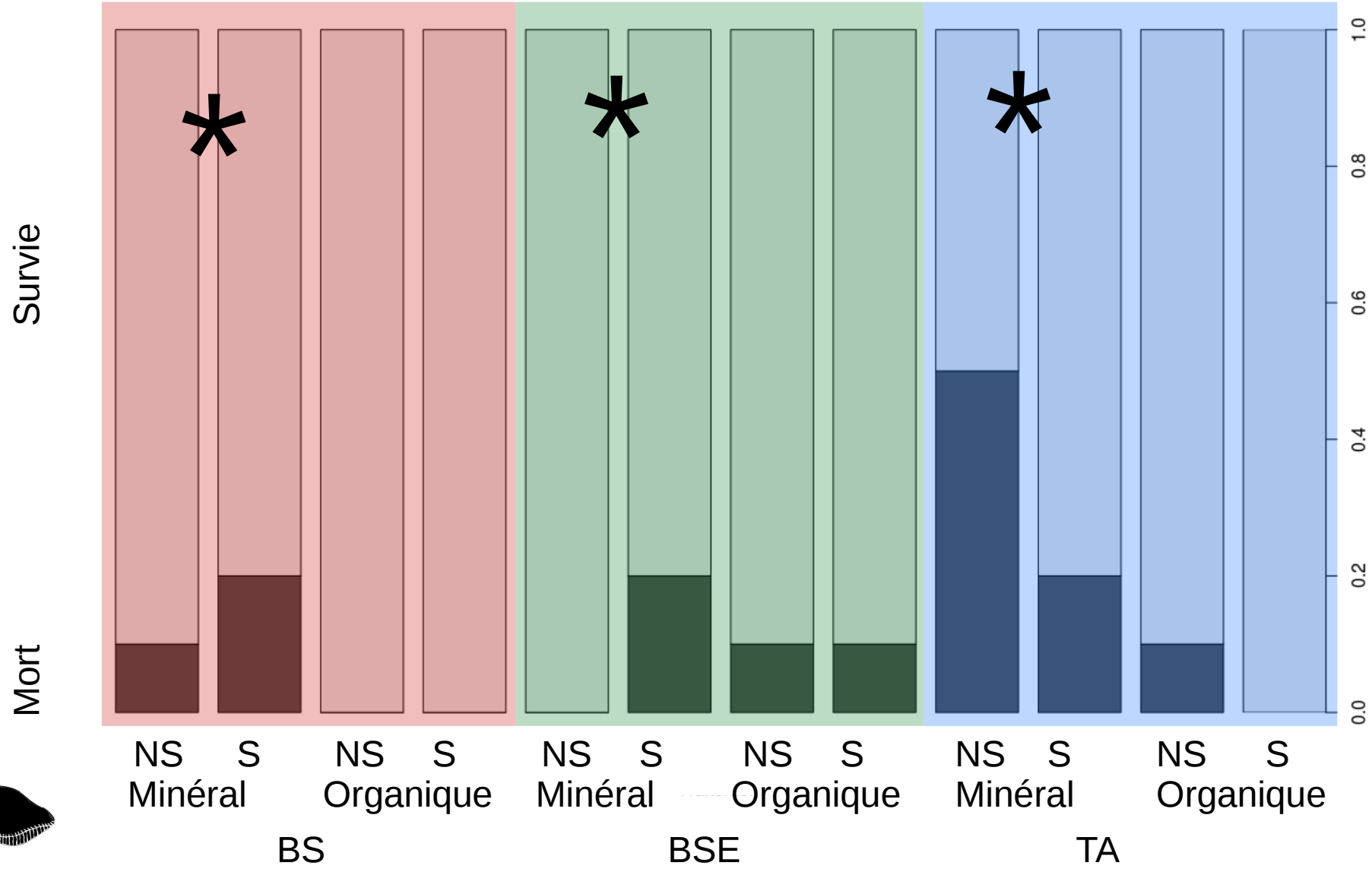
Nagati et al. 2019

RÉSULTATS


PLANTULES
Taux de germination
0.0
0.1
0.2
0.3
0.4
0.5
0.6
*
*
*
NS S NS S NS S NS S NS S NS S
Minéral Organique Minéral Organique Minéral Organique
BS
BSE
TA

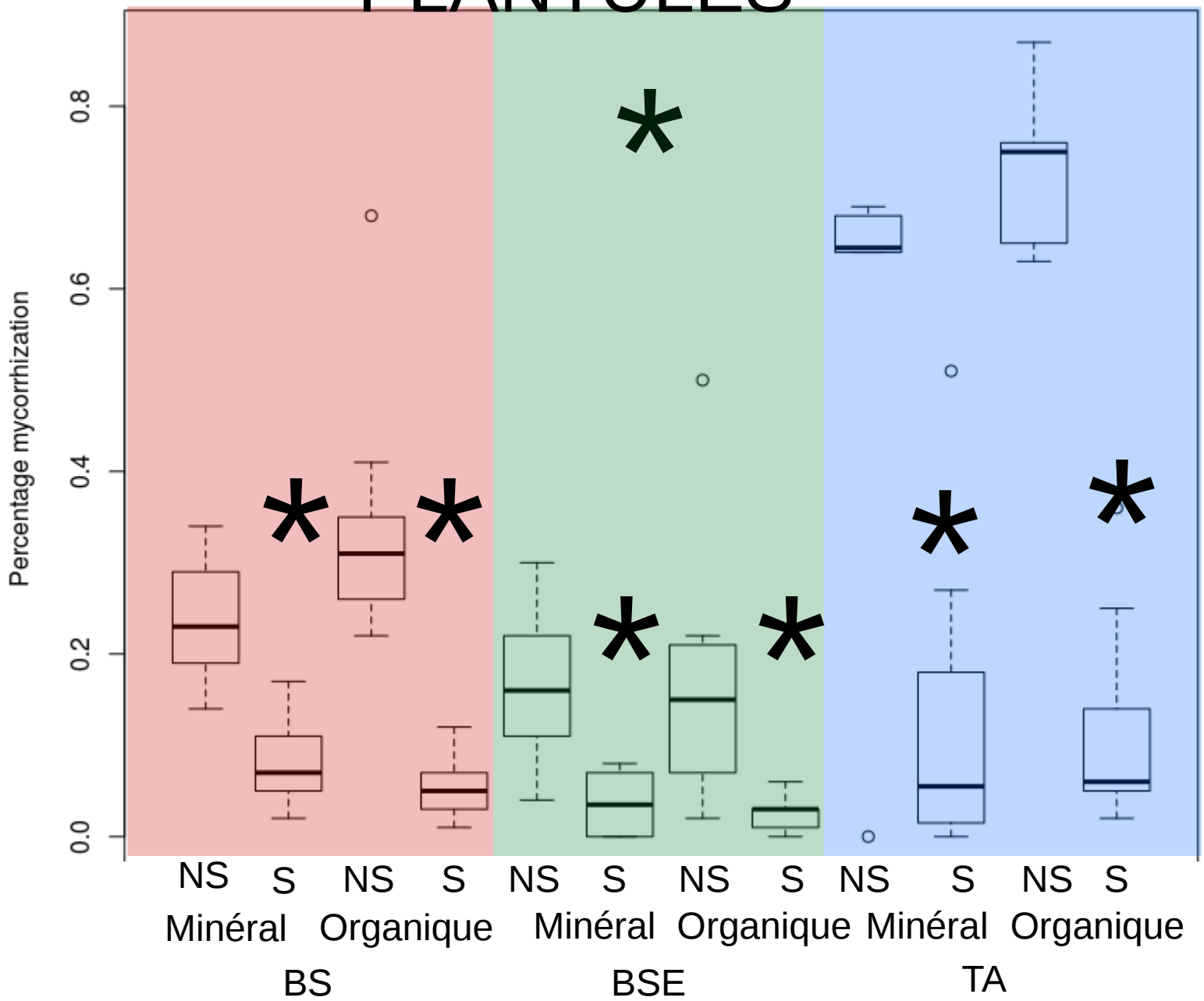
RÉSULTATS

PLANTULES

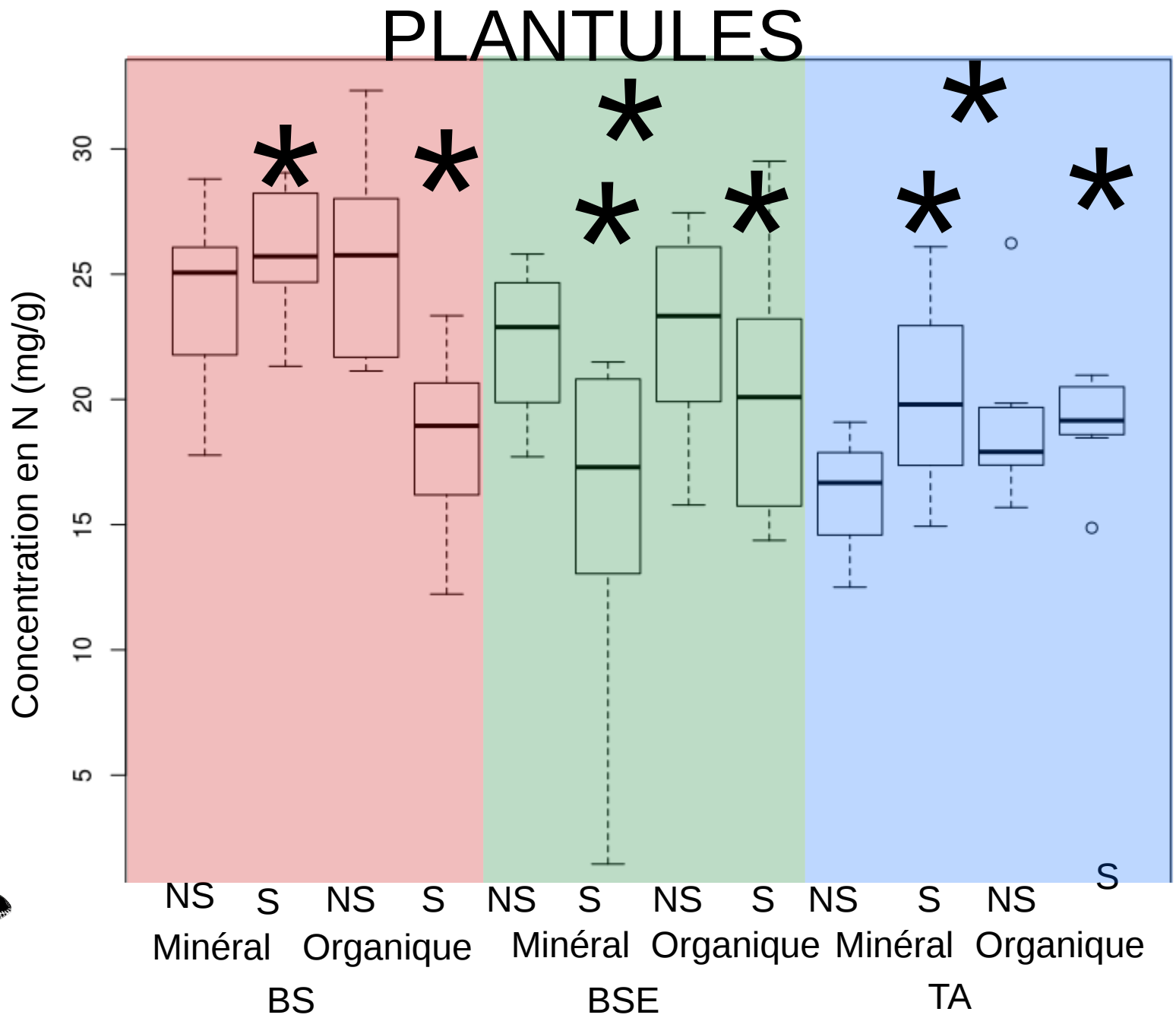


RÉSULTATS

PLANTULES

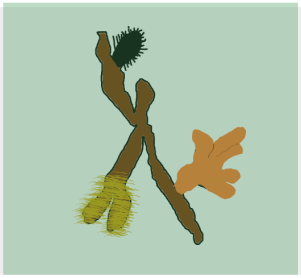


RÉSULTATS

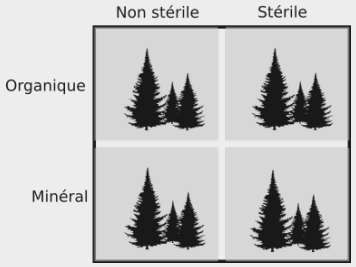

PLANTULES
Concentration en N (mg/g)
5
10
15
20
25
30
NS
S
NS
S
NS
S
NS
S
NS
S
NS
S
Minéral
Organique
Minéral
Organique
Minéral
Organique
BS
BSE
TA

CONCLUSION

Pas d’effet, le sapin trouve des partenaires dans toutes les conditions !



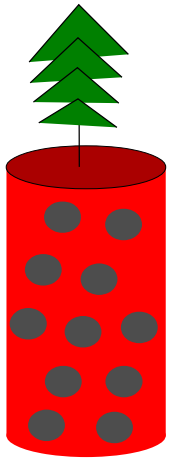
La présence de *Rhododendron* mofidie les communautés associées au sapin ce qui impact négativement [N]



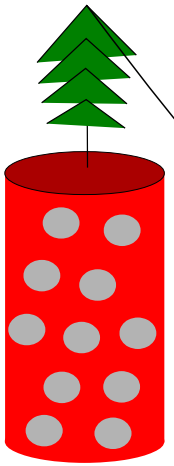
Réseau mycorhizien commun
Helotialaceae, Telephoraceae

Stade jeune plant plus critique que plantule

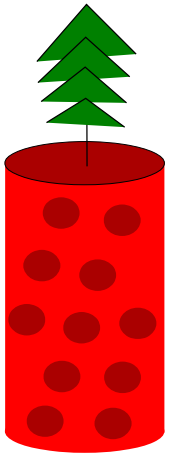
LE RETOUR DU SAPIN



Mesh 5µm :
effet sol

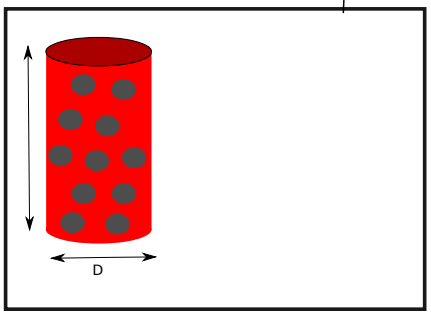


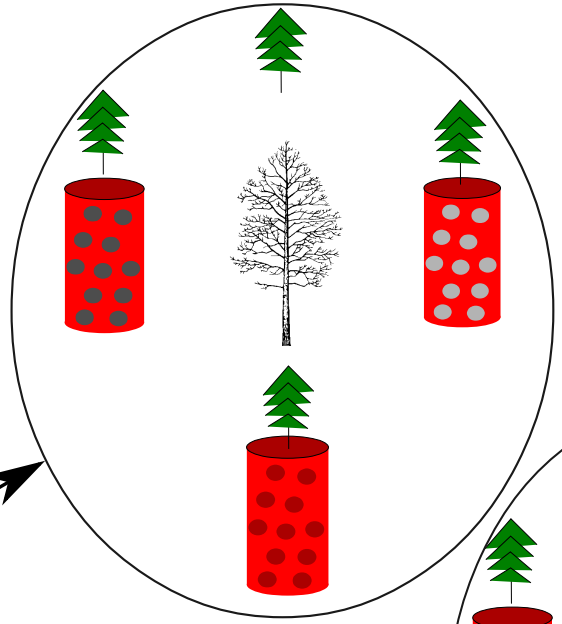
Mesh 50µm :
effet CMN et sol

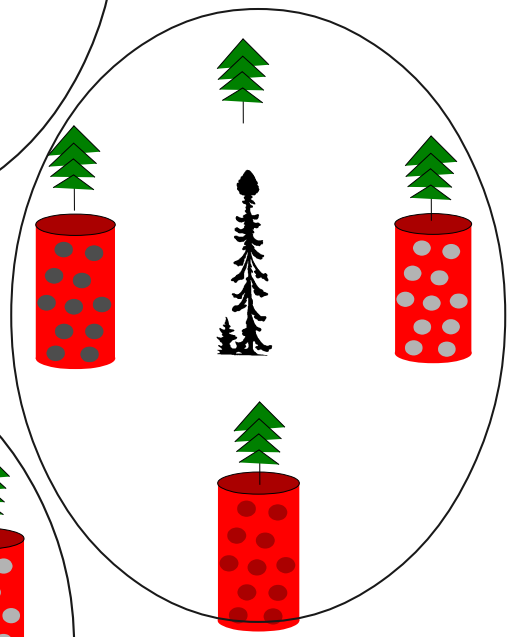


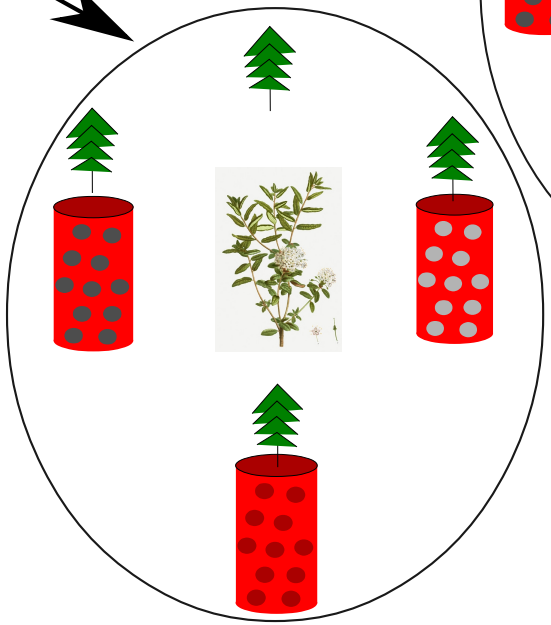
pas de mesh :
effet racines,
CMN et sol

Pas de cylindre :
effet cylindre,
racines, CMN et sol





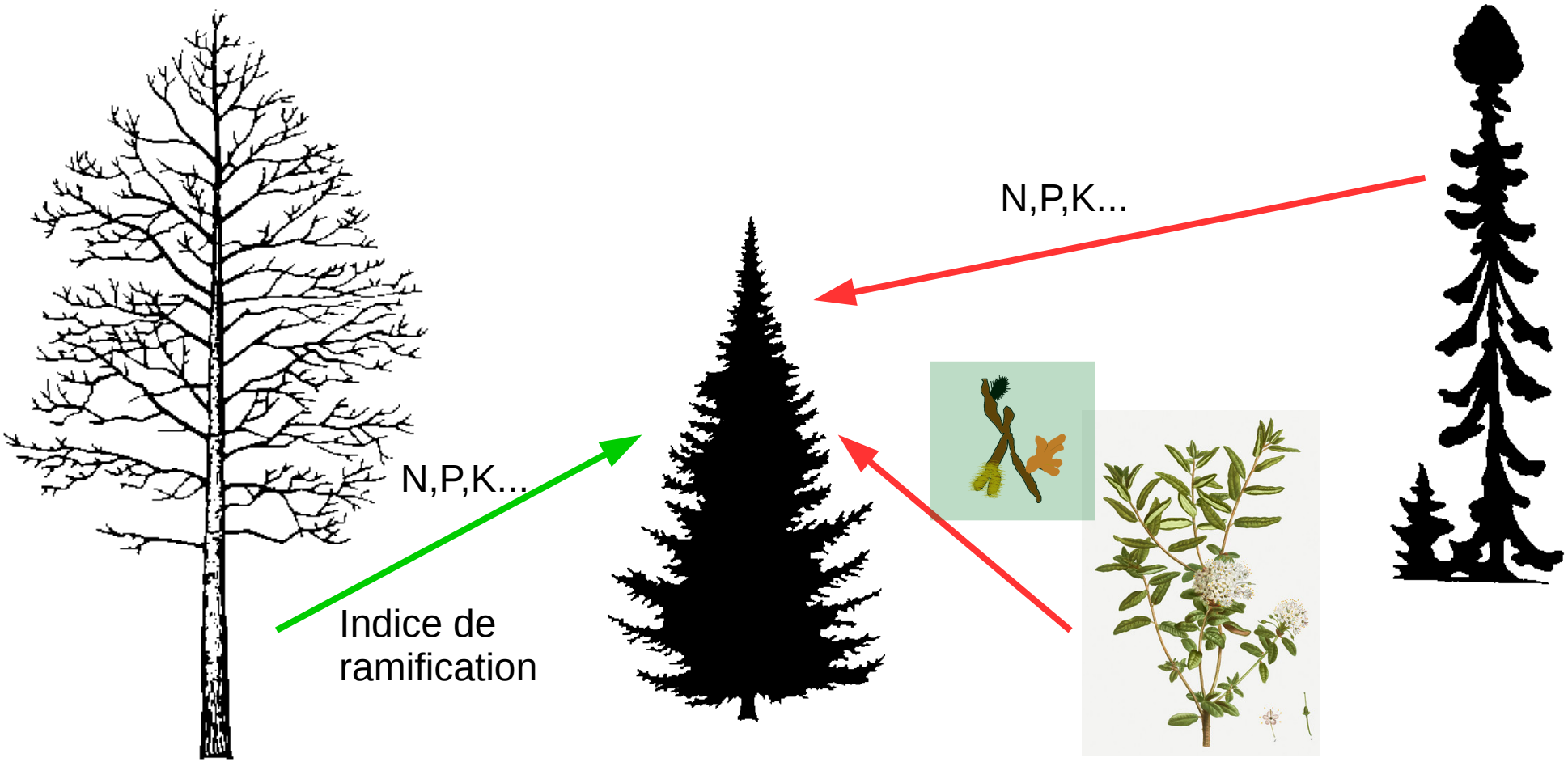




TAKE HOME MESSAGE

Plantules : sol organique > sol minéral

Jeunes arbres



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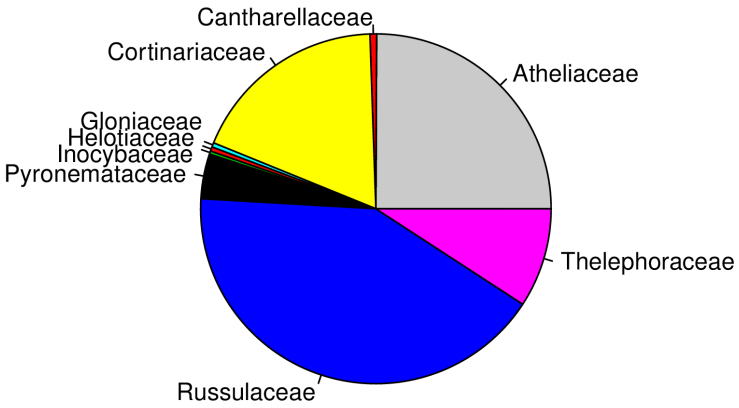
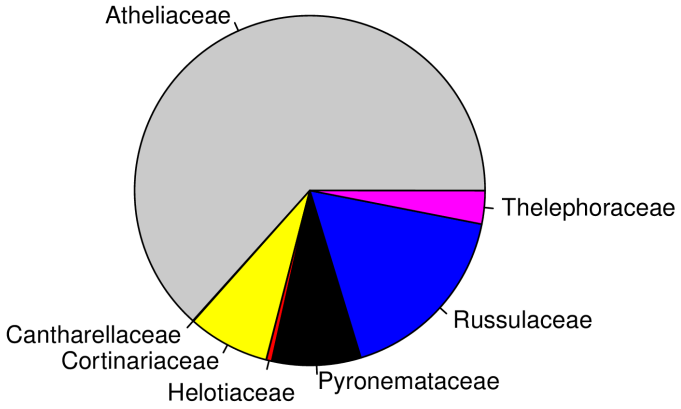
MITACS

Julia Morarin

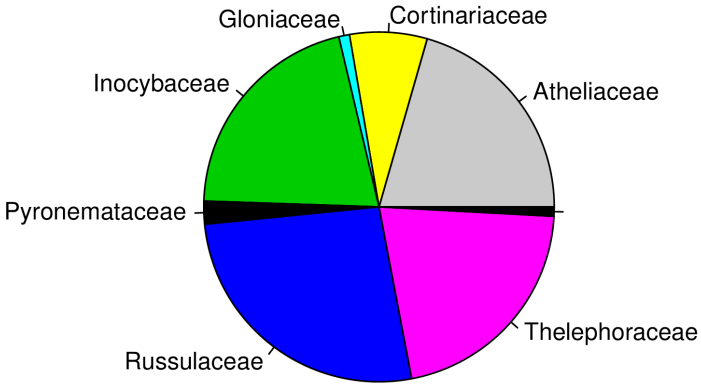
Abundance of ECM families of fir saplings under BS



Abundance of ECM families of fir saplings under BSE

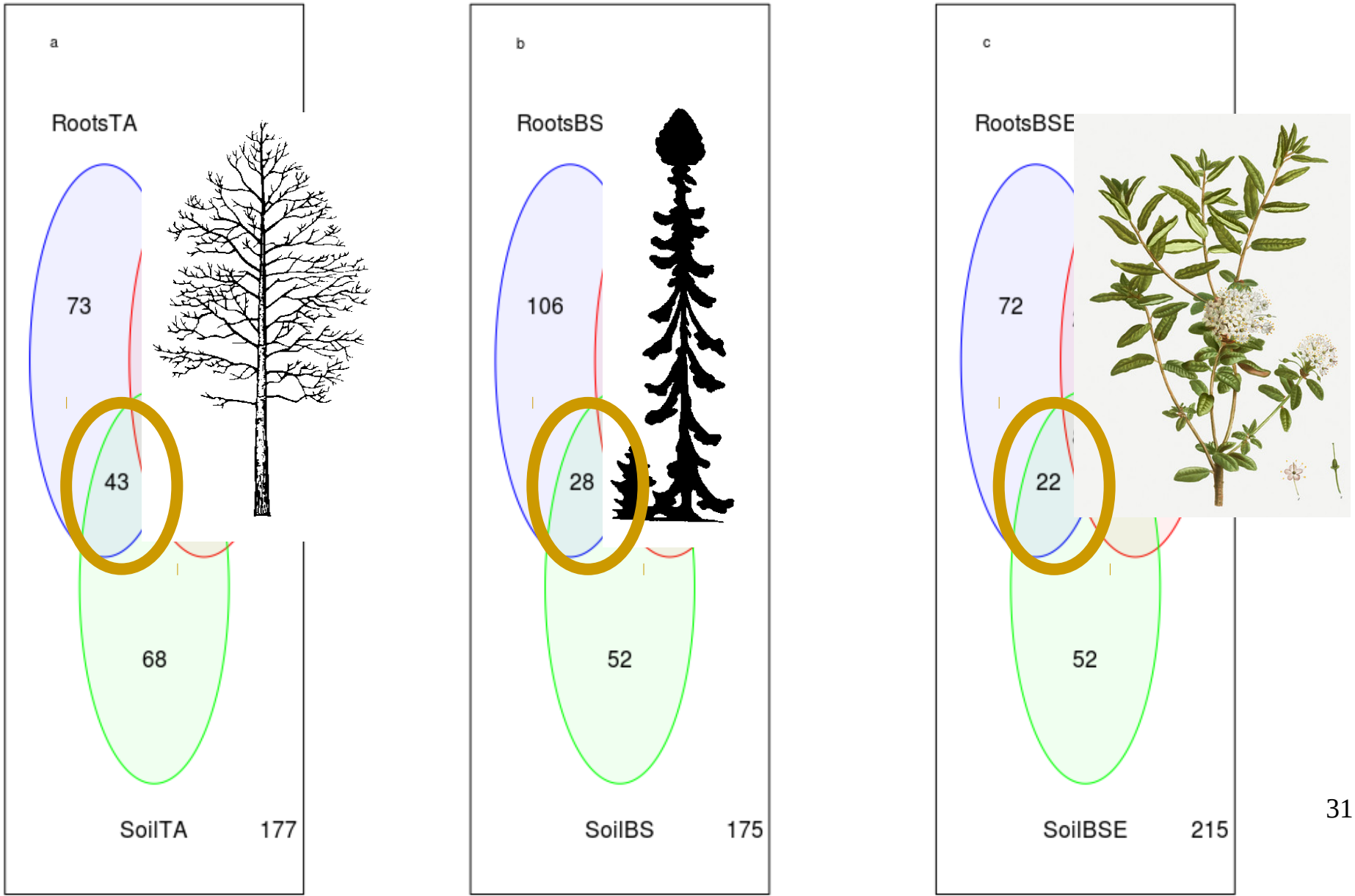


Abundance of ECM families of fir saplings under TA

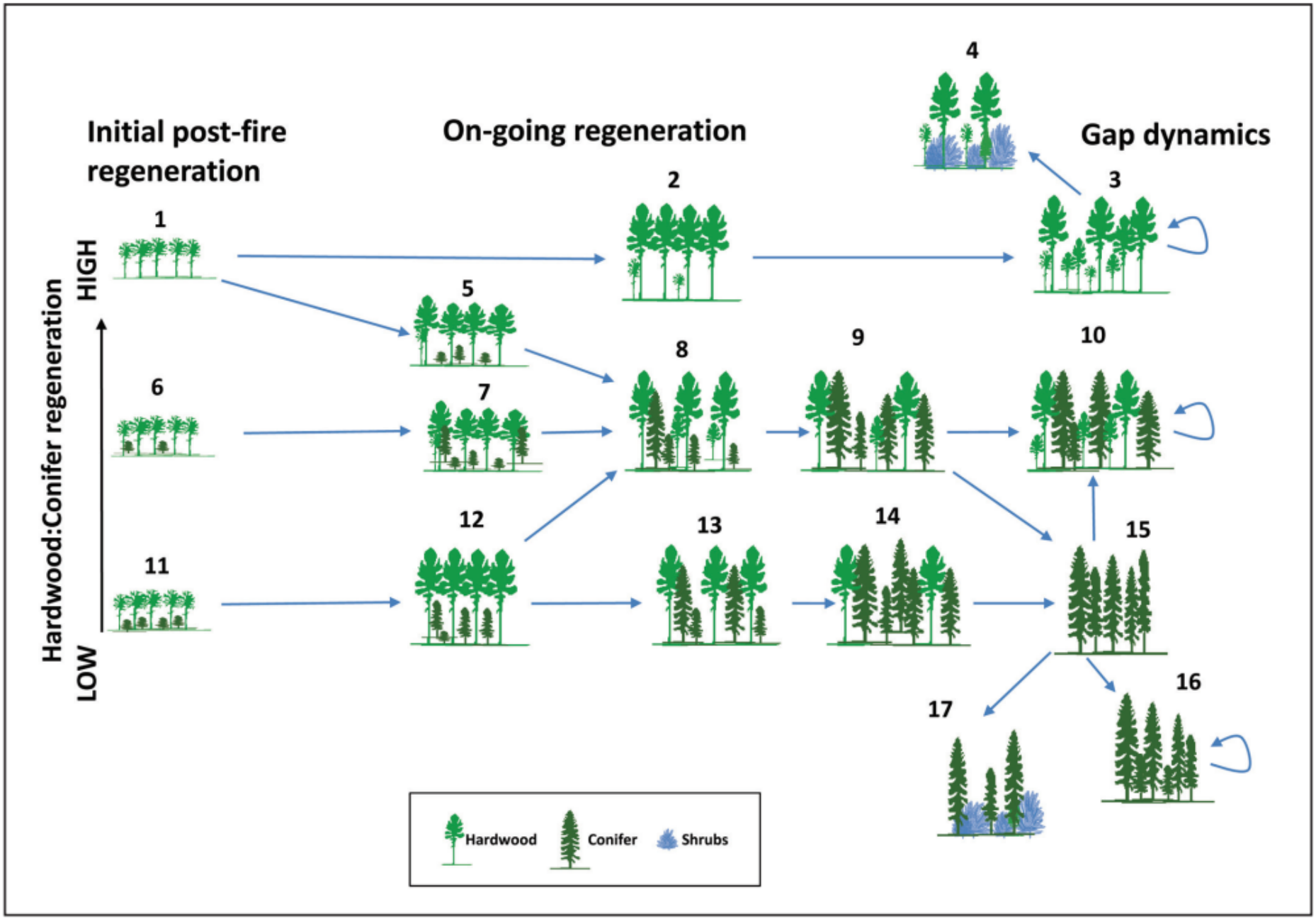


ANNEXE

Comunautés ECM associées au sapin

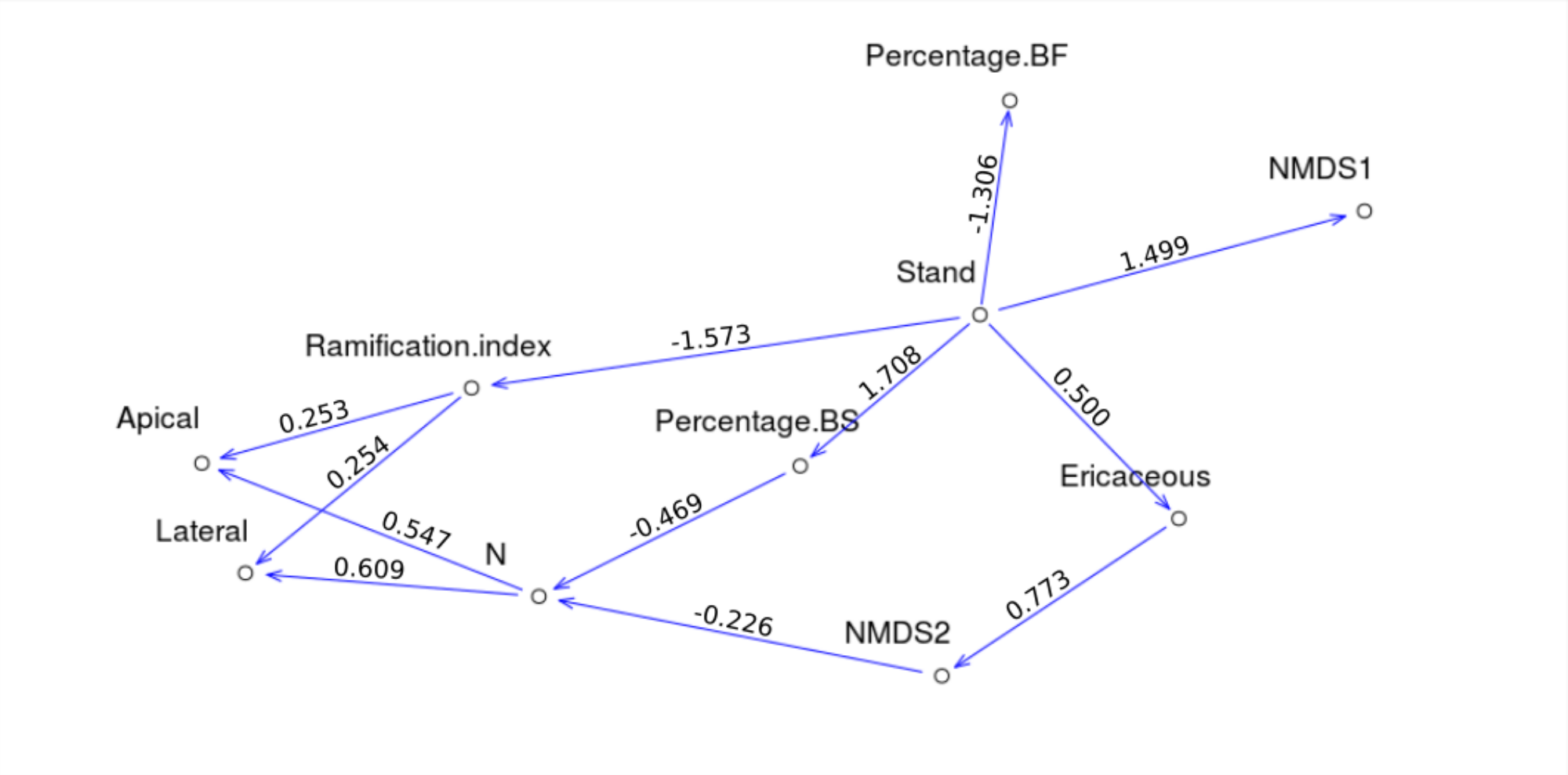


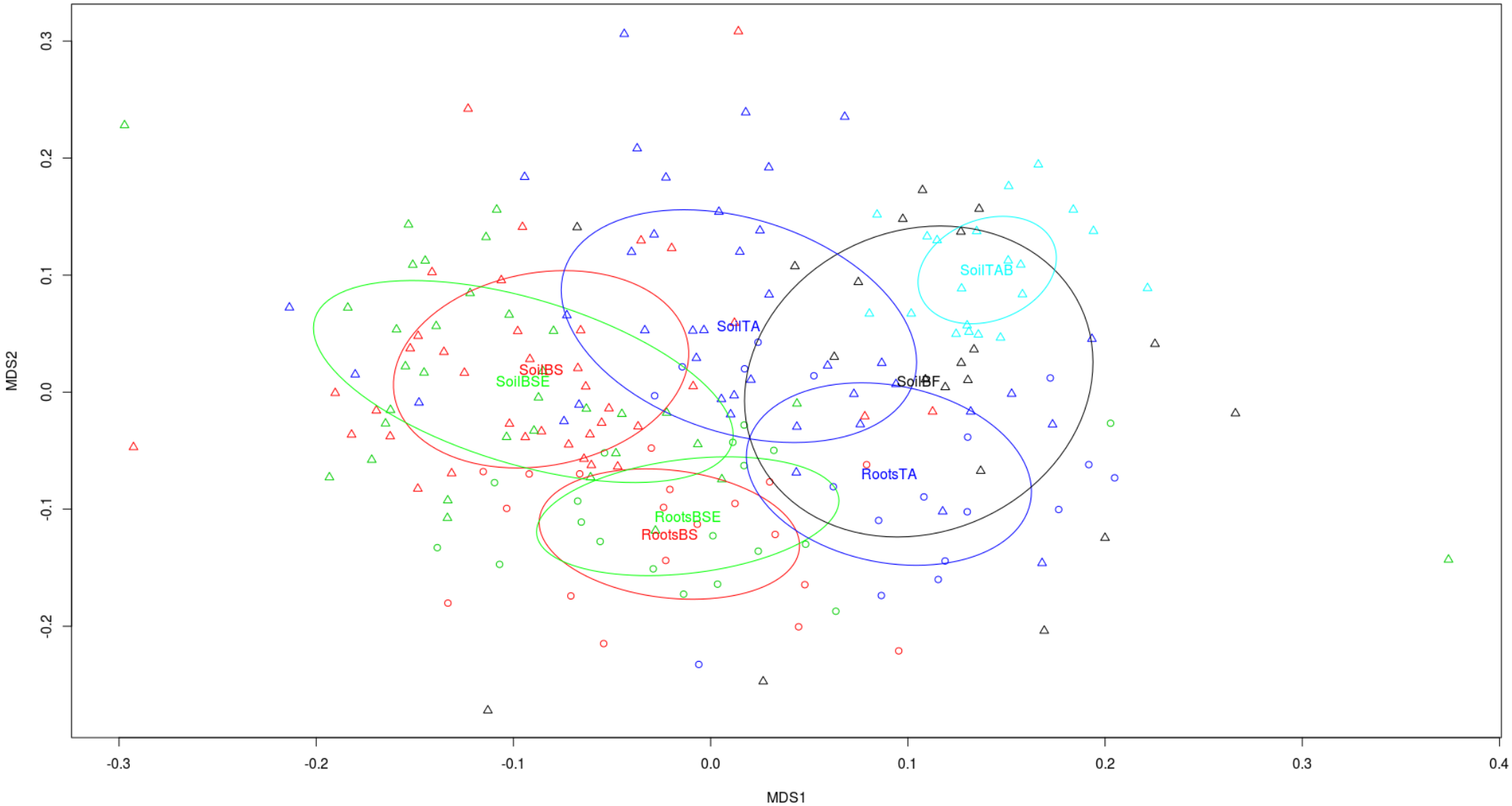
DYNAMIQUE EN FORÊT BORÉALE



Bergeron et al. 2014

Analyses de piste



ANNEXE

Comunautés ECM associées au sapin