

Le mycobiome des sols face aux changements climatiques

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Les sols et leurs fonctions

28/05/2024



La forêt

Ressource

Naturalité

Biodiversité

Réseaux d'interactions

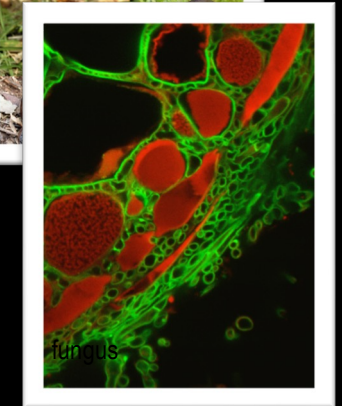
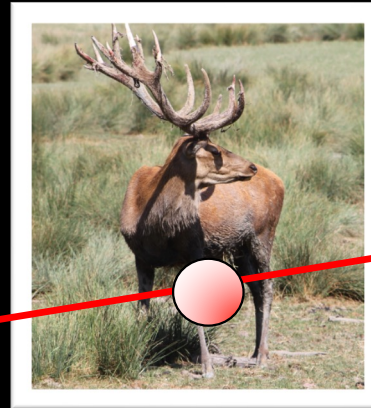
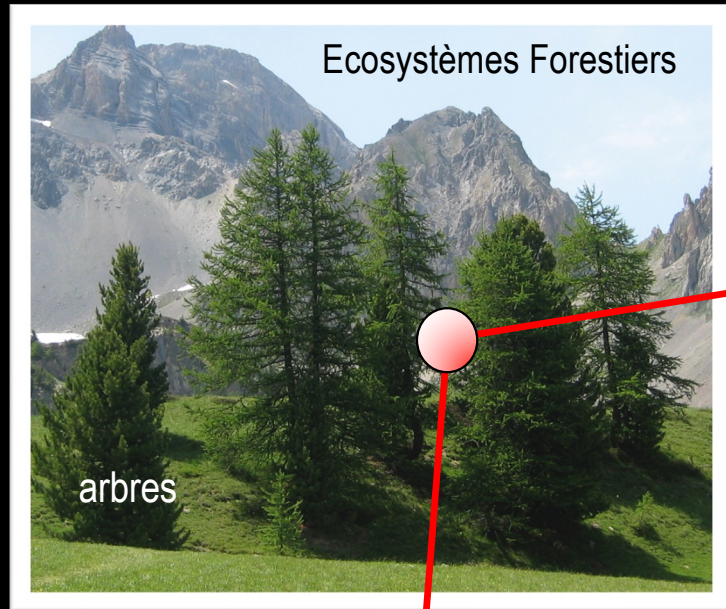
Conflits & coopération

Changement climatique

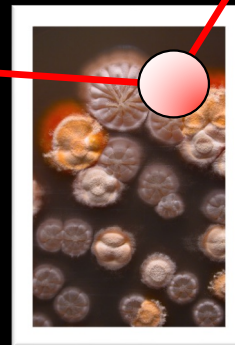
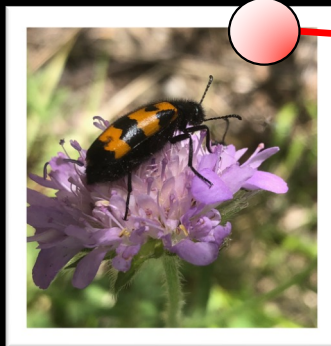
Maladies émergentes

Futur incertain

La forêt : un réseau social



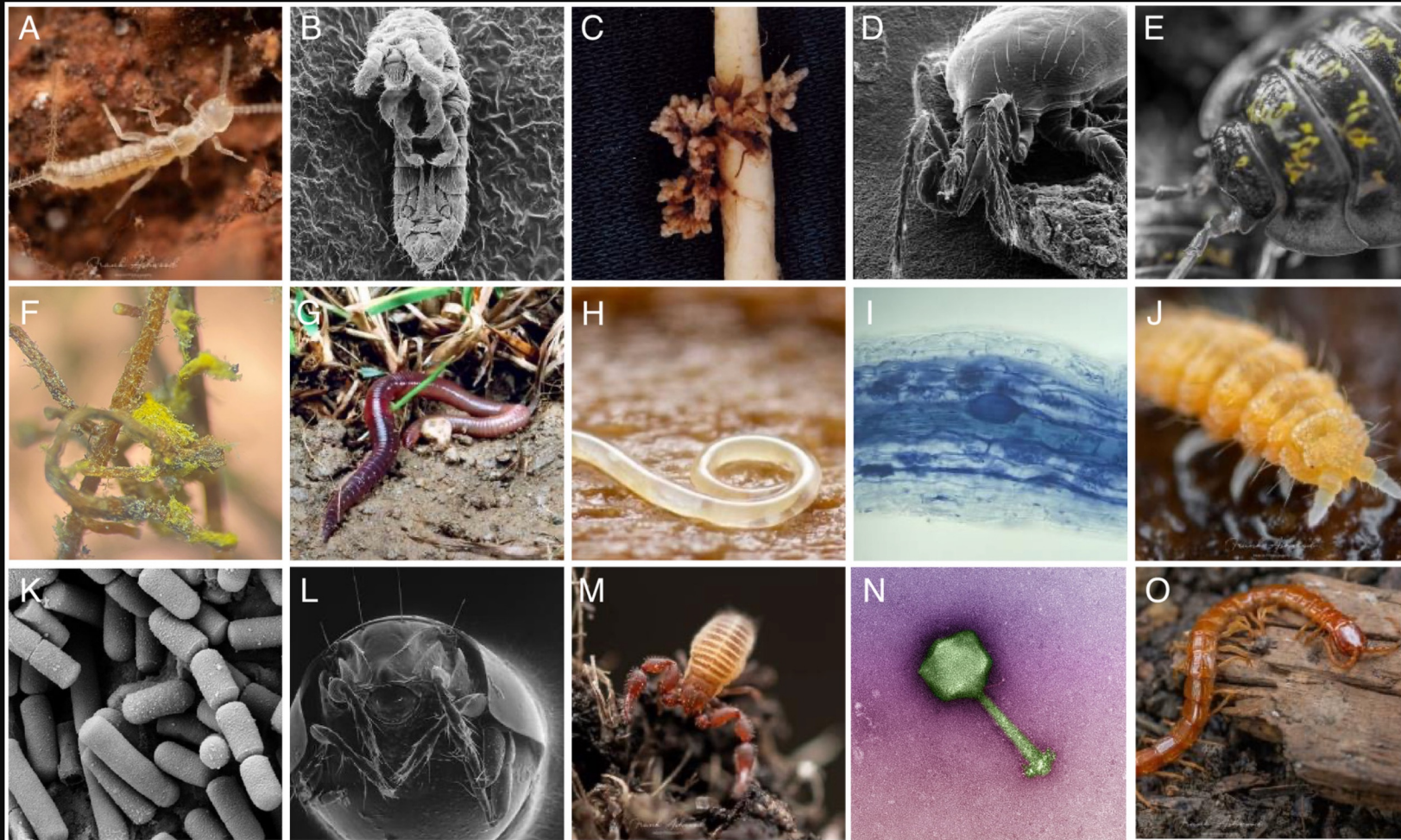
SOLS



Interfaces – Interactions

La recherche en écologie forestière :
décrire, décrypter et interpréter
ces réseaux complexes d'interactions

Le sol ... 59% de la biodiversité



Les réseaux mycéliens ... un rôle clé



Trois guildes majeures de champignons sylvicoles



Trametes versicolor

Caries blanches



Fomitopsis pinicola

Caries brunes



Lepista nuda

Décomposeurs de litière



Ectomycorrhiziens



Amanita muscaria

Symbiotrophes

Endomycorrhiziens



Gigaspora



Lichens

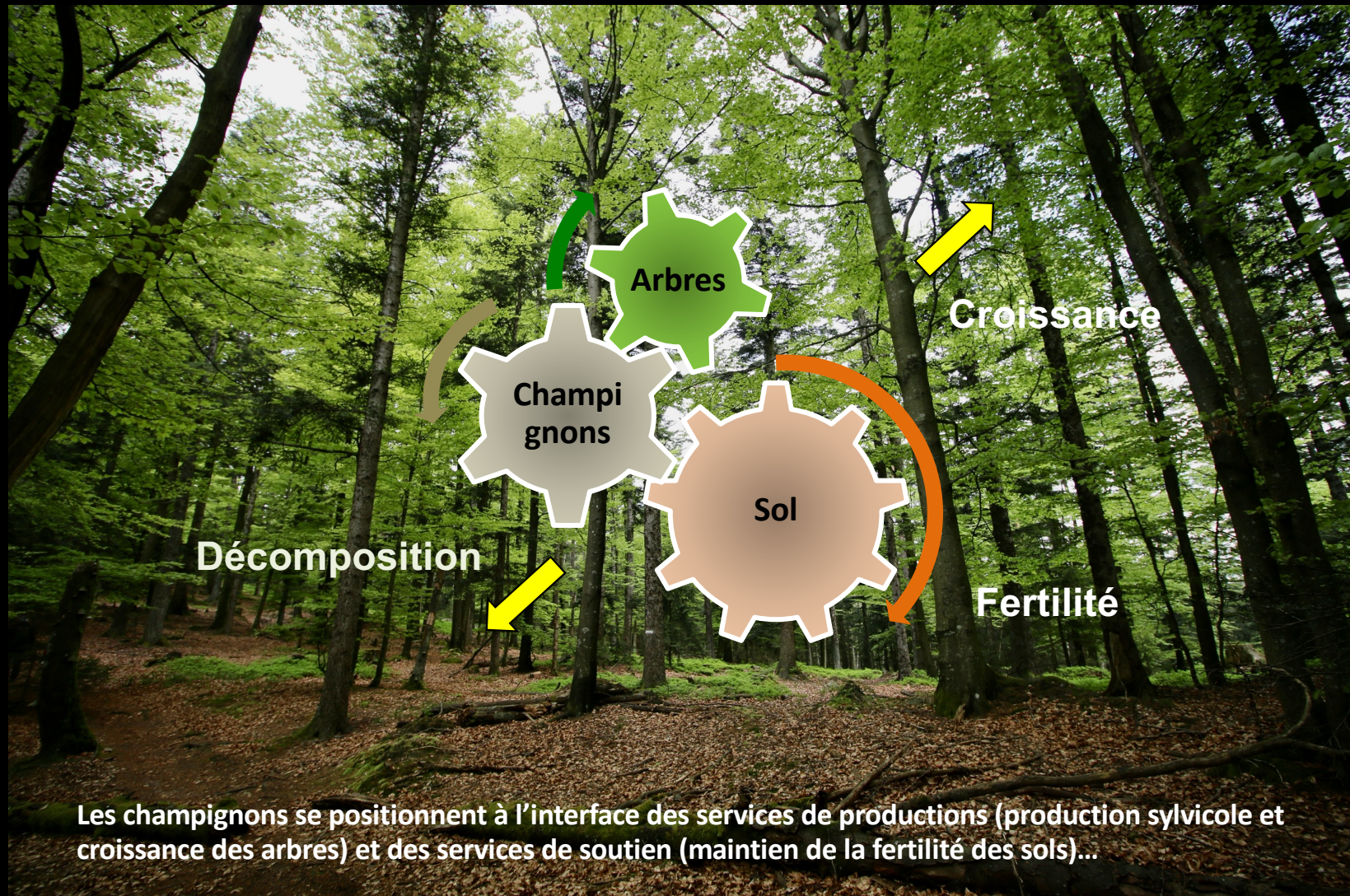


Armillaria

Pathogènes

Saprotrophes

Rôle des communautés fongiques à l'interface SOL - ARBRE





By Ersin Han Ersin (marshmallowlaserfeast.com)

Nos forêts se meurent ...



Grossmann, Massif du Donon, Vosges



Reduced precipitation



Warming

N

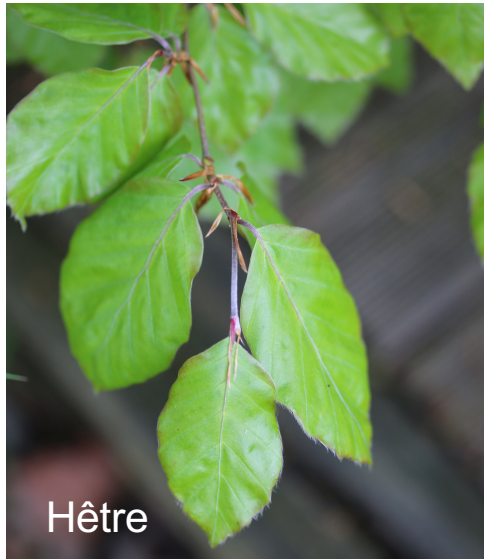
Nitrogen deposition



Increase of CO₂

Sécheresse édaphique
Vagues de chaleur
Dépôts azotés
Teneur en CO₂

Répartition géographique probable en climat futur

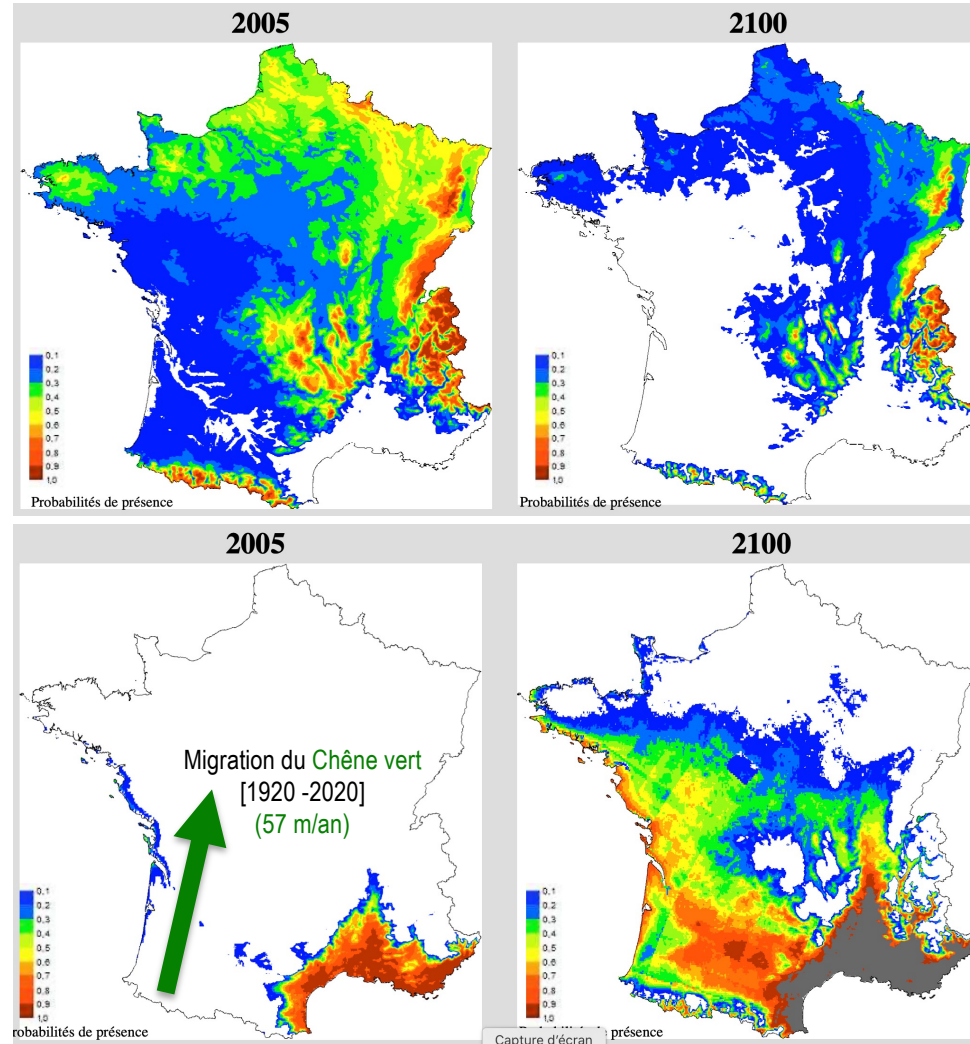


Hêtre

© F Martin



Chêne vert



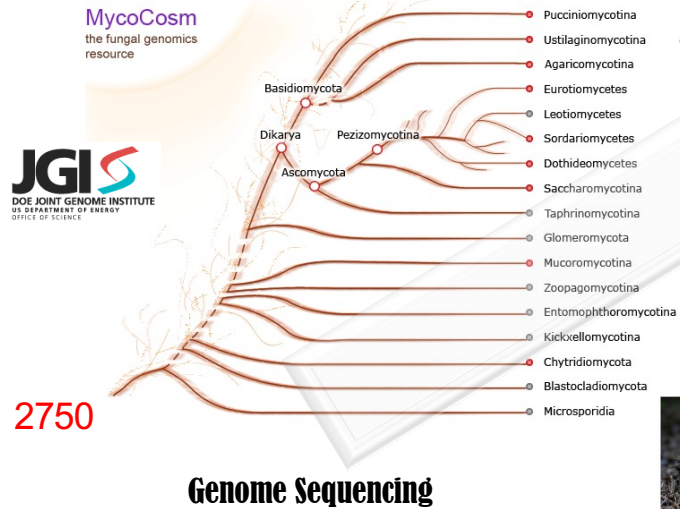
Le retrait du **Hêtre**, qui couvre 15 % de la surface forestière de production, pourrait concerner les 2/3 de son aire actuelle, avec un repli vers les massifs montagneux et le NE de la France.

Le **Chêne vert** et le **Pin maritime**, surtout présents en Aquitaine et en région méditerranéenne, voient leur extension stimulée par le réchauffement dans la moitié nord de la France, tandis qu'elle se maintiendrait dans le Sud à moyen terme

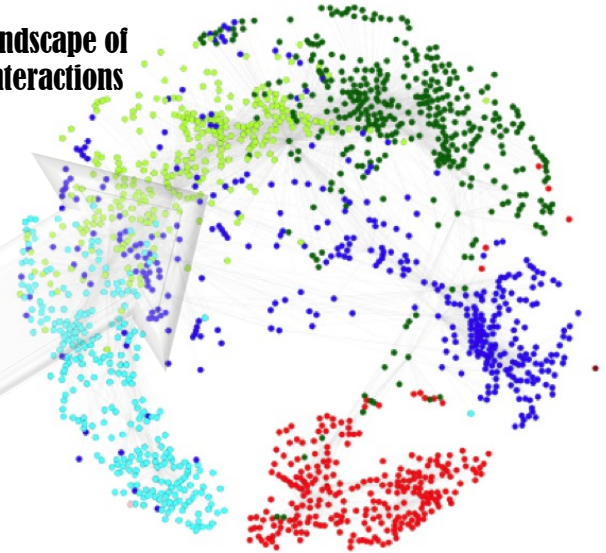
Badeau, 2010 / RMT AFORCE

Shift to large-scale, environmental genomics projects ...

Analyses of multiple genomes will provide insights into the diversity of mechanisms for the mycorrhizal symbiosis, including endo- and ectomycorrhiza. In concert with the proposed sequencing of a suite of fungal wood decayers, these genomes will also illuminate the functional basis of transitions between decayer and symbiotic lifestyles.



The Genetic Landscape of Fungal-Tree Interactions



*U.S. DOE Joint Genome Institute
Community Sequencing Program*

*Mycorrhizal Genomics Initiative
10,000 Fungal Genomes*

*Saprotrophic Agaricomycotina Genomics
Soil Forest Metatranscriptomes
Defining the Populus Microbiome*



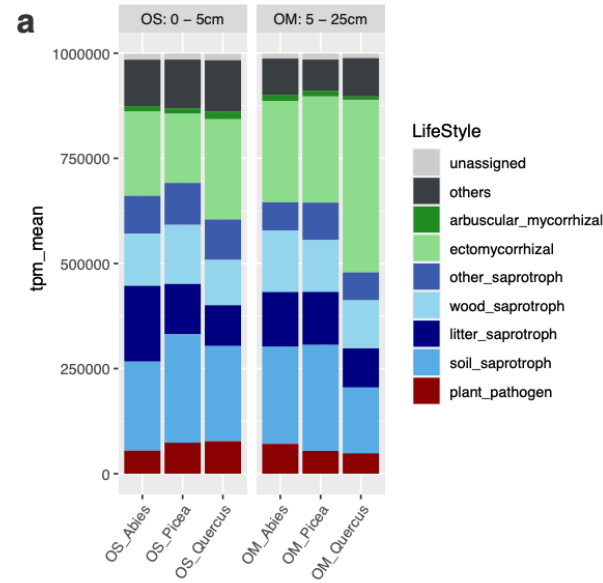


Yulong Xue Shan, Jade Dragon Snow Mountain, Yunnan Province, China

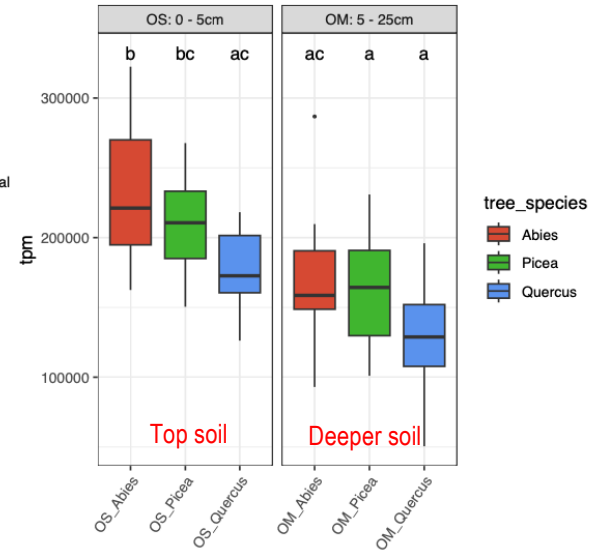
INRAE – Beijing Forestry University – Kunming Institute of Botany
(Profs Y-C Dai, Z-L Yang & G Wu)



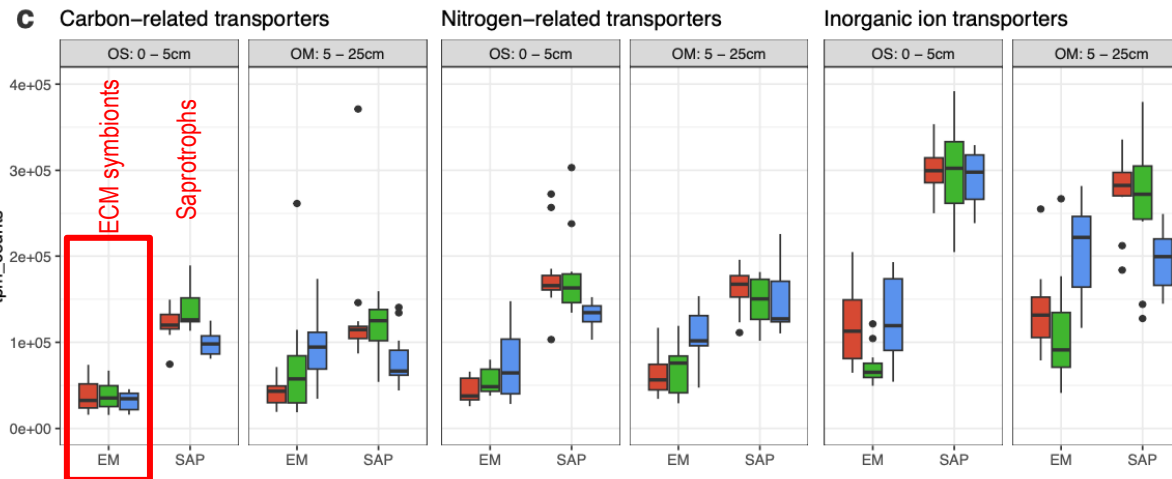
Distribution of transcripts among lifestyles



b Translation, ribosomal structure and biogenesis



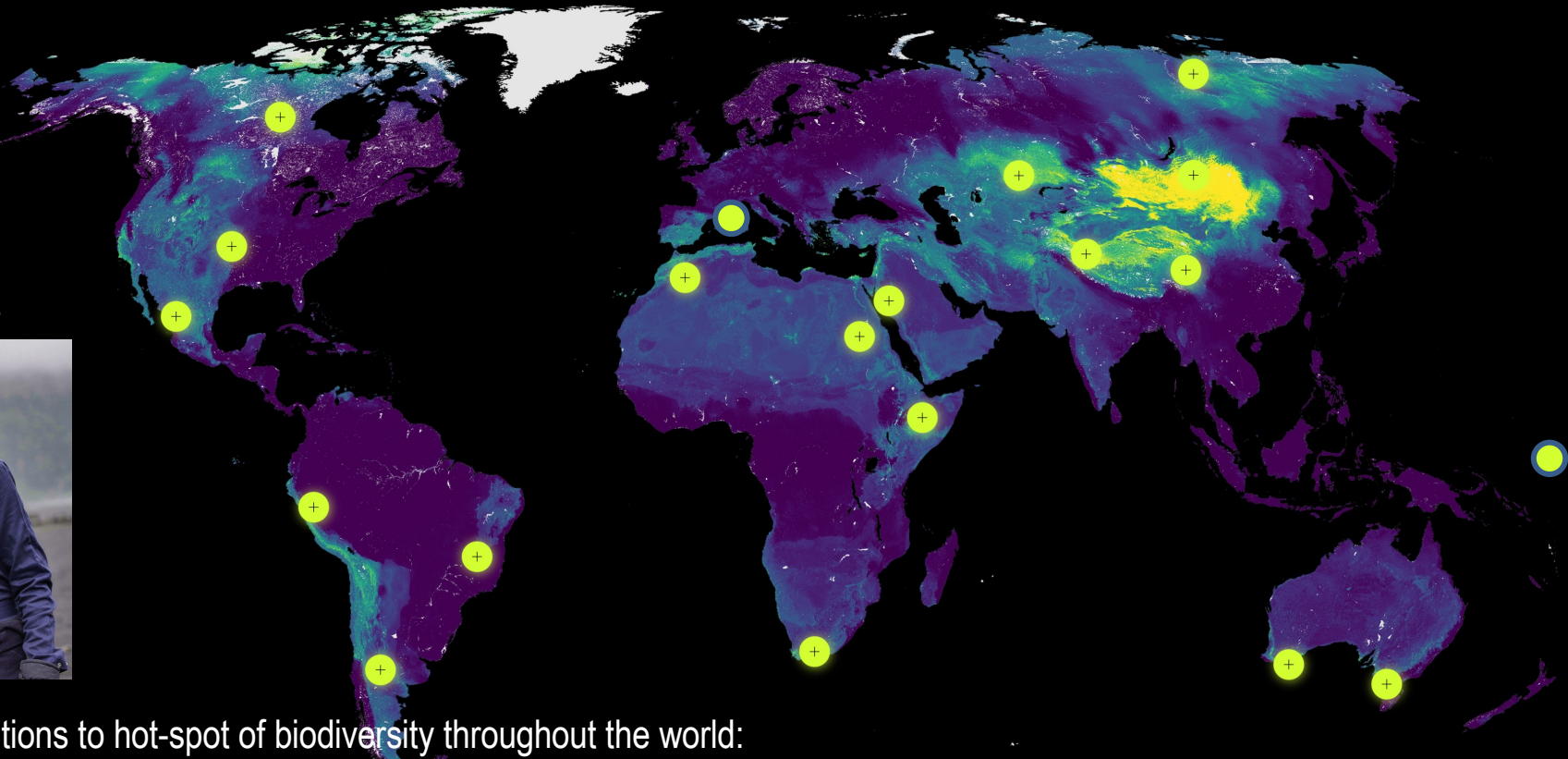
Expression of growth-related transcripts



Expression of transport-related transcripts

SPUN: Society for the Protection of the Underground Networks

Prof. Toby Kiers



Expeditions to hot-spot of biodiversity throughout the world:

- To explore microbiomes in terrestrial ecosystems and their sensitivity to climate change
- To popularize science & team with local communities
- To educate
- To influence policy