



3. Den otevřených dveří

3. 10. 2019, ProFarm Blatnice Vás zve na

Meziplodiny – ochrana půdy

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Mendelova
univerzita
v Brně



EUROPEAN UNION
European Regional
Development Fund



Agronomická
fakulta



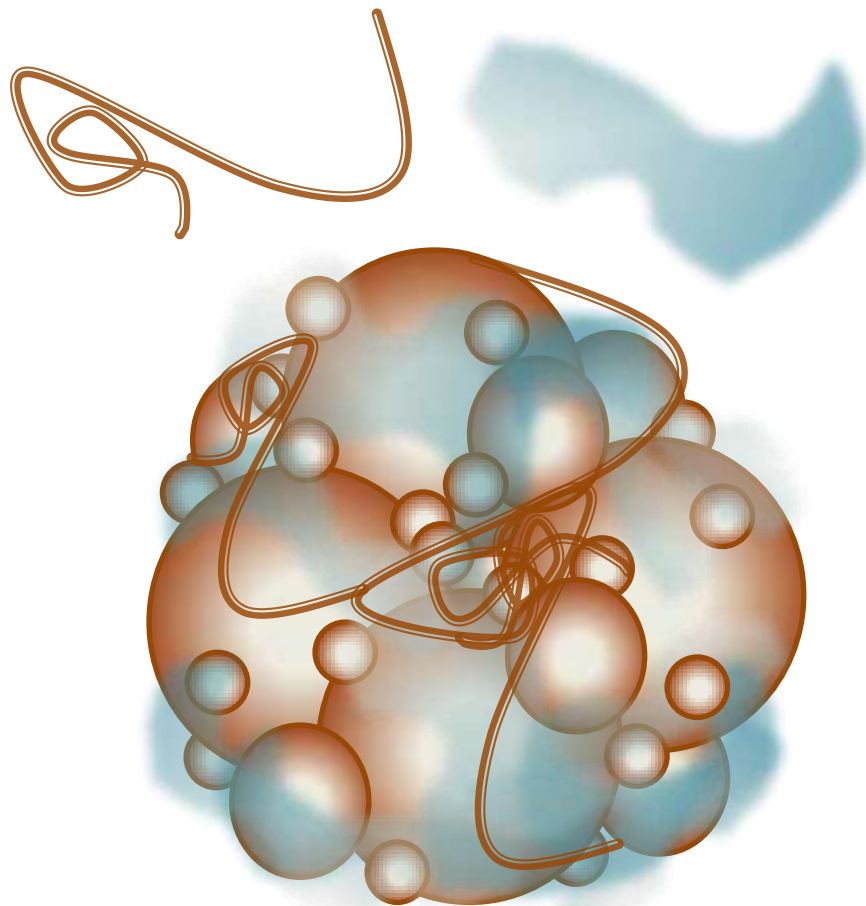
inteko
innovative composting

EUROPEAN TERRITORIAL CO-OPERATION
AUSTRIA-CZECH REPUBLIC 2007-2013
Gemeinsam mehr erreichen. Společně dosáhneme více.

•
Jíl
< 2 µm ø

•
Prach
2 – 63 µm ø

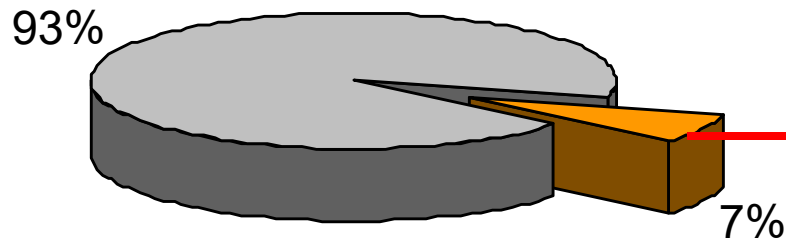
+



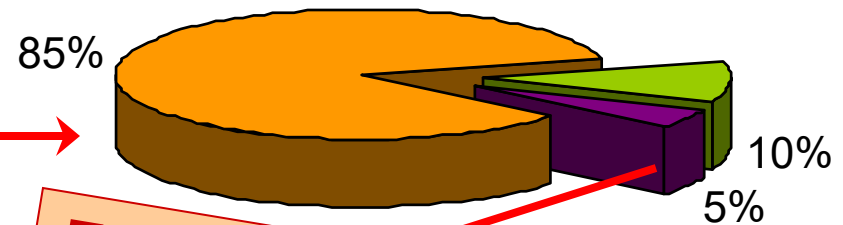
Písek
63 – 2 000 µm ø

Hmotnostní zastoupení složek luční půdy (podle Tischlera)

■ Minerální složky ■ Organické látky

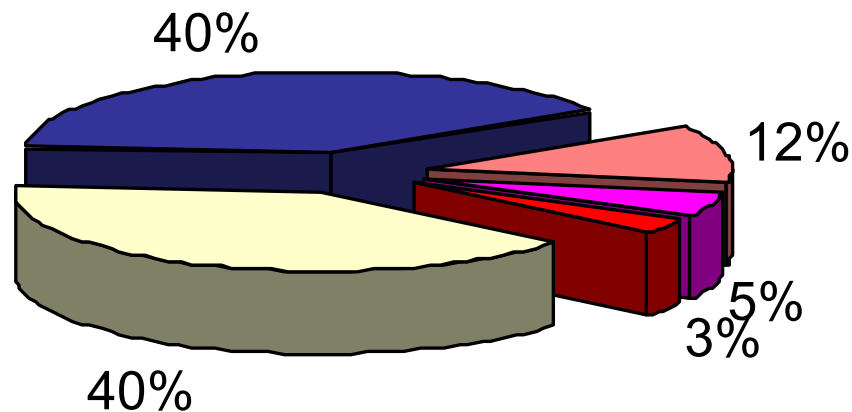


■ Humus ■ Kořeny rostlin ■ Edafon



Edafon cca 0,4 %

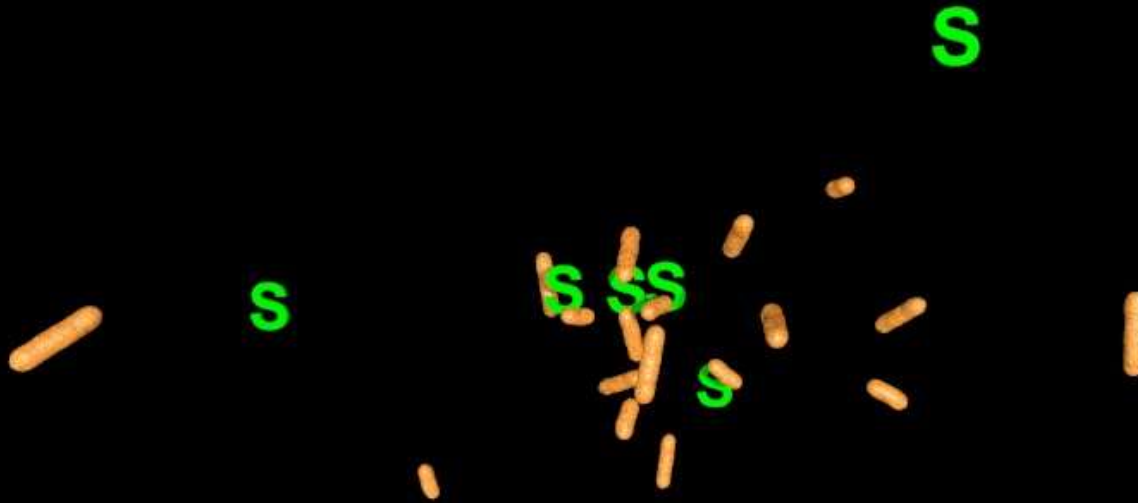
■ Houby a řasy
■ Dešťovky
■ Mezo- a mikrofauna



■ Bakterie a aktinomyceety
■ Ostatní makrofauna

V orných půdách jsou ovšem hmotnostní poměry edafonu 10 - 100x nižší...

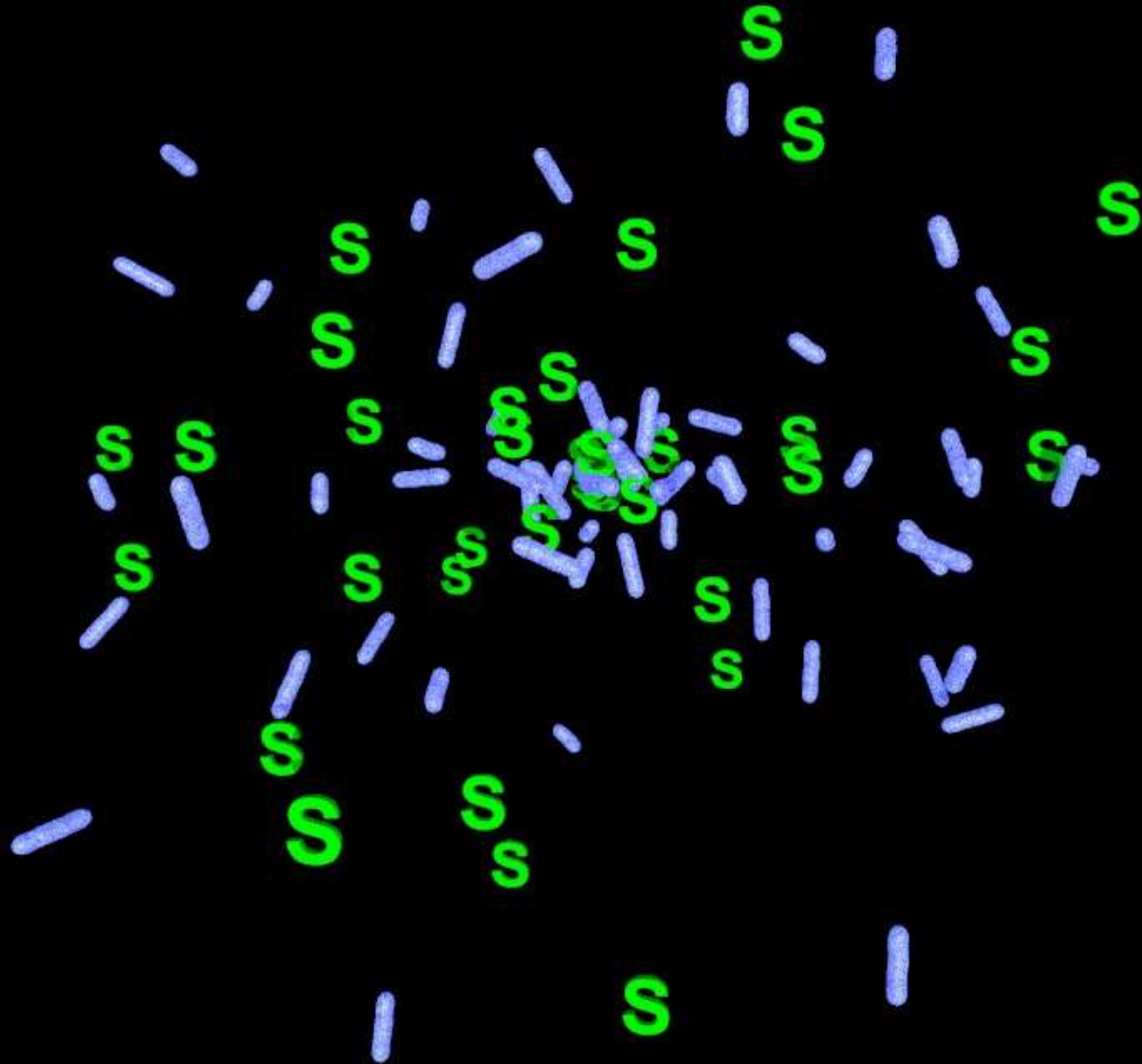
Bacteria can communicate with each other by producing chemical signals.



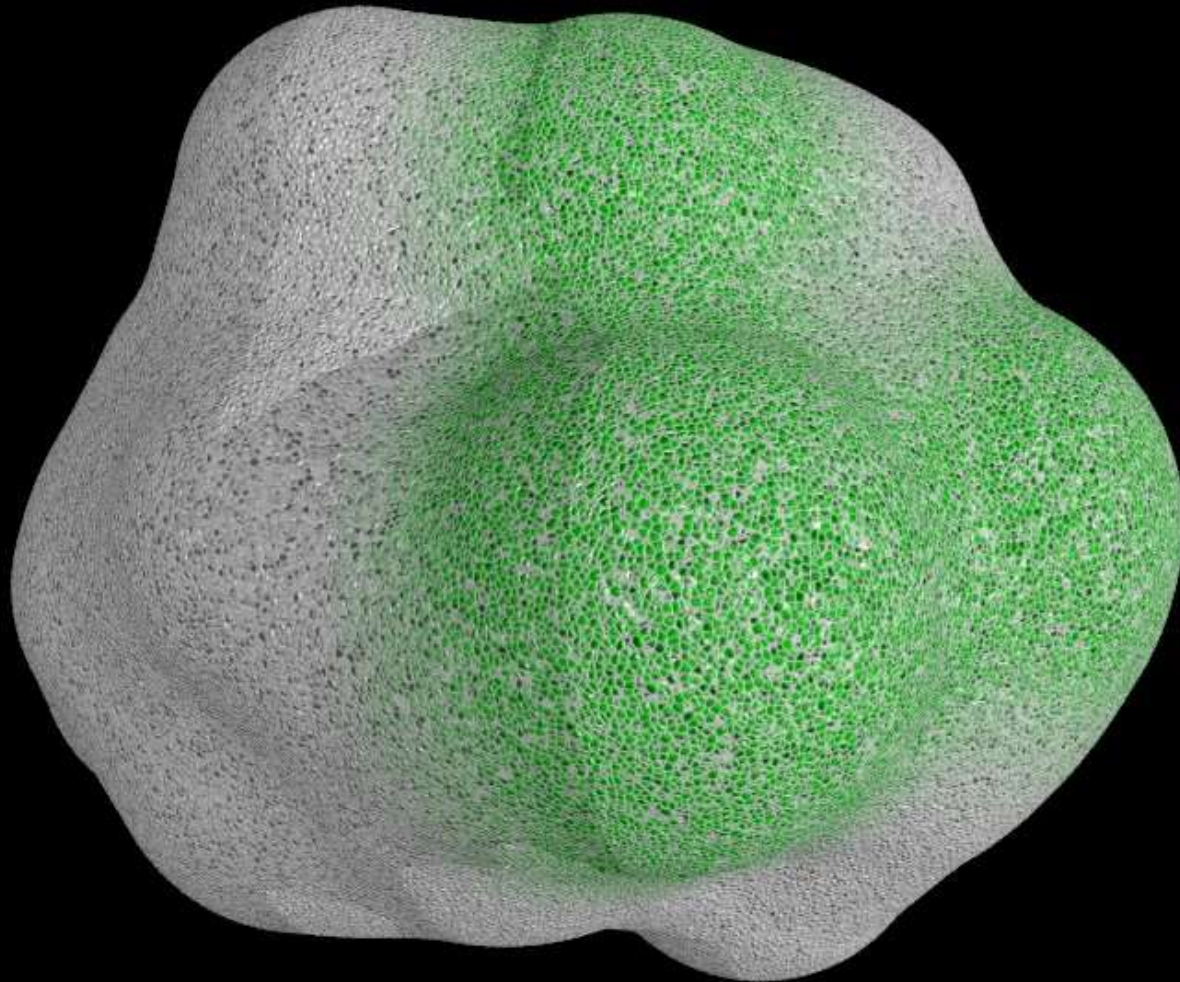
Higher densities of bacteria result in more signal molecules being produced.



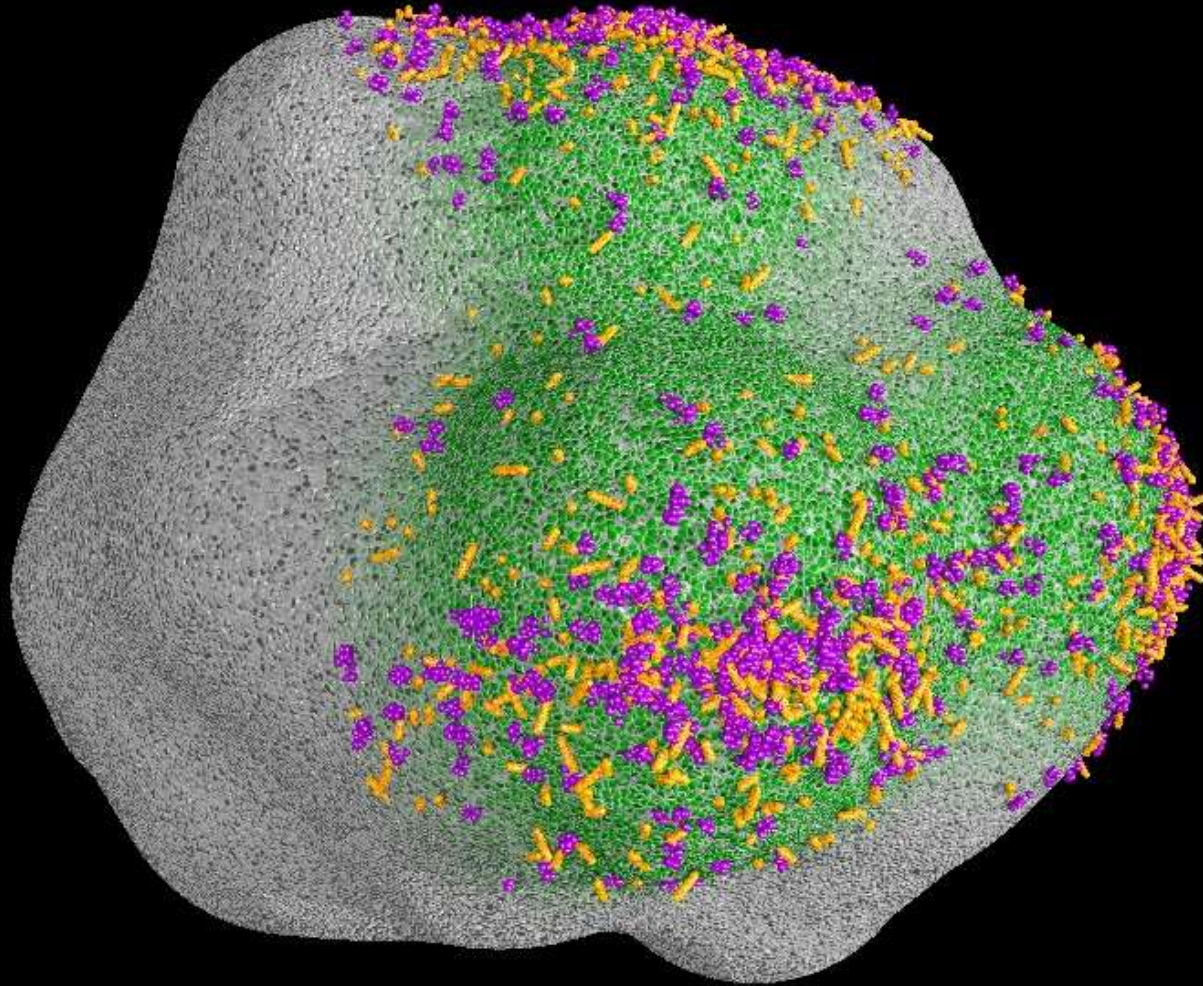
Once the concentration of **signal molecules** exceeds a certain threshold, the bacteria may change their behaviour (e.g., start producing toxic or protective compounds).



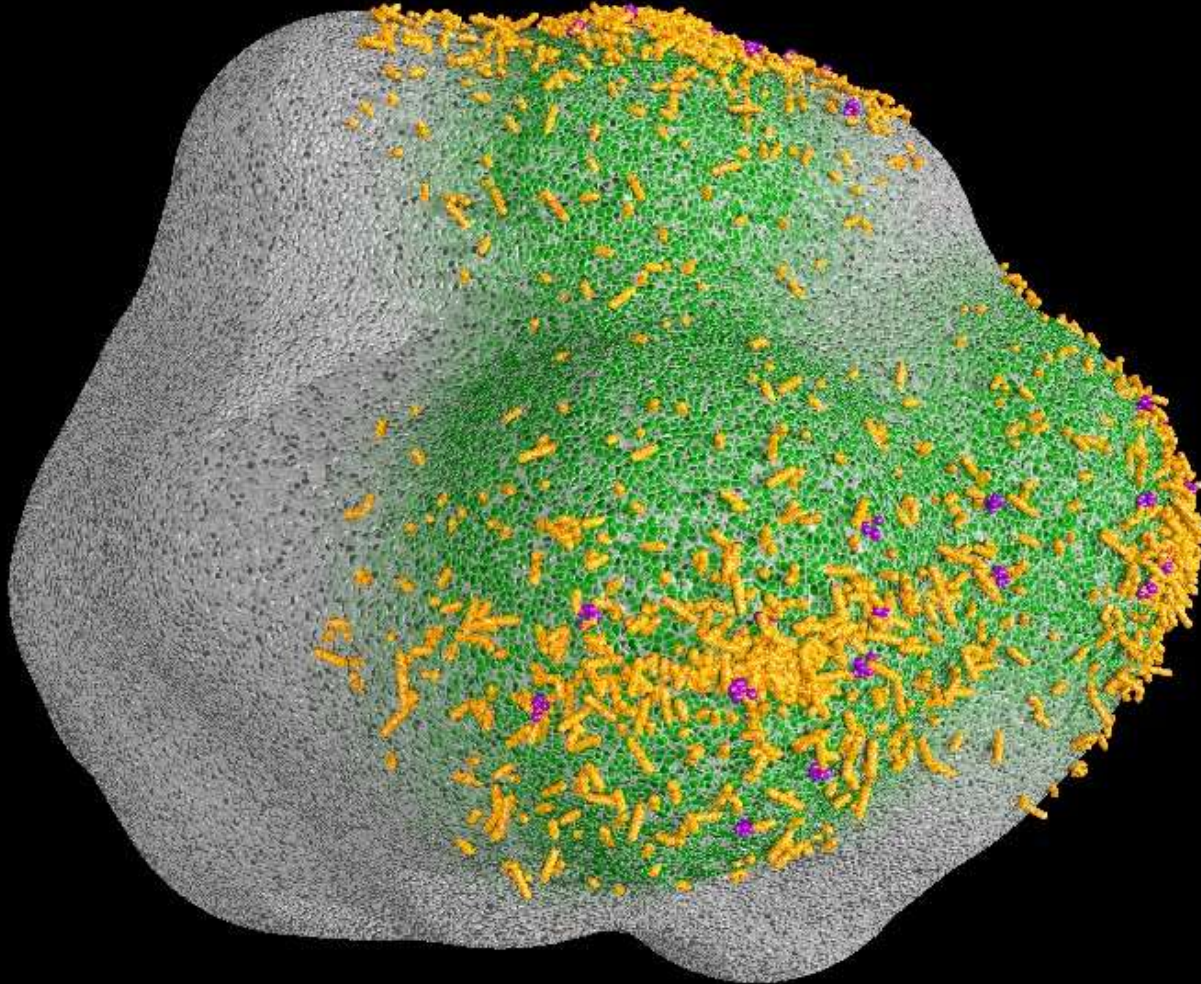
Now, let us assume, this is some chunk of organic material, consisting of cell walls and occasionally bound mineral nutrients.



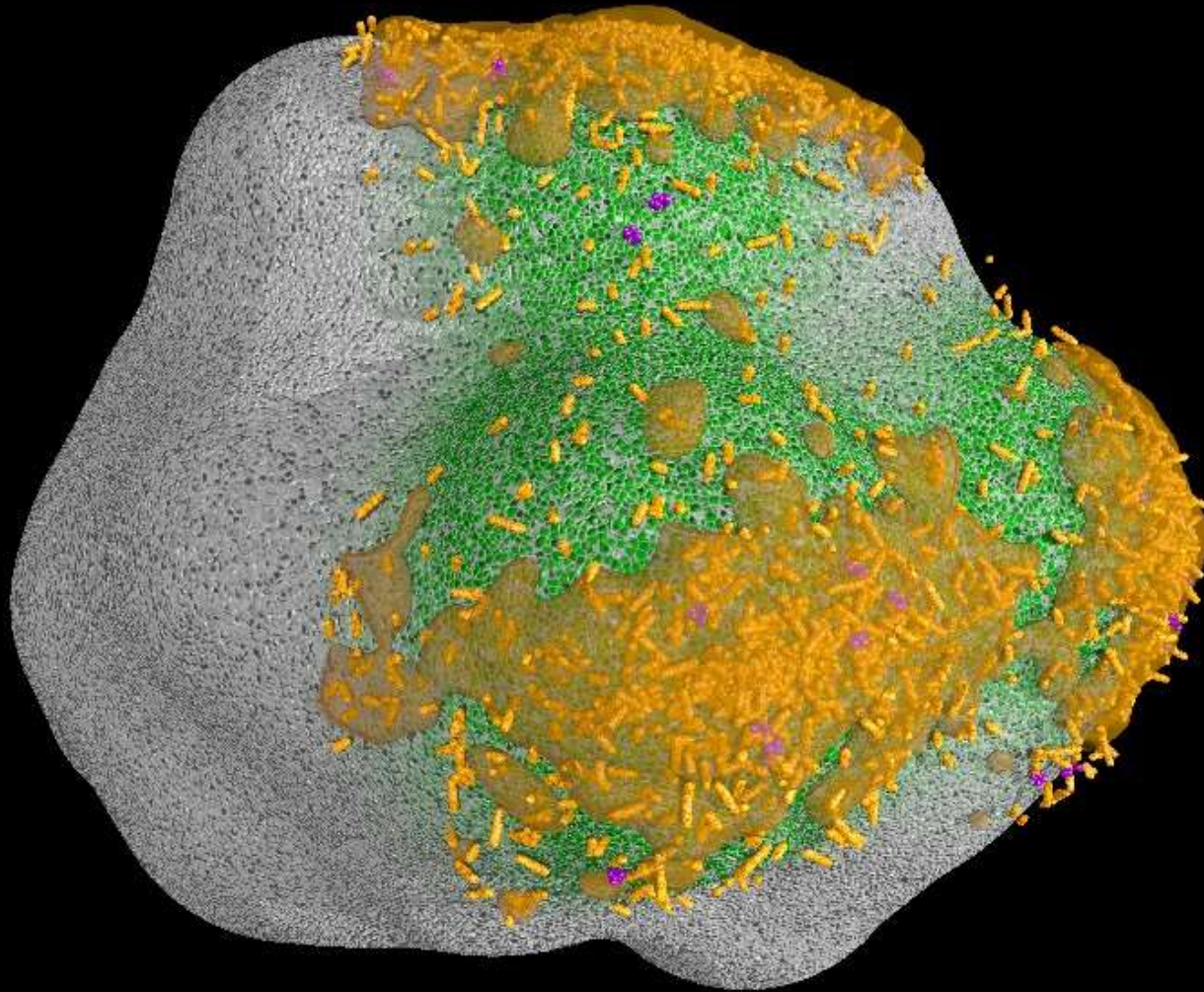
Bacteria will eventually reach the surface of this chunk. They will multiply at places providing sufficient **nutrients.**

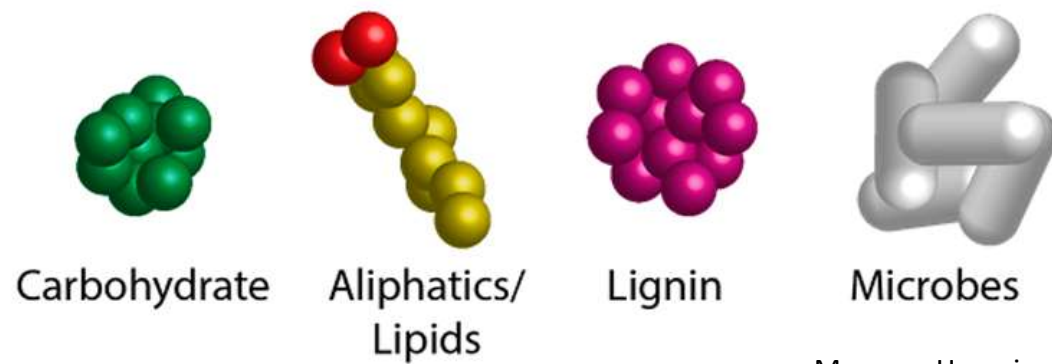
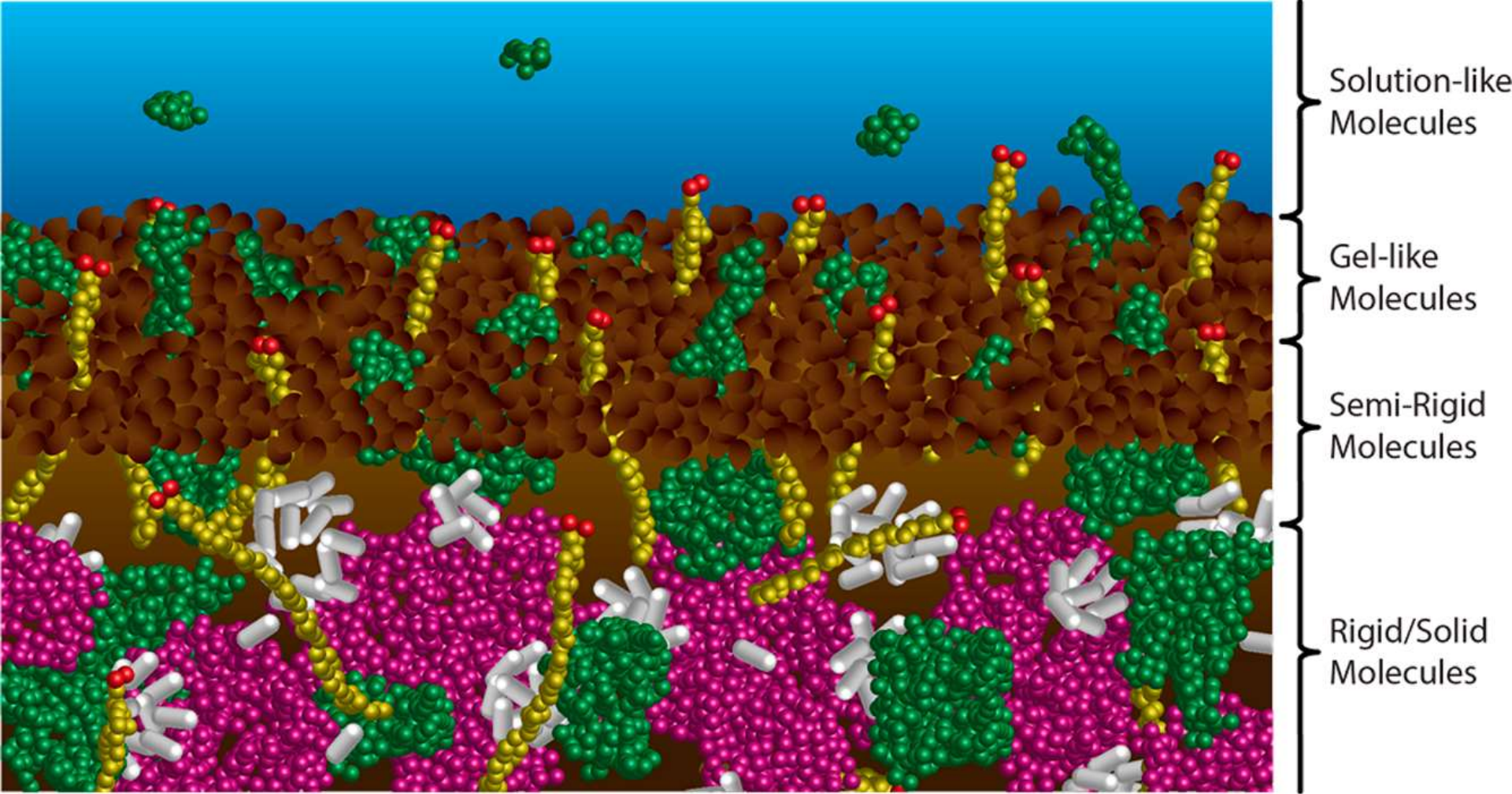


Some bacteria may produce toxic compounds, this way eliminating their competitors.

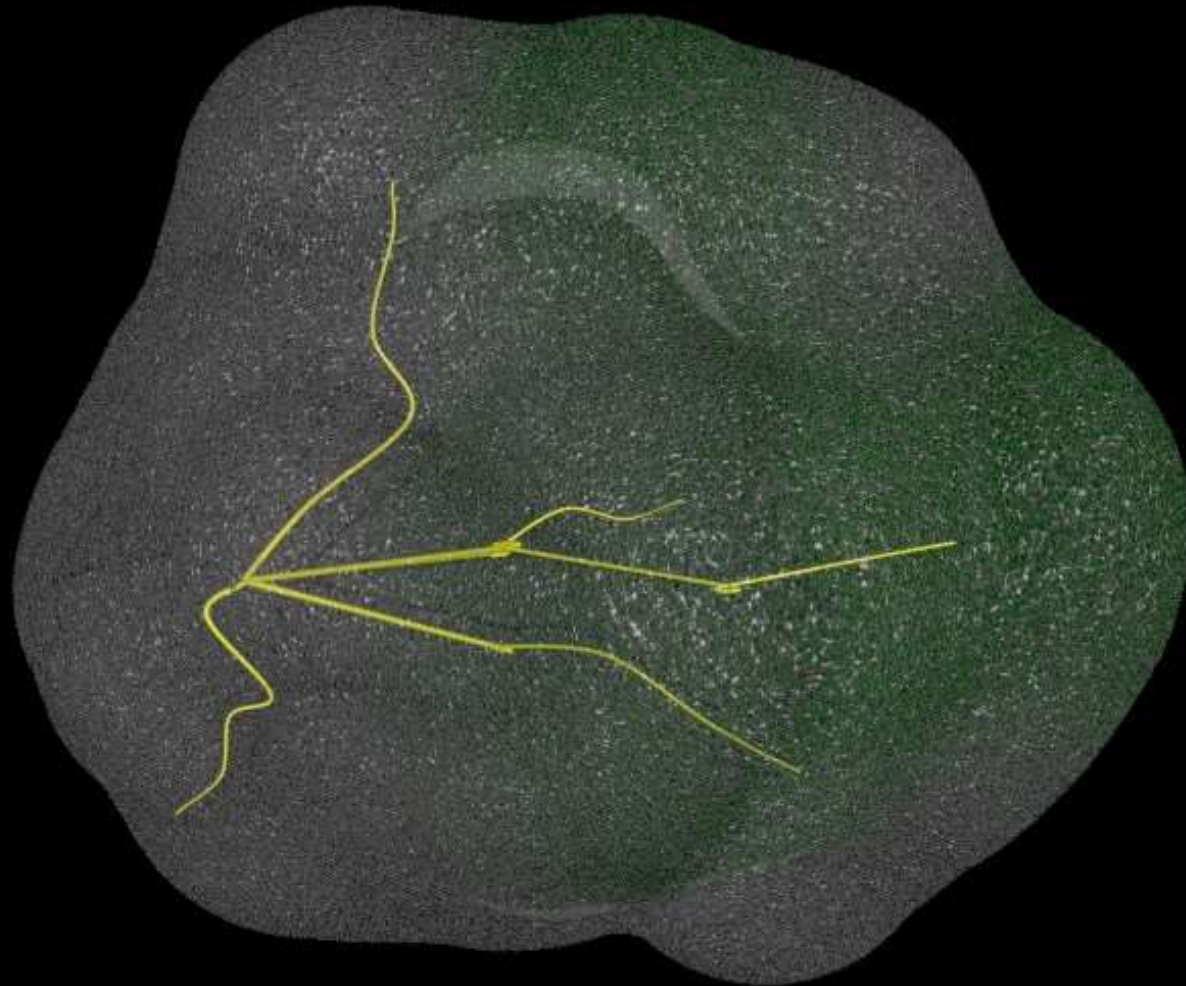


Once they have reached sufficient densities, some bacteria may produce protective mucous material (biofilm formation).

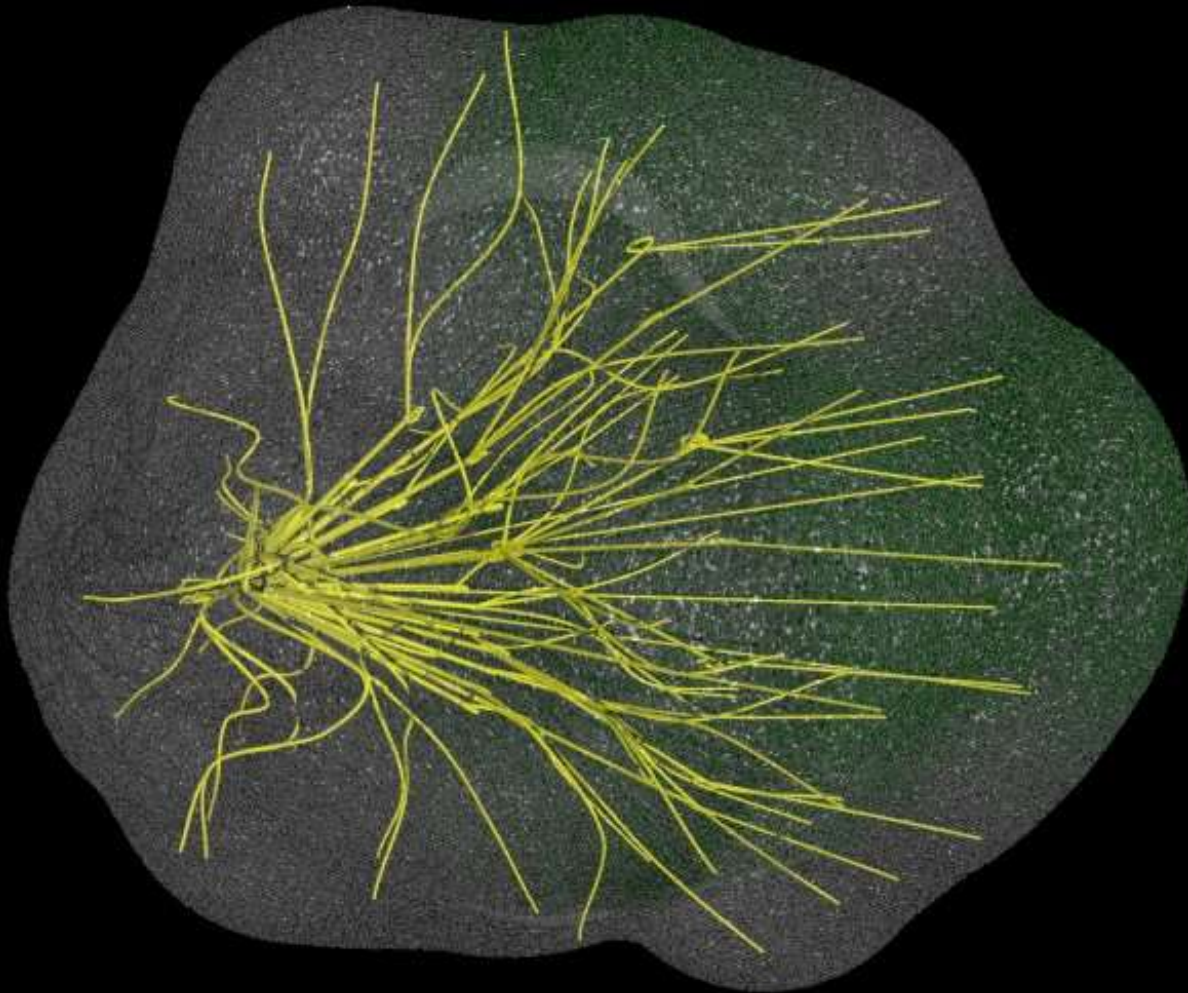


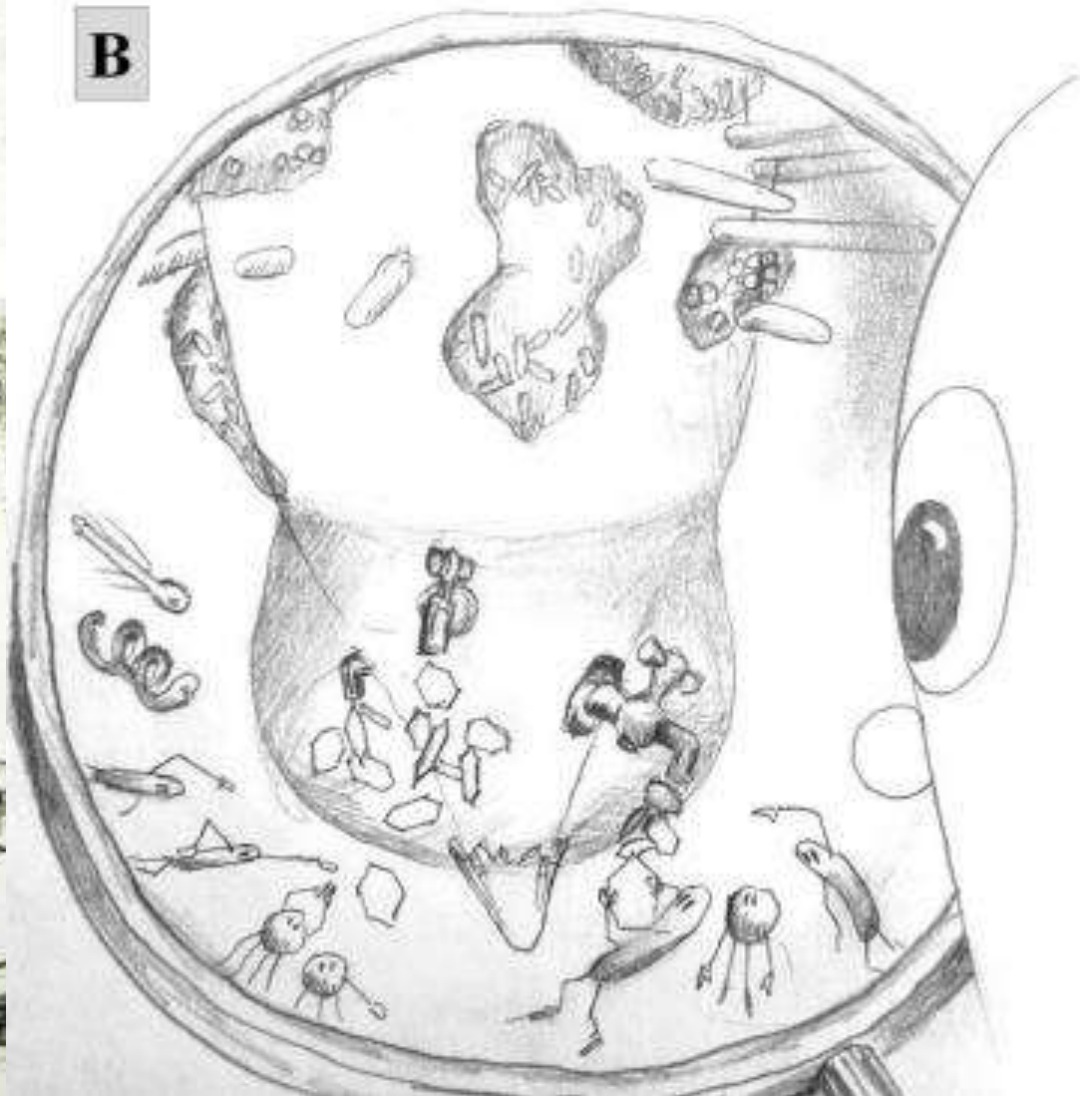


In contrast to bacteria, these hyphae are able to grow inside many substrates.



Since the hyphae can transport **mineral nutrients**, growth is not depending on local concentrations of such **nutrients**.





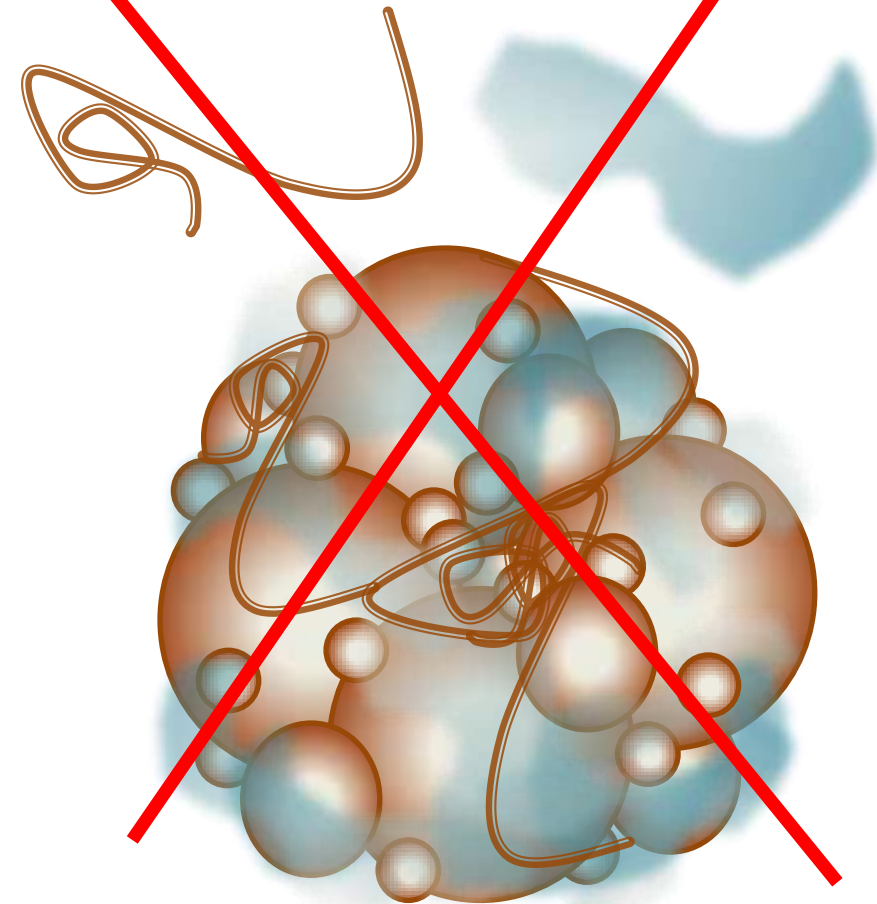
“Sleeping Beauty Paradox” - the contrast between the potential of soil microorganisms for an extremely fast turnover of organic matter in rhizospheric soil (B) and the surviving microorganisms suffering with minimal activities while involuntarily protecting still incompletely decomposed part of soil organic matter (A).



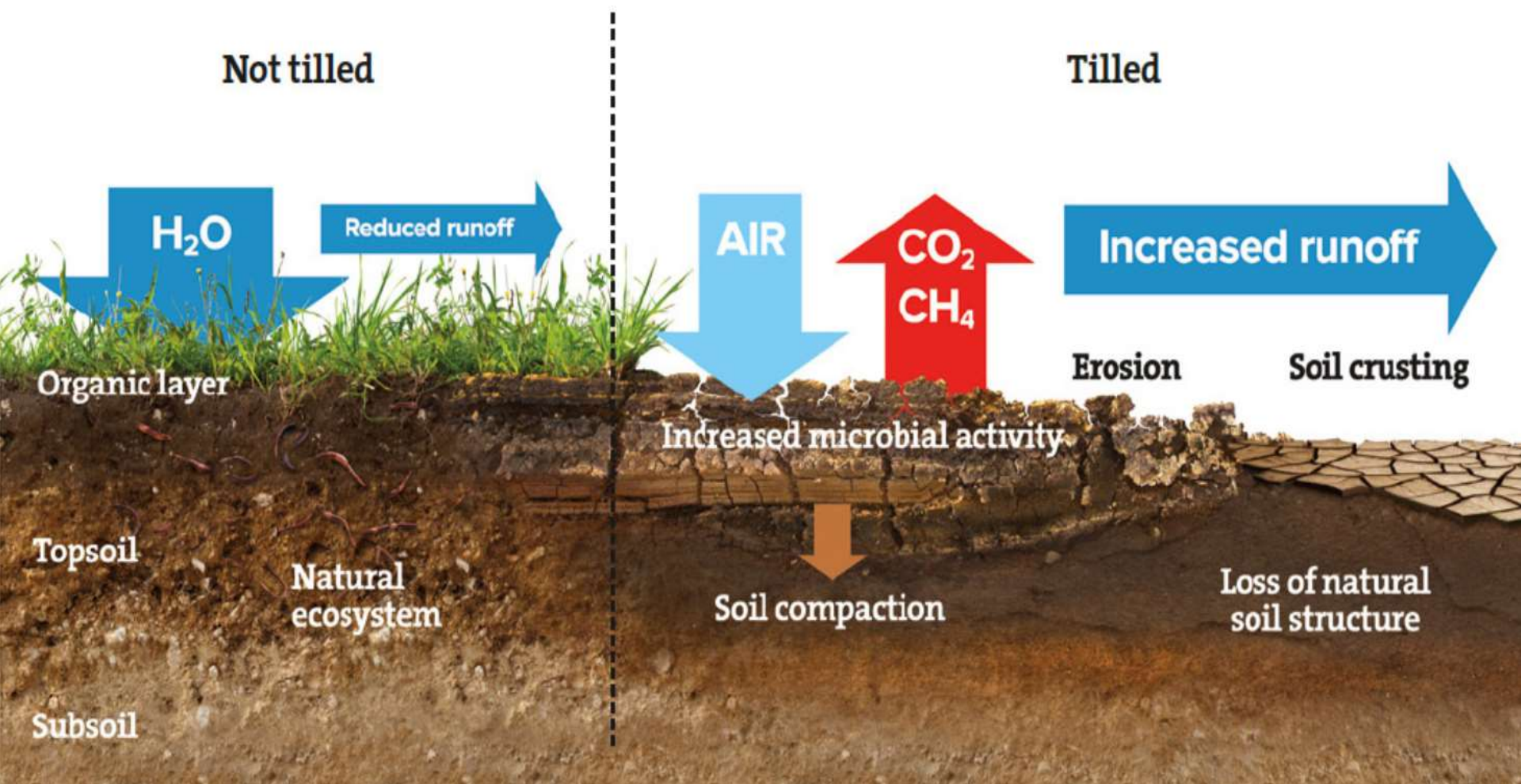
Jíl
< 2 µm ø

Prach
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Písek
63 – 2 000 µm ø

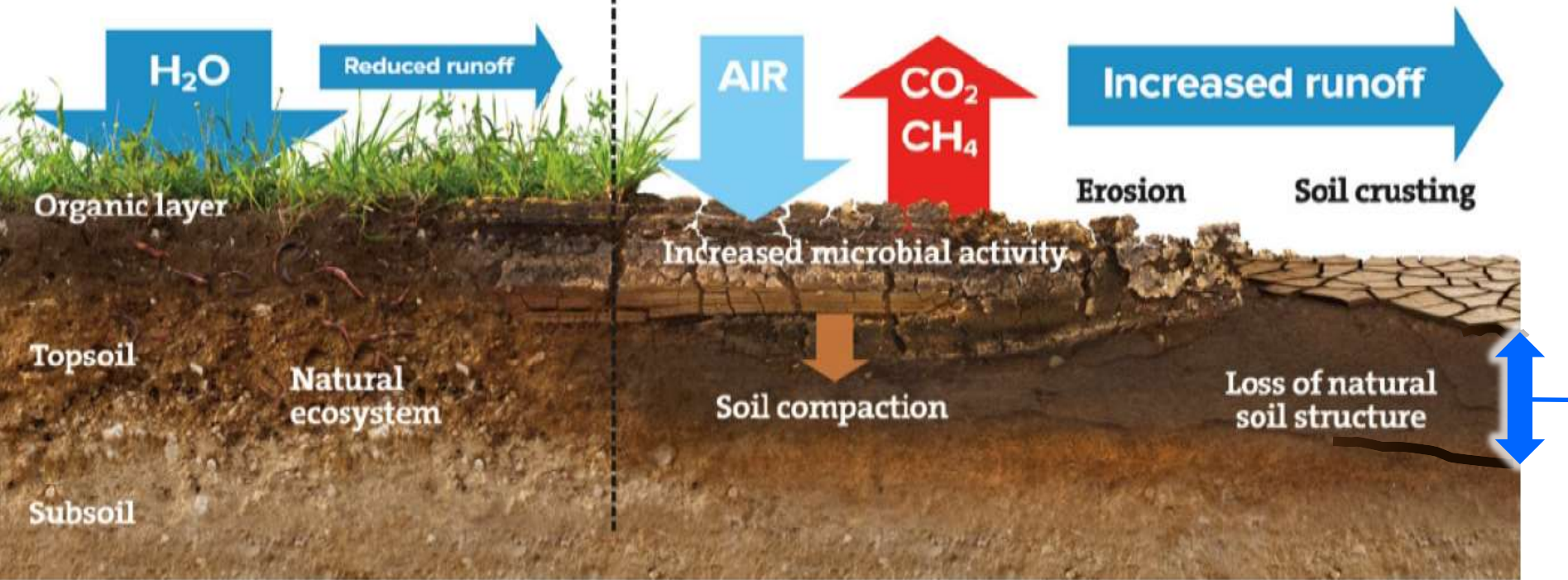


Modified diagram prepared originally by Nik Harron (<https://www.alternativesjournal.ca/sites/default/files/article/notilling.jpg>)

RAINFALL TRAP

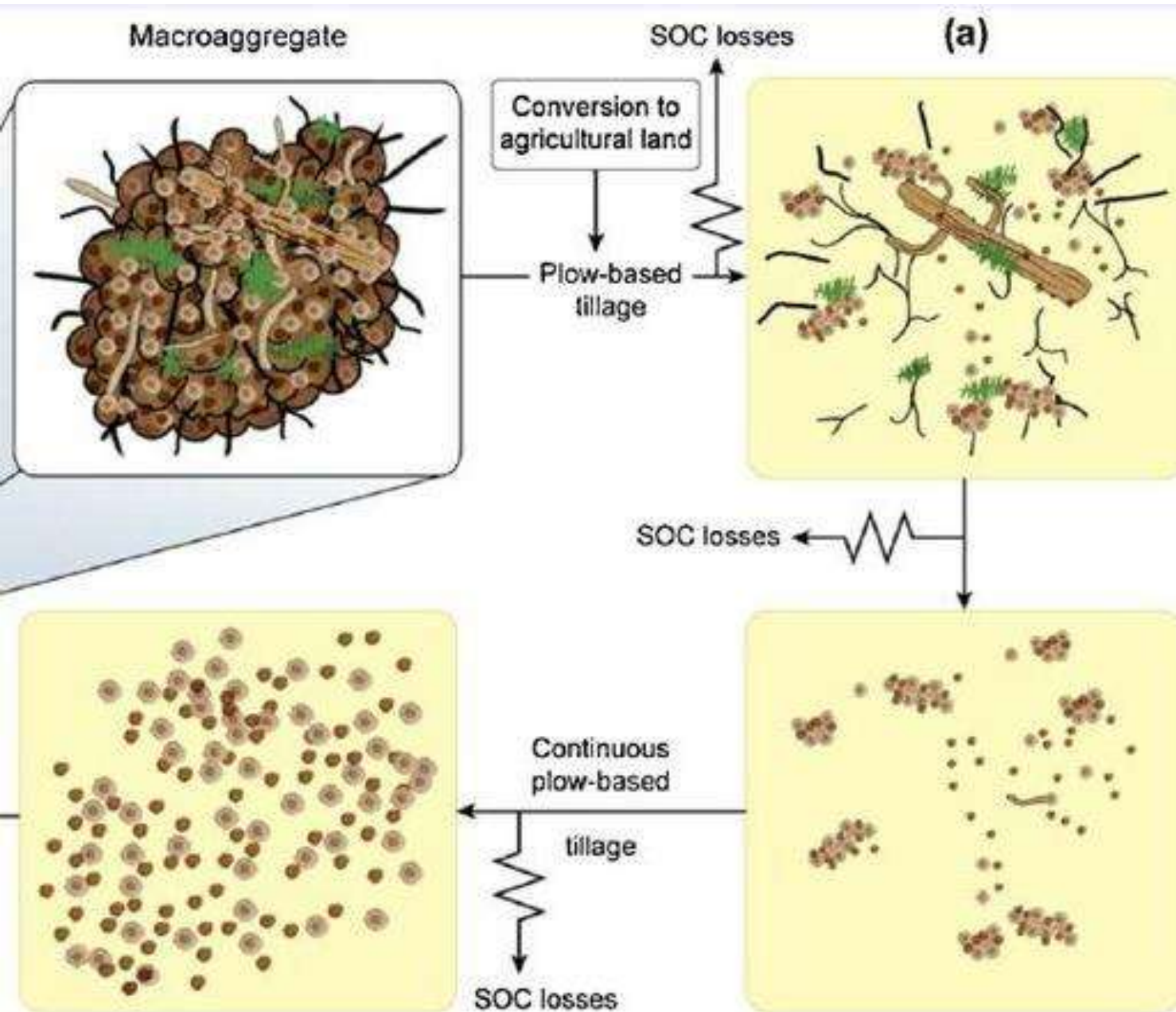
Start of tillage & application of agrochemicals

Killing soil life by continuous addition of pesticides and mineral fertilizers



RAINFALL TRAP The lost natural soil structure represents paradoxically a trap for very slowly infiltrating rainwater and agrochemicals dissolved in it. It is the space between the surface soil crust cracked into protective "tiles", that prevent evaporation, and the compacted subsoil surface. The amount of water and pesticides is sufficient during the average rainfall to cover the demands of the crops being grown.

Gradual breakdown of macroacroaggregates by the intensive agriculture



Soil Tillage Research 126 (2013) 203–218

Contents lists available at ScienceDirect

Soil & Tillage Research

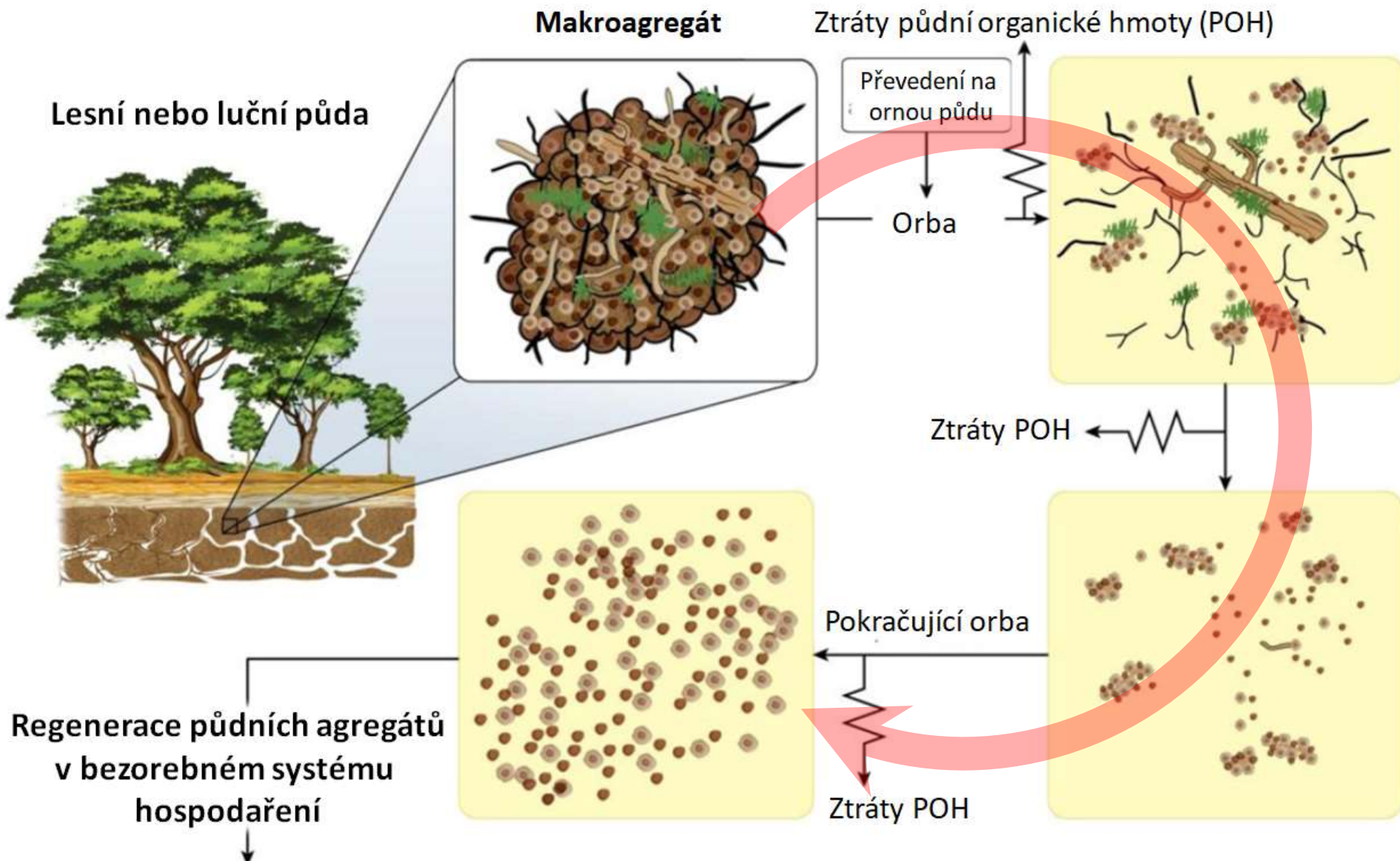
journal homepage: www.elsevier.com/locate/still



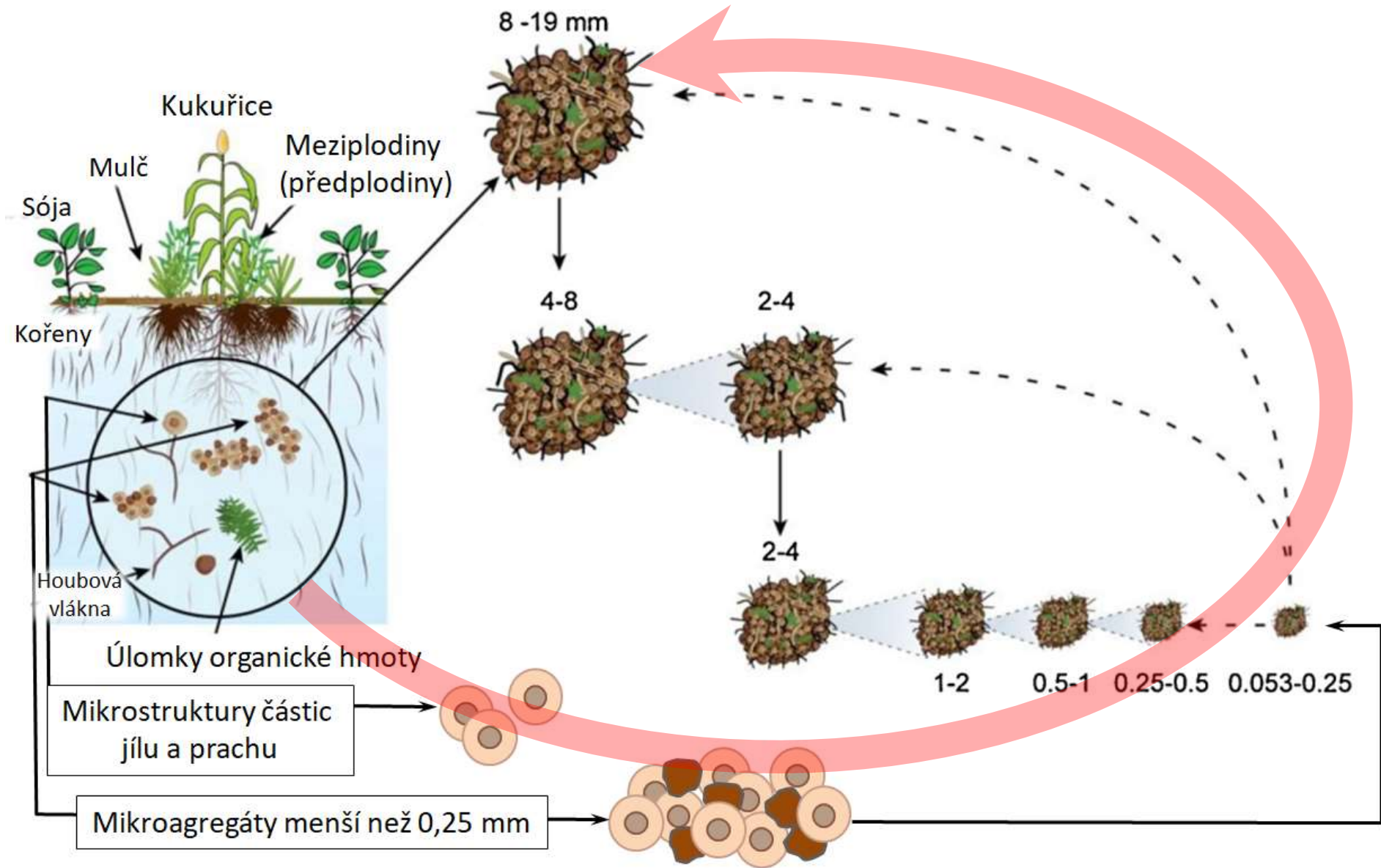
Aggregate C depletion by plowing and its restoration by diverse biomass-C inputs under no-till in sub-tropical and tropical regions of Brazil

Florent Tivet^{a,c,*}, João Carlos de Moraes Sá^b, Rattan Lal^c, Clever Briedis^d, Paulo Rogério Borszowski^d, Josiane Bürkner dos Santos^d, Anderson Farias^e, Guilherme Eurich^e, Dalani da Cruz Hartman^e, Mario Nadolny Junior^e, Serge Bouzinac^a, Lucien Séguy^a

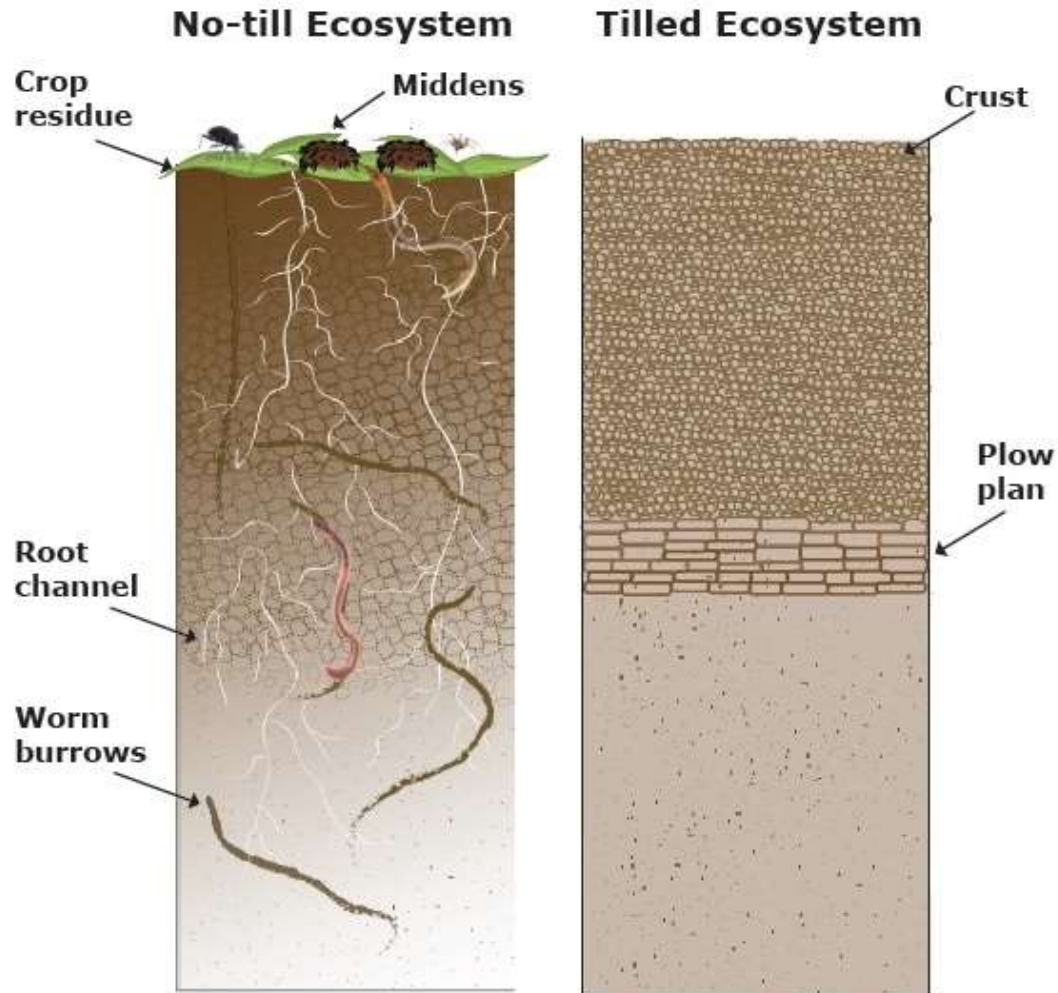
Vliv převedení lesní nebo luční půdy na půdní agregáty



Regenerace půdních agregátů v bezorebném systému hospodaření

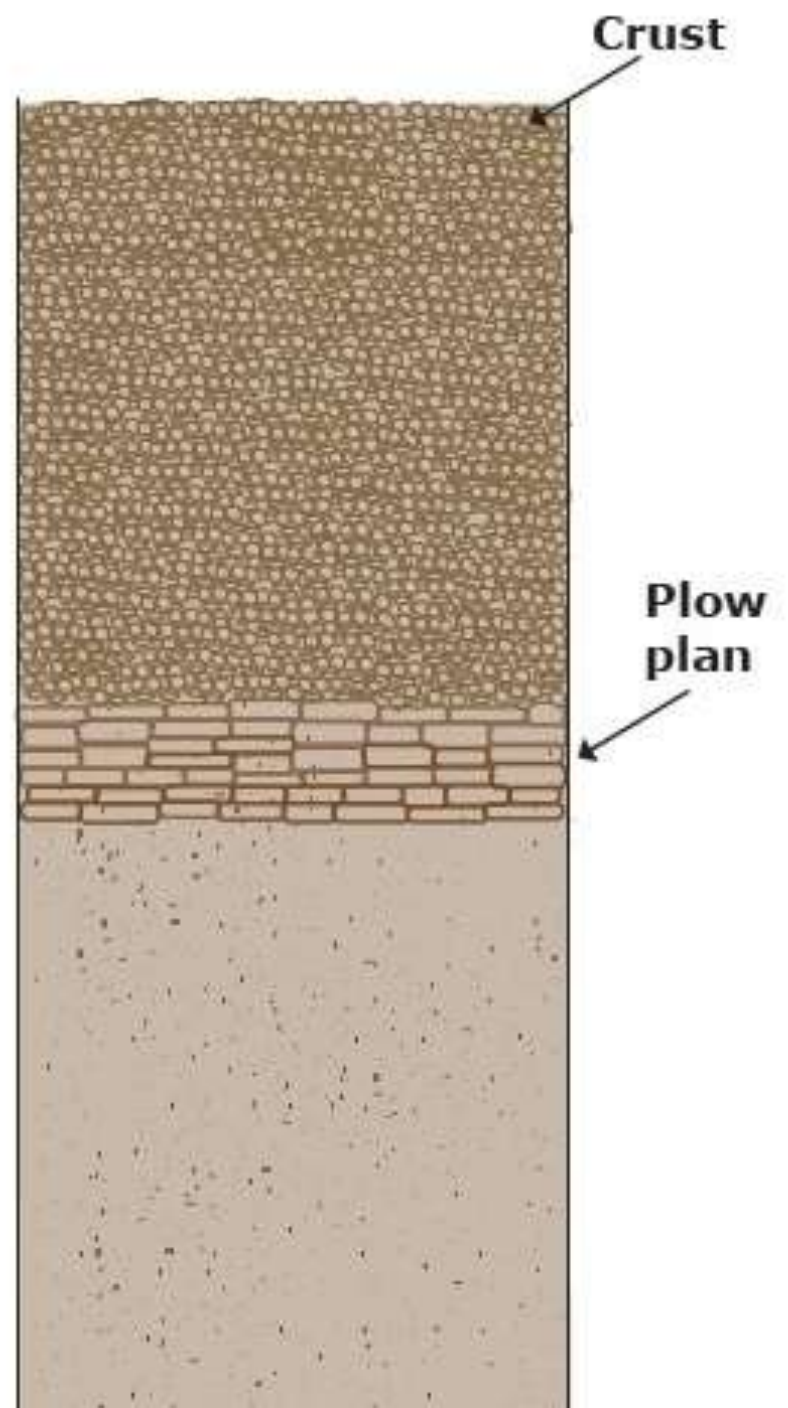
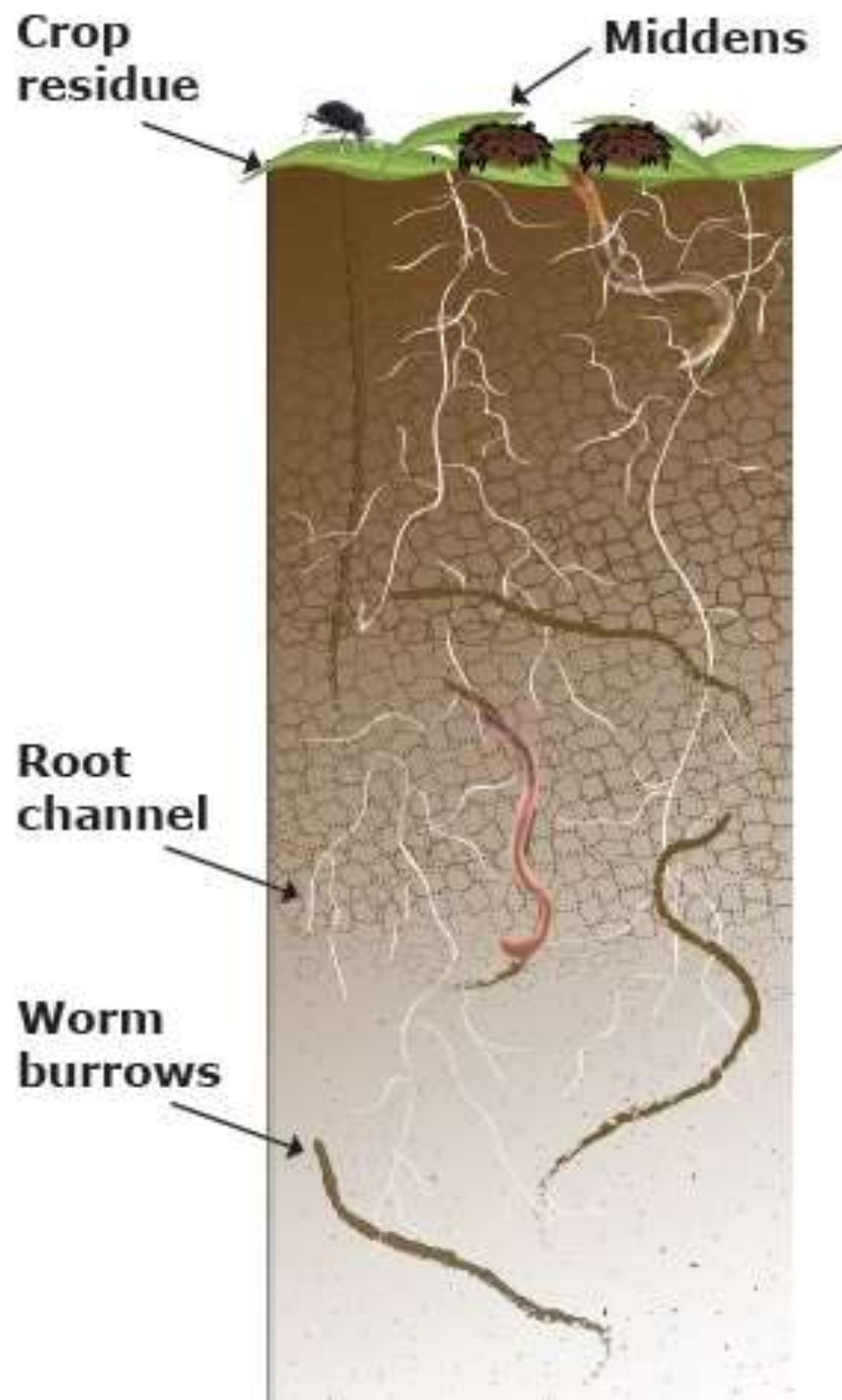


Annually plowed soil will usually show a dense plow pan just below the depth of tillage, the absence of deep burrowing earthworms, and weak surface soil structure. This contrasts with the soil profile of a high-quality, continuous no-till soil that has granular surface structure, blocky structure below the surface layer, absence of a tillage pan, and continuous macropores created by decomposing roots and earthworms which go from the surface deep into the subsoil.



United States Department of Agriculture

https://www.nrcs.usda.gov/wps/portal/nrcs/detail_full/pa/soils/health/?cid=nrcseprd1221422



Visualizing roots impact on soil structure

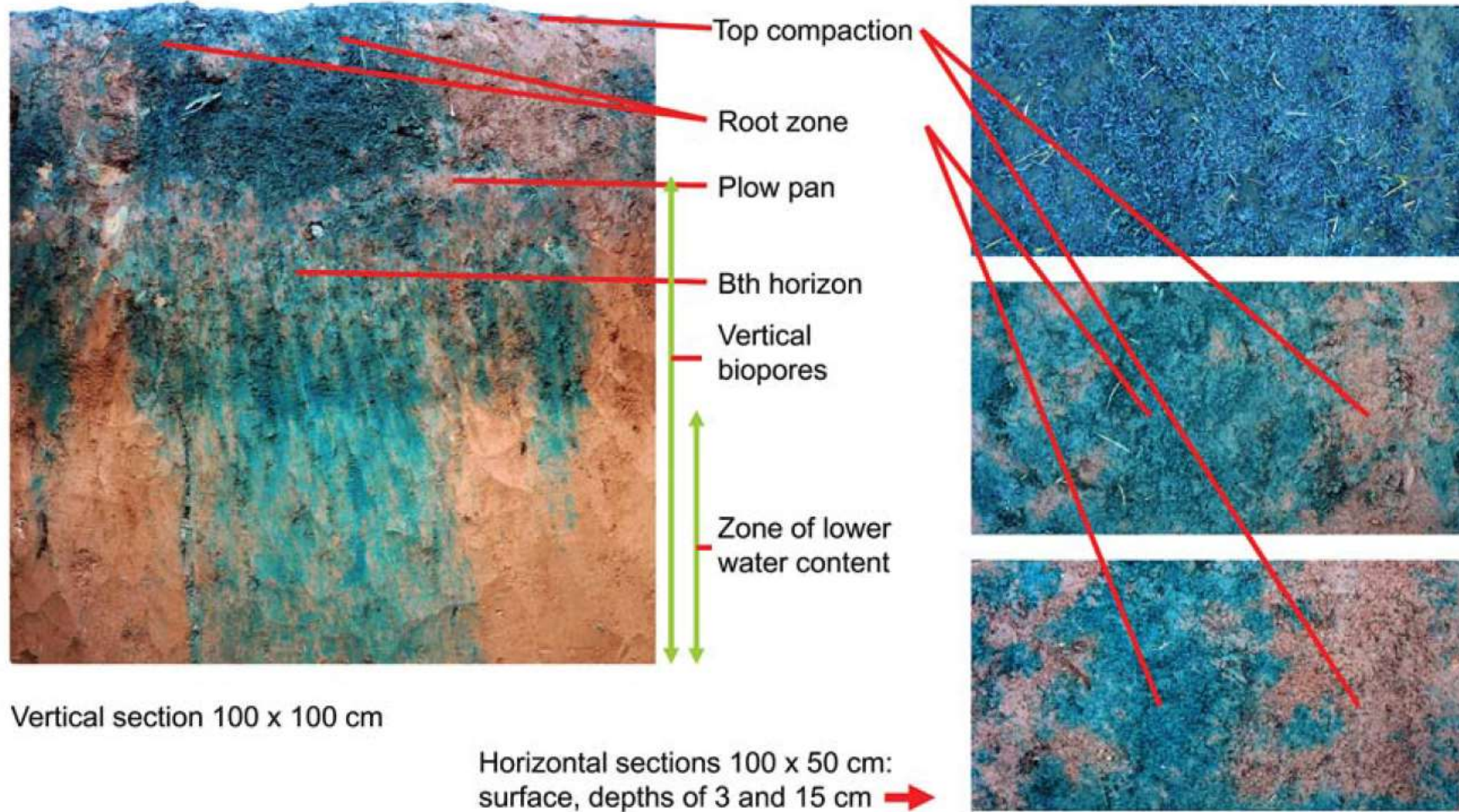
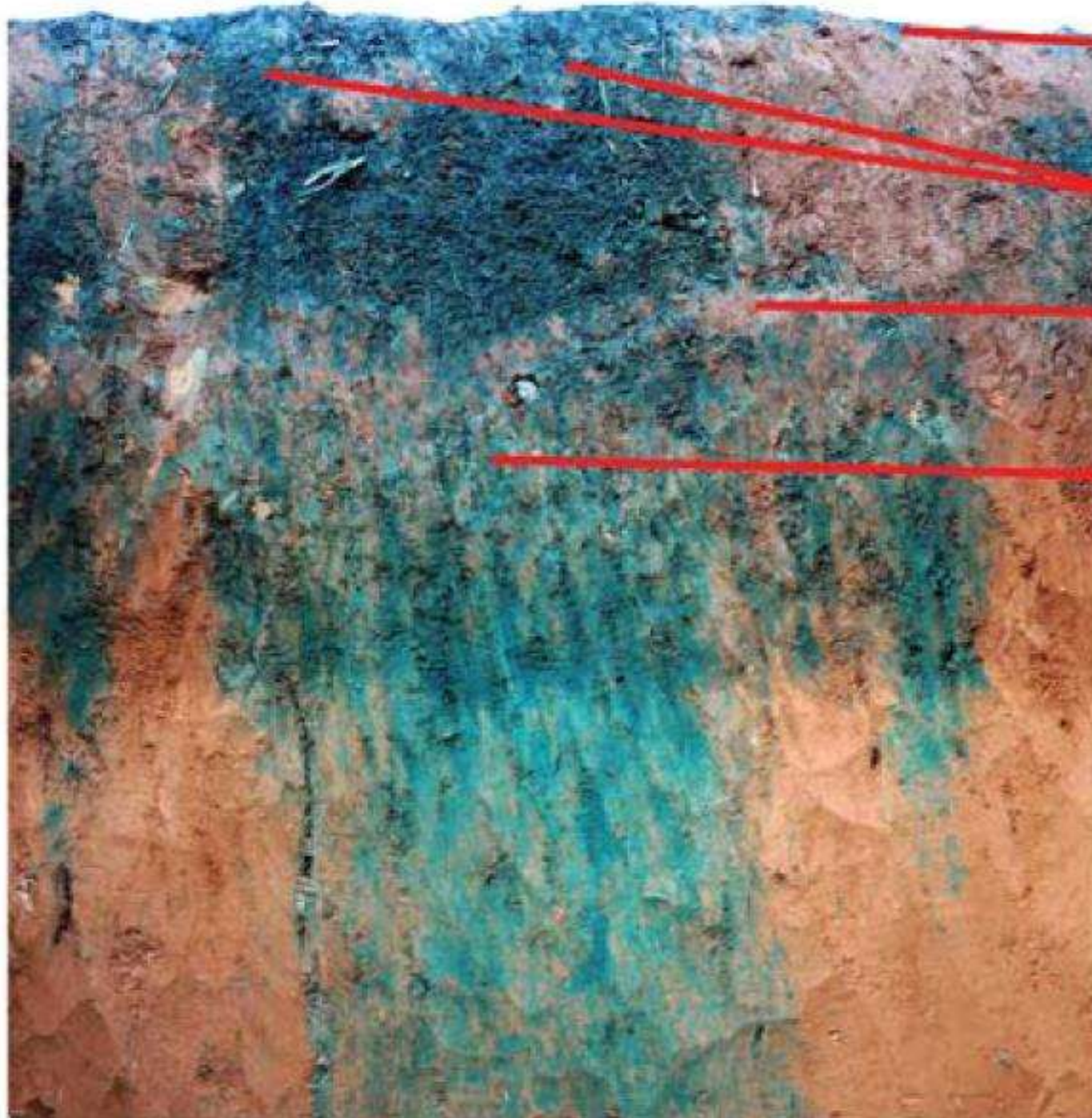


Fig. 1. Field soil sections.

Kodešová, R., et al. 2015: Using dye tracer for visualizing roots impact on soil structure and soil porous system. *Biologia* 70/11: 1439—1443



Top compaction

Root zone

Plow pan

Bth horizon

Vertical
biopores

Zone of lower
water content



Bez minerálních
dusíkatých hnojiv se
**půdní struktura udržuje a
regeneruje uvolňováním
kořenových výměšků**



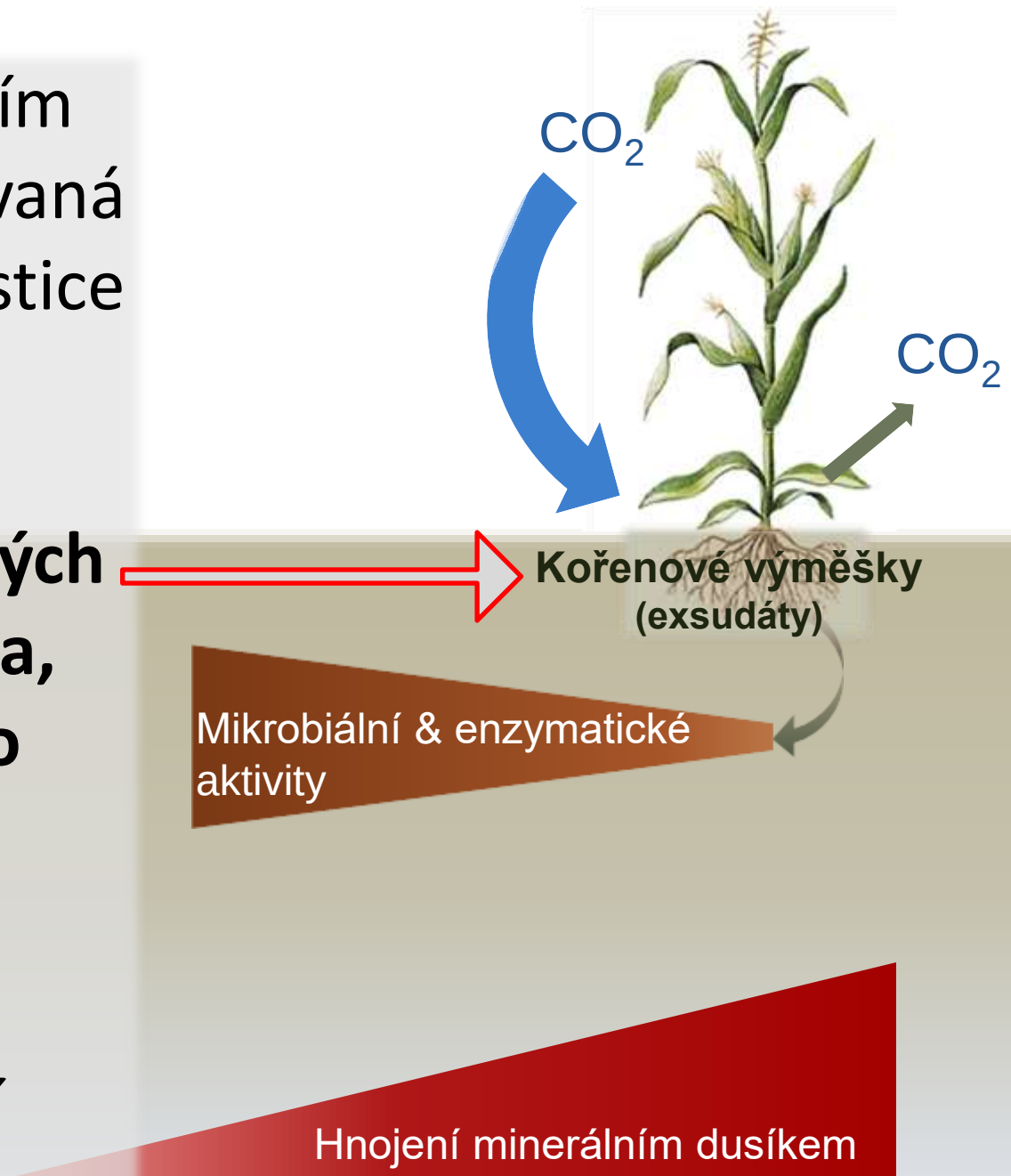
Maiswurzelspitze mit Schleimabsonderung (Exsudat)



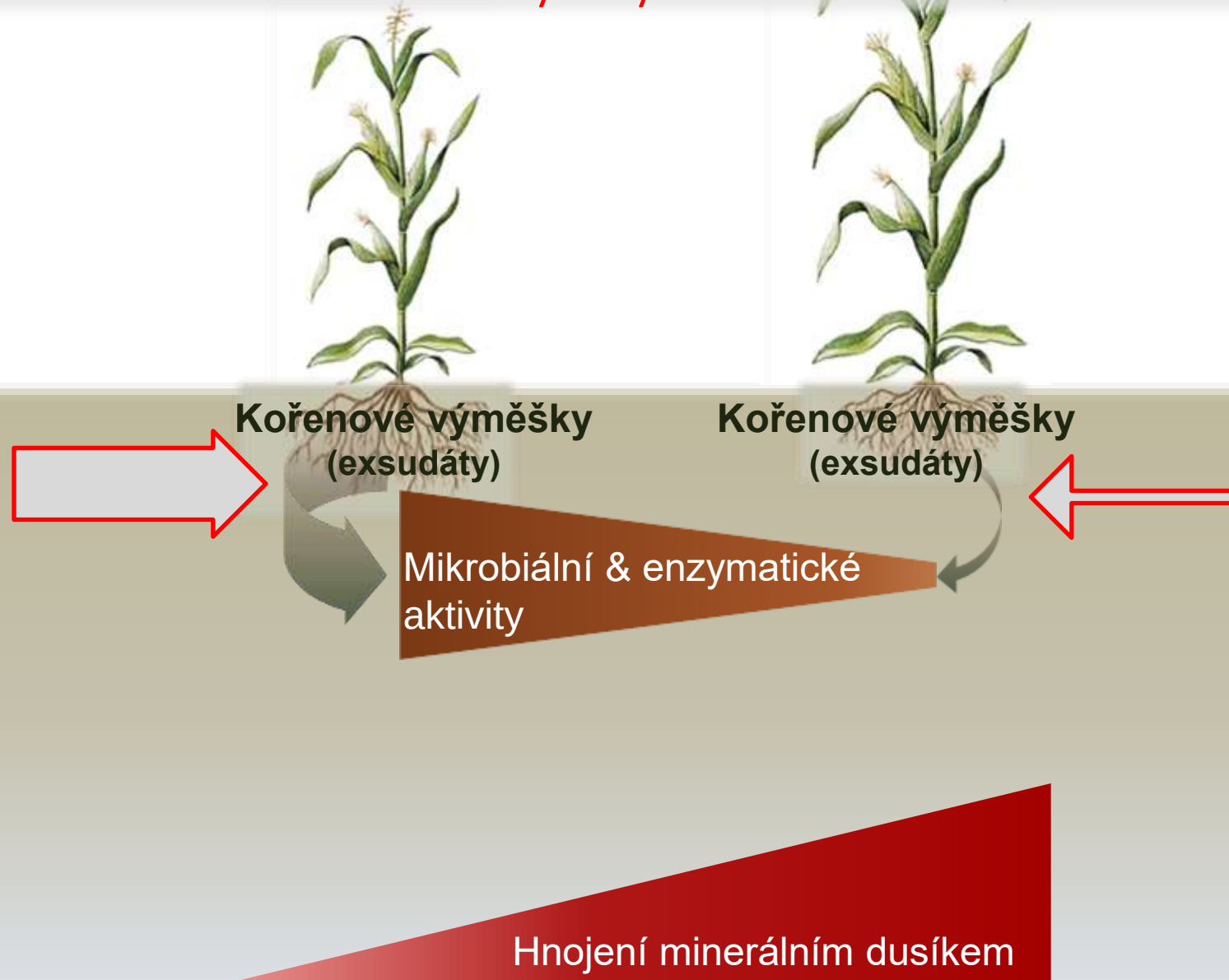
Pokud se půda ještě nerozpadá do výchozích složek- jílu, prachu a písku, **je možno doplňovat kořenové výměšky aplikací statkových hnojiv a tak dosahovat zvýšených výnosů**

Hnojením minerálním dusíkem ztrácí pěstovaná plodina zájem o investice do půdy,

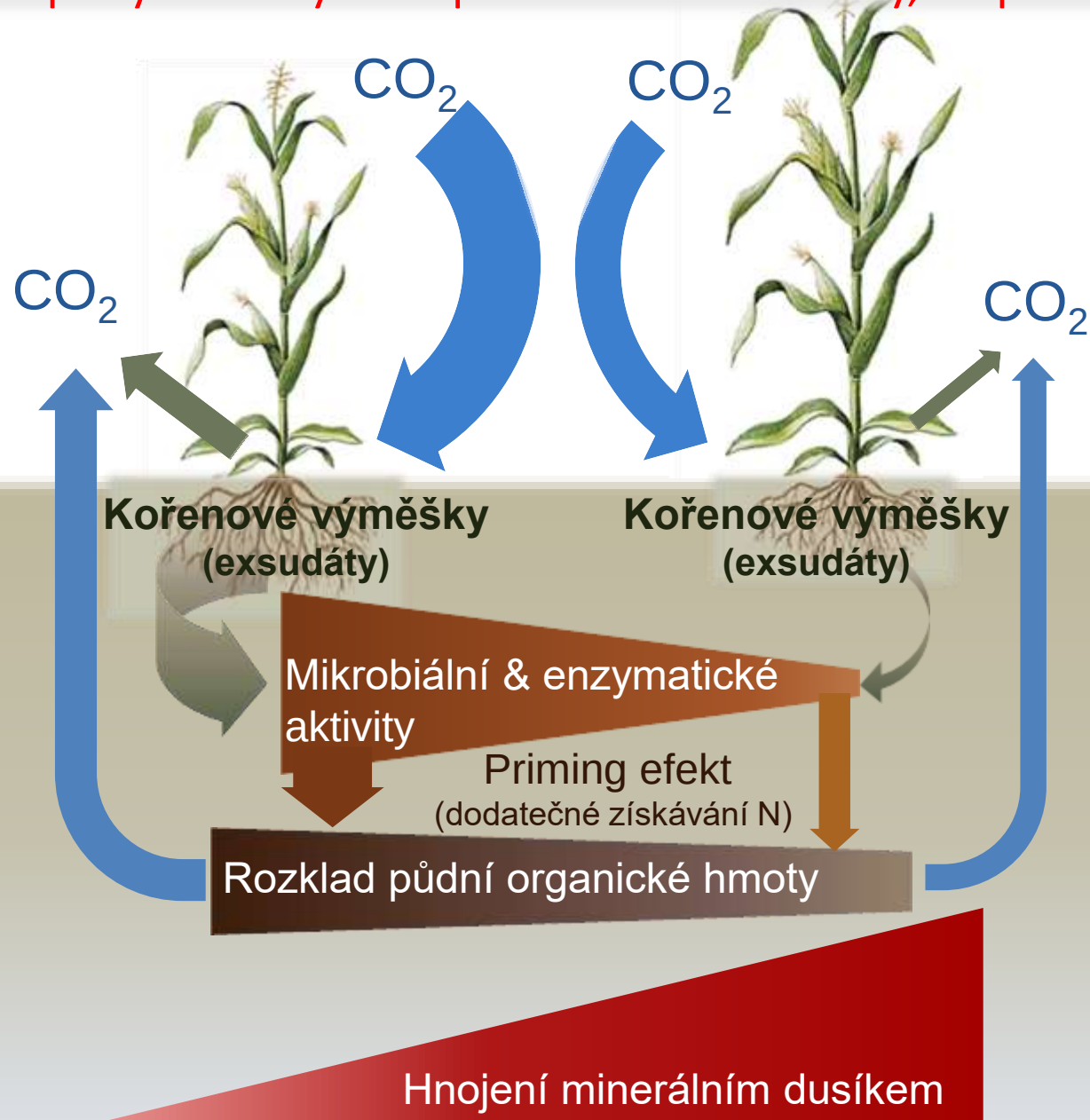
- produkce kořenových výměšků je snížena,
- ztrácí se zdroje pro půdní organismy,
- půdní struktura degraduje a
- rozpadají se půdní agregáty



Závěr: Vlivem zvyšujících se dávek minerálního dusíku dochází k silné redukci kořenových výměšků a



... k degradaci půdy až na výchozí půdotvorné materiály, na písek, prach a jíl.



Salatín research site



.... long-term recorder





**Some stockings were in 2010 enveloped to cellulose
(combination of „mesh bags-method“ with IER traps inside)**

The application of IER stockings

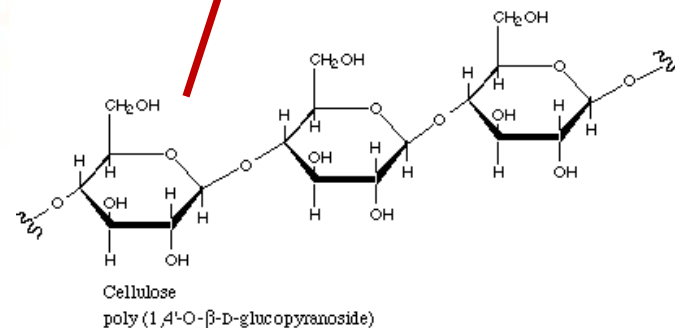
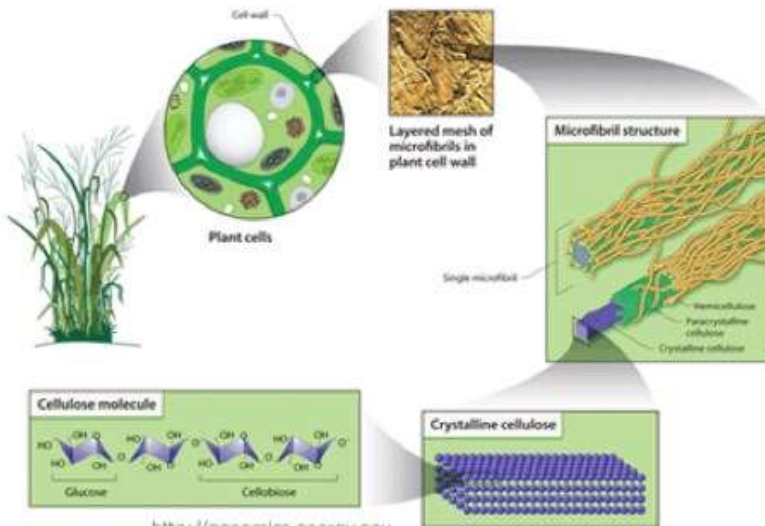
Soil surface

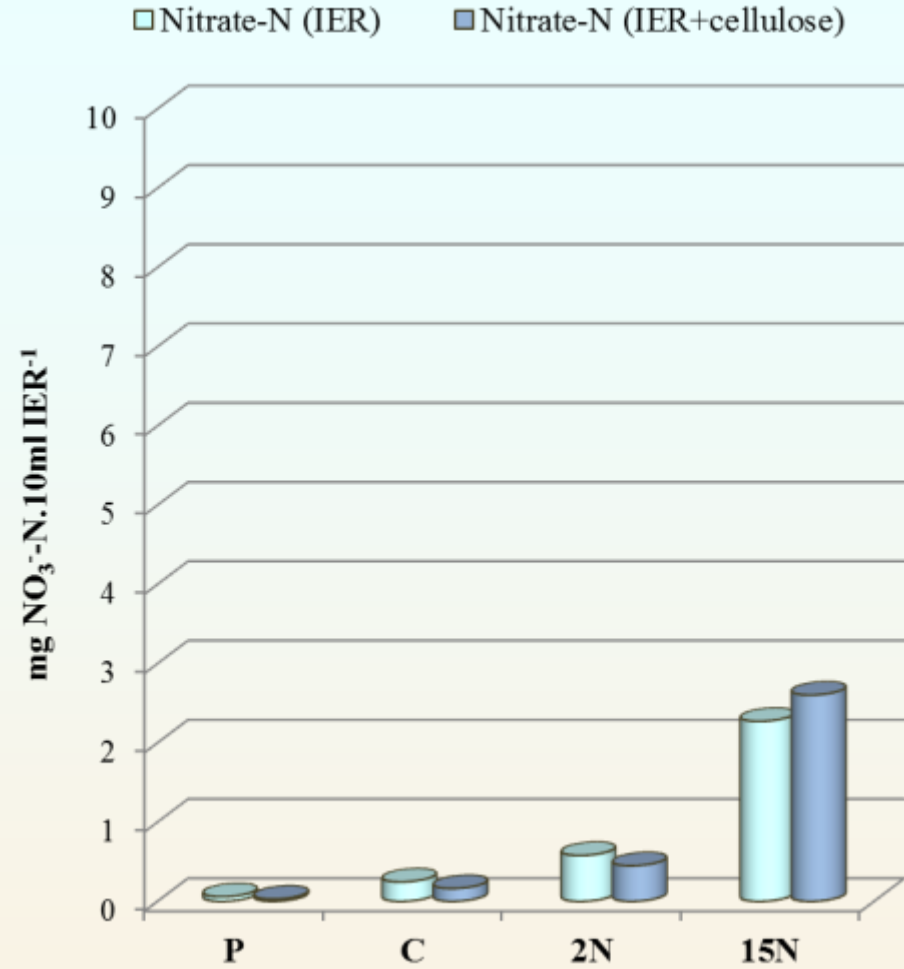
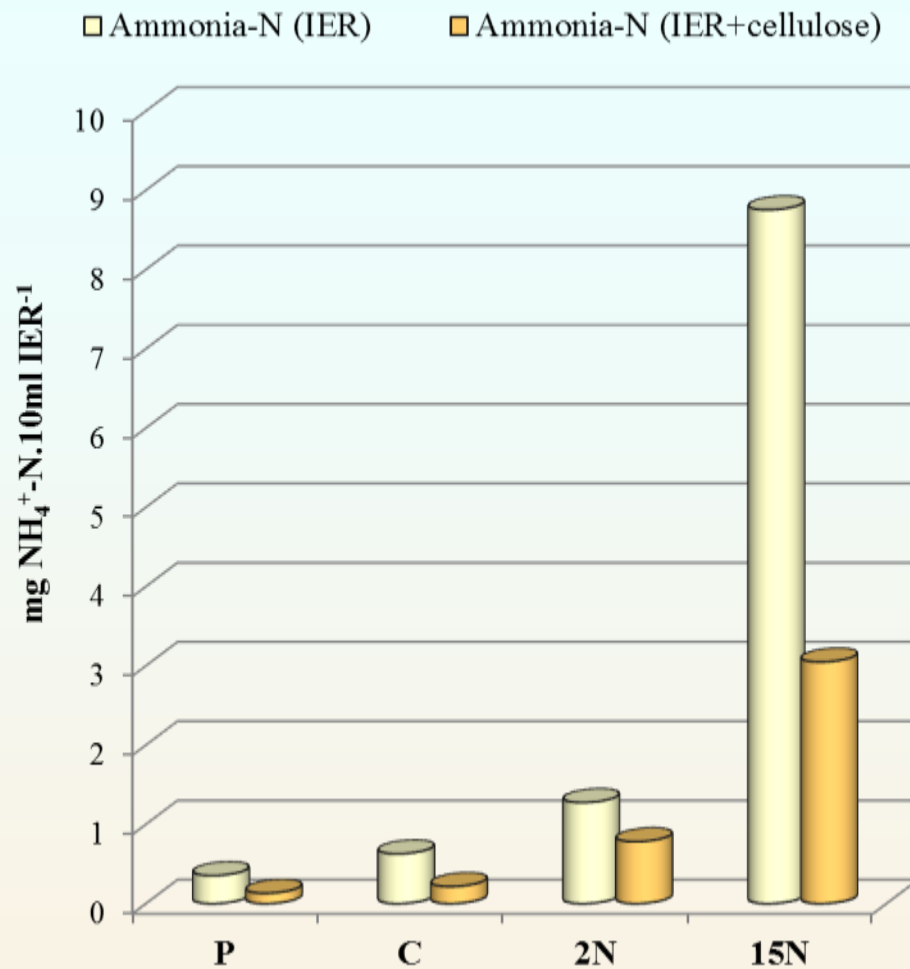
IER

IER (control)

45°

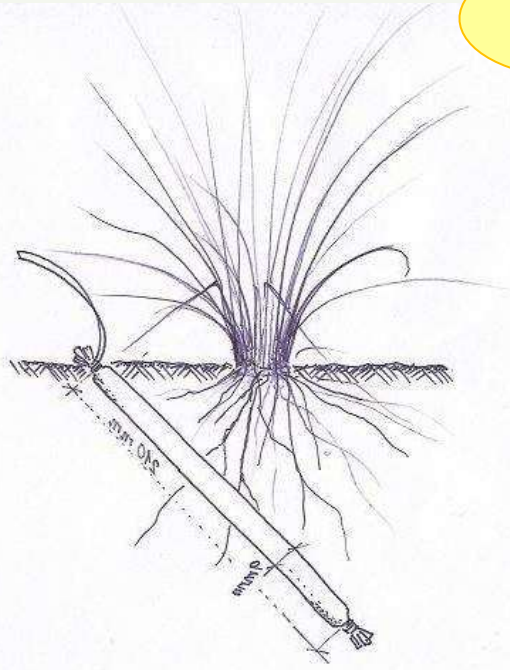
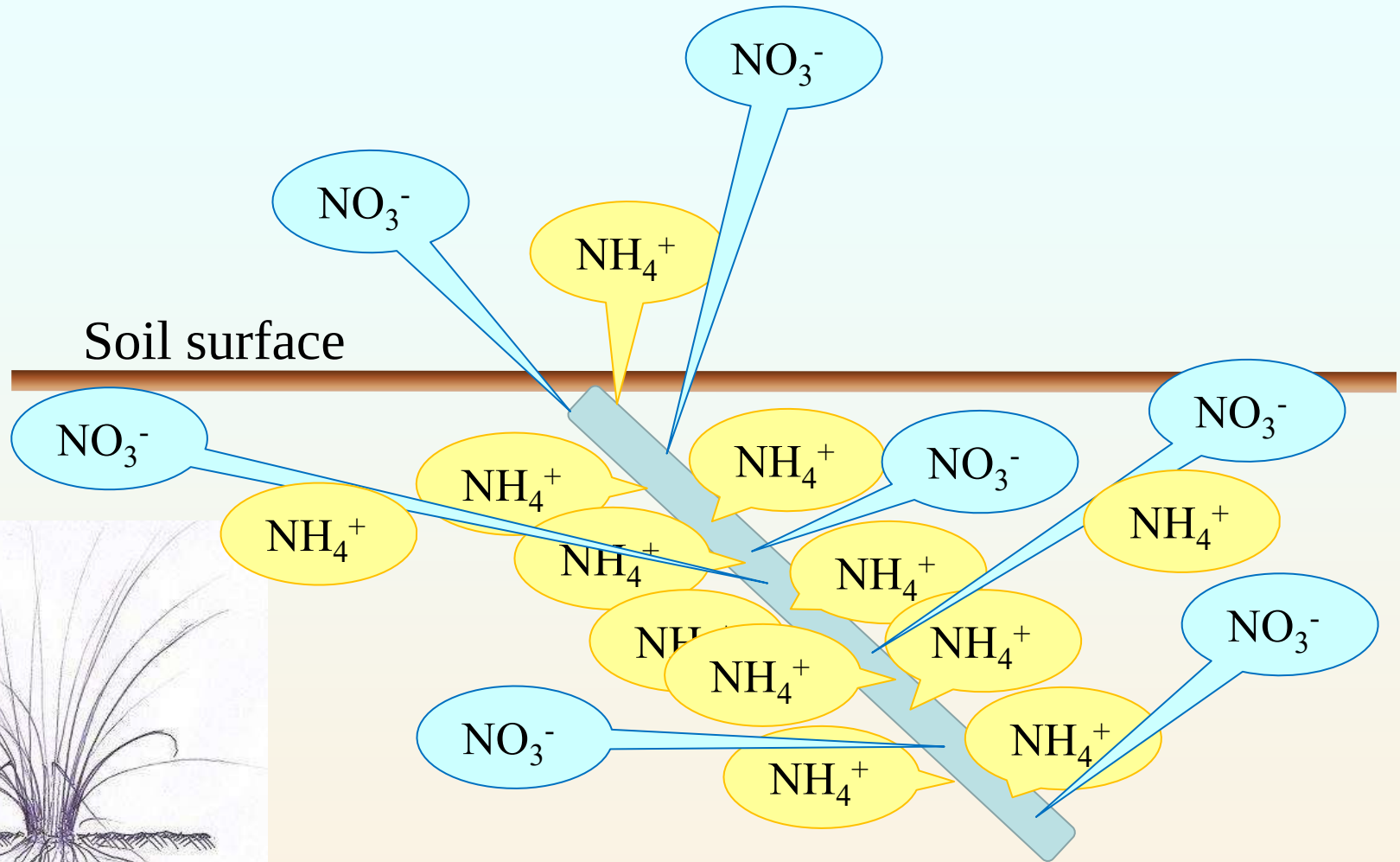
Cellulose coat



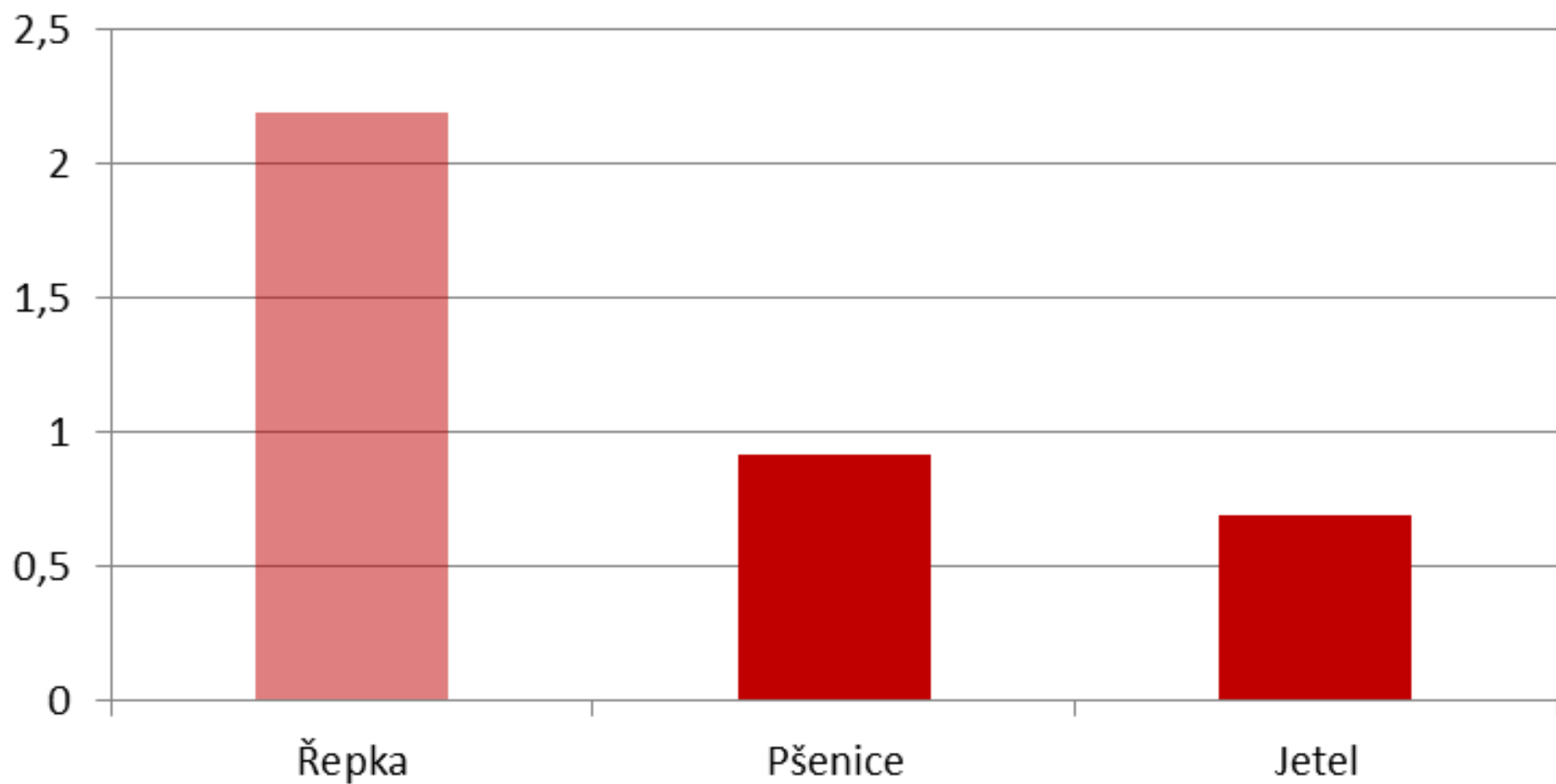


The application of cellulose stimulate the utilization of ammonium-nitrogen not nitrate-N

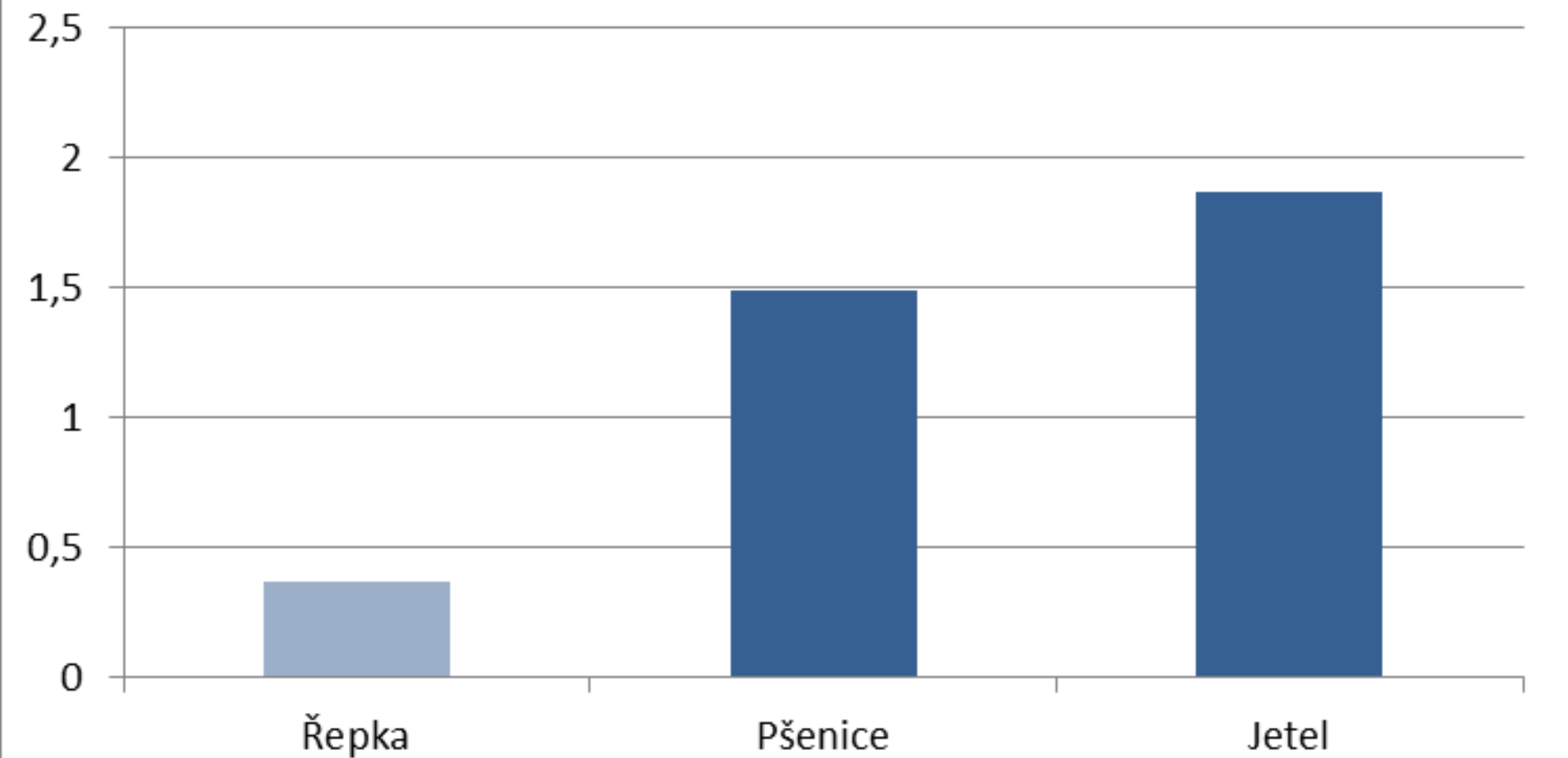
The differences between the trapping NH_4^+ and NO_3^-



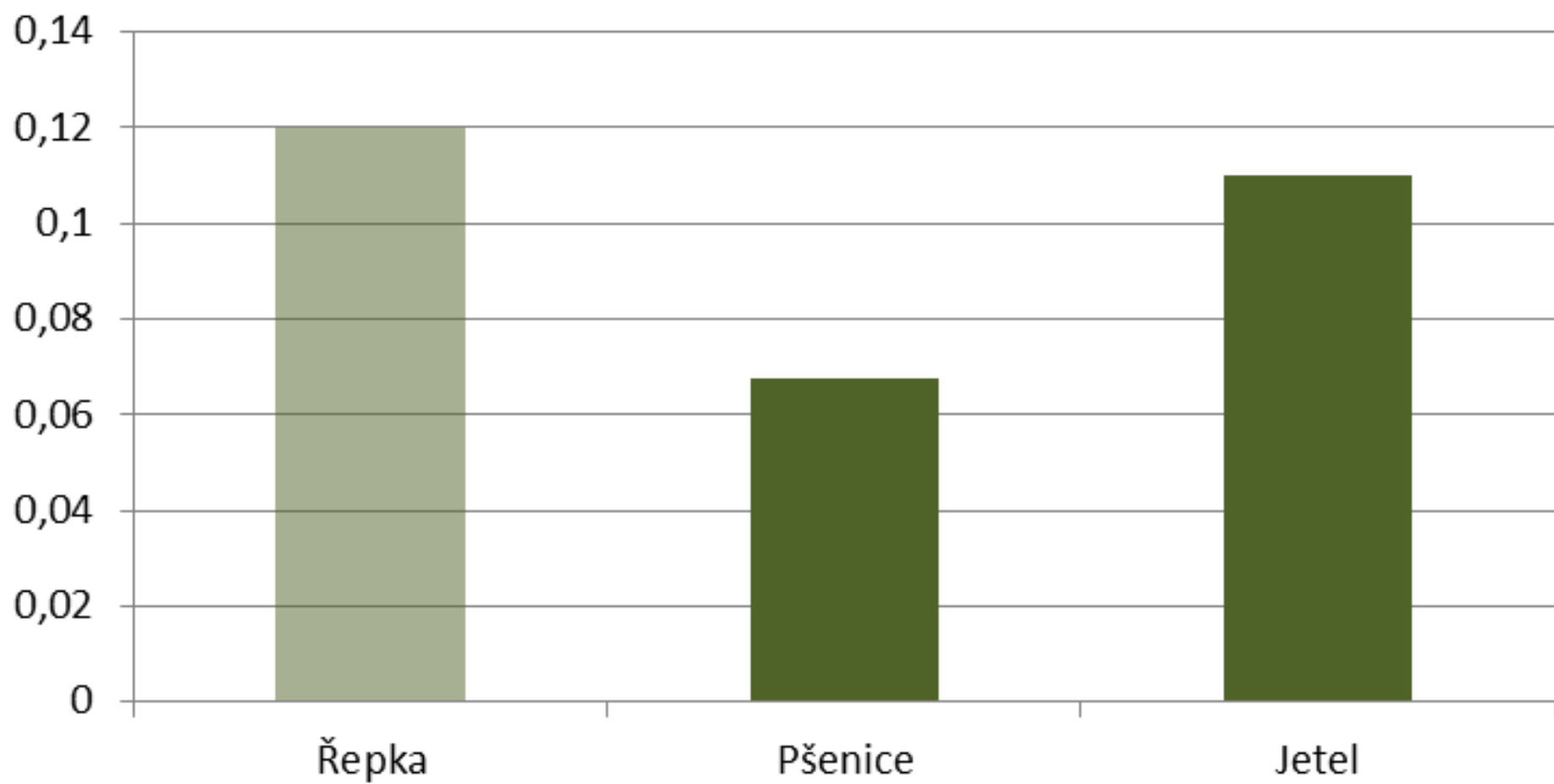
N-NH₄⁺



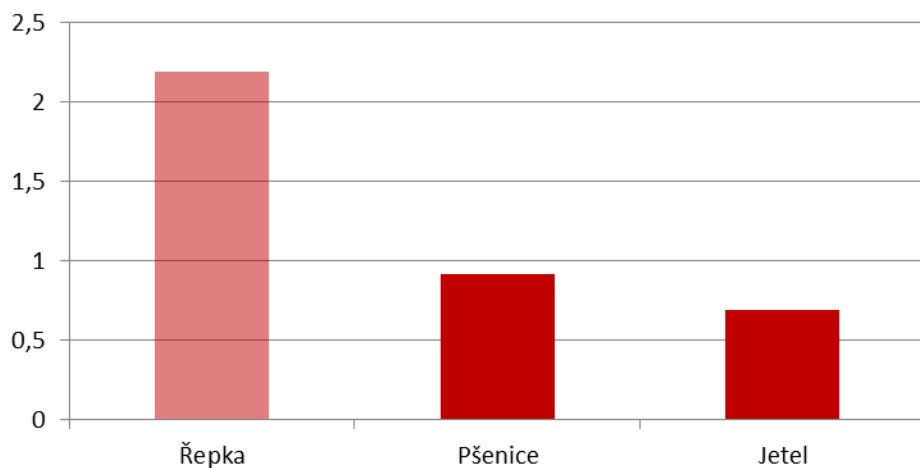
N-NO_3^-



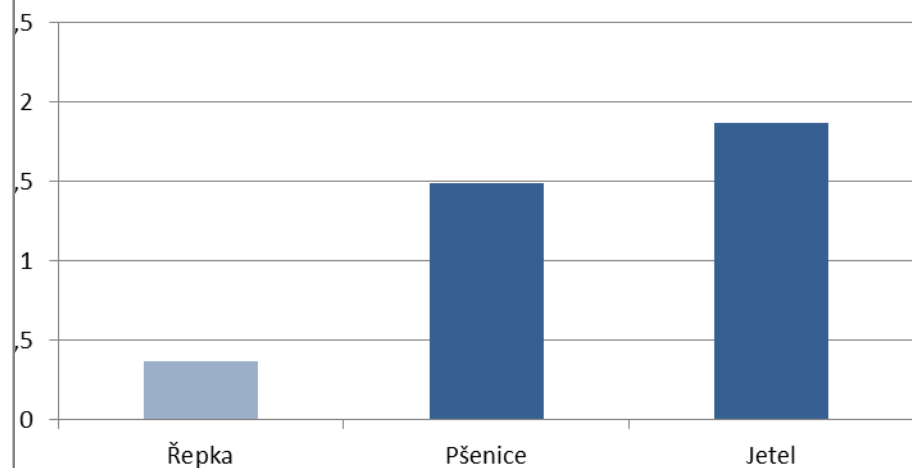
P



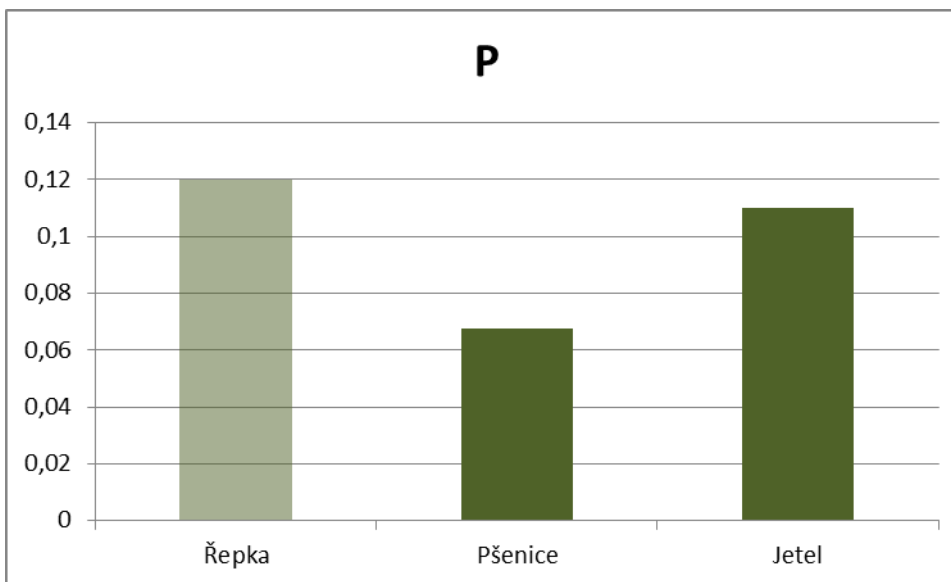
N-NH₄⁺



N-NO₃⁻



P



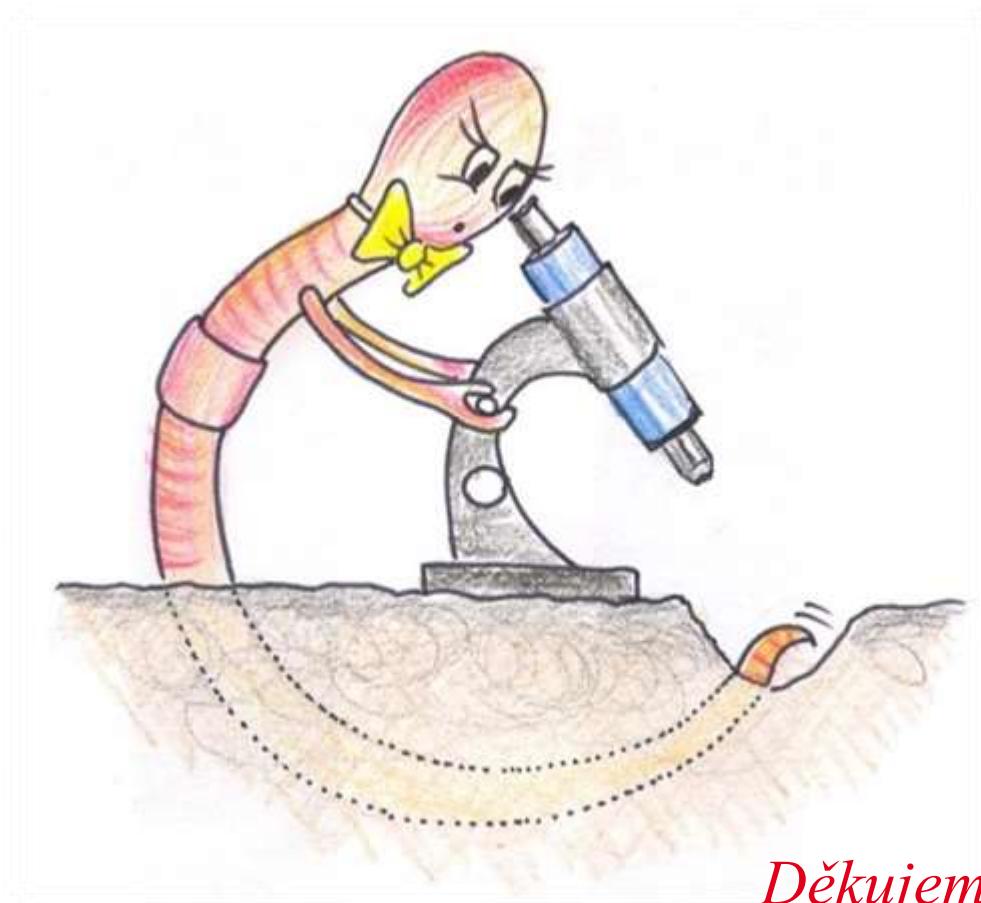
Mgr. Irina Mikajlo
Doktorandka (MENDELU)
Obecná produkce rostlinná

OŽD

Obnovování žížalích domovů

OČP

Obnovování červivosti půdy



Děkujeme za pozornost