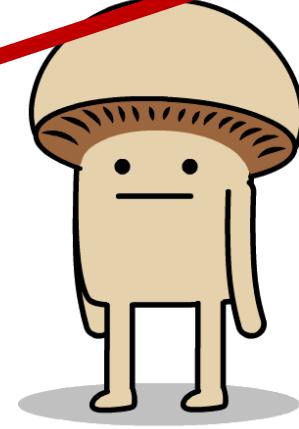


Fungi fact

or

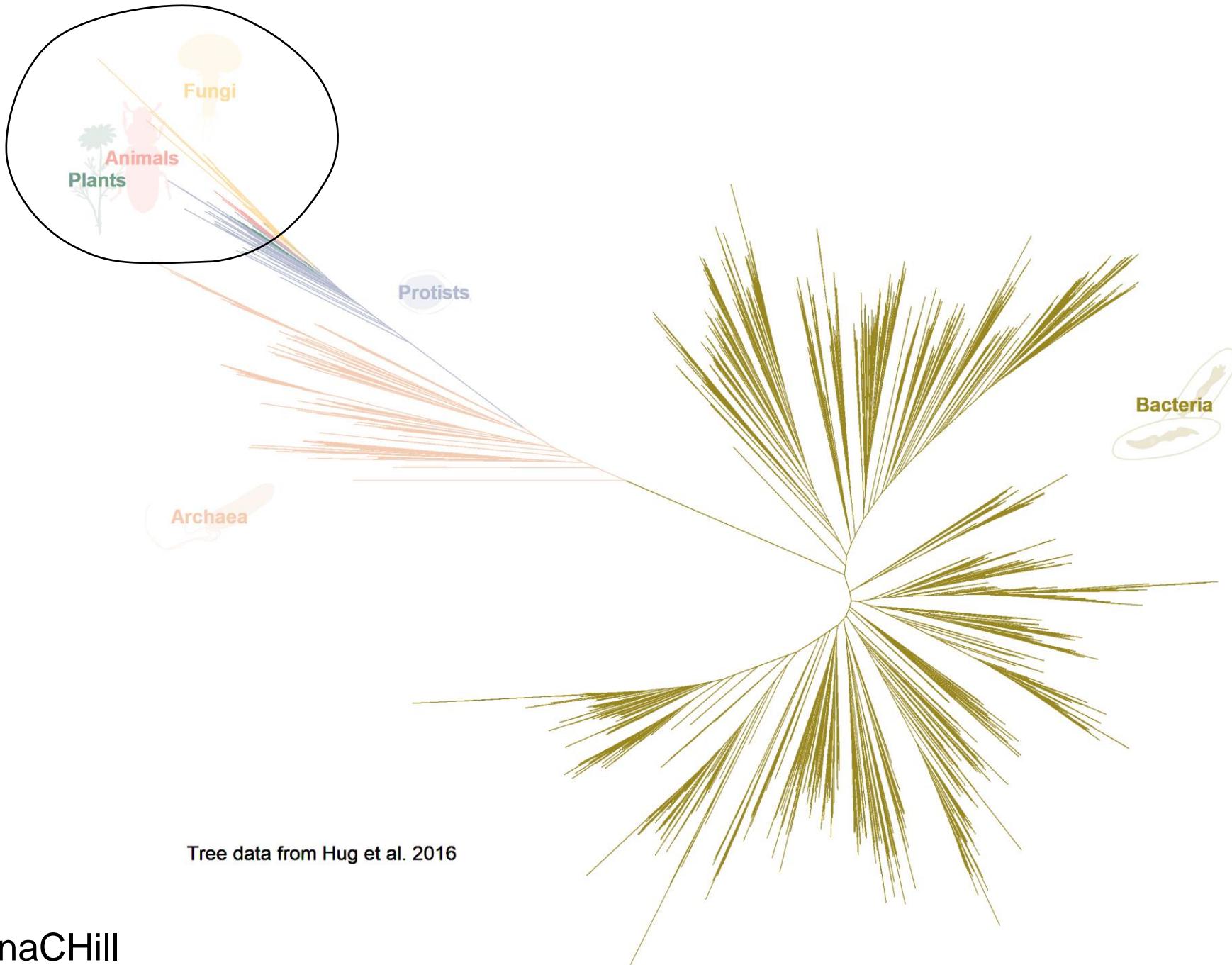
FUNGI FICTION



What are fungi?



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They're everywhere and interact with everything

Plants

Water

Animals

Permafrost

Soil

Rocks

Air



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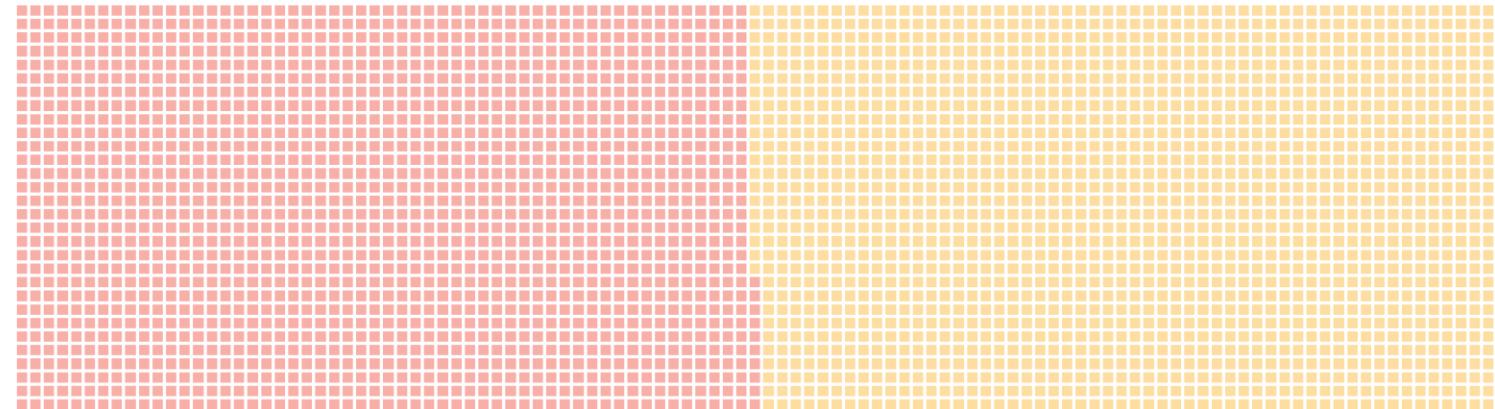
They're so diverse

Total **described** diversity

■ = 100,000 species



Total **estimated** diversity



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Estimates from Larson et al. 2017

They're indispensable to us

Soy sauce and miso
Alcohol
Dairy

Edible fungi

Breadmaking
Meat substitutes

Statins
Medicine

Psychedelics
Immunosuppressants
Antibiotics

Food



Biofuels

Leather and cotton processing

Manufacturing and industry

Paper manufacturing

Plastics and biomaterials

Washing detergents

Bioremediation

Environmental management

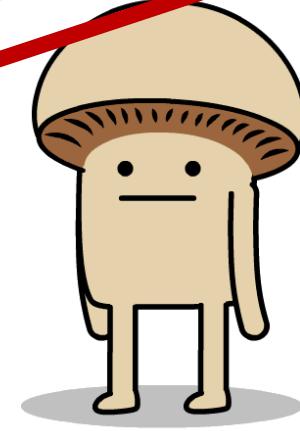
Agricultural biocontrol

Let's play...

Fungi fact

or

FUNGI FICTION



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**The world's first mass-produced
antibiotic was discovered from a fungus**



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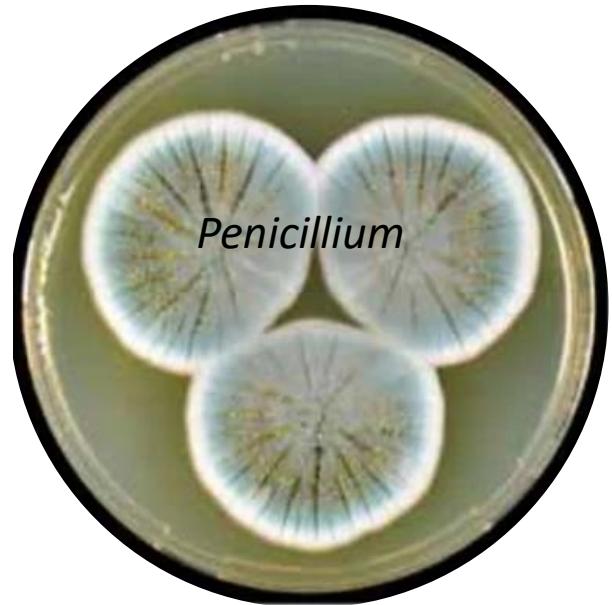
**The world's first mass-produced
antibiotic was discovered from a fungus**

TRUE!

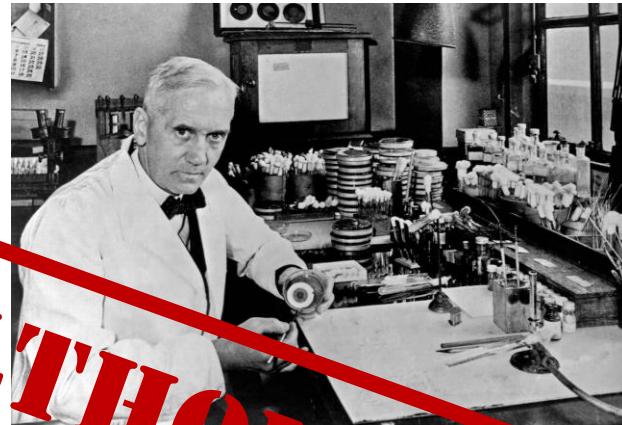


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penicillin



[Houbraken et al. 2011](#)



ALTHOUGH...

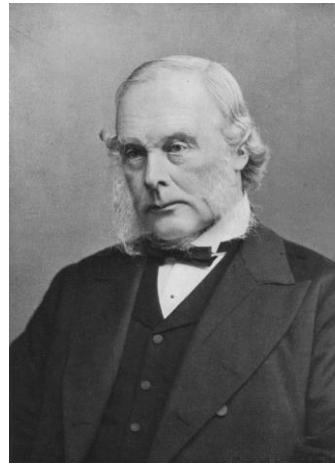
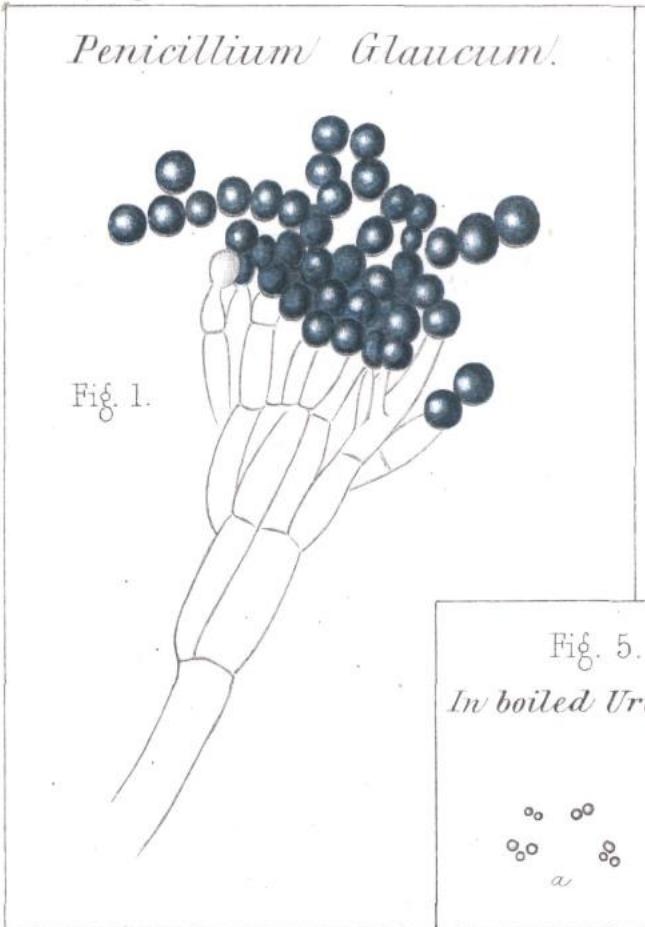


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XVI.—A Contribution to the Germ Theory of Putrefaction and other Fermentative Changes, and to the Natural History of *Torulæ* and *Bacteria*. By JOSEPH LISTER, F.R.S., Professor of Clinical Surgery in the University of Edinburgh. (Plates XXII.—XXVI.)

(Read 7th April 1873.*)

Trans. Roy. Soc. Edin^r



tube with antiseptic precautions, I examined one of the little transparent lumps with the microscope, and found it to consist almost exclusively of the filamentous form of the fungus, the conidial element being, as before, much less marked in this tube than in that of PASTEUR's solution. There was a somewhat larger proportion of conidia in the liquid residue, which, however, was thick from the abundance of the fungus filaments in it; but there was no longer any appearance of bacteria. I introduced a portion of the gelatinous lump into a glass of uncontaminated urine, which had been charged along with the one inoculated from the tube of PASTEUR's solution (viz., nine days previously); but as no growth showed itself in the course of the next eleven days, I concluded that the organism had, in the highly concentrated and altered urine, at length lost its vitality. Yet the examination of this urine-tube proved not devoid of interest.



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**Psychedelics are a promising treatment
for mental health conditions**



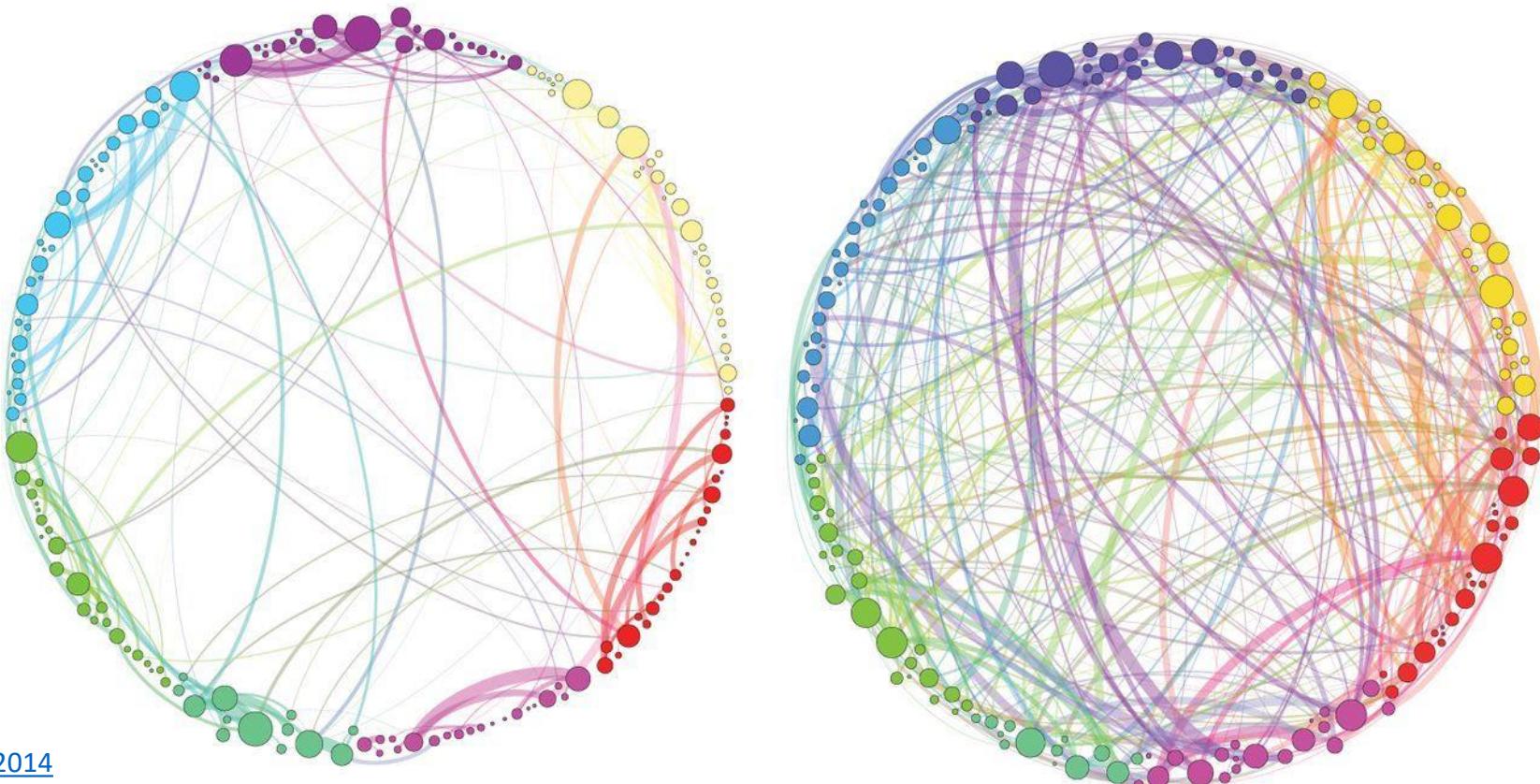
@RowenaCHill

**Psychedelics are a promising treatment
for mental health conditions**

STEADY ON...



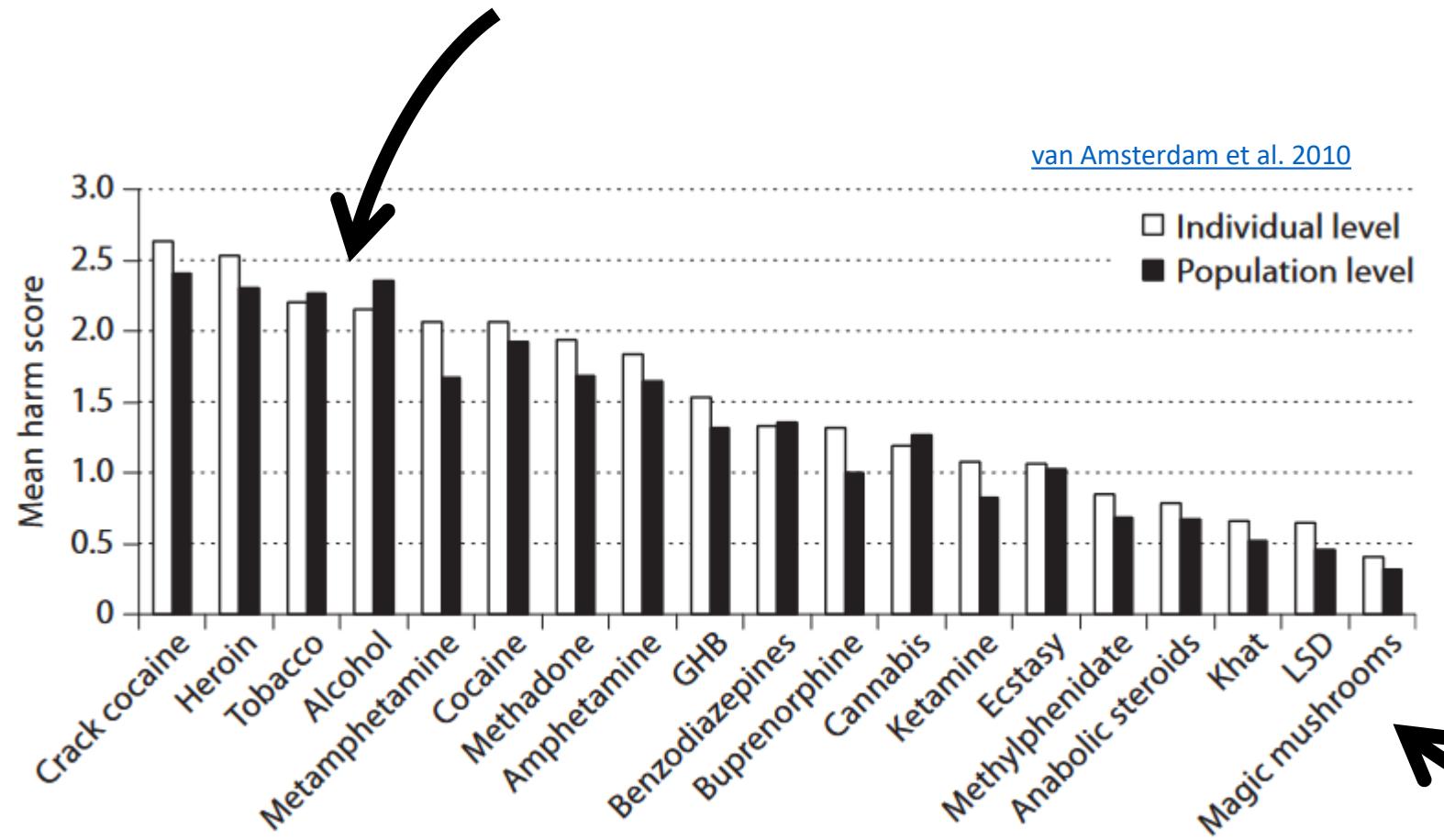
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[Petri et al. 2014](#)



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Trial of Psilocybin versus Escitalopram for Depression

Robin Carhart-Harris, Ph.D., Bruna Giribaldi, B.Sc., Rosalind Watts, D.Clin.Psy., Michelle Baker-Jones, B.A., Ashleigh Murphy-Beiner, M.Sc., Roberta Murphy, M.D., Jonny Martell, M.D., Allan Blehmings, M.Sc., David Erritzoe, M.D., and David J. Nutt, M.D.

CONCLUSIONS

On the basis of the change in depression scores on the QIDS-SR-16 at week 6, this trial did not show a significant difference in antidepressant effects between psilocybin and escitalopram in a selected group of patients. Secondary outcomes generally favored psilocybin over escitalopram, but the analysis included multiple comparisons. Larger and longer trials are needed to establish the antidepressant effects of psilocybin compared with established antidepressants. (Funded by the Wellcome Trust.)

Effects of psilocybin versus escitalopram on rumination and thought suppression in depression

Published online by Cambridge University Press: 06 September 2022

Tommaso Barba , Sarah Buehler, Hannes Kettner, Caterina Radu, Bruna Giribaldi Cunha, David J. Nutt, David Erritzoe, Leor Roseman and Robin Carhart-Harris

Show author details ▾

Despite providing the escitalopram group with a small dose of psilocybin (1 mg) to balance prior expectations, correct guessing of the psilocybin conditions seems likely, particularly in the 25 mg psilocybin arm, as acute subjective effects are typically conspicuous. Combined with differential condition-specific expectations, such correct guessing of the condition could have biased self-reported outcomes. Relatedly, for



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GRACE BROWNE SCIENCE 06.04.2023 12:00 PM

The Therapy Part of Psychedelic Therapy Is a Mess

There's little evidence and some could even be harmful.

THE CUT

STYLE | SELF | CULTURE | POWER 

COVER STORY PODCAST | MAR. 22, 2022

You Won't Feel High After Watching This Video

By Hanna Rosin



ABOUT PLUS THREE POWER TRIP STORE DONATE



COMPASS Pathways Is Trying to Patent Psilocybin for More Mental Health Conditions Than You Can Name

Russell Hausfeld, David Nickles

March 18, 2021

News that COMPASS Pathways is attempting to patent psychedelic therapy room specifications and therapist behaviors started an online firestorm about the company's "monopolistic and shady behaviors," but so far the debates have missed the biggest threats lurking in COMPASS's international patent applications.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)
(19) World Intellectual Property Organization
International Bureau
(43) International Publication Date
22 October 2020 (22.10.2020)
(10) International Publication Number
WO 2020/212952 A1


CLAIMS

1. A method of treating depression in a subject in need thereof, the method comprising administering an effective amount of psilocybin or an active metabolite thereof to the subject.
- 15 34. The method of any of claims 1-33, wherein the psilocybin is administered in a dosage form comprising a therapeutically effective amount of highly pure crystalline psilocybin in the form of Polymorph A, wherein the crystalline psilocybin comprises at least 90% by weight of Polymorph A.

COMPASS Pathways' PCT application WO 2020/212952 A1



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Trees communicate via an underground network of fungi, the ‘wood wide web’

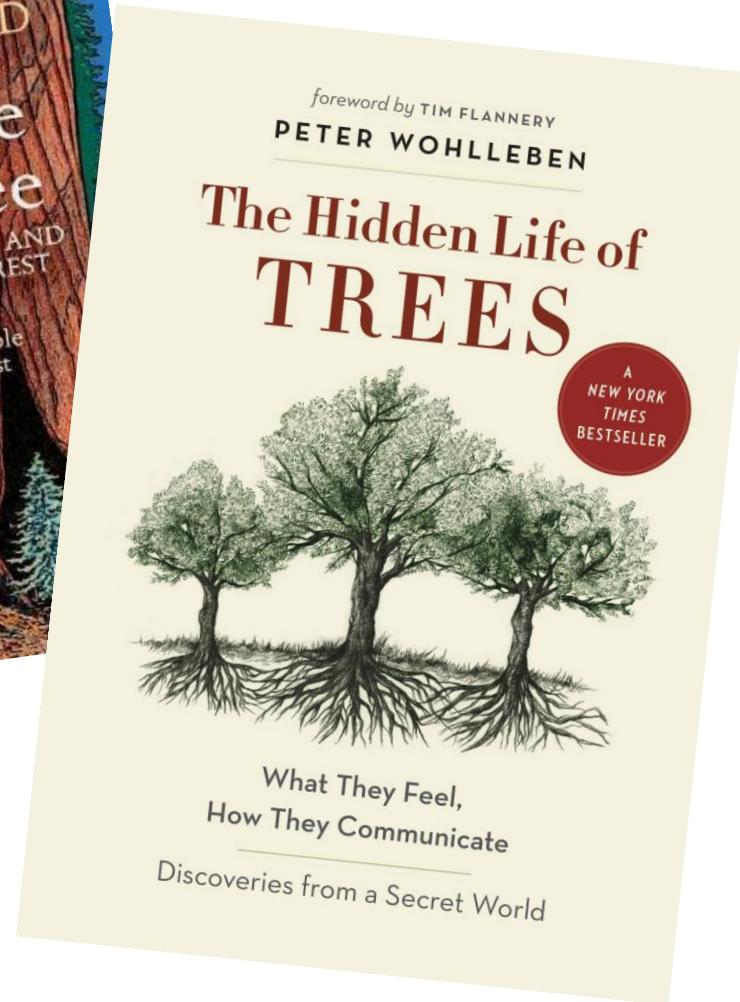
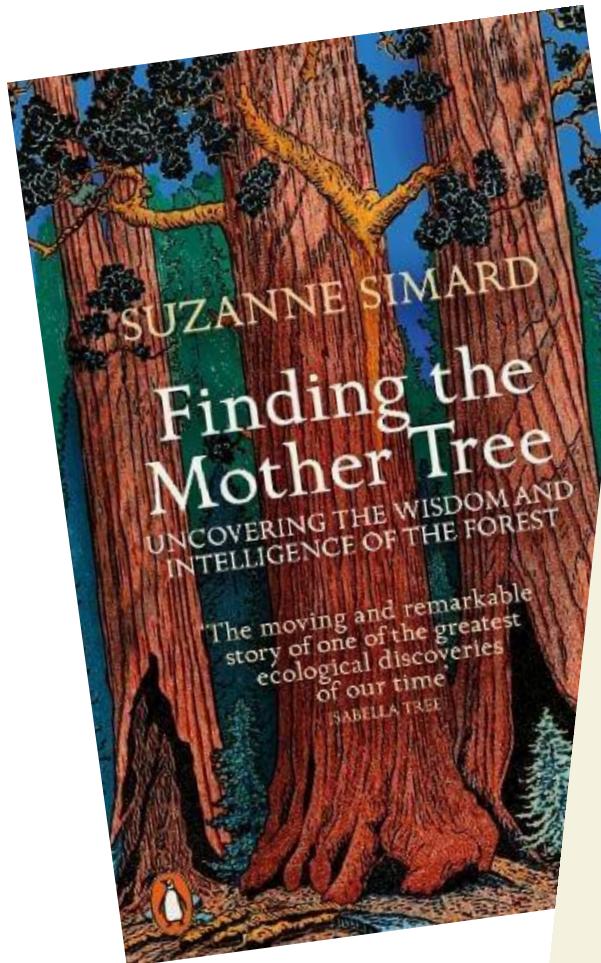


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Trees communicate via an underground network of fungi, the ‘wood wide web’

**NOT THAT WE
KNOW OF...**





THE SECRETS OF THE WOOD WIDE WEB

In London's Epping Forest, a scientist named Merlin eavesdrops on trees' underground conversations.

By Robert Macfarlane

August 7, 2016

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Science & Environment

Wood wide web: Trees' social networks are mapped

15 May 2019

JOURNALS | COVID-19

Science

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HOME > NEWS > ALL NEWS > 'WOOD WIDE WEB'—THE UNDERGROUND NETWORK OF MICROBES THAT CONNECTS TREES—MAPPED FOR FIRST TIME

NEWS | PLANTS & ANIMALS

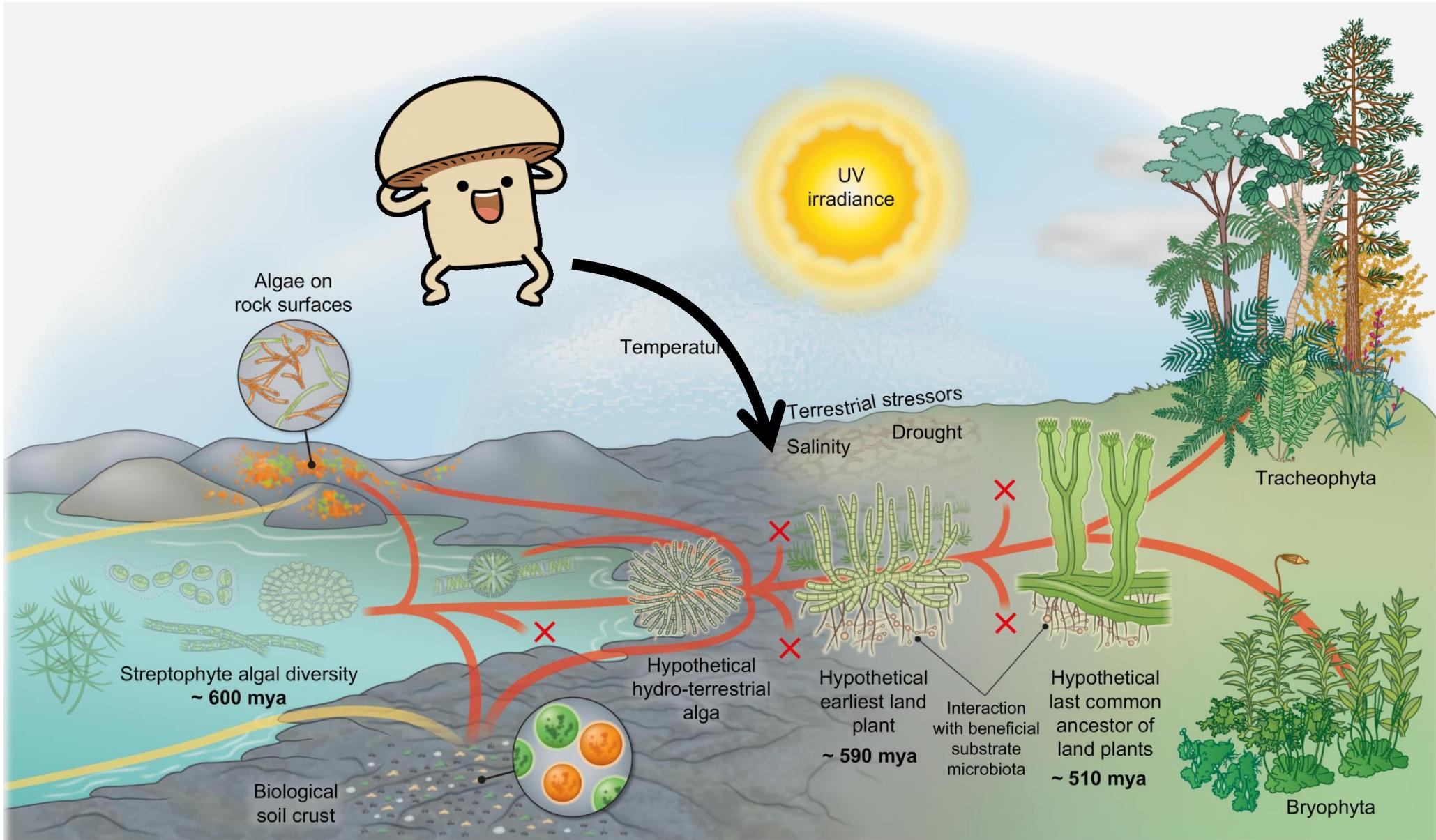
'Wood wide web'—the underground network of microbes that connects trees—mapped for first time

Global census of forest fungi suggests warming could trigger soil carbon bomb

15 MAY 2019 • BY GABRIEL POPKIN

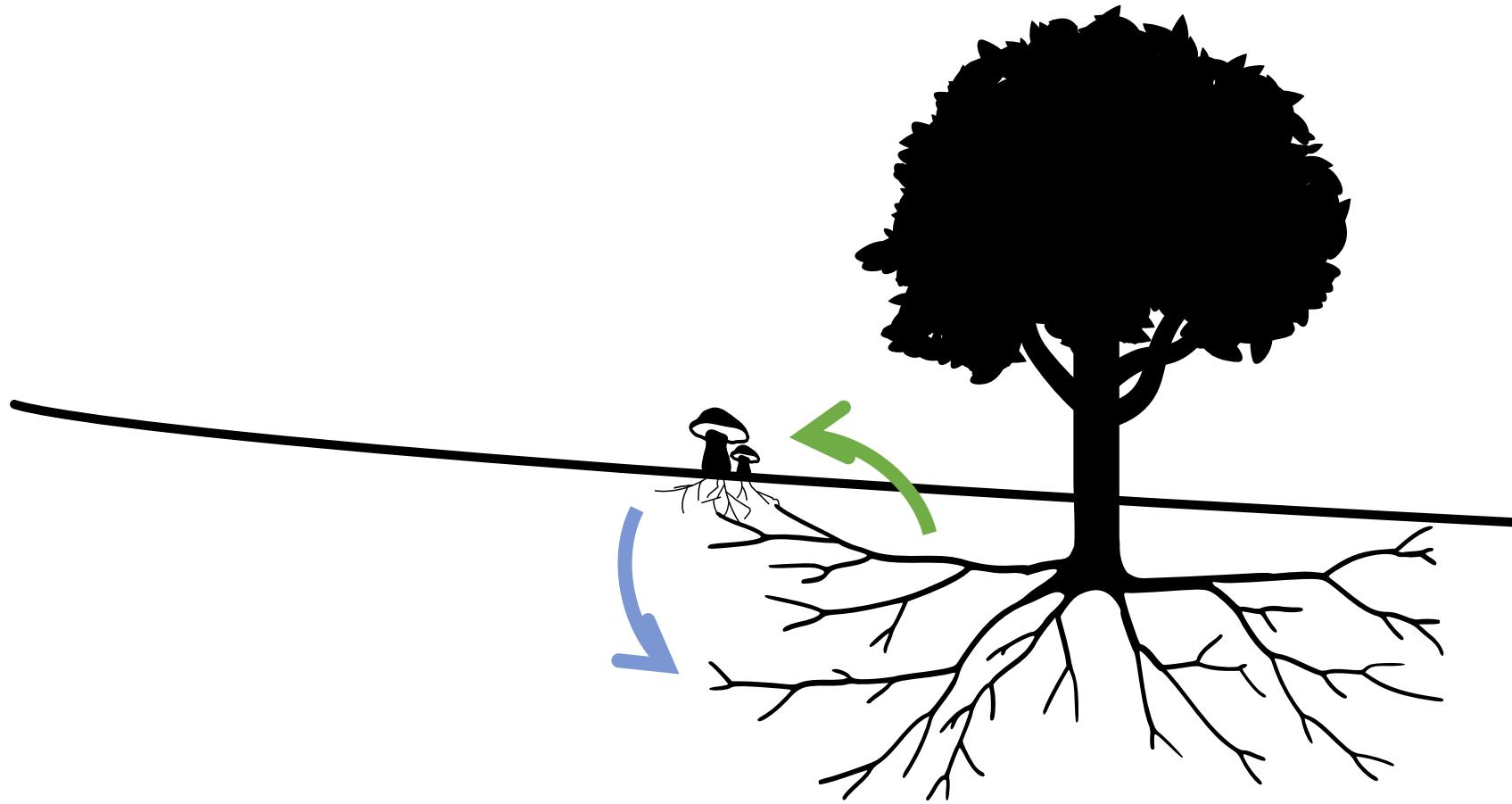


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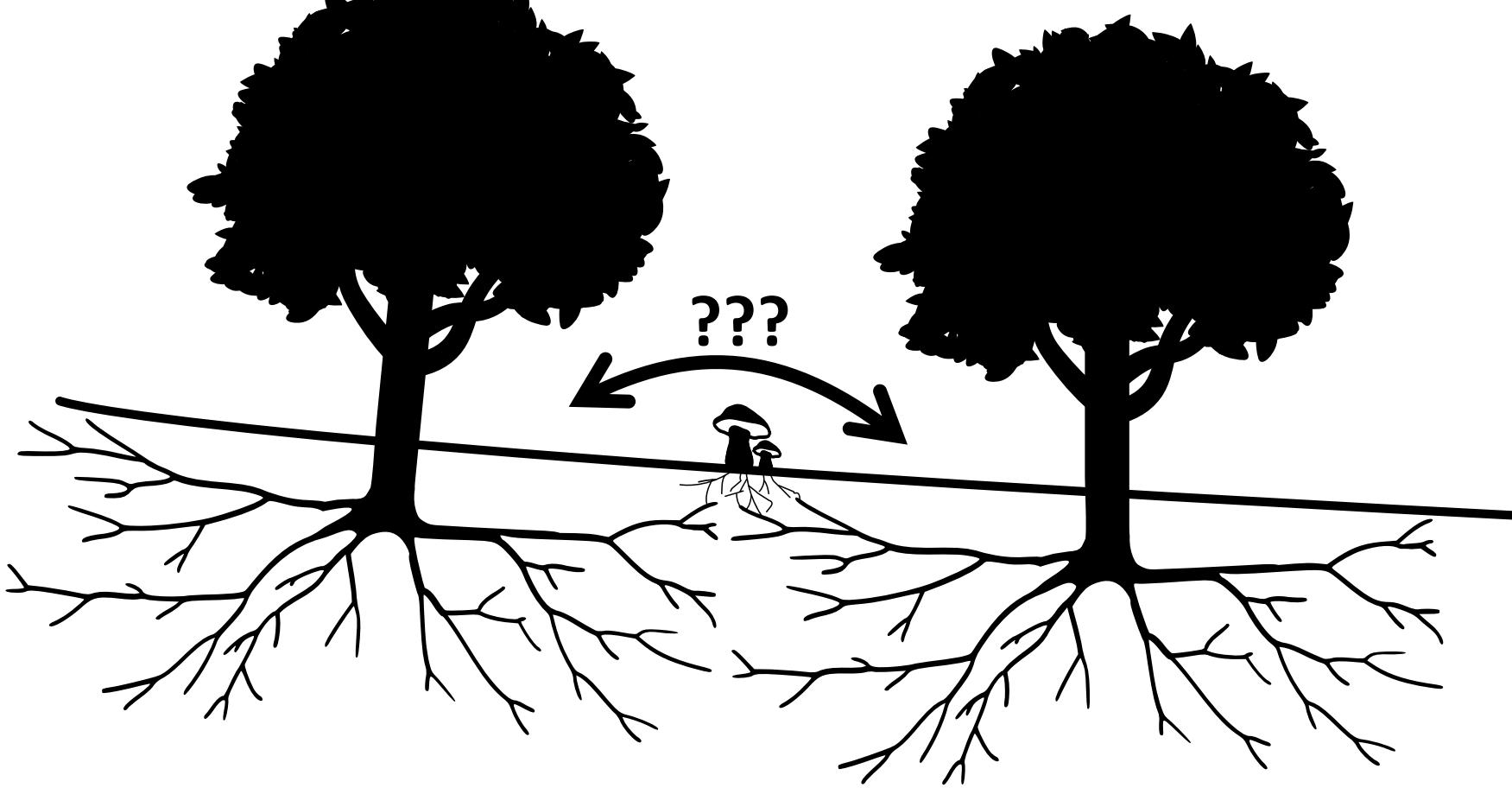


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Fürst-Jansen et al. (2020)



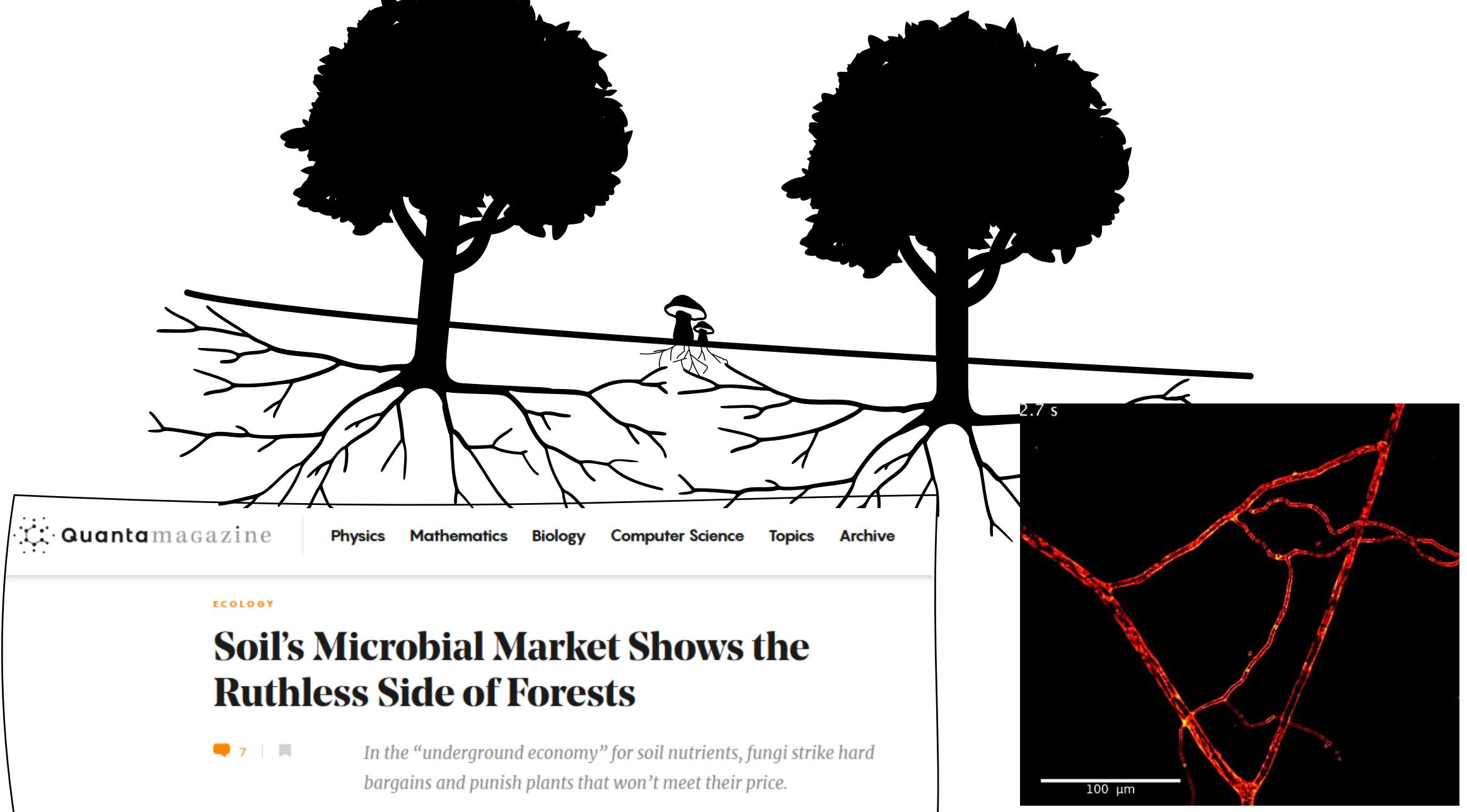
“...most of the stored carbon in boreal forested islands in Sweden is in fact derived from mycorrhizal mycelium rather than from plant litter.” [Clemmensen et al. \(2013\)](#)



“The claim that mature trees preferentially send resources and defence signals to offspring through [mycorrhizal fungi] has no peer-reviewed, published evidence.” [Karst et al. 2023](#)

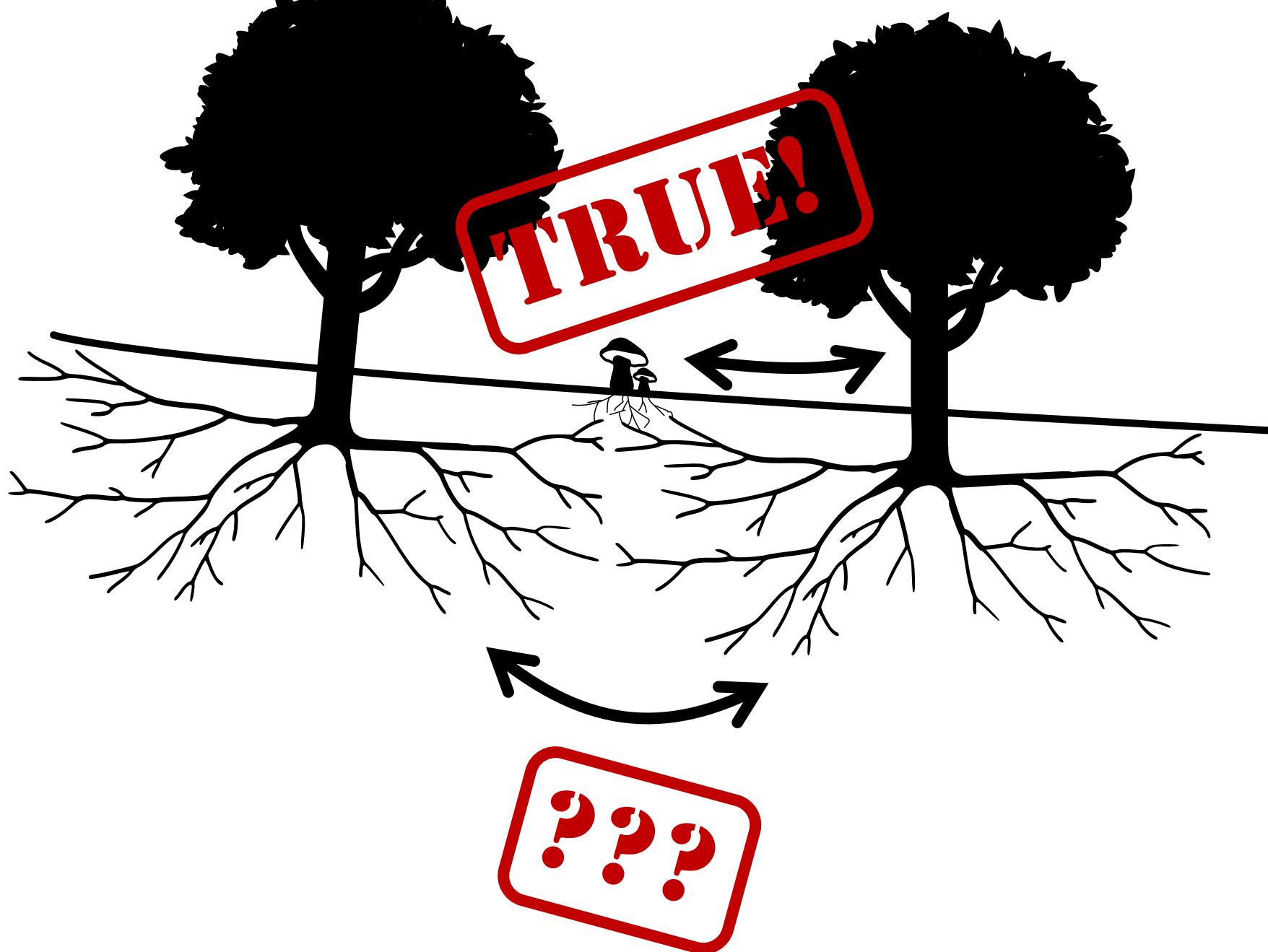


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[Whiteside et al. 2019](#)



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Some fungi can break down plastic



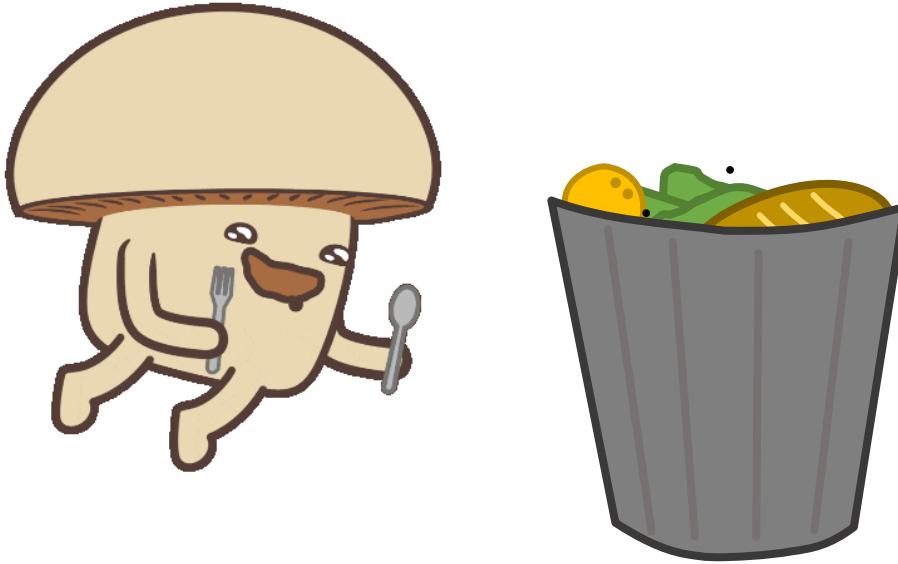
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Some fungi can break down plastic

TRUE!



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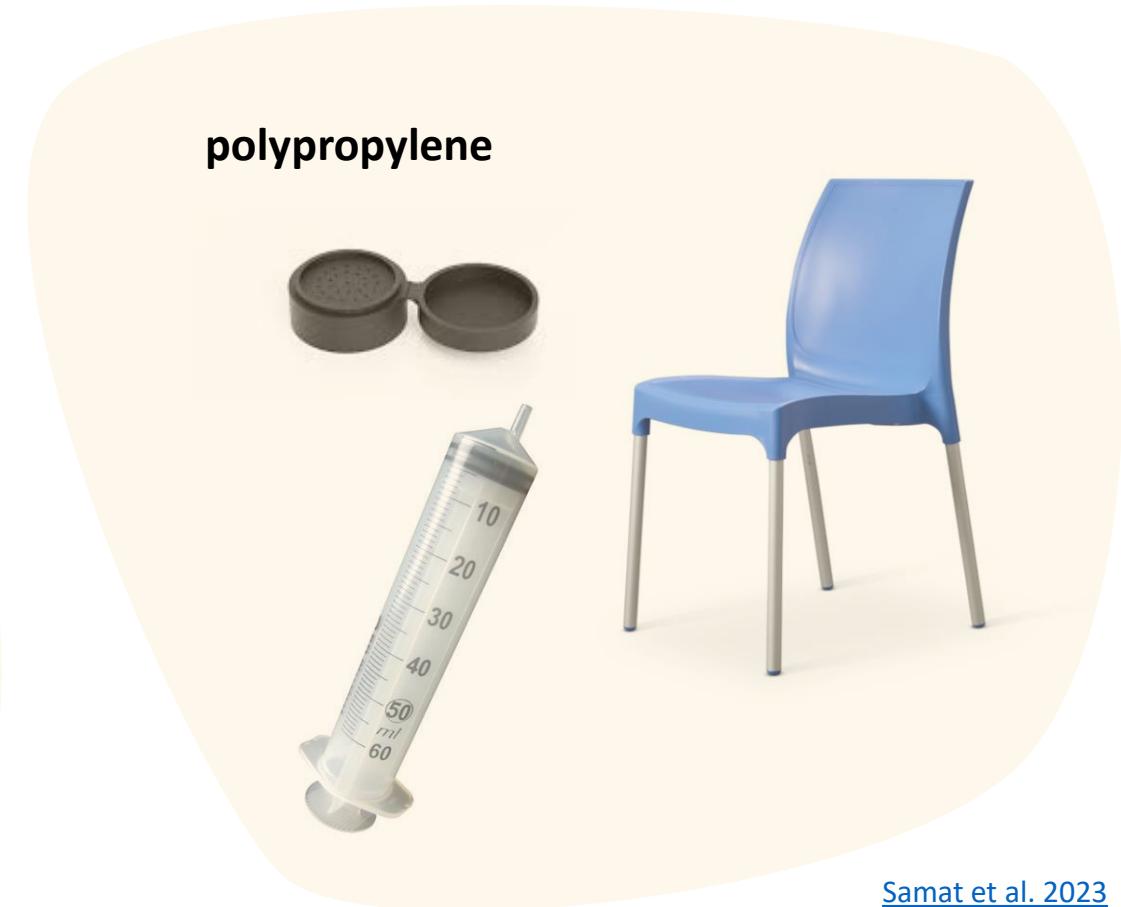
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[Russell et al. 2011](#)



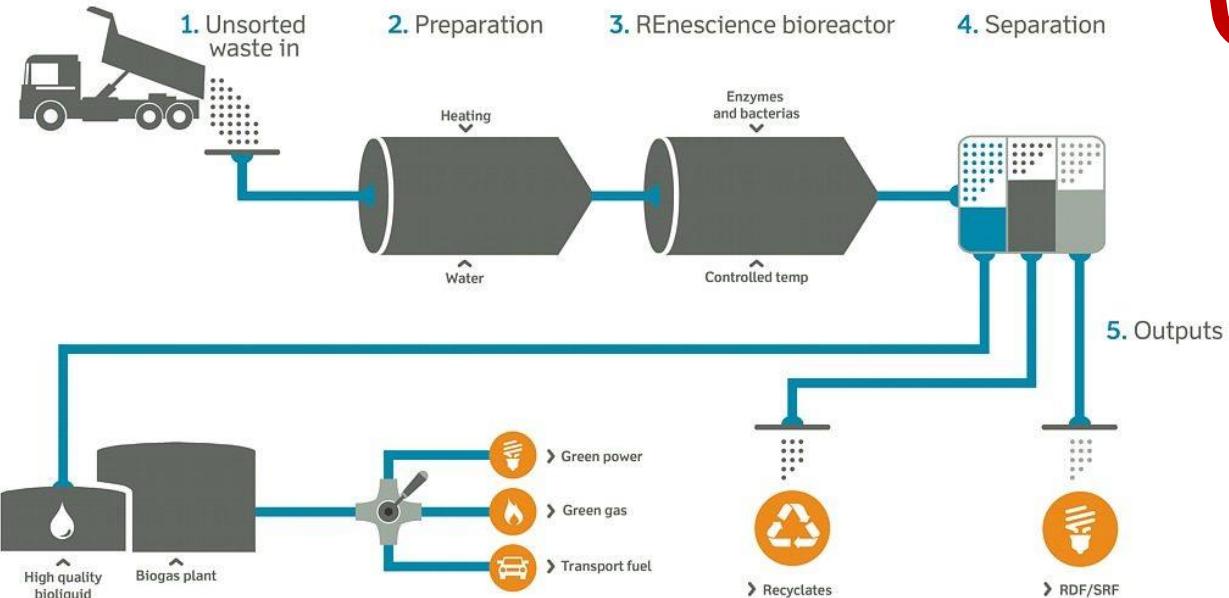
polyurethane

polypropylene



[Samat et al. 2023](#)

ONE DAY...



<https://orsted.co.uk/energy-solutions/renescience>



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**The Salem Witch Trials were actually
a result of fungi poisoning**



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The Salem Witch Trials were actually
a result of fungi poisoning





History of ergot alkaloids from ergotism to ergometrine

Pieter W.J. van Dongen*, Akosua N.J.A. de Groot

SECALE LUXURIANUM

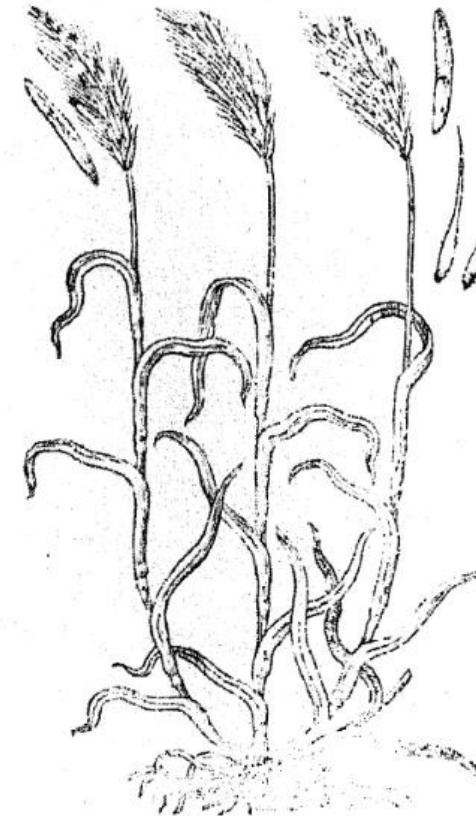


Fig. 1. The first illustration of ergot. Woodcut in Caspar Bauhin's *Theatrum Botanicum* (1685)

The first suggestion that ergotism was caused by blighted grains was already mentioned in 1125. Caspar Schwenkfeldt (Poland, 1600) thought that the honeydew of the rye was the cause of the ergot epidemics [3].

During an epidemic of gangrenous ergotism in Sologne (France, 1630), Tullier Sr. did animal research by giving 'cornicula nigra' to chickens, geese and pigs: they all died. Unfortunately, he did not publish his results. Only in 1676, did Dodart with help from the son of Tullier, solve the problems of the epidemiology and cause of the gangrenous ergotism. Likewise, Johann Brunner, described the cause of the convulsive type in 1695 in Leipzig, Germany [3].



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Ergotism: The Satan Loosed in Salem?

Convulsive ergotism may have been a physiological basis for the Salem witchcraft crisis in 1692.

Linnda R. Caporael

This Hallucinogenic Fungus Might Be Behind the Salem Witch Trials

The trials have confounded historians for centuries. Some scientists think a toxic fungus from rotten grain might be responsible.

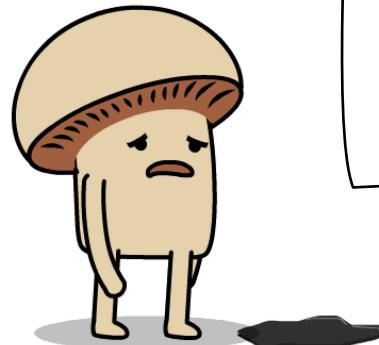
By Emilie Le Beau Lucchesi | Oct 12, 2021 9:00 PM

The Salem Witch Trials' Accused May Have Fallen Victim To Moldy Bread

Fungus has a lot to answer for.



RACHAEL FUNNEL



Published December 16, 2022

The hallucinogens that might have sparked the Salem witch trials

Witches and bread? Spooky!

By Phil Edwards and Estelle Caswell | Oct 29, 2015, 11:40am EDT



Ergotism and the Salem Village Witch Trials

Records of the events of 1692 do not support the hypothesis that ergot poisoning was involved.

Nicholas P. Spanos and Jack Gottlieb

Convulsive ergotism characteristically produces the following symptoms: (i) vomiting, (ii) diarrhea, (iii) a livid skin color, (iv) sensations of heat and cold in the extremities, (v) spastic muscular contractions in the extremities, which in severe cases may become permanent sequelae, (vi) severe itching and tingling sensations, (vii) convulsions, (viii) a ravenous appetite following convulsions, (ix) death in severe cases (2, 3, 5, 12).

Permanent dementia may also be a symptom in severe cases. Perceptual disturbances may occur, but such disturbances would not be expected to occur independently of the other symptoms (12).



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Temptation of Saint Anthony 1512-1516
Matthias Grünewald



THE WITCH TRIALS OF FINNMARK, NORTHERN NORWAY, DURING THE 17TH CENTURY: EVIDENCE FOR ERGOTISM AS A CONTRIBUTING FACTOR¹

TORBJØRN ALM

No.	Year	Persons	Way of acquiring witchcraft
33	1638	Sissel Persdatter (Vadsø)	—
34	1638	Østen's Mari (Vardø)	—
35	1652	Gunnele Amundsdatter (Vadsø)	in beer
36	1652	Bodil, Axel Andersen's wife (Vadsø)	in a drink
37	1652	Bårne, sexton Villat's wife (Vadsø)	in flour for a soup
38	1653	Brite Edisdatter	in a piece of butter and bread
39	1653	Synnøve Olsdatter	in a piece of bread
40	1653	Brite Johansdatter (Andersby)	in a drink
41	1653	Eli Sigvarsdatter (Ekkerøy)	in a piece of bread
42	1653	Brite Christophersdatter (Ekkerøy)	in milk
43	1653	Bårne Olsdatter (Syltevik)	in fish and bread
44	1653	Gjertrud Trondsdatter (Ekkerøy)	in beer
45	1653	Lisbet Paulsdatter (Kiberg)	in a piece of bread
46	1653	Ane Persdatter (Kiberg)	in a piece of bread
47	1653	Marthe Andersdatter (Vardø)	in beer
48	1653	Karen Jonsdatter (Kiberg)	in a cup of milk and water
49	1653	Marthe Rasmusdatter	in a piece of bread
50	1655	Kirsten Olsdatter	had learned it from a woman [in grain?]
51	1655	Siri Christophersdatter (Senja)	in a piece of bread
52	1655	Mari Thomasdatter (Bergen)	had learned it from a woman in milk
53	1662	Dorethe Larsdatter (Vadsø)	[had learned it as a child]
54	1662	Maren Sigvoldsdatter (Vadsø)	in beer
55	1662	Ragnhild Klemmetsdatter (Ekkerøy)	in a piece of bread
56	1662	Maren Mogendsdatter (Ofoten)	[did not confess]
57	1662	Marthe Rasmusdatter (Vadsø)	in a mixture of bread and fish
58	1662	Maren Hemmingsdatter (Ekkerøy)	bread, fish and beer
59	1663	Siri Olsdatter (Kiberg)	in milk
60	1663	Solveig Nilsdatter (Andersby)	in a plate of milk with something black
61	1663	Guri, Larits' wife (Ekkerøy)	in some beer
62	1663	Ingeborg Iversdatter (Vadsø) [a child]	in milk
63	1663	Maren Olsdatter (Vadsø) [12 years old]	—
64	1663	Karen Iversdatter (Vadsø) [8 years old]	—
65	1663	Ellen Gunnarsdatter (Vadsø)	—
66	1663	Karen, sexton Villads' wife (Vadsø)	in a porridge of milk and flour
67	1663	Margrethe, Størker Olsen's wife	in cheese and milk
68	1663	Ragnhild Endresdatter (Kiberg)	in milk

the description may sound like ergot-infected grain: “Confesses that Dorthe Larsdatter gave her a porridge of *milk and flour* with fine butter in it, when she was lying in bed after having given birth. This porridge caused her much pain for about 14 days, and during this time Dorthe stayed with her. She noticed something black in the porridge the size of a barley grain. About three weeks later, *Satan* came to her in the shape of a *cat . . .*” (Hagen and Sparboe 1998).



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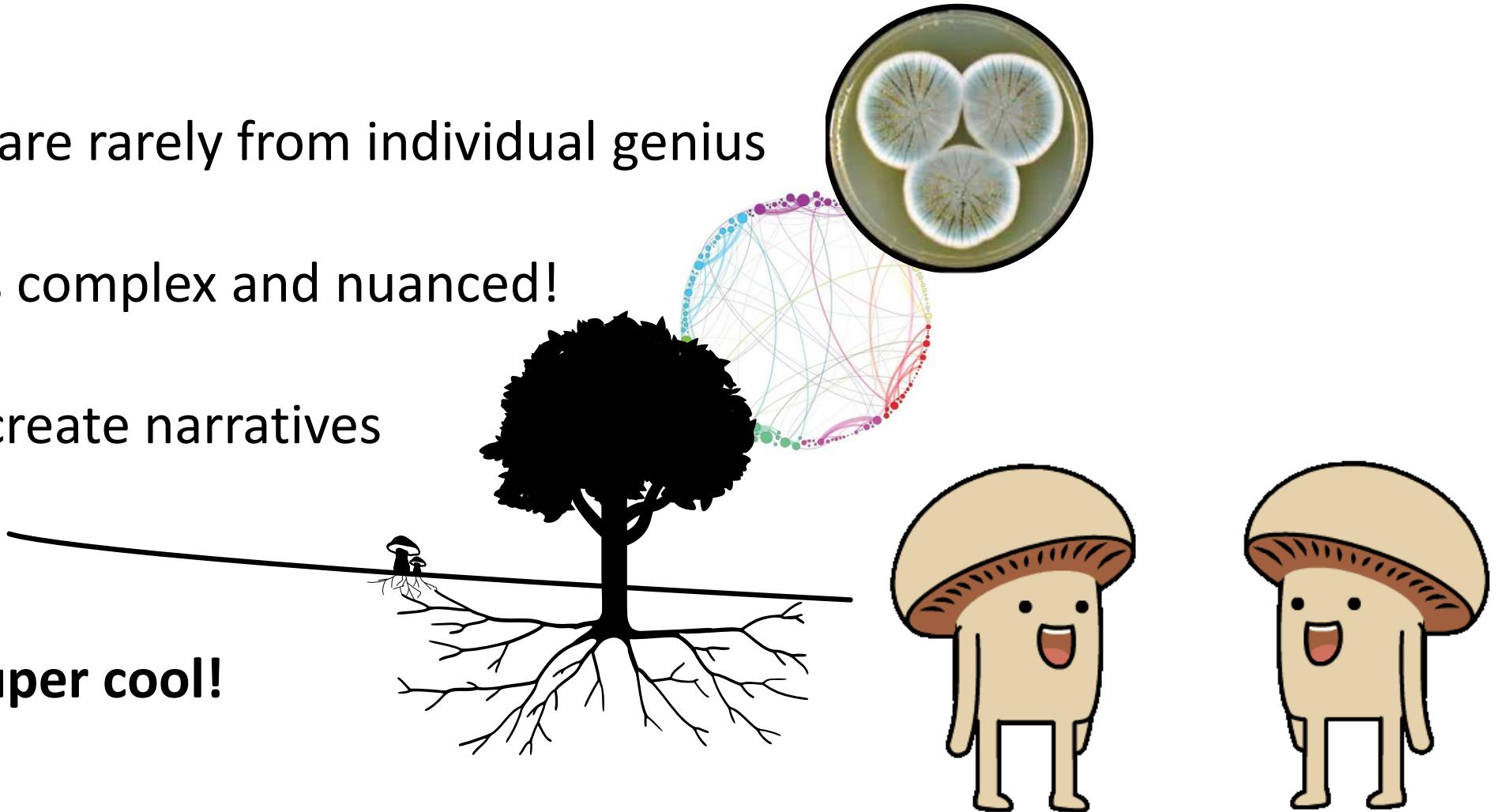
What have we learnt from mythbusting?

Discoveries are rarely from individual genius

The world is complex and nuanced!

It's easy to create narratives

Fungi are super cool!





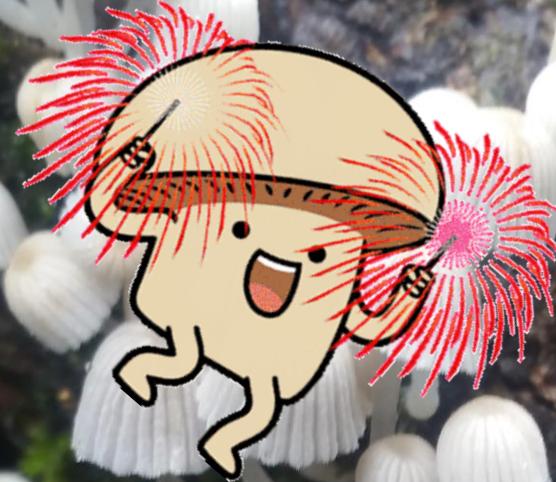
github.com/Rowena-h/Presentations



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Thanks for listening!

[@mushroommoviee](https://mushroommoviee.com/) for all the superlative gifs!



stateoftheworldsfungi.org