

# Scientists conceptualize a species 'stock market' to put a price tag on actions posing risks to biodiversity

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Species Hypotheses (SH)

FASTA Curate

Communication of the SH

**A** Digital Object Identifier (DOI) <https://dx.doi.org/10.15156/BIO/SH1502197.08FU>

**B** Taxon name Tomentella fuscocinerea

**C** Placement in classification and Taxon Hypotheses

Fungi (TH026148) / Dikarya (TH026186) / Basidiomycota (TH026226) / Agaricomycotina (TH026385) / Agaricomycetes (TH026541) / Thelephorales (TH026799) / Thelephoraceae (TH028061) / Tomentella (TH034569)

Reference sequence

Accession number UDB016492

Chosen by Urmas Kõjalg, 13/02/2019 15:59:19

Ecology Taxonomy Statistics History

**EcM lineage** tomentella-thelephora (419)

**D** Interacting taxa Betula papyrifera (1); Cistus (1); Cistus creticus (2); Corallorhiza striata (10); Corallorhiza striata var. involuta (4); Corallorhiza striata var. striata (9); Corallorhiza striata var. vreelandii (7); Dryas integrifolia (2); Dryas octopetala (3); Fagaceae (1)  
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\* Locations without exact coordinates are displayed as country centroids



**F** DOI metadata

**Title** SH1502197.08FU  
**Publisher** UNITE Community  
**Published** 2021  
**Citation** Kõjalg, Urmas; Abarenkov, Kessy; Tedersoo, Leho; Nilsson, R. Henrik; May, Tom; Larsson, Karl-Henrik; Döring, Markus; Schigel, Dmitry; Ryberg, Martin; Sánchez-Ramírez, Santiago et al. (2021): SH1502197.08FU. UNITE Community. 10.15156/BIO/SH1502197.08FU  
**Downloads** SH1502197.08FU, SH1502197.08FU\_graph

**G** Individuals of the current SH (total: 422, core: 69)

Level 1 (69) Level 2 (86) Level 3 (187) Level 4 (191) Level 5 (269) Level 6 (269) Level 7 (422)

Sequences within the same 0.5% SH for the same continent collapsed

Sequence ID	irce	Interacting taxa	Area	0 10 20 30 40 %
GU220669	hid mycorrhiza	Corallorhiza striata var. vreelandii	Canada	
KM403048		Pseudotsuga menziesii	Canada	
LC013814		Populus simonii	China	
UDB027145	omycorrhiza	Cistus creticus	Turkey	
GU220613	hid mycorrhiza	Corallorhiza striata var. involuta	Mexico	
<b>H</b> GU224042	hid mycorrhiza	Corallorhiza striata	United States	
KT585715		Quercus castanea	Mexico	
HQ445063	tr root	Dryas octopetala	Norway	
GU224047	hid mycorrhiza	Corallorhiza striata	United States	
UDB0154372	imple		Unspecified	
UDB0232916	imple		Estonia	
UDB003300	tbody		Iran, Islamic Republic of	
UDB016484	tbody		Italy	
UDB016492	tbody		Italy	
UDB0332332	imple		Estonia	
UDB0622061	imple		Estonia	

A fungal example of a digital species with rich metadata on systematics, ecology, DNA data, and collection localities. Credit: Dr Kessy Abarenkov

So far, science has described more than 2 million species, and millions more await discovery. While species have value in themselves, many also deliver important ecosystem services to humanity, such as insects that pollinate our crops.

Meanwhile, as we lack a standardized system to quantify the value of different [species](#), it is too easy to jump to the conclusion that they are practically worthless. As a result, humanity has been quick to justify actions that diminish populations and even imperil biodiversity at large.

In a study, published in the scholarly open-science journal *Research Ideas and Outcomes*, a team of Estonian and Swedish scientists propose to formalize the value of all species through a conceptual species '[stock market](#)' (SSM). Much like the regular stock market, the SSM is to act as a unified basis for instantaneous valuation of all items in its holdings.

However, other aspects of the SSM would be starkly different from the regular stock market. Ownership, transactions, and trading will take new forms. Indeed, species have no owners, and 'trade' would not be about transfer of ownership rights among shareholders. Instead, the concept of 'selling' would comprise processes that erase species from some specific area—such as war, deforestation, or pollution.

"The SSM would be able to put a price tag on such transactions, and the price could be thought of as an invoice that the seller needs to settle in some way that benefits [global biodiversity](#)," explains the study's lead author Prof. Urmas Kõljalg (University of Tartu, Estonia).

Conversely, taking some action that benefits biodiversity—as estimated through individuals of species—would be akin to buying on the species stock market. Buying, too, has a price tag on it, but this price should probably be thought of in goodwill terms. Here, 'money' represents an investment towards increased biodiversity.

"By rooting such actions in a unified valuation system it is hoped that goodwill actions will become increasingly difficult to dodge and dismiss," adds Kõljalg.

Interestingly, the SSM revolves around the notion of digital species. These are representations of described and [undescribed species](#) concluded to exist based on DNA sequences and elaborated by including all we know about their habitat, ecology, distribution, interactions with other species, and functional traits.

For the SSM to function as described, those DNA sequences and metadata need to be sourced from global scientific and societal resources, including natural history collections, sequence databases, and life science data portals. Digital species might be managed further by incorporating data records of non-sequenced individuals, notably observations, older material in collections, and data from publications.

The study proposes that the SSM is orchestrated by the international associations of taxonomists and economists.

"Non-trivial complications are foreseen when implementing the SSM in practice, but we argue that the most realistic and tangible way out of the looming biodiversity crisis is to put a [price tag](#) on species and thereby a cost to actions that compromise them," says Kõljalg.

"No human being will make direct monetary profit out of the SSM, and yet it's all Earth's inhabitants—including humans—that could benefit from its pointers."

**More information:** Urmas Kõljalg et al, A price tag on species, *Research Ideas and Outcomes* (2022). [DOI: 10.3897/rio.8.e86741](https://doi.org/10.3897/rio.8.e86741)

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