

**‘If we decide to trust the network, we can make this world a better place’ – Laudatio
Liesje Mommer voor Merlin Sheldrake**

Dear biodiversity lovers, dear nature conservationists [or: activists], dear scientists, artists and architects, dear Merlin, dear all,

We are here to celebrate the book ‘Entangled life’ and it is great to see so many of you here. We, as human beings are entangled, although sometimes we tend to forget that, individual egos as we are. I believe that we are entangled – with each other and with other beings on this planet. In this personal reflection, I will share my thoughts, feelings and amazement on that topic. Many of them I got from working with soil-borne fungi as a scientist working belowground on plant roots which are so entangled with fungi. Reading Merlin Sheldrakes book helped me to find the words. I am deeply grateful for the effort you made to write the book, to make the book, to actually *be* the book.

Working with fungi helped me to better understand who I am: more aligned with myself, my being, my mission for a nature-positive world. For you in the audience to understand that viewpoint, I will have to introduce myself a bit more. This is perhaps a bit impolite on a festive occasion for Merlin – my apologies. Wim van Gelder already mentioned that I work as a professor in Plant Ecology & Nature Conservation at Wageningen University, and that I am considered its ‘figurehead’ (boegbeeld) for biodiversity. I have to admit I feel very uncomfortable with that term. I will explain why, and how it relates to fungi.

In the early years of my scientific career, biodiversity experiments in grasslands were ‘hot’, it was a lively field of research. But what is a biodiversity experiment really? In such experiments, scientists grow different plant communities – mostly grassland species – in plots that differ in plant species richness. So, in such experiments, there are many plots established as monocultures, but also 2-species mixtures, 4-species mixtures, even up to 60 species. Biomass is harvested by clipping, then dried, weighed and analysed as a proxy for ecosystem productivity. These experiments have consistently shown: biodiversity matters. Biodiversity improves productivity. Biodiversity enhances ecosystem functioning. I was attracted to this scientific energy – and decided to work in that research field.

I had to find my own niche and decided to look where others did not. The standard was measuring aboveground, so I decided to go *belowground*, where half of the plant biomass is. I

investigated rooting patterns of different plant species, and found that they did not really confirm the ecological theory the textbooks suggested in those days. Then, the soil was considered a box full of nutrients – nitrogen and phosphorus in particular - and plant roots were considered to just ‘sip’ them up. With my team, I set up experiments that demonstrated that root behaviour cannot be understood without explicitly considering the immense biodiversity in soil; without embracing the myriads of other organisms dwelling around the roots. In particular: soil-borne fungi – the symbiotic ones that form the wood-wide web; the saprophytes that decompose our litter, and also the bad ones – the pathogens. They are so fascinating – I could have been digging treasures all my scientific career.

Yet. May 2019. I was sitting behind my desk in my office on the Wageningen campus. Overseeing the pond in the garden, the grassland with its many colourful flowering plants, a green woodpecker on the ground. I was reading the IPBES report: the IPBES is the Intergovernmental Panel for Biodiversity and Ecosystem Services – which is the biodiversity equivalent of the IPCC for Climate. The message was: globally, biodiversity is lost at accelerating rates.. We humans are the cause – the way we eat, built, live ... the way we dominate nature. It is our own fault that society is at risk.

I was shocked of the scale of the destruction of nature, the alarming rate of species extinction. I have two children! Teenagers. What state of the planet do I leave them? What state of planet do *we* leave them?

My next thought was: What to do? What could possibly be my best action? My most strategic move? What would be my most clever contribution to solving this other crisis, next to climate change? My son said: You work at the best university of the world, so do something! Change it. He was right, he provided clear direction.

I mobilised my network. I initiated a group of scientists from all scientific disciplines on the Wageningen campus – ecologists, agronomists, food technologists, geneticists, economists, sociologists to work on a nature-positive future. To break down silos – and work beyond their own hobby horses. Provide the scientific evidence, fill the research gaps, integrate and deliver knowledge in society where it is needed. Work interdisciplinary. Work transdisciplinary: not only a diversity of scientists, but *together with society*: with farmers, businesses, NGOs, policy makers at different levels – from local to global.

We organised dialogues – to meet, listen, and share ideas, desires and... hope. To know of each other, and build on each other. To make better plans from listening to critique rather than build stronger walls. We work evidence-based, but also with the heart, as human beings taking responsibility.

I have been wondering since then – why me? What made me the person to do this? As I explained, I have a scientific background in biodiversity experiments in grasslands – but I have to admit I do not recognize all of the 60 plant species... Would it be my social skills, or my personality, my stubbornness?

Partly. I only found a satisfying answer, a grassroot answer, since I read *Entangled life*. I recognised much of what was written in chapter 1: What it is to be a fungus? I am a plant ecologist – for two decades working underground. By being underground for such a long time, I have been changed by my subject: how to be a fungus? I think I can imagine being one. Working with fungi – as Merlin rightly argues - requires being able to imagine their behaviour, because they are so invisible... so different.... beyond our imagination, and therefore triggering it: imagination. I think that that is the essence of leading for change into a nature-positive future: the belief in unimaginably better. I learned that fungi can change our old habits. They bring new perceptions – unimaginable new ones. Completely different worlds exist. Dreaming about different worlds - not being bound by the current rules, laws and busyness or big business - is what is so much needed nowadays. To trigger the change – to lead the change, it is vital that we get ‘tricked’ out of our perspectives – out of our daily routines. We must dream beyond the horizon, and fully decide to go for it.

Some of you may think that scientists are bad in dreaming, as they are excelling only in “cold-blooded rationality”, in the words of Merlin. But I know – because I am one myself - scientists are emotional, intuitive whole human beings too. We all are. Entangled, being able to take different roles. Fungi learn us to go beyond the imaginable roles – they do things so differently, that whatever we will dream, it already exists in the fungal world. They tell us it is possible, if we would ‘only’ use our common sense. The hope for the world is in fungi – that we learn to dream unimaginable futures, and wholeheartedly go the pathways towards them.

Another insight from the book is that fungal relationships are confusing. To understand what is a relationship, the identities of the ‘things’ that form ‘the relationship’ must be known. The

question: ‘What is an individual?’ has always appealed to biologists. But answering it for fungi – what is an individual? Or even framed a bit more general: what is a species - greatly stretches the minds of even our best scientists. The ‘things’ that form ‘the relationship’ may not be necessarily known in the fungal world, but the ‘things’ that make it happen are the fungal tips. They can fuse with other fungal entities – different individuals; different fungal species, and even live intimately with organisms from other kingdoms. For a long time ecologists have been blind for these confusing, entangled ways of forming relationships. Only recently, scientists have started to appreciate the wood-wide web, the ‘collaborative mode’ of fungal relationships.

The interesting question is: how does the fungal way of forming entangled relationships translate to our human world? On campus we had a Biodiversity challenge earlier this year with many students, staff and their children. Here, you could see it happening: how relationships were formed, between the little boy and the cool scientist, and also between them and the fish - across species. It appeared that we share the campus with at least 821 species (we did not accurately count the fungal species – just a few mushrooms and rusts), but it is that entanglement that touches me every time I come to the Wageningen campus. It makes me wonder: who are we humans to dominate nature? Can we find a more symbiotic relationship? More collaborative? More humble?

I found part of the answer to that question when reflecting on my resistance regarding the term ‘figure head’. First, let me cite from the chapter Living labyrinths: “Fungal lives are lived in a flood of sensory information. And somehow, hyphae, piloted by their tips – are able to integrate these many data streams and determine a suitable trajectory for growth, for the next step”. “Hyphal tips are the part of the mycelium that grow, change direction, branch and fuse. They are the part of the mycelium that do the most”. And – importantly: “They are numerous”.

That is a massive encouragement for the world: if we organise ourselves as mycelial networks – collaborative, mycelium networks - change can happen towards a nature-positive future. Maybe I should introduce myself not as a figurehead, but as a ‘mycelial tip’ of the biodiversity movement from now onwards – thank you Merlin, for giving me that perspective. I integrate data streams (i.e. the knowledge from the different disciplines, the opportunities, ...) and then determine the next best step. Not really knowing the step – but going the step.

But most importantly: there are many mycelial tips in a mycelium – and fungi have found ways to organise them. I believe we can too. Change starts if we organise ourselves like a collaborative mycelium. Fungi show us the way!

Earlier this week at the #COP27 in Egypt, the secretary-general from the United Nations – Antonio Guterres - said: we are on a highway to climate hell. Hearing such quotes, I used to get beyond hope, but now I am fearless and full of courage. Taught by fungi. They are radical, they are unorthodox, and they find solutions. For example, they figured out how to breakdown lignin. They are the only organisms on the planet that can. They are persistent and perseverant. They can even survive in radioactive sites such as Chernobyl, and they seem to thrive in abandoned, polluted, and overexploited habitats. I hope they are generous.

I was hiking a few weeks ago in the Netherlands, with Merlin’s book in my backpack – and its many messages in my mind. Often I feel sad when hiking in the Netherlands – I see what is NOT present, even with my positive attitude. Despite all the good work by nature conservation organisations, the patches of nature are so small, fragmented, disturbed. Yet, this time I hiked along our rivers – the Maas, Waal, Nederrijn, and I felt a little hope. There were so many colourful trees, beavers, kingfishers, even a white-tailed eagle. I suddenly saw the rivers as the mycelium of the landscape. This is where change happens, things fuse. Where hope starts for a better future – a nature-positive future.

During the hike I recalled the beautiful poem by Emily Dickinson:

“Hope” is the thing with feathers –
That perches in the soul –
And sings the tune without the words –
And never stops – at all –

I wonder, what Emily Dickinson would have written if she would have read ‘Entangled life’?

“Courage” is the mycelial thing –
That perches in the soil –
And finds [the way] with radical forms –
And never stops – at all –

I invite you to feel hope, to find courage in the beauty of this musical piece <https://www.youtube.com/watch?v=BGrLL3T0ozE>, in a very recent composition of Christopher Tin, sung by the acapella choir Voces8. In the meantime, dream about being a fungus, to radically change the world, together with many mycelial tips. If we decide to trust the network, and act accordingly, we can make this world a better place.

Liesje Mommer 10/11/2022