

GOOD NATURED S2-EP2

SARA LIL MIDDLETON



**GOOD
NATURED**
A PODCAST SERIES FROM
CONSERVATION OPTIMISM

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INTRO

Julia: Welcome to Good-Natured, a podcast where you can join us for uplifting chats that shine a light on conservation challenges.

Sofia: We interview inspiring conservationists who come from many different backgrounds who each engage with conservation in their own unique way.

Julia: I'm Julia.

Sofia: And I'm Sofia!

Julia: Today we're thrilled to have Sara Lil Middleton on the podcast.

Sofia: Get ready to hear about the dynamism of plants, bringing global challenges home and the role of representation in biology and conservation.

Julia: Hi Sofia.

Sofia: Hi Julia! Today, we are going to be talking to Sara Lil Middleton, who is a PhD student at the University of Oxford between the departments of Zoology and Plant Sciences.

Julia: And Sara is interested in using both functional traits and demographic approaches to understand how different plant communities respond to global environmental change.

Sofia: Sara is also an advocate for equality, diversity and inclusion in science. She has written about and facilitated discussions on decolonising science. And she also founded the Black British Biology Project to highlight the historical contributions of black Britons to the biological sciences.

Julia: And an interesting fun fact about Sara is the fact that she has grown in Oxford and is now studying the impact of climate change in Oxford. So she's got that local lens as well, which is something that we are going to talk about and we're very excited to hear her thoughts on that.

Sofia: So let's hear from Sara!

INTERVIEW

Julia: Hi, Sara we're so happy to have you on the podcast today.

Sara: Thank you for having me, I'm very excited!

Julia: **We wanted to start this episode by asking you the origin question, really, which is when would you say you became a conservationist or in what ways are you in the process of becoming one if you don't consider yourself one already?**

Sara: Yeah, that's a really interesting question actually. And it's interesting in terms of the different conversations that I've had with people where they sort of labelled me as a conservationist or different blog posts that I've written or a paper that I'm co-authoring on about conservation. I've been being absorbed into this discipline but I wouldn't consider myself a conservationist just yet. I would describe myself more as a plant ecologist and science communicator, but it has links to conservation.

Sofia: **Sara, as a plant ecologist, I'm sure you must know that so many people are unaware of how amazing plants can be. Your PhD focuses on grasslands and within that, the grass species, *Bracapodium sylvatica* and in some ways, grass is a very familiar. Many people come across them every day, but perhaps we don't always understand them or think about the different species involved in what we're seeing. What are your favourite things about grasses that people usually don't know?**

Sara: Grasses are a pretty amazing bunch of plant species. They are the fifth largest plant family after the sunflower family, orchid family, and the coffee family. And I think people overlook grasses. They kind of just see it as a green carpet when they go and walk their dog or something like that or just a green expanse, and just think it's all one type of species.

But actually, as I said, it's like about 12,000 species of grasses plants. People I think overlook grasses and we're much closer to them than we think, because a lot of the foods that we eat are staple foods. So things like different types of cereals like rice, barley, wheat, maize, millet has also, it's also fed to cattle and so forth, but we eat a lot of those directly so we're a lot closer to grasses than we think. And also, you know, things like bamboo, which is being used increasingly for types of clothing as well. So yeah grasses are cool!

And also if you think more broadly about grasslands, it's not just grass species you also get forbs and other flowering plants as well. They cover between 30 and 40% of the land surface of the Earth so they're very important.

Julia: So you study the potential impacts of climate change through experiments that control the amount of rain to stimulate drops and flooding events. Could you tell us a bit more about how can an experiment like yours help us understand and plan for the future?

Sara: The experiment is called the RainDrop Project. And it's meant to simulate quite an extreme level of drought that's supposed to happen in the UK. A lot of projections for later on in the century project that the UK will be much drier and hotter summers. So you can translate this knowledge from the project that I'm working at RainDrop to the climate change too.

This is quite a rare habitat in the UK of calcareous grassland and it's managed like a meadow. We've lost 97% meadows and the UK so just learning how the meadow might respond to climate change is hugely important because it supports a lot of insects and birds and so forth.

In my particular work, I look at traits. I'm looking at how the population, that particular population, will manage with droughts. So if we see with an extreme drought that we get less growth, less survival, and it's not reproducing as well then that will have impacts, I guess, for this particular species. But you can maybe translate it to other grass species, which is helpful for conservation managers. I'm not working directly with conservation managers but you can pass that kind of knowledge about how the grasses respond to conservationists.

Julia: So you study the functional traits of plants. Could you tell us a bit more, what is a functional trait and how do you measure them and why do they matter?

Sara: Functional traits, you can describe them as characteristics or features that are measurable. They are used also not just in plant sciences but also in animals, increasingly being used in microbes as well, and also fungi.

So if we're thinking about plants, it can be how tall the plant is, the size of the leaves, how thick the leaves are, how many seeds the plant produces, how deep the roots go. It's any sort of characteristic or feature so there can be sort of physical characteristics as well, which is some of the ones that I've described.

They can also be physiological so looking at the sort of biochemistry and of the different chemicals in the plants and stuff. They're increasingly being used for that predictive capacity in terms of if you can characterise your individual by a bunch of different traits or characteristics and try and relate that to the environment you can then predict where it might occur with. If you have a particular environmental change like a drought, which is the case I'm using it, or a land use change or invasive species or something like that, then you can try and predict where it might occur. So you can kind of make that link, which is what loads of ecologists are trying to use it for.

Sofia: Okay so just to check if I understand, you measure these functional traits so for example, height or the depth of the roots and the size of the leaves, and you see how those traits might be affected by certain conditions like having less water or having more water. And do you do that within this one species or do you do it across a bunch of species to see which species might fare better under these conditions or worse?

Sara: So it depends on your research question. For me, I'm interested in looking at the *Bracopodium*, my focal species, measuring the traits there and also taking a community approach. So seeing what is the, they call it trait space. So what kind of space in terms of traits does the community hold? And you can see if there'll be a shift with the drought so is it being pushed to one certain size. Most of the plants are shifting to become smaller, for example, less high. Or is there a shift in the other direction or is it the same shift to all the species or are there slight differences? It can tell you quite a lot about how the community is doing. So it depends at which level that you measure these traits.

Sofia: Cool! And have you been finding that they got smaller when they are thirstier or how is it looking overall?

Sara: I haven't measured them yet because a lot of the traits are destructive so I'm going to have to be taking leaf samples. I didn't want that to affect the survival of the plants that I've been measuring since 2019. So I'll have an answer maybe next year [laugh]. But from observations it's quite interesting. They do seem a little bit shorter and have less leaves. And what's quite interesting is that some of the target species seem to have shifted. Plants can move! Obviously they don't have legs and things, but they kind of creep towards the better conditions. I've logged them like year on year and it seems that a few of them have moved towards the outside of the shelter where there's more rainfall.

Julia: Aaaaah, that's really cool!

Sara: I know. I was like, really? I was like: 'wait a second, you've moved like five or six centimetres. You weren't there last year!' [laugh]

Sofia: How do they creep? I didn't know plants could creep!

Sara: So you see, I guess like in the films, like tumbleweed and stuff, that's like a different thing, but here I think it senses. So obviously we don't see the roots that are underground but they're quite extensive and I think it senses where there's more resources in this case, like more rainfall. And I think it just starts to grow towards where there is better resources. So a bit like a sunflower faces the sun. It's that kind of thing. So it did that with quite a few. I haven't like done all the sort of analyses yet, but just from observation, I was like, wait a second, you moved there. [laugh]

Julia: I mean that's fascinating! And also it just makes me think that was the problem with my house plants, you see, they can't move away. So they're just like in the conditions that I put them in and if it's not right then they'll just slowly shrink. [laugh]

Sara: Yeah, because they're stuck in the pot. [laugh]

Julia: Exactly! [laugh]

Sofia: Wow! That's so interesting. I mean, they're so dynamic in a way that I think is not appreciated.

Sara: We're starting to appreciate plants a little bit more because there is this issue with plant awareness disparity. But I think when it's lockdown [due to COVID], people who are stuck in the same local area and go for the same walk, I think people are starting to notice small changes in the environment like the flowering times and things like that. I think people are starting to realise that plants actually can move and change and you see the flowering develop and stuff.

Sofia: **That's so cool. Well, that leads quite nicely into our next question. You grew up in Oxford, did your undergrad here, and now your PhD, including your field work in Wytham Woods. What has it been like to address a global challenge like climate change in a place you're so deeply rooted in?**

Sara: Ooh, that's a great question. No one's actually ever asked me that! [laugh] I think the first thing, I've cared deeply about like where I grew up in, in Oxford and I've moved around quite a lot, and I've noticed things in my own lifetime. I'm in my late twenties, I haven't been around for that long but I've noticed changes in terms of the land use changes or the weather patterns as well. So I think for me, it's really important to understand how my local area is being impacted by climate change. So for me this is a really cool project to actually see, up at Wytham, which I would go as a little kid and the surrounding sort of areas, to understand how that specific place is being impacted by climate change. And I think doing drought experiments is pretty cool as well.

That's a cool question because I've done fieldwork elsewhere as well, but I am always kind of drawn to tropical places. I have done quite a bit field work there but I'm always kind of drawn somehow back to the UK. I'm not sure why. Maybe I like the sort of local and homeliness feelings.

Sofia: Well, I mean, there's that, but also Wytham Woods is one of the best places to be a plant ecologist, right? I mean, ecology in general, that has been studied for so many decades. The amount of data is amazing.

Sara: It's one of my favourite places, probably in the world! And I've visited quite a few. I don't know I just feel like an instant calm and just appreciation for nature. It's just really nice to spend time there.

Sofia: What's your ideal day in Wytham?

Sara: Ooh, an ideal day! I would say cycling there so up the hills, which I have managed, and then going around with my camera and just looking at the plants. There's quite a few orchids there. And just looking up at the trees, taking it with all my senses. So smelling all the bluebells if it's the right time of the year. And just doing the same route in different seasons as well and just seeing the changes and the leaf colour changes and stuff.

Julia: That's really interesting what you just said about using all your senses. Is that something that is quite important to you? Making sure that you take all of that in?

Sara: So I really love walking around in nature barefoot cause I feel really grounded that way. And then just like touching and noticing small details and things like in the bark patterns or just the leaves, and then looking at like the different colours, different shades of green, smelling. I don't do any tasting though! [laugh] Unless it's blackberry! So there's a really nice bush at my field site and during breaks I just walk down the hill and then get my little Tupperware and pick them, and end up with a whole box full of blackberries. And that would be my snack.

Sofia: The snacks of nature!

Julia: But I like the mindfulness of it, you know? Sometimes we just kind of forget that we can experience nature in all these different ways. And we just end up looking at things but not really interacting in these other ways and I find that really cool. We know that in addition of your PhD work, you also founded the Black British Biology Project. And so that was to highlight the historical contribution of Black Britons to the biological sciences. Could you tell us a bit more about how the project came about and what are your goals for it?

Sara: Yeah so it came about last year, I think sort of when the resurgence of Black Lives Matter happened. And there was all this sort of, understandably, negativity and really difficult situation for a lot of black people. I'm a natural optimist and for me this project is about reframing Black people because often in the media we're kind of portrayed as sort of lazy or not trustworthy or some other negative stereotypes. So for this project, I wanted to showcase the amazing contributions that often these forgotten scientists or naturalists have made from history and until now. So that was the point of it to kind of reframe the sort of narrative and also to work towards decolonising science. That was sort of main aim.

And then it just sort of came about from just doing, I guess, over the years, like trying to decolonise my own mind and just doing lots of reading around and trying to find better representation of people who look like me in the sciences. I guess it's a combination of the reading that I've done in the past and then it was just a light bulb. I don't really like to

use that word but I was like: 'no, no, no something needs to change'. I was like: 'oh, okay, maybe this project can contribute in some way'.

Sofia: And what do you feel like you've learned from the projects? Did you have any sort of particular discoveries of people who inspired you?

Sara: Yeah, I think the first one I came across was John Edmonstone, who was a former slave who actually was instrumental in teaching Charles Darwin the art of taxidermy, which is animal preservation. And they gave him like 40 hours of tuition but if you look at Darwin's notes and his work and stuff, he doesn't mention John Edmondstone by name. So he is kind of just a forgotten person, even though he was very instrumental and Darwin probably used those skills to do his famous work with the finches on the Beagle Voyage.

So I think that for me, that was just like, wow, I had no idea about this person. I was an adult when I found this out and I was like everyone should know about this, especially in the sciences, because Darwin is so famous, you know?

Sofia: Right. And if his finches hadn't been preserved, how would they have been able to compare them?

Sara: For example yes! So for me that was like: wow! It's currently on pause the project but the aim is to make an open access repository so educators from schools to higher education institutions can use this to help rebalance the curriculum and help towards decolonization. So yeah it involves doing talks, and I've done some with ZSL (Zoological Society of London), trying to look at archives so it involves talking to a lot of people.

Sofia: And how can people help with the project?

Sara: I guess if you come across any Black British naturalist or biologists, let me know! I'm currently in the process of trying to put a website together but you can contact me.

Julia: That's a really exciting project. You mentioned the importance of having representation as well and knowing what people are up to, and what's been done in the past and present. I also saw that you were the co-founder of the BIPOC Stem Network at the University of Oxford so I was wondering if you could tell us a bit more about that as well and why it's important to have those networks in place.

Sara: That again was founded by four of us at the University of Oxford and that came about also in the height of the Black Lives Matter protests but we'd have these discussions previously and we decided that we really needed to push for this. I guess the aim of the network is to provide safe space and support Black, Indigenous and people of colour at Oxford, and also to promote their work and just have a space where we can share I guess issues that we've had with micro aggressions, but also share the joy as well.

So it's a mixture of kind of both because I mean it is hard navigating academia, which is traditionally for white men. So yeah, it's providing that space. We also try to influence policy to make things easier for people like us. In terms of representation we're in the process of starting a mentorship scheme and we're trying to think of it as, I heard it somewhere being described that mentorship should be like a constellation of mentors that you have. So it's not just linear, like you have a PhD student being mentored by a postdoc or something, but you can go to different people. So you can go to a professor for a certain issues and then go to a postdoc for other issues. And then you get expertise on different things from different people and that put less pressure on that one individual to mentor all different types of topics.

Julia: I love that metaphor, the constellation of mentors. That's a beautiful image.

Sara: Yeah. It's really nice. It really stuck with me. I can't remember exactly who coined that term!

Sofia: **Amazing and such important initiatives within the university. Earlier, you mentioned being an optimist. So the next question we're going to ask you is a question that we ask everyone who comes on the podcast. Do you feel optimistic about the future of nature and if so, why?**

Sara: I do and it doesn't mean that I'm not concerned but I see a lot of good people doing a lot of hard work, which really motivates me. And there's still that sense of hope, And you need hope in these kinds of situations. And I see really great initiatives, for example, getting kids in touch with nature or these sort of things that can help with conservation. In the month of June, there's 30 Days Wild run by the Wildlife Trust, which is great! So there's lots of different initiatives that I'm seeing, which make me really optimistic and hopeful.

Julia: **We have reached the final question for the podcast and that's another question that we ask all guests. So could you tell us about another conservationist you admire, if you have any role models and if so why?**

Sara: Oh, that's another hard question! Role models, which again, quite a few people have asked me and I find it a little bit sad that I say I don't have a role model. Cause I'm yet to kind of see someone like me who's in sort of conservation or ecology or my sort of field. So I'm kind of just finding my own path, I guess, hopefully being a role model for those who come after me, I guess.

Julia: I mean, that's, that's an amazing thing to do!

Sara: I am looking for one! [laugh]

Sofia: Send out the search!

Julia: But I feel that's where social media is so powerful at the moment. Like I know, I think, I think it's still happening this week. It was Black Birders Week and it was just amazing to see people being like: 'Hey, I'm in that community'. I think there were introductions happening on Monday and it was so cool to see all of these people studying birds. And I think there was one about plants last year as well. It's just really cool to see how you can then kind of build a tribe and a community and discover people on Twitter these days. I find that really inspiring as well.

Sara: So that's been really good to see. Other people I guess in similar sort of stages as me especially for Black Botanists Week, but in terms of like a specific person, I'm yet to find someone which is a little bit sad but it's never too late I guess!

Sofia: **Definitely not! Can you think of anybody that you just maybe like admire that you you're like: 'oh, that person's cool and it's good that they are doing what they're doing'.**

Sara: It's in a different field, in chemistry. Dr Raychelle Burks, who's just like unapologetically herself and a great role model and she's really into science communication and equality and diversity inclusion work. So, yeah so they're in a different field but I guess I admire her sort of attitude and can-do and positivity!

Sofia: Well, thank you so much, Sara, for coming on the podcast!

OUTRO

Julia: Wow. I'm so impressed with all the different things that Sara is managing to do. She's got like so many different aspects to her work and I found this really fascinating. I find this idea of looking at different timeframes really interesting because obviously with animals, you see them move in front of your eyes and you know, some of them can be slow, but you still see a movement. And the idea that plants might be crawling slowly towards different environments is just fascinating to me.

Sofia: Yeah, or even creeping! I liked that she used the word creeping it's so kind of visual. I realised I am definitely guilty of the green carpet phenomenon that Sara was talking about in terms of just not really thinking about grass very much. It was only in the lead up to this episode and then kind of looking at her research and kind of thinking about that, that it made me really consider more, how many different species of grasses that might be, how they might each be being impacted differently. And the fact that even if we're surrounded by grasses says, perhaps we don't really see the mixes that would be occurring in wild spaces.

Julia: Yeah, I think what was really interesting as well about the points you raised about plant awareness disparity is the fact that I feel during lockdown, we've spent so much time being in our houses and then, you know, being outside outdoors was kind of, I mean for me, it was kind of the highlight of my day. And I feel like I've been noticing plants way more than in previous years. And that connects really nicely to another of

her points, which was about experiencing nature with all your senses. And I feel, again, that's something that has really come through with spending more time inside.

And I felt that was really interesting when she talked about, you know, a perfect day in Wytham and how she would involve all her different senses. That's something that I feel we do forget from time to time, that actually, you know, nature is not something that you just experience in one dimension and just look at it and it looks pretty, it's like, there's so much more to it and you can engage all your senses while experiencing it.

Sofia: It's true.

Julia: And again, I think it brings us to the bigger picture here, which is the impact of climate change. Sometimes people think that climate change is something that is happening far away and they don't really see the impact yet on their day-to-day lives. But actually when we look at Oxford, you know, the impact could be more floods and that's definitely something that for people living in Oxford is a reality. We are seeing more and more floods and it seems that it's getting more frequent every winter. And so I find that really interesting as well to kind of link up these really big issues, but then bringing that to that local level that Sara knows so well.

Sofia: Another thing that I thought was interesting in our discussion with Sara was the way that she related or didn't to the term conservationist. And I know that we have this kind of very all-encompassing definition of a conservationist, as in, if you want to take conservation action and you care about conservation issues, then in our book, you would be a conservationist. But she was kind of hesitant to associate herself with the term.

Julia: It's always interesting that distinction as well, between conservation and ecology. And that's something that sometimes I struggle a bit with. I did a degree in Applied Ecology and then my specialisation within that degree was in conservation. So for me, they kind of like related, but I know that people sometimes have strong feelings towards one or the other. So it's always interesting to see how people actually bring that term back to them and how they apply it to their work or not in this case.

Sofia: I mean, I think for me, one of the biggest differences is that conservation is sometimes described as a mission driven discipline. So even within the sciences, it is a science in which you have goals and perhaps you want the world to look a certain way whereas, for example, with ecology, a lot of the focus is on understanding and observing patterns and dynamics within nature.

Julia: I think that's interesting. I'd never really thought about it that way, but it makes sense to me now that you said it. The last point I wanted to touch on as well back on the interview is the way Sara answered our question about role models and the fact that she didn't really see anyone that looked like her in this field of plant ecology. And that's something that obviously, you know, Sofia and I we we're both white women. So we have lots of privileges and we've clearly, I mean, for me, at least I can't speak for you

Sofia, but I know that I've grown as a white girl, always seeing people that look like me doing things in the natural world. And so I can't imagine how difficult that might be when, when you don't see people that look like you in this field and the work that Sara is doing with a Black British Biology Project, bringing these stories to the spotlight. I think it's just so important and we really need to make sure that we have more of representation in our field, especially in conservation.

Sofia: Absolutely. One thing that I found really fascinating about Sara's work is just the way that she's kind of working in the past and the present and the future all at the same time to increase representation with her Black British Biology Project, but then also with all the work that she's doing within the University to bring these issues today and to kind of work on these task forces. And then also thinking about what kind of a mentor she might be in the future.

And in some ways, it's not really fair that this burden is being put on her because she probably recognises the need for these kinds of interventions and feels the need more than other white students, for example. So that calls up questions of how important it is to be an ally and support initiatives that you can see in your local areas or the spaces that you usually operate in like junior universities.

Hearing her talk about the way that she felt like she didn't have a role model within her field, but that she did have Raychelle in another field who she really admired. It made me think of her constellation of mentors and the way that she had said, you know, how maybe different people can give us different types of mentorship.

Julia: Yeah, and I think that's a beautiful image to end the episode on this constellations of mentors. I love the idea that you can have people from very different fields, kind of like teaching you and mentoring you in very different ways. I think more and more people are keen on doing at the moment, kind of expanding on all these different fields and learning from different people rather than having like one mentor. So yeah, that's, that's it for this episode then.

Sofia: Thank you all for listening and thank you so, so much to Sara for joining us!

Julia: And as usual, if you want to subscribe to the podcast on Spotify, if you want to tell your friends about us, it helps people know that we exist. And you can also send us a voice note if you have any comments about this episode on podcasts@conservatonoptimism.org or on Twitter, if you feel like it @ConservOptimism.

Sofia: And you can also reach out to Sara directly if you come across any Black Britons in the history of the biological sciences. You can reach her on Twitter @Sara_lil_plants.

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