

GOOD NATURED EP 9 CARLOS MAGDALENA



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CONSERVATION OPTIMISM

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INTRO

Julia: The Good Natured podcast comes to you from Conservation Optimism and its Founding Partners, Synchronicity Earth and the University of Oxford.

Sofia: Welcome to Good Natured, a podcast where you can join us for uplifting chats that shine a light on conservation challenges. In each episode, we interview an inspiring conservationist. Our fascinating guests come from many backgrounds: artists, scientists, activists, and many more. I'm Sofia, a PhD student focusing on marine conservation. I love doing science and telling stories through film, writing, improvised comedy and now podcasts.

Julia: And I'm Julia, a science communicator, and journalist. I'm passionate about sharing what people are doing to make the world a better place. We know these are quite hard times and that everyone needs to have a bit of a pick me up. So we're hoping that this conversation will inspire you.

Sofia: Hi Julia.

Julia: Hey Sofia!

Sofia: Today I am very excited to announce that we're going to be speaking to Carlos Magdalena, who is a botanical horticulturist at Kew Gardens in London. That basically means that he grows and manages a whole bunch of different types of plants. He has a pretty fantastic nickname! He is known as the Plant Messiah because he figured out how to get some of the world's rarest plant species to grow.

Julia: One aspect of Carlos' job that is really exciting is the fact that he travels the world to collect seeds and cuttings of extremely rare plants and then he brings them back to Kew Gardens and works with his colleagues to find a way to propagate them. And sometimes it's a bit of detective work because for some of these plants, very little is known about them so you really have to try different things and find out what's working.

And the reason why Carlos work is so important is that often we think of animal species when we think of species going extinct or species being threatened but according to a report by Kew Gardens, a fifth of all the world's plant species are actually threatened by extinction!

Sofia: And those are only the ones we know about because plants are overall, I think, under catalogued and understood a lot less than animals, particularly mammal species. I'm pretty excited to talk to Carlos because I think that he seems to be somebody who has a lot of energy and who really loves talking about plants.

I watched a Ted Talk by him and in it, he compared a botanical garden to a museum and he was just saying how unthinkable it would be to ask the director of a museum why that works of art shouldn't be destroyed. But of course that's what conservationists have to justify all the time. I think a lot of his job is telling people what the importance of plants is and trying to justify to people why they should care about them more. So he also does a lot of outreach.

Julia: And that's really interesting actually, because a lot of people just overlook plants without really realising it. When I worked at Chester zoo, obviously, it's a world where you have lots of animals. So it's really cool that you have all these species but you also have lots of plant species and people just don't really think about them. And for me working with the horticulture team, it was just magical to discover all this world of plants that I had myself overlooked before. So I think it's brilliant that Carlos is on a mission to bring plants in the forefront and make people interested in them.

Sofia: I completely agree. Well, let's hear some more directly from him!

THE INTERVIEW

Julia: Hi, Carlos. We're so excited to have on the podcast today! I've been really keen on having someone to talk about plant conservation for a while so this is a very exciting episode for me. And actually I wanted to ask you, what triggered your interest in the vegetal world to just kickstart this episode?

Carlos: Well, I guess when I was a child, I was initially perhaps more attracted to animals, and things that moved. But then, because I come from Asturias, which is in the North coast of Spain, that together with the interest of my mum, which was always looking for more plants and having more plants. She had a house full of plants and a garden full of plants and on top of that, she had a flower shop!

So that kind of exposed me a lot to plants. And then I believe plants are not obvious. When you don't know anything about a plant it might just look like a green static thing

which doesn't do much. But if you follow up many different plants you start to realise that they move, they think in the same way that animals do! It's just a different format. And then once you understand it and you understand the relationships they have with some other insects, or maybe birds, the strategies they have to not to be eaten or to attract a pollinator then it really gets fascinating.

And somehow at some point as a conservationist you realise something, which I think is really important for me, which is that if you are an animal conservation person then often you restrict yourself to either a species, like let's say rhinos, elephants or something like this, or perhaps a group, you know, the penguins or the bats.

And if you're working with them, you can just kind of work with a few at any one time but if you're working in a botanical garden, we have 80 thousands species in Kew at the same time. And I can attempt to propagate maybe, I don't know, a hundred or 150 plants in one morning!

So when you put it all together I thought it was fantastic because I can look after way more species at any given time. I can keep things going in many different places on many different times. And then they don't bite. They smell wonderful. Well, some of them actually really stink!

I realized that for a career, you know, because at the end of the day, everything needs to be preserved, isn't it? From the smallest lichen to the biggest tree. But I realised that perhaps there was less people working on it and that I had some skills, which I could use to do something about it and then I could work with hundreds and hundreds of species out there at any given time.

For most people, plants are like a green paint that you see in the landscape, isn't it? You need to start knowing them to start realising things. Like what grows first and what comes later, why this plant does this thing and the other one doesn't. Once you start unravelling things, then it's a never ending topic.

Sofia: Fair enough. I mean, it sounds like there's just so much variety! I also didn't realise that your family had flower shops when you were younger.

Julia: I'm really curious, so you've talked about the diversity of plant species that exist, but within your work you do a lot with very rare species. Could you tell us a bit more about the rare species you work with and what has caused them to become so rare in the first place?

Carlos: Well, there are so many that I could be talking to you about this until tomorrow! If you want me to put down one reason of why they are all at risk, it is a single word and only contains two letters: us!

So we are transforming every single inch of the Earth at the moment. What I mean is that every change we do has an impact on something. Plants are really intertwined with the things that happen around them. They cannot move so then they rely on many different things.

For example, one species was this *Nymphaea thermarum*, which was a small water lily from Rwanda. I only knew that there were water lilies in Rwanda and the population was about 50 plants. The minute I found out this, I was shocked because for an herbaceous plant 50 plants could go in one day! So I asked around and found out that there were two plants being grown in Bonn Botanic Gardens so I asked for seeds. They told me they were really hard to germinate and that: 'It's better to forget about it because we have tried a few times and those two plants that came from Rwanda we never managed to propagate them'.

I was put off for a couple of seconds but then I realised that if that's the case then we are really in trouble, if that makes sense. If there are 50 plants left and nobody can propagate these then it was just a matter of time, which will be one hour, one day or 100 years before it disappears!

So they sent me some seeds and then that's the interesting thing about biodiversity, you think water lilies and you then think they all leave in water and they have these parts floating on the surface. So what do you do? You try growing them like any other water lily. Only it doesn't work! So you kind of hold on for a second, trying to work out new things, and then you pretty much tried everything you could think of but nothing works.

And one day I was home cooking tortellini and when the water boils, you see the bubbles. And I was like: 'Oh, that's interesting. It's coming out of the water!'. And then automatically I realised this thing which is that aquatic plants when they are under water, they struggle to get CO₂. And plants really need CO₂, it's one of the main things they need to grow but any normal plant, take it from the air. In fact, there is way more CO₂ now than there used to be. But in the water, it doesn't dissolve as quickly so in a small volume of water the plants tend to wipe out that CO₂ and then they struggle to grow.

So I thought, what about if I get these water lilies, as close to the air so that they have only one or two millimeters of water and are totally wet, but from the first leaves, they touch the surface and that did it! So with the last few seeds I had I managed to grow five plants. By the time they were blooming, a botanical illustrator came to do some botanical illustrations.

She was finishing doing that in the herbarium at Kew when the German guy that discovered the species twenty years ago and collected the two original plants from Bonn happened to pass by, saw the drawings and asked her where she was drawing that from. She said: 'Oh yes, there is a Spanish guy who has a few'. So he was coming from Rwanda certified that the species was gone in the wild went to Bonn where a rat had just eaten the last two plants so all of the sudden, the tortellini plants were the only plants left in the world! No pressure...

Sofia: I love calling it the tortellini plants based around your experience! That story leads quite well into the next question. You've been nicknamed El Mesías de las Plantas or the Plant Messiah. How do you feel about this title?

Carlos: It was quite funny because basically this was on my Spanish newspaper. It was like a feature they ran in the area where I am from and they don't contact you to make the interview. They just choose you and make a profile on you. So I was at home with my mum and I was like: 'Oh, I really fancy one of those Spanish coffees'. So I went down to have a coffee and then in the coffee shop usually they have newspapers so I started looking through the pages, and then suddenly there is a cartoon of me with the heading El Mesías de las Plantas, the Plant Messiah! And then I like: 'What?!'.

The thing got a bit thicker when BBC's wildlife documentarist David Attenborough, who is sometimes seen as this god of the natural science broadcast, read this thing, interviewed me and dropped to everybody in the UK that I was the Plant Messiah.

You know, this is this moment when you're in the theater watching the premiere and then you realise that this is like when you get this nickname on the first day of the school and then you know that it's going to be chasing you all the way to the university!

You know, it's quite funny when you have a little bit of a scientific approach because what is the first thing you will do? Obviously, look at the dictionary. What is a messiah? Interestingly, it's defined in different ways in different countries. For example, my book, the Plant Messiah, got published in Holland as the Lord of the Plants rather than the Plant Messiah, because they thought it was going to be heretic to religious sensibilities.

And the French, they were sending me e-mails saying: 'Are you sure you want to go with this? And I was like: Well, it's just the name it has'. Then they finally went ahead with it. But in English, interestingly, it's not as religious. For example, apparently in Holland, the Messiah is one Jesus Christ but in English, messiah is not subscribed to any religion. It's somebody who has a cause and a message. And so I thought: 'Oh, that's fine then!' If you know what I mean because I have quite a few messages and I have like 400,000 causes.

And interestingly it gets people talking! Some people are laughing, some people are like 'yeah, right', other people are like 'uhg, how pretentious. He must have a messiah complex'. But still it starts a conversation which is always important! I thought I could maybe act a little bit as an ambassador. Obviously, I'm not the only person working in the conservation of plants, there are many more people. But sometimes the public opinion needs to have a character who is funny and has some hair and eyes like an animal to try to speak on behalf of them if that makes sense.

I don't consider myself holy, but actually I do. Actually I do! Yes, because I am in a specimen of Homo sapiens and like everyone else I believe we do have godly capabilities if you like. I can prove you this in no time. We are the only species on this planet capable of absolutely destroying the ecosystems of this planet. We could do this at the click of a button. So if we have this power, surely we have the power of doing the total opposite.

Julia: I mean, that's definitely what we believe in! We surely hope so!

Carlos: Think about it. We do really have powers which are kind of like to the level of a god.

Sofia: That makes sense. You've spoken in the past about how people need plants, but plants also need people and you said in an interview that many of us don't like plants only because we don't know them well. So how do you start to cultivate curiosity about plants so that people learn more and maybe start to take action?

Carlos: Many people maybe feels not very connected to plants but one thing which always fascinates me is think how important these things you don't care for are! They have modified the atmosphere over millennia so that we can live on it. Basically, every single molecule of oxygen you breathe comes from photosynthesis at sea or on land. They have fixed most of the carbon dioxide. They totally have changed the face of the world.

Three out four medicines come from plants, everything we eat comes from plants. They are a really important part of the art. From the columns of Greece to the sunflowers of Van Gogh to the creation of impressionism by Monet and the water lilies. They have a huge symbolism!

They are present in every single corner of our life. So I will find it hard to believe that whatever your interest is, there is not a plant related to it! But then we forget about this. You know, we never think that you wake up wrapped in cotton and you have breakfast containing wheat and coffee. So basically before you finish the end of the day, you will

have used maybe 50, 60, 70 species of plants. Do you know what they are? Do you know where they come from? Do you know the history of how they are cultivated? Can you grow it at home? And I think the minute you go through that path of: 'Oh, I am curious about this plant, let me see how I can grow it', it's going to be the start of a path which can become a highway.

And I found that now for example, during lockdown, the plants I have at home really keep me alive. Alive during lockdown because I was watching the changes, and Spring was coming, and something was blooming, and something was sprouting. But going back to how to do this, maybe think about what plants around your life you may be curious about, I will be surprised if you don't find one, and then try to grow it!

Julia: I love that idea! And actually I really liked what you were just saying about lockdown because I felt that. Plants became really important for me during lockdown because we were stuck inside and then suddenly, I think somehow because it was Spring, it just really became an obsession whenever I was on a walk, I was like looking for flowers and plants. But in general I feel that plants get overshadowed by animal species, even though we see them everywhere. So why do you think that happens? Why do you think people tend to focus on animals, but overlook the plants?

Carlos: Well, this has been interesting I think because it's all to do I believe with a term that is so important in conservation and is called empathy. Why? Because for you to be concerned about something or to be worried about something, you may need to put yourself in their pants.

So when you see a rhino running in the savannah, very proud and stuff, automatically it triggers an emotion in you because it has legs and arms like you do, maybe working in a different way, but it's quite easy to relate. We have four limbs and they have four limbs. They have a head, they have a nose. Even the facial expressions of some animals are similar to humans! You can read in an animal if it's hungry or if it is happy or if it is sleepy and therefore we tend to relate to them much better. But things like plants, some people even wonder if they are alive! And it's just because they don't understand them. And understanding them takes a long, long time...

Sofia: You traveled the world to collect seeds and cuttings of these extremely rare plants. And I hear you've even braved swimming with crocodiles because you suspected that you might have spotted a new species of water lily. So why is it so important to find and study these species that are on the edge of our understanding?

Carlos: Well because I think, it may sound silly, but you cannot protect something that doesn't exist because even if it exists if it's not recorded it doesn't officially exist! So in order to protect a species you need to find that it exists and then once that you know that they exist you need to know where it is and how many of them there are before you realise that they need some help.

Sometimes with plants it's also difficult to study them sometimes in the field. Many of them you are in maybe Australia or even more remote places and as you're saying maybe there are crocodiles around them. And then how do you know if the biology of let's say that water lily is that it is pollinated by itself or if it requires a specific pollinator?

So these things will be lost, you know, you won't be having enough time to this research unless you really apply for big funding. But if you have the plant in captivity, on a cultivation and you exclude pollinators and the plant produces seeds then you know that it is fertile. If you cross it with itself and it doesn't succeed, you know, that it needs another specimen. So there is a lot of things that you're going to learn and sometimes by learning what they like in captivity, you also then can conclude what the problem is in the wild.

And then just going back to thing you said about swimming with crocodiles. Well, hopefully I didn't! The problem with crocodiles is that sometimes you don't know if they are there or not. And then people are like: 'He is so brave! He went in the water!' Well, honestly, sometimes I just panic. I really did then! So they portrayed me like if I was a kind of super crazy adventurer, who will put himself in many risky situations but no way! I try to avoid it as much as I can!

But for example, with this thing in Australia with the crocodiles, it's just that you fly to the other side of the planet. You drive for a week to a super remote area. You get there. Maybe you are the only person who has seen this species and realised what it is for the last 15 years and perhaps the other time was when it was described! Mentally you come from a situation where you know what happened to the Rwandan one.

So my moral argument is that if I get in the water and I get attacked by a crocodile, chances are I may die and if I survive I may have serious and this will cause a big drama for the Australian government because they don't want to have that image that tourists get eaten.

Sofia: Yeah, of course!

Carlos: And then die fertilising water lilies! What an irony! So that is one side of the argument but then the other side of the brain tells me: 'Ok, so what about if I don't go, I

don't collect it and five years later something like what we discussed about Rwanda happens here and the plant is now extinct'.

Sofia: So thinking about the future, what makes you optimistic about the future of nature?

Carlos: The most obvious thing is that there is no future without nature. So we have a choice here! I had this thought with my father when I was about 13 or 14 because I was growing up in Spain and there was Franco the fascist dictator there and then when democracy came to my life I was 10 years old. So when you are 14 years old and talking about conservation, in a country where everybody loves shooting things and killing bulls they were like: 'Right, okay'. And then my father was like: 'Well, there is no future in conservation so that's all very good, but maybe you need to look for something else'.

And my reply to that was: 'Well actually, if there is no future in conservation then there is no future for anything really'. So that was one thing that kept me going.

Sofia: It's always good to rebel against your parents!

Carlos: And there is another thing, which is going to sound very arrogant, because we are in the right side of the argument. It's one of the few discussions you can have in which you have I guess all the power of the science, the ethics, the politics, everything! Because the thing is not doing so [protecting the environment] is laughable.

Julia: So we have one last question for you now and that's one that we ask all our guests. If you had to make a case for one species to save, what would it be and why?

Carlos: The humans! Because if you save them at all levels including morally and ethically, they will stop killing the rest. In the process of saving other animal species, it's just a process of saving ourselves!

Julia: Well, thank you so much for coming on the podcast and answering all our questions.

Carlos: Thank you very much. It was my pleasure to be here and thank you for the opportunity.

OUTRO

Julia: Sofia, can you feel the plant optimism?

Sofia: I can!

Julia: That was such an interesting conversation. I really liked the fact that he was like: 'Just pick a plant that you like and try to grow it'. And you just have this bond with things that you start taking care of so it's like having a pet but instead you start having plants!

I think that's a really nice way to start these connections and start triggering interest in those species.

Sofia: Absolutely. I mean I'm awful at looking after plants. I have a very, very bad track record of owning plants but I completely agree. And also it's interesting to think about what he was saying about how many plants you interact with and use in your daily life in terms of the products that you're involved with.

Julia: They are really all around us, for sure. When you start thinking about it, it's quite impressive. But also it's just this magical world that we don't really tap into. This morning, one of my housemate's plant just grew a new leaf, it grew in like a circular shape instead of just appearing as a fully formed leaf, and I had no idea that that was how they grew! So I feel there's so much to discover in the vegetal world and that makes it really exciting. Also I feel you, I used to be really terrible at growing plants, but I feel I have improved with the years now that I have a bit more interest in it.

Sofia: One of the things that I find really amazing about plants is that I remember at one point seeing a sped-up video of a plant growing and moving in response to the sun or in response to something and I think that they just live in this totally different timescale to humans. So a lot of the time we don't relate to them or see them as alive or perceive the ways that they're moving or the things that they're doing but actually there's so much going on with them.

Julia: And I think we need to remember as well that the timeframe for plants can be really different. I remember reading a book by Elizabeth Gilbert, which is called *The Signature of All Things*, and in this book, there is, a person who is really keen on botany. She is looking at mosses and she starts seeing that after decades, all the communities are different and they've moved and there is this kind of like wars between different species. And you wouldn't notice that if you looked at them only day to day. The timescale is completely different.

Sofia: Exactly! And also, just to think there are trees that are thousands of years old. I mean also just thinking in terms of human lifespans another thing that I found interesting talking to Carlos was just thinking about the way that being exposed to things as a child can unconsciously build knowledge and interest that is useful later on.

So it's kind of similar to when we were talking to Carl [Carl Jones, Episode 4] and he spoke about trying to breed birds in his garden when he was a child and here, Carlos' parents had flower shops! So he was always surrounded by plants and growing them and caring for them and obviously that kind of sparked something in him, which has now been to the benefit of the greater plant world. I definitely found that that happened for me as a child because I just always loved the sea so much.

Julia: For sure, and actually plants are all around us so you don't necessarily need to go to a specific place to start exposing your kids to plants. But I mean if you do want to do so then obviously if you're in the UK Kew gardens is an amazing place for plants! I go every year to see the Orchid Festival and it's just such a pleasure visually and it makes me discover all these plant species that I didn't know existed.

Sofia: Another thing that I found really cool about the interview was just thinking about moments of insight in science. So for example, the way that he had this breakthrough moment when he was cooking tortellini to try and figure out the distribution of gases and carbon dioxide within water. I definitely find that sometimes I get really overwhelmed by the things that I'm doing, like in the moment if I try to figure out a problem too hard. And sometimes stepping away and just thinking about something else actually means that the answer comes to me. And I just thought that was a really nice reminder of the fact that you don't always have to be very consciously hammering away at a problem in order for your brain to figure out a solution.

Julia: Yes and I think you can apply that to other areas as well. It's not necessarily just for research but I know I have that with writing as well. Sometimes if I feel a bit stuck and I just can't get my writing done or I just feel a bit uninspired, sometimes doing something completely different, like just going on a walk or making pasta, then suddenly you give your brain that space that it needs to be creative again. And I find that really important for what writing specifically.

Sofia: Absolutely. The most hilarious part of this interview for me was just thinking about how nicknames are given and perpetuated. And the ways that they can mean different things in different places and have these different associations like potentially religious or potentially just giving a message and the fact that maybe he felt a bit self-conscious about the nickname at first, but then seems to have really taken ownership of it.

Julia: I really liked that aspect as well and when he mentioned France, I thought it was really funny because being French myself, I could see how there the title Plant Messiah would be really jarring to people or might seem quite unusual. So it's interesting to think that you might decide to keep it because actually it'll get people talking and then you

start a conversation. So it's an interesting way to think about it as well, in terms of how to use your nickname to your own advantage!

Sofia: I guess so! I've yet to have a nickname that I think can be used to my advantage. I was called Sophocles in school because I was so wise.

Anyway, it also played quite nicely into his thing about humans having godlike powers now and the way that that's our responsibility. The fact that we've reached this point, often referred to as the Anthropocene, where humans can completely alter the world and the planet in a much more sort of extensive way than used to be possible. And so just trying to think about the ways that maybe we can harness that power.

Julia: But I find this idea of we are all holy in some way quite powerful. And it made me think of the Spiderman quote: "With great powers come great responsibility". And I think here, it's very much this idea that yes, we have all this power, but we really need to make sure that we are using it for good and we need to be more conscious of the impact we're having and the fact that what we're creating can have a massive impact down the line. So that was quite thought provoking in a way.

Sofia: I mean so much to think about! I think it was a wonderful interview.

Julia: Yes! And I think that's it for this episode, Sofia. Thank you for listening. We hope you enjoyed this episode. And if you did, we'd love to hear your thoughts. You can send us voice notes, at podcast@conservationoptimism.org and you can also subscribe on Spotify and Apple podcasts. If you can, you can also rate us on Apple podcasts and that helps other people find us!

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