© 2024. Published by The Company of Biologists Ltd | Development (2024) 151, dev204228. doi:10.1242/dev.204228

INTERVIEW

Pathway to Independence – an interview with Martina Cerise

Martina Cerise is a postdoctoral fellow in the lab of George Coupland at the Max Planck Institute for Plant Breeding Research in Cologne, Germany. She is interested in using different plant organisms to understand the floral transition, which helps define plant architecture, and leads to fruit and seed production. Martina is one of the 2024 fellows of the Pathway to Independence Programme. We caught up with Martina to find out more about her research interests, her passion for science outreach and her plans as an independent group leader.

Let's start from the beginning, when did you first become interested in science?

I've always been into science as a kid, but I really started to become interested in doing science during high school, when we started to approach problems in chemistry and biology. I liked the fact that there is logic behind every organism and every chemical reaction. I did biology for my Bachelor's and fell completely in love with molecular biology and the mechanisms inside the cell.

Have you always been interested in plants?

My love was initially in molecular biology. When I was ready to pick where to do my Master's thesis, I had to choose from several projects. Before that, I had never thought about plants. But then I found a project in plants, and I realised I could do molecular biology and genetics in a fast and robust way. I ended up in plant research because I appreciate how I can use good molecular tools in plants to address cell biology questions.

What did you work on during your PhD with Fabio Fornara at the University of Milan, Italy?

I went to Fabio's lab for my Master's and stayed to do my PhD. His lab is interested in how the photoperiod (the day length) affects the flowering of plants. During my Master's and at the beginning of my PhD, I was more involved in the project about how leaves perceive and respond to changes in day length. I was studying the floral transition in rice, which is a model plant for basic research but also has real-life applications. Rice prefers to flower when the days are short. But in places like Italy, the day is long, so Fabio's lab was interested in how to adapt rice to longer photoperiods. Over time during my PhD, I became more interested in the shoot apical meristem, where the stem cell niche is located. I looked at the signals that move from the leaves to the meristem that determine when the plant decides to flower and what happens at the stem cell niche level during floral transition.

You are now doing a postdoc with George Coupland at the Max Planck Institute for Plant Breeding Research in Cologne, Germany. Can you talk about the project(s) you're working on?

By the end of my PhD, my research interest was more in the shoot apical meristem, but that was not the focus of Fabio's lab. Around that time, George gave a talk in the university, and he mentioned his group was looking at the morphological changes that are happening in the shoot apical meristem during floral transition. I thought I would like to move in this direction for my postdoc. After an interview and some discussion around potential projects, I decided to join his lab.

During my postdoc, I have two main projects. The first one was recently published in Development (Cerise et al., 2023) and investigates the role of TERMINAL FLOWER 1 (TFL1) during floral transition. TFL1 delays flowering in the shoot apical meristem. In *tfl1* mutants, the plants create a flower on the top, limiting the number of flowers; the plants also transition to flowering earlier. The first question we asked was how the same gene can have two different roles. The results show that TFL1 is expressed in different domains during development, allowing this protein to regulate different genes based on its temporal and spatial localisation. My second postdoc project is more related to my obsession in the stem cell niche from my PhD. We identified that the stem cell niche rearranges during floral transition. There are regions that become bigger and expand in one direction or another, but we still don't know why this is happening. This is where I am now: trying to understand the mechanism of this rearrangement.

How was your experience moving from a university-based lab to an institute that is focused on plant research?

The positive thing is that everybody is working on plants and the facilities are excellent. The instruments are all set up so my experiments can proceed faster. But I miss going to seminars and hearing about research not on plant sciences. When I was in Milan during my PhD, I would go to seminars that I thought wouldn't be

Martina Cerise's contact details: Max Planck Institute for Plant Breeding Research, 50829 Cologne, Germany.
E-mail: mcerise@mpipz.mpg.de

Development (2024) 151, dev204228. doi:10.1242/dev.204228

relevant, but I ended up learning about a new method, or a new approach to molecular biology that I never thought about.

How did you hear about Development's Pathway to Independence Programme? Why did you decide to apply and what do you hope to get out of it?

It was almost the deadline for applying when a principal investigator (PI) from my institute mentioned the Pathway to Independence Programme to me. I was attracted to the fact that there will be an international cohort of future PIs working on different topics. I hope to meet other people in the programme who work on different organisms and find similarities in our questions. I think that could really enrich my research. I am also interested in the mentorship programme so I decided to apply. My mentor is Dominique. We had a meeting already, which was very useful to me. She's very kind and gave me good advice about my CV and grant applications. I find it useful to speak to more established PIs, because they have already seen so many people going through the process and have a completely different perspective from mine.

What are the factors influencing your job search, and where are you in the process at the moment?

In terms of the research environment, I would like to go to a place that has a focus in plant biology, but also has other departments. I find this to be enriching for my research, even though I may have fewer possibilities to find collaborators within the same environment. But there are many other opportunities, such as conferences, for me to meet people in my field. In terms of the facilities, I hope to find somewhere with a good confocal microscopy facility. And, of course, funding is important when starting a lab. I've started to apply for grants already. I'm looking for somewhere that offers some core funding, but if I see an interesting opportunity that doesn't explicitly talk about core funding, I'll still apply if I feel that the environment could be a good fit for me and my research.

What excites you most about being an independent researcher?

The most exciting part is addressing all the biological questions I have and in the direction I want. At the moment, I'm full of questions I want to answer, but I'm only one person. Having a team working on different parts of a puzzle would be exciting.

What research questions do you want to address in your own group?

I would like to continue studying flowering from the perspective of stem cell niche rearrangement. We are discovering that the stem cell niche organisation is changing in response to floral transition. In particular, I'm interested in studying the region at the base of the tissue that is supposed to be important for the stem development, according to the literature. I would like to address the question of how the stem develops during floral transition. The flower is not the only structure that appears during floral transition; there is also the elongation of the stem. I would like to understand cellular origin of the stem and the timing of the stem formation.

Are you thinking of continuing using both *Arabidopsis* and rice in your own research group?

Rice is a very good model, with real-world applications. But compared to *Arabidopsis*, the lifecycle of rice is much longer and there are fewer tools available. What I use will also depend on the place where I end up starting my lab. I might take a combinatorial approach, doing pure basic research in *Arabidopsis* and then trying to transfer the knowledge to a crop like wheat or tomato.

I might take a combinatorial approach, doing pure basic research in *Arabidopsis* and then trying to transfer the knowledge to a crop like wheat or tomato

Who have been the key mentors during your career and how do you think they will influence your own mentorship style?

Fabio and George are, for sure, my key mentors. I will also add Vittoria Brambilla as an important mentor to me. She is now a PI. She used to be a postdoc when I was doing my PhD. She was the one I was interacting with the most and talking to about science in the lab. As for how they will influence my mentorship style, this is a very difficult question, because most of the time I was observing how they approached biological questions, not how they managed the lab. My three mentors were in different career stages when I interacted with them: Fabio had been a PI for a few years; George is a very senior PI; Vittoria was a postdoc like I am now. I hope to extract the good aspects from all the different mentorship styles and figure out what could be my way of managing a team. Let's see what happens when I start my lab!

Apart from mentoring and managing a team, what other challenges do you think you'll encounter?

Being a PI involves a combination of several skills that you don't really use during your postdoc or PhD when doing experiments. Being PI means managing and supervising people, writing grants and papers, and forming collaborations. Even though I have had experience supervising students in the lab as a postdoc, it's a different kind of supervision. As a postdoc, I stay with the students in the lab most of the time. But as a PI, there is less time to be in the lab, so I will have to find a way to supervise them that is reliable and makes them feel like they can do good science. The challenge to me as a PI is to find the balance of managing all the tasks and allowing people to be productive in the lab.

Apart from being in the lab, you also enjoy doing science outreach. Why do you like spending time participating in these activities?

For me, doing outreach is part of the life of a scientist. In Milan, I had much more opportunity to do outreach. Every year, we did at least one or two events. I particularly love talking about science to children. Because children are always very curious, and I can approach science like a fun game. A few years ago, for the 'Meet Me Tonight – the night of research' event in Milan, we created a track for marbles. Children had to push the marbles from the leaves to the shoot apical meristem. When enough balls reached the meristem, a flower would pop out. It was a visual way for children to learn about how flowering works in plants.

For me, doing outreach is part of the life of a scientist

I think doing outreach work is also good training for preparing presentations in general. I like the challenge of taking something complicated in my head and conveying the message to others in a way they can understand. Now in Cologne, there are fewer outreach opportunities for me because of the language barrier, especially with children. But I'm trying to learn German. I also speak a bit of

Development (2024) 151, dev204228. doi:10.1242/dev.204228

French. I would love to be able to speak the language of the people living there to be able to do more science outreach.

Finally, what do you like to do outside of the lab?

I like to spend time with my husband and my cats. I enjoy playing board games and solving Sudoku problems. I also like doing embroidery and cross-stitch, especially during the Christmas holidays.

Martina Cerise was interviewed by Joyce Yu, Online Editor at Development. This piece has been edited and condensed with approval from the interviewee.

Reference

Cerise, M., da Silveira Falavigna, V., Rodríguez-Maroto, G., Signol, A., Severing, E., Gao, H., van Driel, A., Vincent, C., Wilkens, S., Iacobini, F. R. et al. (2023). Two modes of gene regulation by TFL1 mediate its dual function in flowering time and shoot determinacy of *Arabidopsis*. *Development* **150**, dev202089. doi:10.1242/dev.202089