Western Faculty Profile: Dr. Vojislava Grbic

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No conflicts of interest declared.

Background

Dr. Vojislava Grbic is an Associate Professor in the Department of Biology at Western University. She completed her BSc in Plant Breeding and her MSc in Plant Genetics at the University of Novi Sad, before going on to complete her PhD in Genetics at the University of Wisconsin. She teaches undergraduate science courses, including Genetic Engineering and a fourth year Seminar in Genetics. Her research focuses on Arabidopsis developmental genetics, genomics of plant-pest interaction and biotechnology. Dana Nguyen, a member of the Academic Affairs Committee for WURJHNS, had the pleasure of interviewing Dr. Grbic to learn more about her career path and her research.

Tell us about yourself and your career path.

I completed my undergraduate studies at the University of Novi Sad in Serbia, studying agronomy and working on field crops. I also completed my Masters of Science there, studying corn breeding and

population genetics. Following this, I received a one-year USDA fellowship, which allowed me to go to the University of Berkeley in the United States to work on corn developmental genetics. I spent a year there, and then continued my graduate studies at the University of Wisconsin-Madison. After completing my PhD, I moved on to the University of Cambridge in the UK to do my post-doctoral fellowship. Just before completing my studies there, I got a position here at Western. I joined the department in 1998 and have been here ever since.

What is currently your main research focus?

Previously, I had been interested in the evolution of development. I was intrigued by morphological diversities in plants and how they came about. I worked on Arabidopsis as a model plant, and eventually learned the mechanism behind plants converting from one particular morphology to another. Following this, my colleague (and husband), who works in the Biology Department at Western, started

studying spider mites, an agricultural pest. Because this pest eats plants, we decided to start working on the project together and study the interaction between the plant and the spider mite. This has been the focus of our lab in the last 10 years or so.

What we're now interested in is to understand how plants defend themselves against mites, and how mites subsequently evolve counter adaptations to plant defenses. It's really that evolutionary interplay between mites and plants that we would like to understand. It also has a very practical importance. The plant defenses that are effective against mites can be enhanced, or provided separately (by pesticides for example), in order to control mites. It's important to also understand what these counter adaptations of mites are to the plants defenses – either to create ways through technology to prevent these modifications, or to enhance aspects of plant physiology through breeding, so that mites cannot easily bypass them.

This is all with the goal in mind of developing alternative pest control strategies for sustainable agriculture. Studying the interaction between plants and their herbivores could uncover fundamental knowledge to develop novel tools for sustainable agriculture.

What are some challenges that you've faced in conducting this research?

One of the major difficulties with this research is the biological lack of homogeneity. We have plants and mites, and we put them together in various combinations. Attempting to control all of the physiological conditions so that only the plant-mite interaction is responsible for the result is a major challenge.

Experimentally, we're taking the most reductionist approach to eliminate as many parameters as we can. We have one plant and one mite together at a time, and we have everything about them defined (i.e. genotypes). However, in real life, there are likely also many other different aspects

at play. Other agricultural pests, bacteria and microorganism interactions are also affecting the plant.

To uncover that complexity is really tough. We're now using big data in order to address that, but in this big data is huge noise. Extracting biologically relevant information from this data is then a challenge. So this is what we're up against – this huge complexity and how to recognize it.

What sparked your interest in plant genomics and biotechnology?

My interest in this research was really sparked during my USDA fellowship at the University of Berkeley. When I arrived for my fellowship, I found that it was just such a different environment than I'd ever experienced. There was so much enthusiasm and passion and a real sense of community. People were not afraid to ask questions. Everyone was helping one another and it was such a great collaborative atmosphere. There was so much support within the team.

Working in such an enthusiastic and passionate team really drove my interest for the research. This passion is a necessity to survive and be successful in research. Research is comprised of failing 90% of the time and succeeding 10% of the time. It is a lot of trial and error, and so enthusiasm for the work is truly crucial.

Has there ever been a time where you've been discouraged in your research because of how long it sometimes takes to achieve successful results?

Oh, I'm sure there was. It's a point that many researchers, if not all, have reached and experienced at some point. It's hitting that point and wondering what to do next, where to go from there. The best thing to do then is to discuss with other people, maybe put it off for a bit and/or do

some more reading and explore more of the literature. There is always a solution; sometimes it just takes a little more effort to get there.

What advice do you have for students interested in doing research?

Firstly, the ability to work effectively in teams is crucial. The field of scientific research is really a team effort. Working on your own doesn't really exist in the real world. The most successful communities are the ones where every person is contributing each of their respective strong points. It's the complement of these strengths that really bring in the quality of the work and the quality of the lab. Often in the real world, you don't have the opportunity to choose your teammates. So in training, it is important to instil and build this ability to work with diverse people.

As well, a huge piece of advice I have would be to read. Read read read! My advice to all my students wishing to pursue graduate studies is to go straight to the literature and read papers. Find an area that you're interested in, and read a few review articles in that area. Then go and read some of the primary literature in that area. Get excited! Find what it is that you would like to do.

Following this, write an email to the PI of a study that you're really interested in, and express your genuine interest in the work and joining the team. If your interest and passion for the work is clear, I doubt there would be a single professor who would say no to that.

In order to get into that position, one needs to do a lot of that preparative work. Finding what you're really interested in and what you really want to do is key. The work in graduate studies can be very repetitive, and can become boring unless you have an idea of what is to come out of it. If you're not interested in the research, you won't be able to go through the repetitive work

or to pay attention to detail or to do it properly. It is a significant time commitment, and tons of effort is required to be successful. So taking that step to really find what it is that you're interested in is crucial. Channel yourself from big areas; discover what it is that you find exciting, and go for it! If there is an aim, there will always be a way to achieve it.

To read more on Dr. Grbic and her research, please visit her website at:

<http://www.spidermite.org/gapm/>