Post-doctoral research position available

Project: Using quantum dots to study pollen movement

Where: Stellenbosch University, South Africa

Duration: 1 year

Start: 2023 (flexible)

Application closing date: 1 September 2022

Salary: R220 000

How to apply: Please send a full CV to Bruce Anderson (banderso.bruce@gmail.com). The CV should be accompanied by a cover letter, motivating why you would want to do this post doc. Also write a short paragraph telling me what you would want to do if you were able to mark pollen grains with any colour. Any further queries can be directed to Bruce Anderson

Project Summary:

Patterns of pollen movement can affect male and female fitness of plants[1], with important ecological and evolutionary implications. While the journey of pollen grains from the anthers to the stigmas of flowers sounds deceptively simple, it is in fact highly complex and pollen grains face numerous potential fates that prevent them from fertilizing ovules[1,2]. Each of these fates represents an opportunity for evolution to select on phenotypic traits that improve the chances of pollen success - a potentially fascinating area for plant studies. However, the journeys of pollen grains are often exceedingly difficult to study, and one reason for this is that it is hard to distinguish the origins of one pollen grain versus another. Our lab has spent the last few years pioneering techniques to mark and follow the fates of pollen grains using fluorescent nano crystals (quantum dots)[3] and this has allowed us to start answering interesting questions about aspects of male fitness which were difficult or impossible to ask in the past[4,5]. I hope to continue our research in this area and I am looking for a post-doctoral researcher to work on questions such as:

1. How does bilateral versus radial symmetry affect the efficiency of pollen transfer?
2. How do pollen grains compete for space on the bodies of pollinators?
3. What do pollen decay curves look like for different pollinators?
4. Is there sexual conflict for pollen export versus pollen receipt?

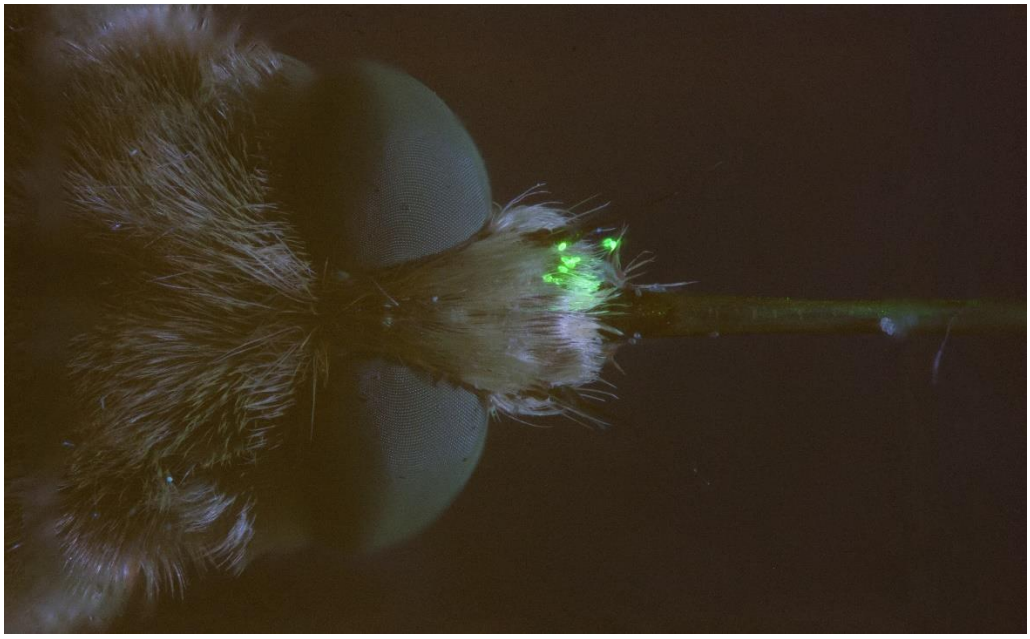

Figure 1. After a flower was labelled with quantum dots, it was visited by a long proboscid fly (above). Under an ultra-violet excitation box, the labelled pollen grains fluoresce green, allowing us to distinguish them from unlabelled grains which are purple

Who should apply:

Candidates should hold a PhD in a relevant field (e.g. ecology, evolution, pollination biology) with research experience as demonstrated by international publications. A passion for plant science/plant-animal interactions, curiosity, and a hunger to publish, and excellent statistical, organizational and communication skills are essential. Skills in electronics would be a bonus. Applicants must have obtained their PhD in the past 5 years and may not previously (since achieving the PhD) have held full-time professional or academic positions. Applicants need to have a valid driver's licence.

References

1. Minnaar C, Anderson B, de Jager ML, Karron JD. 2019. Plant–pollinator interactions along the pathway to paternity. Annals of Botany 123, 225-245

2. Anderson B and Minnaar C. 2020. Illuminating the incredible journey of pollen. American Journey of Botany 107, 1-4

3. Minnaar C and Anderson B. 2019. Using quantum dots as pollen labels to track the fates of individual pollen grainsMethods in Ecology and Evolution 10, 604-614

4. Minnaar C and Anderson B. 2021. A combination of pollen mosaics on pollinators and floral handedness facilitates the increase of outcross pollen movement. Current Biology 31, 3180-3184

5. Minnaar C, de Jager M, Anderson B. 2019. Intraspecific divergence in floral-tube length promotes asymmetric pollen movement and reproductive isolation. New Phytologist 224, 1160–1170