C•I•B
DST-NRF Centre of Excellence for Invasion Biology

DST/NRF Centre of Excellence at the Percy FitzPatrick Institute

THE 4TH COE BIODIVERSITY CONSERVATION ACADEMY
11 – 15 January 2010

Overview

The Centres of Excellence for Birds as Keys to Biodiversity (UCT) and Invasion Biology (Stellenbosch University) together held the 4th in its series of Biodiversity Conservation Academies that have as their main aim redress of the poor representation of previously disadvantaged persons in the South African conservation and natural science sectors and in higher education institutions. The Academies are directed at undergraduate life science students, especially those from previously disadvantaged backgrounds, with the aims of broadening their understanding and appreciation of biodiversity and conservation issues and encouraging them to pursue their studies beyond the undergraduate level.

Figure 1. Participants in the 4th Biodiversity Conservation Academy, held at De Hoop Nature Reserve, January 2010.

The Academy was held first in January 2006, and has been held annually since 2008 at the De Hoop Nature Reserve in the Western Cape. This year the Academy was attended by 14 students from a wide range of South African universities, four of whom were interns from the South African National Biodiversity Institute (see Appendix 1 for details). Of the 14 students who attended the Academy, 11 are from historically disadvantaged backgrounds and nine are women. Thirteen academic and support-staff from the two CoEs and from SANBI (CREW) and CapeNature helped with the management and running of the Academy. The five-day programme immersed students in an intensive series of theoretical, practical and philosophical discussions and field-work sessions, all concerning biodiversity conservation. The main aim of these sessions was to improve student appreciation for the complexity of biodiversity, sharpen their knowledge and grasp of the skills required to assess it, and broaden their knowledge of the theory and practice of conservation in a South African context.

Figure 2. Prof. Steven Chown presents an overview of biodiversity measurement and assessment to Academy participants.

The lectures at the Academy were all informal, though a high level of participation and careful attention by the students was required. An initial assessment of basic biodiversity knowledge, on which participants typically scored poorly, galvanized further action and sharpened the level of attention. Thereafter, the informal discussions, led by staff, and the guidance provided during discussion sessions worked well, with students actively participating in all of the sessions, both in the informal discussions concerning theory and experimental design, and in the field work. The ethos of the Academy is not one of formal assessment, but rather involves one-to-one discussions with students to ensure that they know exactly what is going on in the area being considered and that they have full understanding of the theory and practical aspects of the topics presented. This route of encouragement makes a sharp contrast with a formal University setting and is specifically set up this way to show students how enjoyable, yet how rigorous, formal

scientific work is. Often the dual aspects of rigour and enjoyment are lost in the formal, mark-based setting of an undergraduate course.

The students were split into two study groups and the groups alternated their activities to enable staff to provide very close supervision and guidance and to enable students ready access to advice. Two major activities in the field were undertaken. The first concerned the influence of alien vegetation on the diversity of indigenous plants at different scales in the Potberg section of De Hoop Nature Reserve. During this activity the assistance of staff from the Custodians of Rare and Endangered Wildflowers (CREW) programme and from CapeNature was absolutely invaluable. Ismail Ebrahim (CREW) and Rupert Koopman (CapeNature) were exceptionally generous and helpful, and added considerably to the quality of the experience of the students. The former have exceptional knowledge of Fynbos plants and ecology. The second activity examined the impacts of changing environments on the conservation of long-lived species, using the African Black Oystercatcher *Haematopus moquini* as a model.

After their field work and data analysis, which involved understanding of the influence of scale in ecology and the ways in which populations can be compared and modelled, the groups convened for a general report-back of the two topics and for further discussions (see Appendix 3 for a detailed programme). During the reporting sessions the students were expected to present their data in a style suitable for a conference, using appropriate information technology. Their presentations had to include a general introduction, methods, experimental design and statistical approach and analyses, results of the work, and interpretation in the broader context of the literature. This literature not only had to be derived from the students' own recollection of their coursework at their home institutions, but was also provided in the form of about 20 relevant research papers from the primary literature that the students were expected to read over the course of the Academy (see Appendix 3).

Figure 3. Participants in the Academy discussing the meaning of the results from the biodiversity surveys.

During the discussion sessions towards the end of the Academy, staff from the CoEs, notably Prof. Phil Hockey and Prof. Steven Chown, presented the students with guidance about searching the literature, undertaking small research projects, identifying an appropriate project and supervisor, soliciting funding for post-graduate studies, and careers in the biodiversity sciences. Short overviews of the activities of both Centres were also presented and information leaflets were made available to the students. Because the Academy is not a formally accredited programme through the HEQC, students were not formally assessed and assigned marks. However, because of the high staff to student ratio, close watch was kept on all students and where problems were identified (such as with thorny conceptual matters), these were promptly dealt with on an individual basis.

Detailed Programme

Day 1 – Monday

After travelling from Cape Town and Stellenbosch, the programme started mid-morning with a session on getting to know the various levels of biodiversity, to tackle the question "What is Biodiversity". An introductory session on issues surrounding the conservation of long-lived species followed. The final session of the day focused on approaches to measuring biodiversity, with the students prompted to think critically about the influence of scale and experimental design on measuring biodiversity. These sessions laid a foundation for the main activities of the next two days.

Day 2 – Tuesday

After breakfast, half the students (Group A) departed for the oystercatcher field surveys. These activities included a) a survey of the breeding and non-breeding oystercatcher population in de Hoop Nature Reserve (for comparison with historical data going back to 1980); b) collection of mussels from the shore and the driftline (to assess the extent of invasion by the alien species *Mytilus galloprovincialis*); and c) collection of chick middens (shells that accumulate where adults feed their chicks) – these could also be compared with historical diet. Students were also exposed to the art of locating and capturing oystercatcher chicks, which were subsequently measured, ringed and bled for genetic analyses.

The other half of the group (Group B) discussed and settled on an appropriate sampling design for measuring the influence of alien vegetation on plant diversity at several spatial scales in Potberg. In particular, attention was given to complete sampling (rarefaction and accumulation curves), the need to ensure that the experimental design and statistics are appropriate for the question being posed, and the way in which compromises must be sought in biodiversity surveys between the goals of and resources available for a given project. After a short lunch, the group gathered the required equipment and went to the field for the rest of the day to conduct their

vegetation surveys. This involved identifying and counting all plants within a standardised series of sampling plots. The evening was spent identifying samples from the plant surveys and entering data into a computer spreadsheet.

Figure 4. Ismail Ebrahim (SANBI CREW) and Rupert Koopman (CapeNature) discuss restio identification with Suzaan Kritzinger-Klopper and Steven Chown (C·I·B) and Academy participants.

Day 3 – Wednesday

On this day the two groups switched roles. In the late afternoon, back at the centre, lines of mist-nets, which had been set up to capture birds around the education centre, were opened. Students were given hands-on experience of handling birds, as they learned how to remove the birds from the nests, measure and ring the birds, record their moult status and take a blood sample before release. The evening was again spent processing samples and entering data from the plant surveys.

Figure 5. Prof. Peter Ryan shows participants how to take measurements from birds caught by mist-nets.

Figure 6. Evenings were usually spent on plant identifications, data analyses and discussion. Ismail Ebrahim from CREW supervises a participant's work.

Day 4 – Thursday

After completion of the field sampling by both groups, staff and students convened to discuss lessons learnt from the two-day field exercises and to identify questions to be addressed with the data. The groups then split up to analyse their data independently using Excel spreadsheets and graphs, and to prepare Powerpoint presentations. After an early lunch, the students and staff visited the limestone fynbos to view and discuss the dramatic species turnover between the adjoining mountain fynbos and limestone fynbos areas. On our return to the centre, the students continued working on their presentations and the rest of the evening was spent relaxing around the camp fire.

Figure 7. Fitzpatrick staff point out the Potberg Cape Vulture colony to participants and discuss vulture and raptor conservation both in the sub-region and elsewhere, such as in India.

Day 5 – Friday

The last day of the Academy started with early morning bird ringing and final preparations for the Powerpoint presentations. We paused for breakfast and thereafter convened for lively student presentations of the key findings of the bird and vegetation surveys. Students were also provided with a detailed explanation of and practise in bird atlassing. The South African Bird Atlas Project II (SABAP II) is currently underway and the students were provided with background knowledge of project and shown how atlassing is undertaken.

Figure 8. The Academy's mini-conference on the final day.

Participant Evaluations

Before departure on the last day, the students were provided with an opportunity to evaluate and comment on the structure, content and running of the Academy and to suggest improvements where necessary (see Appendix 4). The response was overwhelmingly positive (see graphed responses to coded questions below). The students really liked being involved and learning about project planning, design, and presentation skills. They also particularly enjoyed the close interaction and discussions with experienced scientists and peers.