T h e M i d m a r M e m o r a n d u m

Priorities for freshwater biodiversity research and conservation in Africa

AFRESH1, the first **Afr**ican **Fre**shwater **E**ntomology Work**sh**op, was held at Midmar (South Africa) from 1 to 7 February 2016: 69 delegates representing 21 African countries working with dragonflies, damselflies, mayflies and caddisflies convened for the first time in history.

Freshwater covers less than a hundredth of earth's surface, but harbours one in ten animal species. Four-fifths of global population growth in the 21st century is predicted in Africa: nowhere will future impacts on the most threatened biodiversity be greater. As insects make up over two-thirds of all aquatic species, the university lecturers and students, museum researchers and curators, conservation managers and educators, environmental consultants, ecotourism guides, and nature enthusiasts that met at AFRESH1 are equipped best to set priorities for freshwater biodiversity knowledge advance.

Our plenary discussions and a formal vote identified these main thrusts:

Priority 1: develop identification tools for the aquatic stages of African insects
All surveys, databases, red lists, assessment tools and ecological research rely on trustworthy taxonomy. Much work across Africa is redundant simply because appropriate identification tools do not exist and European, North American and Australian literature is used instead. We must facilitate the identification of the larval stages of dragonflies, damselflies, mayflies, stoneflies, caddisflies and possibly others at the genus level, from where we can begin tackling species. While good keys are needed more urgently than all other tools, finding support for the mobilisation of these data is also hardest. This focus was therefore favoured overwhelmingly by AFRESH1.

Priority 2: test and refine freshwater assessment tools for local user needs
Species-level surveys of target taxa (e.g. using the Dragonfly Biotic Index) best assess the irreplaceability of aquatic habitats, while invertebrate sampling with less taxonomic resolution but more ecological breadth (e.g. the South African Scoring System) is suitable to determine their health. A marriage of these tools allows optimal environmental assessment and monitoring across Africa, but requires adjusting these to the ecology and composition of regional faunas. Moreover, further simplification allows citizens to assess their own rivers, as shown by South African school children using mini-SASS. Thus tools that can be both precise and versatile not only best support freshwater conservation and consultancy, but also education and awareness.

Both directions require future AFRESH events, expansion of our network by field surveys and academic exchange, the mobilisation of existing knowledge and generation of new data, and capacity building through training and equipment. Both will support the other priorities identified at AFRESH1, in order of votes received: (1) research into the ecological tolerance and life history of indicator species; (2) release of data still held in museum collections and the literature; and (3) molecular tools for identification and inventories such as DNA-barcoding and environmental DNA.

The text, drafted to inform collaborators and potential funders, is endorsed by all AFRESH1 attendees:

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