

# Biodiversity

Research • Education • Consultancy

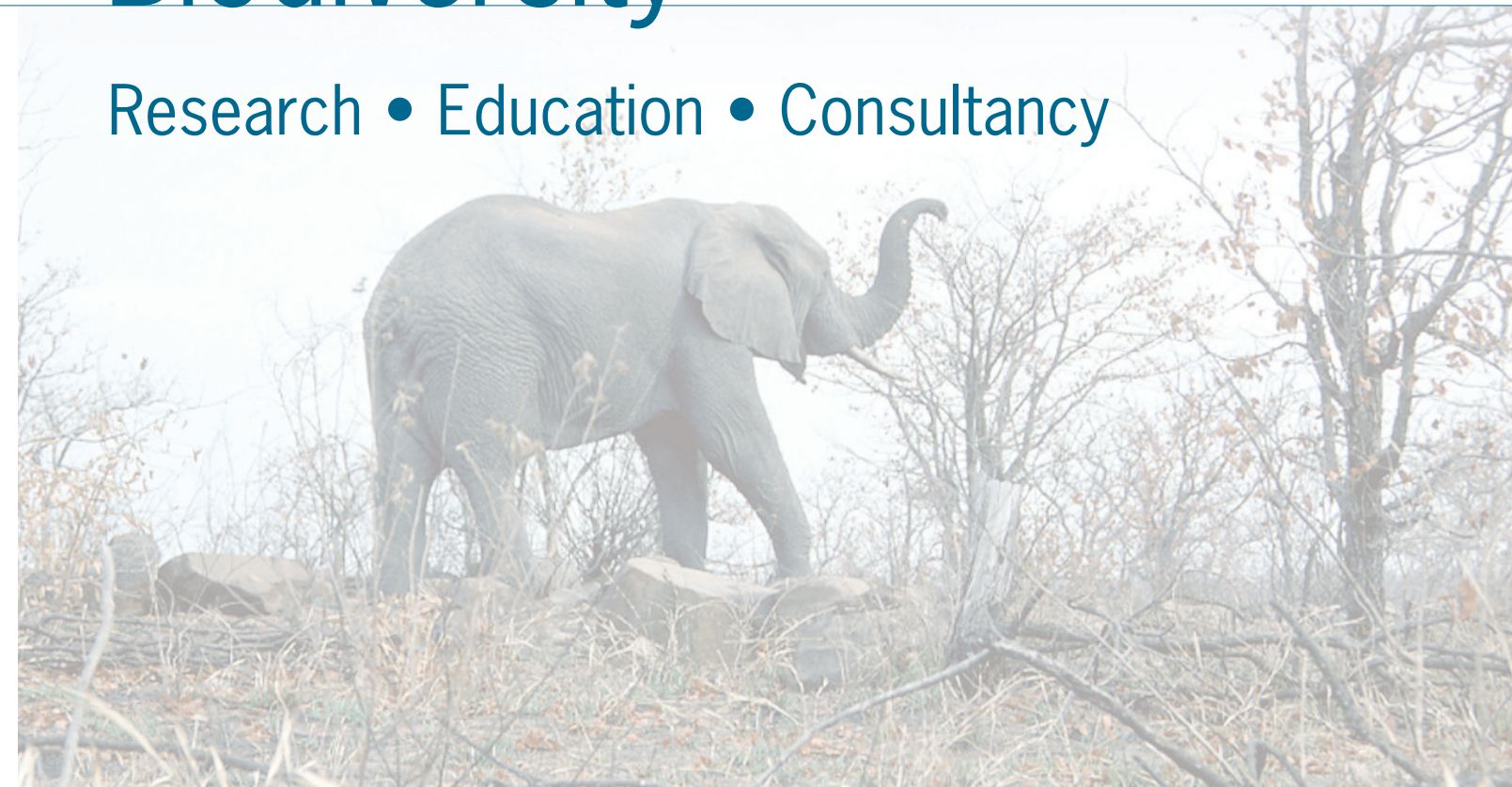
## Co-operation means a broader vision

Biodiversity issues require an international approach. Therefore, the ESG closely co-operates with research and educational institutes within and outside Europe. We participate in a large number of EU-programmes and we are part of European and global networks.

EU-programmes include EASY, Dynabeech, Europop, Green Veins, Coastal Bird Diversity, Greenscom, and Carbo Europe. European and global networks include Alternet FP6 (network of excellence on biodiversity), Connect (European institutes on nature conservation), PEER (Europe's largest institutes on environmental research), Diversitas (UNESCO umbrella for research on biological diversity), Scope (programme on soil and sediment biodiversity and ecosystem functioning), and UN Convention on Biological Diversity (for soil biodiversity commissioned to the FAO project on integrated soil biological management).

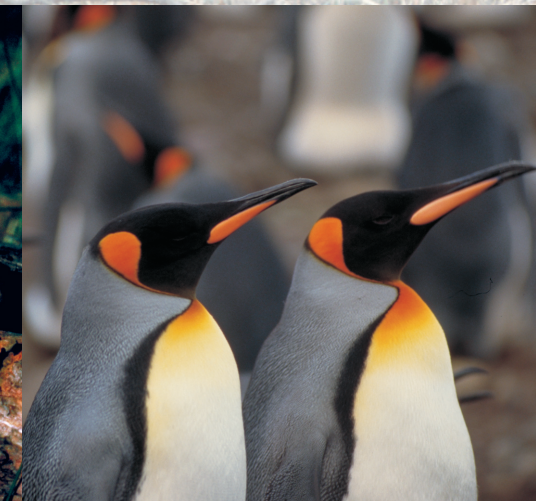
## Part of a sound entity

The Environmental Sciences Group is part of Wageningen University and Research Centre (Wageningen UR) and is divided into five centres. Because we are part of Wageningen UR, we have access to many other fields of expertise, such as healthy food, sustainable agrosystems, a viable environment and processes of social changes. Through our scientific and independent research and education, we contribute to the realisation of a high quality and viable green living environment. We play a key role in the debate on many issues related to biodiversity and we engage in policy making and management on a local, national and international level.



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## The importance of being diverse

Biodiversity - or biological diversity - is the sum of the genetic, taxonomic and ecosystem diversity. About 1.75 million species have been identified so far, a large part of that being composed by insects. Scientists estimate there are about 13 million species in total on earth.

Biodiversity is important for the health of people and the environment: it provides a large number of goods and services that sustain our lives. There is a wide variety of ecosystems such as forests, wetlands, rivers and agricultural landscapes in which living creatures, including humans, form a community. Governments, corporations and NGO's have to manage these ecosystems in a sustainable way to meet our needs of the present while ensuring a viable world for the future.

## Biodiversity loss

The ever-increasing extent and intensity of many human activities, such as over-exploitation, erosion, chemical pollution, causes rapid decline in biodiversity, both in Europe and worldwide. Stopping this decline in biodiversity will require important efforts in adapting our activities to the needs of natural systems.

At the 1992 Earth Summit in Rio de Janeiro, world leaders agreed on a strategy for sustainable development. One of the key agreements was the Convention on Biological Diversity (CBD), which describes the commitment for maintaining the world's ecological integrity under economic development. The European Platform for Biodiversity Research Strategy has recently set a target of halting biodiversity loss by 2010.

## What can we offer you?

The Environmental Sciences Group (ESG) consists of the Environmental Sciences Department of Wageningen University and the research institute Alterra. Within the ESG forces are combined for fundamental and applied research, as well as university education concerning our green living environment.

## Research and Consultancy

Biodiversity research in the ESG is diverse but focuses on the effects of biodiversity on ecosystem functioning in plant and forest communities, grazing herbivore communities, aquatic systems and soil communities. One of our main questions is what mechanisms are responsible for the maintenance of biodiversity. Belowground studies revealed a high diversity in functional relationships between plants, fungi and soil fauna, which is essential to our understanding of aboveground biodiversity. The strength of our multidisciplinary approach is the link between observation - model - experiment as a basis for theoretical development.

Human disturbance often has a negative effect on biodiversity. The ESG devotes several long-term research programmes to study the effects of global and local climate change on tropical forests, arid zone savannah, temperate zone peatlands, and aquatic ecosystems. Other studies investigate the effects of fragmentation, atmospheric nitrogen deposition and fire on various ecosystems. Invasive species introduced by humans are one of the major threats of biodiversity worldwide and we have started several new research programmes on this subject. We consider sustainable use of natural resources as a long-

term solution to the continuing loss of biodiversity. The ESG research programmes around this theme include studies of the effects of agro-environment schemes on agricultural biodiversity (plants, insects, birds), natural resource management options for tropical land use, wildlife conservation by sustainable use, and wetland ecology in arid zones. Other issues in this context are the restoration of aquatic ecosystems, wetlands, grasslands and nature development studies. Our research capacity for consultancy covers areas such as natural biodiversity and species protection, management of forest, nature and landscape, aquatic and estuarine ecology and agricultural biodiversity. Our expertise ranges from the highly topical implementation of EU Habitat and Birds Directive and the EU Water Directive, to the functioning of small landscape elements such as ponds and hedgerows. Moreover, we focus on regional identity and provide solutions such as the restoration of typical regional ecosystems and landscapes, functional ecological analyses and development of non-invasive tracking techniques.

## Education

The ESG offers Bachelor, Master and PhD courses on many different aspects of biodiversity. Within the MSc Forest and Nature Conservation courses include plant and animal ecology, forest ecology and management, sustainable forest management, tropical nature management and conservation, vertebrate ecology, management of nature reserves, and restoration and ecology. Other MSc courses include ecology of tropical forests, resource ecology, molecular ecology and systems and landscape ecology. MSc courses on soil biology focus on soil plant analysis, soil quality, nutrient management,

soil pollution and soil protection, and speciation and transport. The MSc course on aquatic ecology deals with processes in aquatic systems, aquatic ecology and water.

## Knowledge, technologies and facilities

We invest in the development of new knowledge, technologies and facilities to anticipate scientific and market demands. To conduct our work optimally we have excellent research facilities at our disposal, such as laboratories for entomology, fresh water ecology, soil biology and soil fertility, microbial ecology, and genetical biodiversity which include experimental streams, ditches and basins. We manage and maintain large databases, information systems and models on ecological and distribution data of insects, spiders and mites, and pest species on trees, macrofungi, vegetation science, phenology of trees, world populations of waterbirds, and fresh water ecology.

