

Committed to conservation



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Deputy Director and Professor of Research at the Doñana Biological Station in Seville, **Dr Montserrat Vilà** discusses how research conducted at the centre has grown from strength to strength over the past 50 years



For what purpose was the Doñana Biological Station (EBD-CSIC) first created in 1964?

The EBD-CSIC was launched through the determination and commitment of a few naturalists to preserve Doñana, the coastal estuary of the Guadalquivir River in southwest Spain. By the mid-20th Century, the area had been intensively explored by international photographers and ornithologists. They were extremely influential in convincing the newly-funded World Wide Fund for Nature (WWF) to buy a piece of land at the heart of Doñana and ensure it continued to thrive as a biological reserve. In 1964, the WWF entrusted the land to the Spanish National Research Council (CSIC) to study its ecosystems and wildlife. To fulfil this mandate, CSIC created a research centre, the EBD-CSIC, establishing headquarters in Seville.

The centre focuses on seven major research lines. How were these selected and how has the EBD-CSIC honed its expertise in these fields?

Our seven main lines of investigation – wetland ecology, evolutionary biology, molecular ecology, ecological synthesis, conservation biology, biological invasions and plant-animal interactions – are simply umbrella terms that define our research aims rather than representing independent areas of study. Close collaboration and cross-referencing between scientists is commonplace among respective teams at the centre. For example, we work on the ecology of non-native species in wetlands, which in turn has a strong impact on conservation biology. Ultimately, our focus is to understand

ecological systems as the foundation for nature conservation. Field observations and experiments form the basis of our work but are generally just the first stage of research. Many different techniques are then applied, such as molecular genetics and physiological or isotopic analyses. We have strong expertise in ecological modelling and risk analysis.

Could you give a general overview of the facilities offered at the EBD-CSIC?

Besides the field reserve in Doñana, we manage another field station in the Sierras de Cazorla, Segura y Las Villas, Jaén, in a well-preserved mountain area. This area has been highly inspirational, informing seminal studies about plant pollination and seed dispersal in Mediterranean ecosystems. Researchers at EBD-CSIC are world leaders in wildlife ecology. However, our research also relies on an impressive range of laboratories hosted at our EBD-CSIC headquarters in Seville. Moreover, the centre holds the second largest scientific animal collection in Spain, which contains a large variety of national and international vertebrate specimens.

Does EBD-CSIC collaborate with any external research institutes or laboratories?

Collaboration is very important to us. We no longer focus our research topics solely around Doñana – we work in many different regions. For example, we conduct projects in the tropics, in arid lands, on a number of islands, etc. Most relevant international collaborations are with

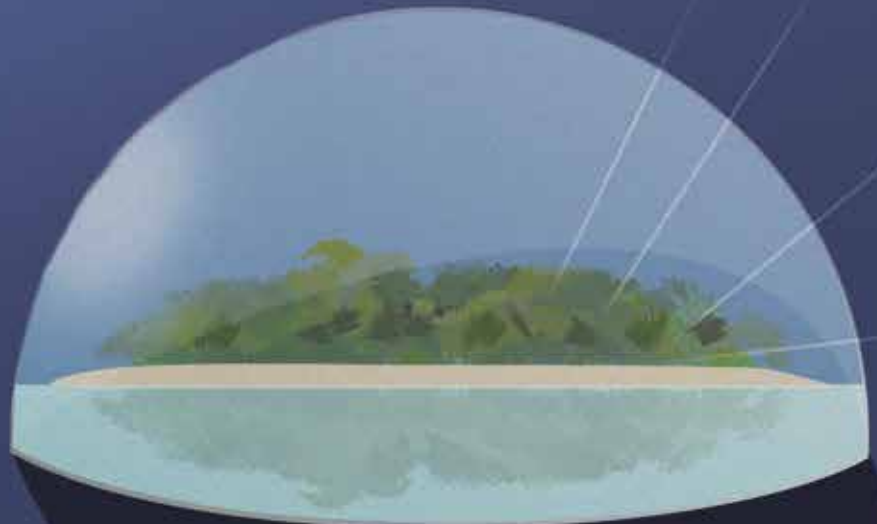
European research centres through EU-funded projects; however, we also work intensively with scientists from all over the world, especially from North and South American universities. We train our PhD students to begin collaborating with foreign laboratories very early in their careers. Many foreign ecologists also visit EBD-CSIC, and most of our regular seminars are conducted in English.

What role have postdoctoral researchers played in the Station's success?

In the last decade, one of the most important changes at EBD-CSIC has been the increasing number of postdoctoral researchers, many of whom come from different countries. This reflects the consolidation and international recognition of our research centre. Postdocs are passionate and productive young scientists; their creativity and hard work is crucial to the research teams. At EBD-CSIC they also play an important role in mentoring PhD students.

Can you highlight some of the future events the EBD-CSIC is hosting over the next 18 months?

This autumn, we will be organising an International Conference on Phylogenetic Comparative Methods, and in 2015 we will host the 10th European Vertebrate Pest Management Conference. We are encouraging researchers, especially women scientists, to be active in coordinating workshops and symposia as these events are crucial to enlarge our network of international collaborators.





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Exploring biodiversity

A team of highly skilled researchers based at the **Doñana Biological Station** in southern Spain is conducting pioneering and multidisciplinary research into biodiversity and ecology

INVESTIGATING BIODIVERSITY AND ecology to understand how natural systems function is a prerequisite for grasping complexity in a range of disciplines. From medical discoveries to pragmatic adaptation, global challenges and even economic development, maintaining ecosystem health is not only important for preserving wildlife and the environment but also for promoting human wellbeing.

A major natural reserve in southern Spain, Doñana hosts a broad variety of habitats and provides shelter for a wide range of wildlife, including thousands of European and African migratory birds. Doñana is the largest coastal marshland in Europe and also comprises beaches, dunes, scrubland, pine tree forests, streams and lagoons. In light of this, Doñana was designated a World Heritage Site by UNESCO in 1994 and has been recognised as a biosphere reserve and a wetland of international importance ever since.

50 years ago, the World Wide Fund for Nature (WWF) entrusted a piece of land in Doñana to the Spanish National Research Council (CSIC) with a mandate to conduct scientific research into the reserve's ecosystems. The Doñana Biological Station (EBD-CSIC) was created in 1964 for this purpose and has since continued the administration and management of this section of the protected area. Moreover, EBD-CSIC coordinates all scientific projects undertaken in Doñana. Over the past 50 years the Seville-based centre has developed and strengthened its research network by connecting ecological researchers all over the world.

GROWTH AND DIVERSIFICATION

Having grown rapidly in the past six years, the EBD-CSIC has now almost doubled its staff, hosting 43 civil servant researchers, over 30 postdoctoral scientists and more than 20 PhD students, all supported by approximately 130 technicians and administrators. In 2006, the Doñana Biological Reserve was designated a Singular Scientific and Technological Infrastructure by the Spanish Government, which has created new opportunities for international scientists to carry out ecological research in Doñana.

The extensive facilities at the EBD-CSIC promote innovative research techniques, offering excellent services to many different research groups. In addition to the well-established Laboratories of Molecular Ecology, Aquatic Ecology, and GIS and Remote Sensing, three new laboratories were opened between 2010 and 2013, specially designed for research on chemical ecology, ecophysiology and stable isotopes. The library is a vast repository of books and scientific journals on zoology, ecology and ethology, proving a valuable resource for the many researchers based at the centre, as well as international scientists. Besides coordinating all projects undertaken in the Doñana area, the EBD-CSIC runs the Roblehondo Field Station based in the mountainous Sierras de Carzoria, Segura y Las Villas Natural Park in southeastern Spain, which serves as an ideal base for field investigations on Mediterranean ecosystems.

A key researcher at the centre, Dr Montserrat Vilà is Deputy Director and Professor of Research. Her studies primarily focus on the

INTELLIGENCE

EBD-CSIC

DOÑANA BIOLOGICAL STATION

OBJECTIVES

To understand the impact of global change on biodiversity and evolution through seven key research lines: wetland ecology, evolutionary biology, molecular ecology, ecological synthesis, conservation biology, biological invasions and plant-animal interactions. The research demonstrates strong expertise in natural history, and fundamental theoretical and empirical ecological approaches. The EBD-CSIC is strongly committed to knowledge transfer for nature conservation.

PARTNERS

Over 300 national and international research centres and universities, including:

National Museum of Natural Sciences (MNCN-CSIC), Spain • **Centre for Ecological Research and Forestry Applications (CREAF), Spain** • **Helmholtz Centre for Environmental Research, Germany** • **University of Aarhus, Denmark** • **University of Saskatchewan, Canada** • **State University in Campinas, Brazil**

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MONTSERRAT VILÀ is Professor of Research at EBD-CSIC. Her research focuses on the ecology of biological invasion and their interaction with stressors of environmental change particularly in Mediterranean ecosystems.



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As an internationally renowned research centre, the Doñana Biological Station's activities have extended throughout the world

ecology and impacts of invasive species. Proud to work with such a diverse group of colleagues, Vilà points out that 30 per cent of the centre's body of researchers are among the 1 per cent most frequently cited researchers in the areas of ecology, environment and plant and animal sciences, testifying to the quality and importance of its research activities. "Our responsibility for studying Doñana is supported by a team of well-trained field technicians and managers who maintain the field station and run an ambitious environmental and wildlife monitoring programme," Vilà explains. "We have diversified our research outside Doñana, more than half our scientific publications are collaborative enterprises with foreign centres. In the last five years we have published more than 1,000 papers, the vast majority in high impact environmental sciences and ecology journals."

A PRESTIGIOUS AWARD

The EBD-CSIC is highly praised for its advanced, multidisciplinary research approaches and has subsequently been awarded a Severo Ochoa Centre of Excellence distinction. Sponsored by the Spanish Ministry of Economy and Competitiveness, this prominent award provides the centre with €4 million in funding over a four-year period. In a country where scientific research has been severely dented by the economic crisis, this cash injection will give the research centre's activities an enormous boost.

Crucially, the Severo Ochoa award will enable the centre to hire several new postdoctoral fellows and PhD students. It will, for example, enhance the integration of existing projects on how global change affects distribution, demography, behaviour and physiology of species, and how evolutionary processes in nature contribute to biodiversity complexity. Furthermore, the funds will facilitate the use of complex methodologies including next-generation sequencing and remote sensing, leading to more accurate predictive models of global change. This research will help to inform

real-life issues of nature conservation and environmental management.

PROMOTING KNOWLEDGE TRANSFER

Education is integral to the centre's activities; the EBD-CSIC is actively engaged in designing Masters programmes – for example, Biodiversity and Conservation Biology at Pablo de Olavide University, Seville – as well as an array of international academic courses. Yet, the researchers are also passionate about applying theoretical knowledge to real-world biodiversity conservation: "In terms of knowledge transfer, our research results are pivotal to wildlife conservation and determining how species respond to global change, especially in Mediterranean ecosystems," discloses Vilà. "Many EBD-CSIC researchers are members of national and international committees with influence on policy and environmental management." The centre also engages in public outreach through organising exhibitions, popular forums and providing non-technical literature.

AMBITIOUS AIMS

Looking to the future, the researchers at EBD-CSIC are keen to continue developing their novel multidisciplinary research into ecological systems. Specifically, they aim to further understand how different components of global change – ie. climate change, changes in land-use, biological invasions, emerging diseases – influence biodiversity in its broad sense from genes to ecosystems, including disruptions in the network of species interactions.

Importantly, the EBD-CSIC will continue to prioritise internal collaboration between its researchers while fostering worldwide external partnerships. With an increasing commitment to studying ecological issues of broad interest and implementing practical research applications, the researchers are striving to achieve scientific excellence in all of their activities.

