

QuESSA - the benefits of nature



Flower margins are perfect habitat for predatory beetles and parasitic wasps. © John Holland/GWCT

Nature can provide a multitude of hidden benefits for humans and these can be clearly seen in food production. For example, bees pollinate flowering crops whereas crop pests are largely kept in check by their natural enemies such as predatory beetles and parasitic wasps. Soil organisms recycle nutrients, break down pesticides and improve the soil structure. An attractive landscape is also recognised as contributing to our well-being. All these benefits are known as 'ecosystem services' and are worth many billions every year in each European country. The exploitation of such services can help make farming systems more sustainable while also helping to justify the three billion euros spent annually in the EU on supporting biodiversity and preserving semi-natural habitats through agri-environment schemes.

KEY FINDINGS

- Our hedgerows and woodlands support 'ecosystem services' such as crop pollination and natural pest control.
- There are opportunities to exploit and improve 'ecosystem services' to make farming more sustainable and profitable.
- The QuESSA project will help to identify how better to exploit 'ecosystem services' derived from semi-natural habitats.

John Holland
Barbara Smith
Tom Birkett
Steve Moreby
Amy Smith & Laura Kor



Pan traps used to collect pollinators and pest natural enemies. © John Holland/GWCT



Bees are important pollinators.
© Peter Thompson/GWCT



Insect prey items mounted on card to measure rates of removal by important predators as an 'ecosystem service'. © John Holland/GWCT

In 2013 we started a new study that looks at how we can better exploit those 'ecosystem services' that derive from semi-natural habitats such as hedgerows and woodland on farmland. The project is called Quantification of Ecological Services for Sustainable Agriculture (QuESSA) and the GWCT is the lead partner. We have 13 other partners from Estonia, France, Germany, Hungary, Italy, Netherlands and Switzerland. The field-based research will be conducted in 16 case studies in eight countries that represent the predominant cropping systems in Europe. Each case study involves using at least 18 landscape sectors. In the UK we will look at wheat and oilseed rape.

This year we identified the main semi-natural habitats in our landscape sectors and surveyed the vegetation, pollinating insects and natural enemies within them. Our next objective is to identify those plants in the semi-natural habitats which best support each type of ecosystem service that we investigate. From this we will generate a score for each type of semi-natural habitat. For example, a habitat with flower species that provide high levels of nectar or pollen will score highly for pollination. These scores will then be used to generate a score for each landscape type and ecosystem service based upon the proportion of cover of each type of semi-natural habitat. Over the next two years we will measure the actual levels of ecosystem service provision in the crops to verify and modify our predictions. Our sampling systems aim to provide an indication of, for example, levels of pest predation or seed consumption (see photos).

The data collected from all the case studies will be used to develop simulation models to explore how the amounts, type and location of semi-natural habitat influence ecosystem services from a farm to a landscape level. Models will also be used to explore how different semi-natural habitats and their arrangement in the landscape affect provision of the different ecosystem services, as there may be some that complement each other, whereas others may be antagonistic. We will also quantify the economic benefits and non-monetary value of selected ecosystem services. The outputs will include a web-based advisory tool for land managers to assess and improve the provision of ecosystem services on their farms.

For further information on QuESSA see www.quesa.eu



Weed seeds mounted on card used to measure seed consumption as an 'ecosystem service'.
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ACKNOWLEDGEMENTS



QuESSA

is funded by:



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