

The AMIGA Butterfly Monitoring Project

The **AMIGA project** "Assessing and Monitoring the Impacts of Genetically modified plants on Agro-ecosystems" is a research project funded within the 7th EU framework programme and runs from 2011 to 2016 (<http://www.amigaproject.eu/>). In general, AMIGA aims at providing baseline data on biodiversity in agro-ecosystems in the EU, with a special focus on the potential environmental effects of the cultivation of genetically modified plants (GMPs). Among others, objectives include defining lists of suitable bio-indicators for various European regions, improving knowledge on potential long term environmental effects of GMPs, providing systematic analysis and recommendations for the environmental risk assessment of GMPs, and exploring new strategies for environmental monitoring of GMPs. The consortium includes 22 partners (research institutes, universities, state agencies and SMEs) located in 15 EU countries.

Within a work package of the AMIGA project, a monitoring framework for butterflies is developed for recording possible effects of GMPs on butterflies in agricultural land. The study includes producing standardized guidelines for surveying farmland butterflies, and a field test of the generated protocols for their feasibility and practicability. Task leader is Büro Lang, Germany, and co-operating partners are the Catalan Butterfly Monitoring Scheme in Spain, the Lund University in Sweden, the University of Cluj in Romania, INRA France and the University of Basel in Switzerland. The field test, i.e. the actual butterfly monitoring, is carried out in Romania (Transylvania), Sweden (Scania) and Spain (Catalonia). In each of the three countries, ten 1-km long line transects are walked back and forth, and all observed specimens of Papilionoidea, HesperIIDae and Zygaenidae are recorded. So far, the butterfly monitoring runs three seasons from 2013 to 2015, and each transect is inspected four times a season (in May, June, July, and August).

On grounds of the project results, a scheme for monitoring the effects of GMPs on farmland butterflies will be proposed, including recommendations for sample sizes, cost-efficient approaches and possible future monitoring sites in Europe. Thus, this study will deliver (i) a baseline of the occurring number of lepidopteran species and their abundance in agricultural land of representative regions of Europe, (ii) information about variance of species richness and abundance and year-to-year variation, and (iii) the development, testing and validation of a standardized monitoring approach for a GMP monitoring of day-active Lepidoptera. Moreover, the results will contribute generally to butterfly monitoring schemes in agro-ecosystems (irrespective of GMPs).

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Pictures



Fig. 1. Field work in Romania (photo by A. Lang).



Fig. 2. Silver-Studded Blues, *Plebejus argus*, in Romania (photo by A. Lang).



Fig. 3. Chestnut Heath, *Coneonympha glycerion*, in Romania (photo by A. Lang).



Fig. 4. Agricultural landscape at the village Mureni, near Sighisoara, Romania (photo by A. Lang).



Fig. 5. Catching butterflies is a hard job (photo by Franz KALLHARDT).



Fig. 6. Agricultural landscape around the village Prod, near Sighisoara, Romania (photo by A. Lang).



Fig. 7. Farmland near Almacelles, Spain (photo by Marina LEE).



Fig. 8. Butterfly transect near Almacelles, Spain (photo by Marina LEE).



Fig. 9. Brimstone, *Gonepteryx rhamni*, near La Seu d'Urgell, Spain (photo by Marina LEE).



Fig. 10. Aerial view of a butterfly transect (red line) near Gislövshammar, Sweden (picture by Lars PETTERSSON).