



DIARS Detection of Invasive plant species and Assessment of their impact on ecosystem properties through Remote Sensing

Programme
STEREO III

Contract
SR/67/315

Start - End
1 June 2014 - 31 May 2017

Project type
Shared cost

<https://eo.belspo.be/DIARS>
<https://eo.belspo.be/DIARS-webstory>



Context and objectives

- The biodiversity conservation policy of the European Commission includes the development of warning and rapid response systems for biological invasions and urges further investigations of their impacts on ecosystem function and services.
- Remote sensing technology provides a promising avenue to upscaling the level of observations of biological invasion, It is yet largely underexplored and underused by ecologists.
- DIARS aimed at better demonstrating and characterizing the impact of invasive species on ecosystems through the combined use of field data and data obtained through remote sensing technologies. It also aimed at supporting monitoring, prediction of spread and risk assessment of invasive plant species through remote sensing as preconditions for taking management measures for mitigation.

Project outcome

Scientific results

The DIARS project resulted in 18 international peer-reviewed publications and several presentations at international fora. Main results are:

- the ability of airborne hyperspectral remote sensing data to generate reliable distribution maps of *Campylopus introflexus*, a non-native highly invasive moss species ([link](#)).
- a novel sampling design tuned to IAS in order to collect presence-absence data which can be used as input for species distribution models ([link](#)).
- the project successfully showed that the mapping methodology for IAS can be transferred to other areas, hence limiting the collection of additional field data ([link](#)).
- the project demonstrated that LiDAR-derived data can be combined together with hyperspectral bands to model leaf nutrient content (nitrogen, phosphorus) in the tree canopy at very fine spatial resolution ([link](#)) as well as we quantified the impact of *Prunus serotina* on structural and leaf chemical vegetation traits ([link1](#) - [link2](#)).



Products and services

- Fine-resolution baseline maps and scenarios of the distribution of invasive plant species at the landscape scale
- The [DIARS toolbox](#): a free and open-access toolbox (cf. the DIARS toolbox) with:
 - > Open-source codes to be used in the free and open source software (FOSS) R and GRASS GIS;
 - > A new R package (cf. iSDM: <https://cran.r-project.org/web/packages/iSDM/>);
 - > Guidelines;
 - > Hands-on training based on real data collected throughout the DIARS project. The DIARS toolbox and its iSDM companion ensure a proper knowledge transfer that aims at engaging and educating stakeholders and end users.

Potential users

Ecologists, conservation biologists, policy makers and landscape managers across Europe.



Project leader(s)

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Location

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Website

<http://diars.vgt.vito.be>



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