

Developing a tool to apply in the risk assessment for Plant Communities in the vicinity of agricultural fields/orchards

Arts, Gertie H.P., Stephan Hennekens, Peter Verweij, Michiel van Eupen, WUR, Wageningen, The Netherlands
Rena Isemer, Joanna Davies, Michael Geiger, Tiffany Kung, Stefania Loutseti, Eileen Patterson, ECPA monitoring group



Background

The risk assessment of pesticides for terrestrial plants is currently based on standardized greenhouse tests with a selection of 6 to 10 monocotyledon and dicotyledon plant species providing an ER₅₀ value. As higher tier tests considering plant abundance and biomass are not standardized and landscape level risk assessment is in development in Europe, the question arises how such a risk assessment can be performed for terrestrial plants.

Objective

- to deduce an appropriate number (presumably 5 – 10) of representative plant communities in terms of habitats, functionalities and structures in off-field areas at the European level to be used in the risk assessment and/or testing for herbicides.

Research questions

- Which natural vegetation is likely to grow in the off-field area given biophysical (climate, soil, hydrology, elevation, aspect, slope), plant-sociological and potentially landscape characteristics?
- How can this vegetation be characterized by its plant traits ?



Figure 1. Off-field plant communities

Approach

As a first step data that could be used to identify plant communities and their underlying driving factors at the landscape level in agricultural areas in Europe was explored.

Secondly, we explored how these datasets could be used and therefore we applied the Quicksan tool (<http://www.QUICKScan.pro>), which is a spatial modelling environment that combines expert knowledge with spatial and statistical data.

Results

Quicksan modeling environment

Figure 1 shows a first output of the application of the Quicksan tool.

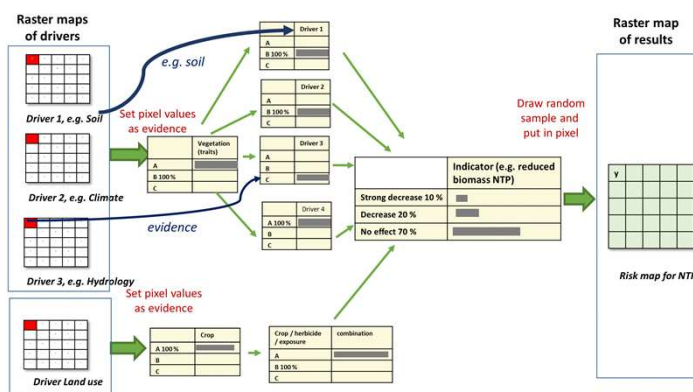


Figure 2. First output of the Quicksan tool.

In the Quicksan tool we make use of the following databases as drivers for the vegetation:

- Climate parameters (www.worldclim.org);
- Soil parameters of European soils: basic data from ISRIC (World Soil Information Centre housed in Wageningen (soilgrids.org);
- Biogeographical regions from European Environment Agency website;
- Map of crop types and their distribution;
- Corine land use data (as a proxy for management);

For the vegetation we make use of the following databases:

- EVA (European Vegetation Archive) database with vegetation plot observations: <http://euroveg.org/eva-database>;
- EUNIS man-made habitats relevant for this study;
- Anthropogenic vegetation classes from Mucina (2016);
- TRY plant trait database with plant traits: <https://www.try-db.org/TryWeb/Home.php> in order to translate plant species into traits.

Conclusions

- From the first explorations performed in 2019, we conclude that the Quicksan tool is a promising tool to link the drivers for the terrestrial vegetation in off-field areas in agricultural landscapes in Europe to the vegetation communities and their traits and to make a selection for use in testing and risk assessment.

