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Raphaël PAUT[1], Safia MEDIENE[1] and Muriel VALANTIN-MORISON[1]

[1] *INRAE, UMR Agronomie, AgroParisTech, Université Paris-Saclay, 78850 Thiverval-Grignon, France*

ABSTRACT

Crop mixture is often presented as a relevant lever for redesigning dominant agricultural systems towards sustainable systems (Bedoussac et al., 2015). However, their implementation is still facing difficulties due to the lack of knowledge on (i) their complex biological functioning (ii) on species selection and (iii) on their insertion in the crop rotation (Bybee-Finley & Ryan, 2018). In addition, the great diversity of crops in terms of phenology, the number of combinations, the various biological interactions to consider (and the nature of these interactions) make it very difficult to acquire scientific references on these systems. While research is underway to better understand crop mixtures functioning and the services they provide, the nearly unlimited modalities of crop combinations make this work very tedious.

In parallel, there is a substantial "empirical literature" on these systems. This mainly includes reports (annual, technical, project, etc.) and farmers on-site experimentations. It compiles empirical knowledge resulting from the capitalization of site-specific experiments. The objective of the present work is therefore to combine scientific and empirical literature in order to provide a decision support tool for the design of crop mixtures.

We carried out a review on crop mixtures in scientific literature and empirical experimentations. With regard to scientific literature, 46 papers were analysed, resulting in 122 experiments (an experiment was defined by a unique crop combination in a site and year). With regard to farmers on-site experimentations, surveys were carried out on ReMix (H2020 project) multi-actor platforms and on a diagnosis of uses conducted on a tool for oilseed rape-based mixture. This resulted in 160 additional experiments.

Data from our literature review were combined in a web-based interactive platform. The user can enter a query by crops, expected service, location or mixture type. Several forms of graphic representations are then available. The platform also allows for a more exploratory approach by generating a crop network representation. The web-based application is available at: https://raphaelpaut.shinyapps.io/EcoSystemix/

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