

Cropping system diversification aiming at pesticide use reduction: Developing concepts at the landscape scale

Convenors:

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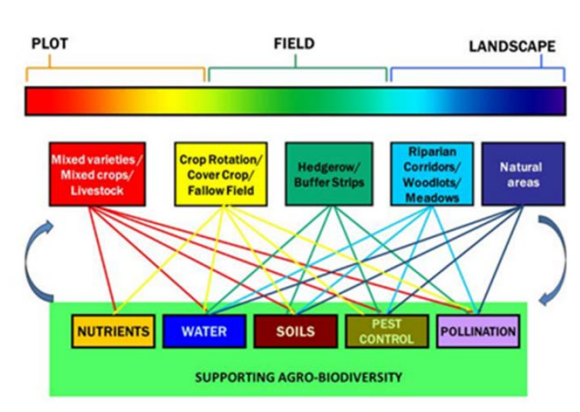
Moritz Reckling, Leibniz Centre for Agricultural Landscape Research (ZALF), Germany

Dachbrodt-Saaydeh, JKI, Germany

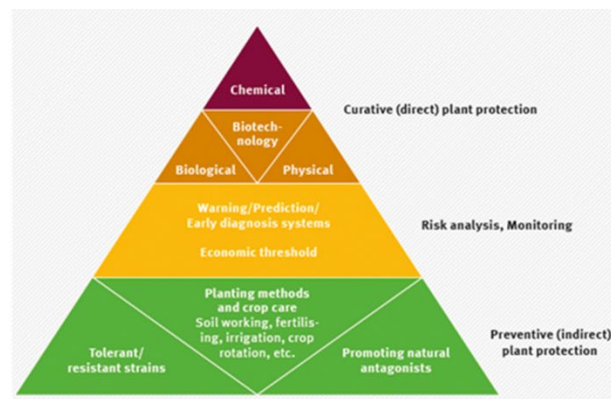
Sandrine Petit, INRAE, France

Josef Settele, Helmholtz-Zentrum für Umweltforschung - UFZ, Germany

Riccardo Bommarco, Swedish University of Agricultural Sciences, Sweden



Diversified farming systems: an agroecological, systems-based alternative to modern industrial agriculture
(Kremen, C., Iles, A., & Bacon, C. (2012), Ecology and society, 17(4).)



5-Point programme for sustainable plant protection
(Frische, T., Egerer, S., Matezki, S. et al. Environ Sci Eur 30, 8 (2018).)

Reducing pesticide use is a focal target of European agricultural policy and a key for farmers' public appreciation. Pesticide effects on farming systems and landscape ecology are complex which is also the case for any attempts for reducing pesticide use. Cropping system diversification (e.g. rotations, cover crops, legumes, intercropping, elements supporting biodiversity) could increase resilience of cropping systems through more spatial and temporal diversity. Together with other agro-ecological measures (e.g. mechanical and biological control), cropping system diversification could result in reduced needs of chemical-synthetic pesticides. Empirical examples are still rare and it is challenging to generalize for large-scale farming conditions. A framework is needed to design strategies of diversification and to assess their impacts in terms of reducing pesticide use intensity and compare these in current and diversified systems. This session will provide a platform for:

- Highlighting case studies of crop diversification and agroecology for increasing environmental benefits and resilience.
- Illustrating examples on the effectiveness of different crop protection strategies in an integrative assessment on environmental effects, biodiversity and agronomic consequences.
- Discussing pros and cons of different indicators for pesticide use intensities in relation to potential effects of crop diversification.

The session will conclude with novel options at the landscape scale on promising crop protection strategies through crop diversification. It aims to design a new framework, integrating aspects of diversification (e.g. *Kremen et al. 2012*) and pesticide use (e.g. *Frische et al. 2018*).

Session format:

- Introduction and Keynote presentations (70 min)
 - Alexandra Klein (Uni Freiburg) "Challenges and opportunities to reduce pesticides without compromising agricultural yield"
 - Sandrine Petit (INRAE) "Designing agroecological landscapes: from theory to practice"
 - tbc (JKI)
- Cased study: The patchCROP Experiment at ZALF as an example of a living lab by Kathrin Grahmann (ZALF) (10 min)
- Short pitches by participants (20 min)
- Group work around 3 key themes (30 min) and discussion (30 min)

Maximum number of participants: 40