

Hella Kehlenbeck, Silke Dachbrodt-Saaydeh

## Editorial

### Affiliation

Julius Kühn Institute (JKI) – Federal Research Centre for Cultivated Plants, Institute for Strategies and Technology Assessment, Kleinmachnow, Germany.

### Correspondence

Dr. Hella Kehlenbeck, Julius Kühn Institute (JKI) – Federal Research Centre for Cultivated Plants, Institute for Strategies and Technology Assessment, Stahnsdorfer Damm 81, 14532 Kleinmachnow, Germany, email: hella.kehlenbeck@julius-kuehn.de

Finding sustainable and environmentally friendly solutions is becoming increasingly important as the farming community faces the many challenges of modern agriculture. Crop protection is a cornerstone of cropping systems to prevent yield losses due to pests, diseases and weeds, both in organic and conventional systems. Although preventive cultural, physical, biological, biophysical methods and decision support systems should be fully exploited before applying direct control measures, until now chemical pesticides are still the main crop protection measure in many crops. Pesticide use remains on a high level with reported undesired effects for the environment. To address these shortcomings, the European Commission has formulated ambitious aims for the reduction of pesticide use and risks by 50% until 2030 within the F2F-Strategy, which were included in the first draft of the Sustainable Use Regulation (SUR [1]).

In research, the reduction of pesticide use has been addressed for many years. New approaches for alternative methods are being developed and are combined in strategies. However, answering questions on quantitative and qualitative aspects of pesticide savings and their associated impacts remains challenging. Additionally, implementation on farms is still limited so far.

This journal issue „Towards a reduction of pesticide use in cropping systems“, offers insights into recent scientific results on existing and innovative cropping systems with a high potential of pesticide use and risk reduction. The articles cover both agronomic as well as economic aspects linked to pesticide reduction strategies.

These strategies comprise existing cropping systems which are built on the strict implementation of Integrated Pest Management (IPM) including appropriate crop rotations, resistant

varieties, intensive pest, disease and weed monitoring and thresholds. Digital technologies are rapidly developing and will increasingly replace manual or visual monitoring methods. Study findings suggest that using Digital Yellow Traps in winter oilseed rape are a reliable and useful tool for pollen beetle monitoring. They offer a promising avenue for further development of monitoring insect pests. Altogether, the combination of IPM measures has a considerable potential to reduce pesticide use while being also economically viable.

Innovative strategies for a pesticide-free cropping system and the use of mineral fertilizers are presented. The system revealed to be an opportunity between organic and conventional production systems, with higher yields than organic but lower yields than conventional systems. Applying these findings and systems on farms requires understanding of those factors that influence acceptance, such as local conditions, marketing structures or attainable yield. On the consumer side, claims on pesticide renunciation are more easily understood than claims related to sustainability.

Another approach to reducing pesticide use by restricting or banning pesticide use in sensitive areas was proposed within the draft proposal for a new EU Regulation on the Sustainable Use of Plant Protection Products (SUR). The effects of such an approach have a considerable impact, but the quantitative estimation depends very much on methods and data used. Although the study did not focus on cropping systems, pesticide-free systems could be a viable solution to meet the necessary restrictions in sensitive areas.

Modern agriculture must address the growing need for sustainability. These research findings highlight the need for a comprehensive understanding of the various interconnected factors that contribute to pesticide use and risk reduction in cropping systems and agricultural production systems. This understanding will help us to move towards a more sustainable and resilient future for our food systems.

<sup>1</sup> REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the sustainable use of plant protection products and amending Regulation (EU) 2021/2115