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Diversification of current plant protection strategies to mitigate climate change effects

J. R. Lamichhane¹, M. Barzman¹, K. Booij², P. Boonekamp², N. Desneux³, L. Huber¹, P. Kudsk⁴, S. R. H. Langrell⁵, A. Ratnadass⁶, P. Ricci³, J.-L. Sarah⁶, A. Messéan¹

¹*INRA, Grignon, France*

²*Wageningen University, Wageningen, Netherlands*

³*INRA, Sophia, France*

⁴*Aarhus University, Slagelse, Denmark*

⁵*European Commission, Grange, Ireland*

⁶*CIRAD, Montpellier, France*

jay-ram.lamichhane@grignon.inra.fr

Climate change is increasingly perceived as one of the major constraints that limit agricultural productivity. Crop losses due to climate change could be direct, such as damages through flooding or storms, or indirect such as altered distribution of crop pests. The real impact of climate change at global level is yet uncertain and likely variable from one region to another. Within this context, it is difficult to predict effects of climate change, particularly when long-term datasets from the past are missing to develop and test predictive models for the future. Nevertheless, our knowledge of plant-disease interactions, population genetics of pathogens as well as crops, and examples of overwhelming establishment of new diseases in a given region provides insights into how climate change may affect disease incidence and severity. Here we report examples of pest populations which have been established across regions previously considered detrimental for their survival and yield losses associated to these pests. Faced with the uncertainty regarding the effects of changing climate on crop protection, here we propose a number of action points that, to our opinion, may help improve current plant protection strategies. Given this uncertainty, policy, research, and extension should be prepared to promote resilience vis-à-vis pests which, at the biophysical level, entails uncovering what currently makes cropping systems resilient, while at the organizational level, the capacity to adapt needs to be recognized and strengthened (Lamichhane et al 2014). Such action points include increase in human resources, development of resilient cropping systems, more focus on crop-weed competition, anticipating of risks and international monitoring, and more effort on breeding for resistance, development of biological control strategies and pest risks analysis. This diversification could be achieved by improving current plant protection practices which might help mitigate the effect of climate change in future crop protection, particularly in the EU, but also at global level. The vision presented here is that of the ENDURE European Research Group, which brings together some of Europe's leading agricultural research, teaching, and extension institutes with a special interest in IPM.

References: Lamichhane JR, Barzman M, Booij K et al., 2014. Robust cropping systems to tackle pests under climate change: a review. *Agronomy for Sustainable Development*, DOI 10.1007/s13593-014-0275-9.