



A view of future avenues of research in pest and weed management

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EDITORIAL

A view of future avenues of research in pest and weed management

Every year, through this brief editorial piece I summarize the main events from the past year in the *International Journal of Pest Management* and try to unravel where the field is heading. During 2016 our editorial board has handled more than 320 new manuscripts, covering a broad range of research topics, from farmers' decisions in the use of pesticides or other pest, weed and disease management methods to the use of satellite imagery to estimate crop damage. As in recent years, most submissions came from Asia, although we have seen an increase in manuscripts submitted from other regions such as South America and Eastern Europe. This emphasizes – once again – the role our journal plays as an outlet for much pest and weed management discoveries carried out in the less industrialized world. This is not a minor issue, given that agricultural produce can be a key component of many (if not most) developing economies where pest management heeds sound, sustainable practices.

For those of us involved in pest management in some way or another, IPM is the approach we believe needs to be adopted for sustainable food production. While the aim of reducing the use of synthetic pesticides is a key principal of IPM, a crucial component involves acquiring sound biological knowledge of the crops (and where they are cultivated), their pests and weed problems and of course on their natural enemies. As we all know, publishing one's findings is the backbone of science as it implies sharing our results with our peers. The outcomes of field trials and of laboratory assays are often obtained by students and early career scientists in need of showing their progress, and are financially supported by public or private funding bodies who also want to see published results. In this sense, publishing new findings has become an essential cog in the big science machinery. Now the question remains, how much do these findings affect practitioners and help reduce crop losses to pests, weeds and diseases?

If measuring the impact of a journal in a research discipline is easily done through standard metrics, gauging the influence of a given pest management new development on agriculture or forestry remains less clear. Moreover, the effects of a given technique or protocol to reduce crop losses on staple foods of local or regional importance can have little visibility among scientists, yet can dramatically impact people's livelihoods. Even at the risk of low Impact Factors, it is here where we want our journal to stand. Not only are

creative approaches (rather than jumping on the bandwagon) to pest management of interest to us, but looking for manuscripts that we believe can actually make a change is something we try to keep as a clear aim.

I have already expanded on what I believe are some of the main threats faced by agriculture and forestry in terms of pests and weeds in the near future: climate change and the increase of the arrival and establishment of non-native species (Corley 2015, 2016). At the risk of partly repeating myself, I still feel there are (at least) four major features that deserve much more research effort in the coming years, if we are to improve our abilities to deal with pests and weeds. First, insect and plant biochemistry. Here, unravelling the mode of action of new insecticides and herbicides, how they degrade into the environment, how resistance evolves as well as work on insect growth regulators are likely appropriate pathways towards greener pesticides. Second, further knowledge and discussion on how the agricultural landscape should be planned is warranted; that is how extensive/intensive crops are to be grown, the role of intercropping in space and time, and how pest management practices interfere with other aspects essential to food production as, for example, pollination services. Growing crops that are better suited to the environment on which they develop may be better than adapting and/or modifying successful crops to cultivate them outside their natural range, even if in some instance they appear free from pests and pathogens. Third, we need to pay more attention to the part played by smallholders and their cultural knowledge and perceptions of pest and weed issues, especially in less developed regions. Determining damage thresholds in the light of better educated consumer demands, where there is a healthier tolerance to, say, a "worm in your apple" every now and then, may be an interesting, mind-shifting idea. Last, but by no means least, is the furthering of our understanding of pest, weed and natural enemy ecology (Corley 2016). The science of ecology is at the base of pest management. We need to better comprehend how and why insects disperse and hence deal with the landscape they inhabit, how they choose among resource patches, the existence of Allee effects which affect natural enemy establishment or pest eradication plans and the population dynamics of pests and weeds in their interaction with introduce natural enemies, is paramount to success in biological control programs. Understanding why populations grow or decline and what are the regulating

factors may help us predict pest outbreaks better. Ecological knowledge of disease vectors is crucial to develop measures to prevent or slow their range expansion or minimize their populations in human dwellings.

A noteworthy new avenue for research on pest management concerns the increase in urbanization which is a recognizable fact of modern times. Recent work has suggested that the total global urban expanse could triple between 2000 and 2030, mostly in the less developed countries (Secretariat of the Convention on Biological Diversity 2012). In contrast with agricultural landscapes, urban environments are exposed to new kinds of pest and weed issues that do not threaten food production but call for control measures based rather than on economic damage thresholds, on human health issues or on human values, such as cleanliness. This is because many of these organisms are generally unwanted in urban areas, irrespective of their numbers. Here, even though this should be always considered in pest management, the ethical issues related with the use of pesticides and mass killing of living organisms or practices that involve animal suffering become particularly perceptible. In our journal we to give such issues a very high consideration.

On behalf of the *International Journal of Pest Management*, I hope to see many new submissions on these challenging topics mentioned above. I'd like to see published those works that can finally reach practitioners and farmers, as well as the scientific community involved in pest and weed management.

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