Biorationals in the field – towards solutions

Jan Mostert*

Can biorationals make the transition from the glasshouse to field crops?

Demand from consumers, retailer and politicians to make all sectors of the food industry less dependent on the use of conventional chemical crop protection products continues to grow. The industry has already established effective solutions using biorational products in protected cropping for ornamentals, fruit and vegetables, but there is still much work to be done to make them consistently effective in field crops.

Certis Europe defines biorationals as; "registered plant protection products generally derived from the natural environment, offering improved benefits for plants, people and the planet, which are increasingly important factors for Integrated Crop Production, to satisfy requirements of the value chain and consumers". Most of them have no residue issues as the active ingredients are naturally occurring substances that degrade rapidly. This attribute also means they might be used in organic production and form the basis for Integrated Crop Management programmes.

They have the advantage of generally being compatible with beneficial arthropods used in pest management, as they have no impact or minimal impact on pollinators, predators and parasitoids of the most important pests. A further major benefit is that biorationals pose a lower risk than conventional products to workers applying them, to bystanders and to consumers of the end produce. Overall their environmental profile is substantially better and in addition they carry a low risk of the development of resistance. Growers and produce buyers are therefore strongly in favour of their use.

For many growers the successful use of biorational products in a wide range of protected crops has become the norm and they are confident of production of almost residue-free output, with little or no conventional product usage, thus responding to the demands of both retailers and consumers. It should be recognised that significant changes occurred in recent years in protected cropping techniques to enable this to be achieved. An example is the now routinely accepted thinning or removal of tomato leaves to reduce unproductive leaf mass and make spraying from the underside of the remaining productive leaves in the crop more feasible, providing better contact with the pest or disease.

The real challenge for the use of biorationals then lies in the successful transfer of these solutions to an outdoor crop situation. If we wish to reduce dependence on crop protection chemicals, we must apply parallel thinking processes to the outdoor situation, to ensure that biorationals achieve equally effective and satisfactory results. Experience has taught us that simply copying the techniques and protocols used in protected crops, does not achieve this. It is critical to get the application of the products in the outdoor crops right as well.

Many new techniques such as robotization and automation including screening and monitoring of the crop to detect and identify pests and diseases are already in use, particularly in greenhouse production. The early detection of pests and diseases, facilitated in this way, is a great advantage for biorational products, as treatment can begin at an earlier pest infestation level which is not yet harming production. However these biorational products do not have a systemic mode of action, so must be targeted correctly and precisely to make contact with pests and diseases such as thrips, whitefly, mites, botrytis and powdery mildew wherever they occur on the plant or the control provided will be far less effective than with conventional products.

The current trend is to work towards greening agricultural production. We expect that developments with robots and drones for monitoring will progress further and will continue to be accepted rapidly in both protected and field crops. If they become more successful in outdoor crops in the coming 10 years, demands from governments to reduce chemical dependency are likely to become even greater. Such machines can check the crops 24/7 for deficiencies so biorational products could be applied at a very early stage of pest or disease development.

The challenge we face is to devise innovative and appropriate production and application technology that will enable the effective use of biorationals in field crops. Unless we have such innovations, the successful use of biorationals in outdoor crops will unfortunately stagnate. ■

*Biorationals and Horticulture Portfolio Lead, Certis Europe