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Pesticides – a changing landscape that demands close monitoring

Discussion around the use of pesticides, or ‘plant protection products’, can often be emotive, and occasionally the lines between scientific and political argument can become somewhat blurred. There is little doubt, however, that they are an important part of modern agricultural practice. Without them it has been estimated that we would see a 40% increase in UK food prices, and they are considered an essential tool in providing food security to a growing population. Figures from the Food and Agriculture Organisation of the United Nations suggest that global agricultural productivity will need to increase by 70% to feed a predicted population of 9.5 billion by 2050. The challenge is to achieve that through improved efficiency rather than the cultivation of more land.

This brief white paper discusses the issues involved.

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Why all the regulations?

Pesticides by their very nature tend to be toxic. Insecticides control pests by poisoning them using a number of different modes of action. In some cases that toxicity is extended to non-target organisms, including humans, due to shared biology, e.g. organophosphates inhibit acetylcholinesterase, an enzyme required for the metabolism of the neurotransmitter acetylcholine, found in most animals. Therefore it is essential that there are a set of rules in place regarding what active substance (a.s.) can be used as well as the manner of that use. Not only do the Regulations protect the consumer, they also protect the workers within the agricultural industries and the wider environment.

Why are we seeing so many plant protection products being withdrawn?

A number of different factors account for the significant levels of product withdrawal seen. Firstly, European Commission Regulation (EC) No. 1107/2009 as amended is the current legislation regulating the use of all plant protection products in the EU. One of the key departures from the rules laid out in the previous legislation, 91/414/EEC, was that a hazard-based approach should be used to assess products submitted for approval in favour of the older risk-based system. Essentially this means plant protection products are assessed for toxicity without consideration of how they will be used. Products that were considered safe to use under risk management conditions, such as low rate use and reduced operator exposure (PPE), are now being rejected at application; in some cases, existing products are being reassessed and approval revoked.

Secondly, Regulation (EC) No. 396/2005 as amended, which specifies the system for setting Maximum Residue Limits (MRLs) for pesticides applied to foods, is subject to continuous updating through further regulations amending the relevant Annexes. Typically a.s. with higher toxicity levels, Category 1-3 under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), will have lower permitted MRLs and in some cases this has affected the product's efficacy. If a manufacturer is unable to provide supporting evidence that satisfactory control of the pest or disease can be achieved at the specified rates then it is likely to be withdrawn. Crop science companies are very aware of these issues and may choose to cease support of a product as part of their own commercial strategy. In 2015 further legislation was introduced which created the "candidates for substitution list". This is a list of currently approved a.s. that have "one or more characteristics which are less favourable than most active substances". Any a.s. included on this list is subject to a process known as comparative assessment at such time as it requires renewal or any amendment to an authorisation. The comparative assessment process compares the safety and efficacy of the a.s. in relation to that of products containing alternative a.s. The intention is that only the best, safest a.s. will be authorised for a particular use. The full effect of the candidates for substitution list has yet to be seen, as many a.s. are due for renewal in the next 3-5 years, but it is likely to further reduce the choice available to growers.

Don't fewer products make decision making simpler for the grower?

In theory, yes. This is based on the assumption that there are products available for selection and that they work. In some cases, especially on minor use or speciality crops, there are no registered products available to growers and they must rely on an Extension of Authorisation for Minor Use (EAMU). However, the responsibility for this off-label use lies with the user. In addition, reliance on fewer a.s., and therefore fewer modes of action, significantly increases the risk of the target organism developing

resistance. The question is: can the regulations keep up with this process to make sure growers are not left without any cover? In 2009 the European Commission issued Directive 2009/128/EC with the intent of establishing a framework for Community action to achieve the sustainable use of pesticides in the hope of addressing this question. The Directive includes the requirement for all Member States to have a National Action Plan (NAP), with the UK government's DEFRA publishing theirs in 2013. As well as making sure all approved plant protection products are used correctly, the NAP emphasises the need to apply an integrated pest management approach and combine the use of conventional chemistry with alternative control methods.

What does this mean for the food industry?

In early 2016 the European Commission announced that chlorpyrifos was to be withdrawn from the list of approved a.s. (found in Annex I to Commission Implementing Regulation (EU) No.540/2011 as amended) and as a result the MRL would be reduced from 0.5mg/kg to 0.01mg/kg with effect from 10th August 2016. This news was perhaps not unexpected as the permitted uses of chlorpyrifos have been declining for some time including the withdrawal from all amenity use in 2015, but this understandably caused considerable consternation within some sectors of the food industry. The proposed change failed to acknowledge that many dried fruit ingredients used by food manufacturers, such as sultanas and raisins, are from produce harvested during the previous year, and levels of chlorpyrifos in the products could potentially exceed the new MRL. The notification period was considered adequate to prevent further use of chlorpyrifos on the 2016 crop, but there was no provision for a longer period between harvest and end use. It is likely that chlorpyrifos will not be the last a.s. to cause such concern, but it is hoped that this will be used as a test case by the authorities when considering the impact of further changes. It does highlight how vulnerable the industry can be to changes in the way that their primary ingredients are produced.

What products are next?

Beyond the published list of candidates for substitution we can only apply an educated assessment. Those a.s. with proven disruptive effect on the endocrine system are likely to be under significant scrutiny, and this includes some of the most commonly used insecticides such as deltamethrin and other pyrethroids. The world's most used herbicide, glyphosate, came within a whisker of withdrawal in 2016 before a last minute 18 month extension was put in place, and it is currently under review by the European Chemicals Agency. Other herbicides, such as diquat, glufosinate and tritosulfuron have just had their MRLs amended following notification in June 2016. Finally, the debate over the use of the neonicotinoid group of a.s. continues, with the National Farmers Union recently submitting an application for emergency use of seed treatments containing these a.s. in an attempt to control flea beetle on oilseed rape. It is estimated that 46,000ha of the oilseed rape planted has been lost due to crop failure this season and figures such as this will influence growers' decision-making and ultimately the viability of their businesses.

It's not all bad news

The regulatory pressures on conventional chemistry have given rise to alternative, low-toxicity products previously considered too expensive or niche. Many of these technologies have come through the research pipelines of smaller companies and even academic departments. In the absence

of chemical options, these novel products are slowly becoming more mainstream and represent the fastest growing sector in seed treatments. On 16th February 2017 the European Parliament voted in favour of submitting a proposal to amend Regulation (EC) 1107/2009 by enabling a fast-track evaluation, approval and authorisation process for low-risk pesticides of biological origin before the end of 2018. Meanwhile, the agrochemical industry has refocused its efforts to bring new, safer products to market. Hopefully, as consumers, we will all benefit in the long term, but the watchword for the industry is “vigilance”.

Campden BRI continually monitors the changes to pesticide legislation and engages in horizon scanning to identify at-risk products. We would be happy to discuss how these might affect your business and steps that could be taken to mitigate the risk.

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