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A simplified way of mentioning the side-effects of pesticides on beneficials as shown on the label

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Abstract: Recently the Belgian authorities have been following a new approach when mentioning, on the label, the side-effects of plant protection compounds on beneficial fauna. So far, it has always been indicated in relation to Integrated Pest Management, for instance 'Product X can be used in Integrated Pest Management of apple'. However, some inconveniences appeared with this method, which are illustrated in the text. The main disadvantages of the old way of labeling were outdated statements due to changed information caused by altered cultural methods or different use of phytopharmaceutical compounds. In other words, Integrated Pest Management (IPM), is continuously adapted according to the appearance of new selective plant protection compounds and beneficials, this was not the case in the statements up till now. Therefore, the Belgian authorities have agreed on a proposal that companies label whether a compound is harmless for a specific beneficial. This information might become irrelevant but is never false. Even then, compounds without such statement might be used in IPM when beneficials are not (yet) present, are present in an insensitive stage or when prey/predator ratios remain unchanged after treatment. However, this information can no longer be indicated on the label.

Key words: beneficials arthropods, natural ennemies, pesticide selectivity

Introduction

In the past, it has always been indicated on the label of plant protection compounds in Belgium *when* a compound was compatible with Integrated Pest Management. On the label of formulated products containing parathion-ethyl as an active ingredient, it was e.g. indicated that it could be used for the control of summer generations of the leafroller moth, *Adoxophyes orana*, in IPM of apple. This statement was based on the fact that in early years of IPM, the only available selective compound for leafroller control was fenoxycarb. Due to its mode of action as a juvenile hormone analogue, it is only effective against L5 larval stages and its use is therefore restricted to the pre- and postflowering period. If in some particular cases the economical threshold has been achieved (an inadequate result of fenoxycarb due to bad weather conditions before and after flowering or inflight of adult moths from neighbouring orchards) only *broad* spectrum insecticides like organophosphoric esters (OP) could be used. Parathion-ethyl was withh*e*ld due to its short persistency and its semi-select*ivity to* OP-resistent *Typhlodromus pyri.* However, since 1997 flufenoxuron is registered in Belgium for the use against codling moth, *Cydia pomonella*, and *A. orana* in summer and the use of the less selective parathion-ethyl should be omitted.

Also some differences might occur between the federal registration of a plant protection compound with the label „can be used in IPM" and the classification of the product in a book of charge for IP (Integrated Production).

This was the case for some years for imidacloprid with the statement on the label that the product fits into IPM - because of its selectivity to predatory mites - and the (contradictory) classification 'orange' in the book of charge that it should be avoided in IP. The latter classification was based on the high persistency of imidacloprid and on its toxicity to beneficial insects such as *Coccinella, Trichogramma, Chrysoperla.* As it is used for the control of aphids only in early spring when populations of beneficial insects are very low, it can be accepted in IPM. Classifications of compounds are made by a working group consisting of advisers, growers and official authorities (but without consulting the registration committee).

The two examples: parathion-ethyl and imidacloprid indicate the confusing situation for the grower between information on the label and other information available for instance in the book of charge of a certain IP system.

New approach

For the aforementioned reasons, it was decided to develop a new method, which is simple and easy to understand for the growers, and of which the indicated statements on the label give information that is always true and hence not related to developing IPM practises. Moreover, the methods to obtain the information needed to give the statement should already exist and be based on current*ly* validated experimental methods.

The new statement on the label 'Compound X is selective for beneficial Y' is given after the decision of the registration committee after studies provided by the company and after judgement by experts. The statement is only possible if 'harmlessness' is reached in the successive levels of the Tier-testing system developed by the IOBC Working Group „Pesticides and Beneficial Organisms" (Hassan *et al.,* 1985). To get a statement on the label, tests executed according to the principles and guidelines of this Working Group (Hassan *et al.,* 1985, Hassan, 1988, Sterk *et al.,* 1999) have to be provided. These tests, which do not have to be carried out according to Good Laboratory Practice, are judged by the registration committee.

Discussion

The newly proposed method has major advantages as compared with the former one. First, there is no judgement on the use of a product in IPM or IP. This means that changing methods in IPM or new possibilities with other compounds do not influence the statement on the label. A certain compound, which is not completely selective for the relevant beneficials, might be permitted in IPM or IP because of the absence of alternatives or because the prey/predator ratio is not disturbed. Or the use of a non-selective compound is still possible when the sensitive beneficial has not (yet} been introduced or *is* present in a tolerant life stage. Moreover, the currently increasing availability of beneficials in glasshouse cultures does not influence the statement anymore. If a compound is harmful for *Orius* spp. but not for *Amblyseius cucumeris,* the latter species can be chosen for thrips biocontrol. For a long time *Encarsia formosa* was the only beneficial used for the control of whiteflies, but nowadays *Macrolophus caliginosus* and *Eretmocerus californicus* can also be used. With the new approach, the label statement is independent of the beneficials used. It also stimulates the phytopharmaceutical industry for further testing till harmlessness is achieved and it encourages those that are testing many beneficials for compatibility in IPM.

For grammatical and logical reasons the statement 'is selective for' is preferred to the statement 'not harmful'. In the latter case it can be interpreted that three out of the four *possible* IOBC categories (harmless, slightly harmful, moderately harmful, harmful) fulfill the

requirements of this statement. The statement ‘is selective for’ is also preferred above ‘harmless’, because the latter *might* falsly indicate to the grower that there is no effect at all.

The new approach has also some disadvantages. It is possible that long lists of statements for different beneficials will occur on the label of the product. However, since good studies are expensive we believe that companies will limit the statements to the beneficials which are relevant and of which the use is of commercial interest. Another disadvantage is that a quite long list of beneficials for which the product is harmless, might suggest that the product is completely selective for all beneficial arthropods. Therefore, the growers should be warned by advisory services but we think this is of minor importance compared with the advantages of the new approach.

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