What's the score? –Eco-rating pesticides

The European Union has recently agreed to fund research to evaluate methods and techniques which rank pesticides according to their environmental impact. Kathy Lewis reports on the UK contribution.

The EU research project aims to compare, contrast and evaluate the various different techniques, developed by various European experts, to rank pesticides according to their environmental impact. The research will be carried out by a consortium of 11 different organisations. These organisations include those which have already developed such a system and those which are interested in sharing the experiences and results.

Current methods which will be evaluated include the Pesticide Eco-rating System developed at the University of Hertfordshire UK, the Pesticide Yardstick developed at CLM (Centrum voor Landbouw en Milieu) in the Netherlands, the Agro-indicators System developed at INRA (Institut National de la Recherche Agronomique) France and the PC Plant Protection system developed at the Danish Institute for Plant and Soil Science. The results will be published in a report and a conference will be organised to share the experiences and results with all interested parties.

Assessing UK pesticide use

All UK pesticides carry label precautions regarding safeguards that are necessary to protect humans and the environment. If these precautions are followed environmental risk is minimised. Nevertheless, the environmental impact arising from pesticide use is causing widespread concern. Few control procedures are in place at the farm level to regulate either the quantities of chemicals applied to the land or the application techniques used. The need for the agricultural industry to apply best practice is clearly apparent.

There is substantial information on best practice, guidance being available in a number of publications. However, its implementation appears to be slow. One of the reasons for this is that effective environmental protection is site specific. No two farms are identical; different crops are grown, various activities undertaken and there will be differences in soil type, local climate and the presence of features such as surface water, groundwater and habitats. The information available is rarely sufficient to allow the farmer to develop a coherent action plan specific to the farm. There is a need for a decision support system which will help the farming industry distil information and produce a site specific management plan which will not jeopardise profitability, balancing implementation costs and environmental benefits.

The University of Hertfordshire is currently developing a computer-based system to encourage agricultural best practice and a significant part of the system is dedicated to the use of pesticides. The software uses performance indices to report to the farmer how current practices compare with what is perceived to be best practice for that site. The software divides pesticide use into two main areas: field applications and management issues and general farm use.

Field applications

The index used is based on three data types. Firstly a scoring system is applied to the label warnings assigned by Pesticide Safety Directorate. Each warning has an associated score. The scores for a particular pesticide formulation are aggregated depending upon the local site and associated risk. Secondly, for each active ingredient within the formulation a score is derived based upon a range of parameters which reflect environmental fate and potential for damage. These parameters include application rate, solubility, vapour pressure and soil half-life. The measures consider whether: has the harvest interval been complied with; the maximum dose and/or maximum number of applications have been exceeded; and, applications have official approval.

The resulting score, known as the eco-rating, is expressed on a scale of -100 to 0. A score of 0 indicates full compliance and no environmental impact. Scores between -70 and -100 indicate poor practices, an undesirable or illegal application. Scores in the range of -40 to -60 may not necessarily represent unapproved applications but may indicate that an alternative chemical or an adjustment in practices may be environmentally beneficial. The user should aim for a score of between -40 and 0.

The figure illustrates how the system behaves for a range of pesticides. As the software is site specific a hypothetical farm situation has been used for demonstration purpose The first four examples relate to officially approved applications. Examples 5 and 6 sho typical eco-ratings for unapproved pesticide In example 5, carbetamide does not have approval to treat corn marigold on oilseed rap In the last example extreme mis-managemen is illustrated. It is highly likely that the pe has been mis-identified and pirimicarb cu rently only has approval to treat aphids o potatoes.

These examples demonstrate evaluatio of perceived good and bad practice and th spread of eco-ratings from relatively benig pesticides, for example fatty acids, to thos that may be more environmentally toxic, fo example cyanazine.

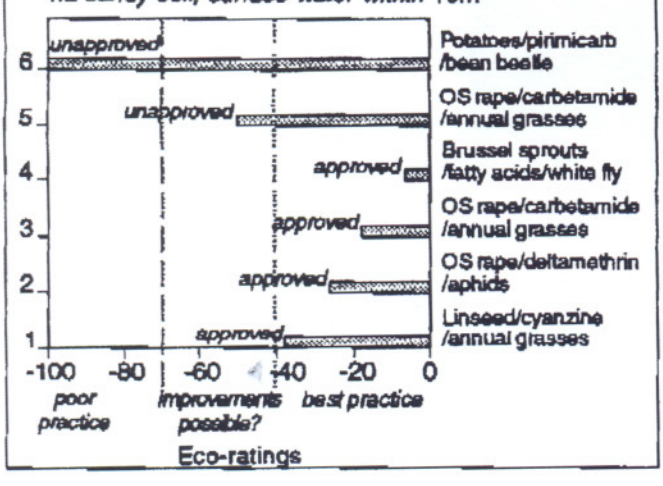
Farm management issues

The environmental risks associated with pes ticide use come not only from application but also from management practices. Thes include storage, handling, waste management application techniques, pollution prevention activities and machinery calibration. Due t the non-quantitative nature of the data, a de tailed multiple choice questionnaire is usec to determine the performance eco-rating. The questionnaire is divided into sections, for example, waste management, storage, training transportation, protection of field margins and application techniques. Options of both good and bad practices are scored according to the perceived environmental risk. The users choices are then assessed and a report produced. A similar methodology has also been used to assess the farmers use of non-crop pesticides such as biocides, rodenticides, sheep dips, and plant and seed dressings.

The software does not rate, rank and so compare the environmental risks associated with one pesticide against another. Nor does it advise on what products to use. Instead it determines a site specific score based upon all aspects of pesticide use which reflects environmental risk. It also produces a report comparing current practices with best practice and regulatory compliance.

The software will be available from Spring 1998. A variety of formats including 3.5 inch diskettes, CD ROM and Internet service are currently being considered.

Examples of Eco-ratings for a range of pesticides in a hypothetical farm situation. 10 ha sandy soil, surface water within 10m



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