**ISSUES IN TRAINING HERBICIDE APPLICATORS**

*John Kent*

Farrer Centre, Charles Sturt University,
Locked Bag 588, Wagga Wagga, NSW 2678

**Abstract**  Weed managers must adopt best practice when using herbicides to ensure efficacy and minimisation of risks. The Farmcare Australia farm chemical user training program has led the way in training and accrediting competent operators. Even though good progress has been made, many challenges remain to ensure protection of trade, human health and the environment, and continued access to herbicides.

**INTRODUCTION**

Weed managers are all in the business of food and natural fibre production or amenity and environmental management. Potential adverse impacts of weed management activities emphasise the importance of adopting best practice and integrated weed management (IWM) principles, particularly in relation to herbicide use. The way in which herbicides are applied is often the weak link in effective iwm programs. Poor application technique is wasteful of chemical, is costly and can lead to adverse ramifications.

As stakeholders we must all become partners in maximising the benefits and reducing the risks of herbicide use. To achieve this it is essential that these products are used by competent operators. Education, training and extension is a fundamental cornerstone of this - it is the “E” part of RD&E. In recent years there has been considerable progress towards achieving this, particularly through the Farmcare Australia farm chemical user training program. However, since the program commenced, significant changes have occurred in the political and commercial climate in which researchers, weed managers and herbicide applicators operate bringing many new challenges placing even more emphasis on education. The implications and importance of this are put into perspective when we consider that many ground spray rigs now sold are worth in excess of $100,000, and inappropriate use of herbicides can threaten both international and domestic markets for agricultural produce and access to herbicides themselves.

**CURRENT AND FUTURE CHALLENGES**

Good training and education will assist weed managers and herbicide applicators meet the following challenges:

**International pressures and trade issues**  In recent years there has been a stronger primary production focus on the requirements of domestic and overseas markets for food and fibre to meet quality assurance (QA) requirements. Consumers are demanding that foods they buy and eat are safe and free of residues but residue testing alone will not allay their fears. They want to know that pesticide use in production processes is minimal, and that they have been used by competent people without harming the environment (Barratt 1998, Copeman 1998). This is one of the reasons why foods grown and certified under organic production systems are gaining market share.

It is no longer acceptable for us to claim that our food production and environmental management is “clean and green”, we have to be able to prove it, preferably by independent audit (e.g. to ISO 14000 standards), and preferably as part of a planned and monitored environmental management system to minimise the impact of a business on the environment (Alexandra 1999).

**Environmental issues**  Intensity of production and diversity of land use is increasing with integration of farming, environmental management and rural communities. This has led to greater concern about chemical trespass - movement of chemical out of a treated area to adversely affect the surrounding areas. This can occur through drift of sprays and vapour, runoff with rainwater, or movement with eroded sediment. Risks include damage to ecosystems, non-target organisms, livestock, crops and humans. Apart from damage through loss of production, unwanted chemical residues can make produce unsaleable. In future, chemical contamination of water and preservation of water quality will possibly be a bigger issue than water quantity or availability.
On a political level, a public increasingly distanced from primary production is demanding more care be taken of the environment. People are insisting on reduced chemical inputs and better ways for managing weeds and other pests and these demands are being heard by the regulators and legislators. Herbicide drift management is becoming more important than efficacy, while prevention of spills during transport, storage and use must be ensured. Correct disposal of empty containers and unwanted chemical product are high priorities.

As Avery (1995) states, the challenge of the 21st century therefore is not humanitarian (how do we produce more food) but environmental (how do we produce it sustainably without destroying natural environments).

**Health issues** The effect on human health of occupational and community exposure to pesticides continues to be a concern (Faulkner 1993). Poisonings by pesticides or suspected adverse health effects always attract media attention.

**Sustainable weed management** The rate at which new herbicide products are appearing on the market has diminished in recent years because of the high cost of product development (up to $100 million) and stringent regulatory requirements. We must therefore preserve the products we have through good product stewardship, particularly by using herbicides as part of integrated weed management programs. This is especially important for herbicide resistance management, but weed managers often take action too late. Does this mean our education and extension programs are not working and need modification?

The introduction of herbicide resistant crops is raising concerns about the overuse of herbicides leading to build up of herbicide residues in the soil, faster development of herbicide resistant weeds and cross breeding of crops with wild weeds to create ‘super weeds’.

**Regulatory issues** We are experiencing ever-more stringent regulatory restrictions - some imposed by government and others by industry self-regulation - often through QA programs.

The National Registration Authority for Agricultural and Veterinary Chemicals (NRA) is undertaking an existing chemical review program (ECRP). As a result, restrictions are being placed on the use of some products e.g. atrazine not to be used near water, while access to other products is restricted to approved operators only. Product labels are being amended to include these restrictions.

Most state Governments in Australia have, are in the process of, or are about to review pesticide control of use legislation. Systems similar to the Agricultural Chemical User Permit (ACUP) in operation in Victoria will probably extend to a number of other states. In NSW, the Hazardous Substances Regulations (1996) under the Occupational Health and Safety Act (1983) requires urine testing of herbicide applicators to be conducted if the herbicides used are designated hazardous substances, and there is a test available and there is a risk of exposure identified by risk assessment. Such herbicides include bromoxynil, dicamba, picloram, triclopyr and 2,4-D (Cross 1998).

Discussions are being held on the introduction of national farm chemical user permits. It is proposed that all products be categorised on the basis of assessed risk with a different level of permit required to use products in each category. Potential difficulties and confusion could arise because registration and sale is governed by federal legislation, while states are responsible for control of use. There are considerable differences between states and further harmonisation of legislation is highly desirable.

It is also possible that in future workplace audits of chemical management practices (equipment standards, chemical transport, handling, storage and disposal practices, record keeping and operator competency) may be required for the highest levels of accreditation. A UK-style system which requires an operator’s license for each type of application equipment and for equipment to be regularly checked and certified against engineering standards is not anticipated.

**Risk management** Weed managers have a common law responsibility, or Duty of Care, to ensure our actions do not cause damage to ourselves, our neighbours or the environment. We live in an increasingly litigious society and victims of chemical misuse are becoming more likely to sue for damages. The financial and legal systems are becoming interested and aware of chemical issues and are requiring due diligence to limit liability and to maintain access to finance and insurance (Dibley 1999). Damage caused by pesticides is considered foreseeable and preventable, and not unexpected or accidental. Therefore, the person deemed negligent carries the risk and this may include remediation of damage caused.
Labelling There is a legal requirement to follow label directions but reading it is not enough - the information must be correctly interpreted and implemented. This is often difficult because of the complexity of labels and problems of literacy and numeracy. Language difficulties among some operators from a non-English speaking background is an increasing problem. On the positive side, a project has just been initiated by Worksafe Australia to attempt to simplify product labels.

Herbicide application technology issues are frequently underestimated when we talk about weed management. The way in which herbicides are applied is a major determinant of efficacy. Equipment is becoming more sophisticated with innovative delivery mechanisms, new nozzle technology, and computer-controlled application of herbicides to weed patches based on digitised weed maps. The type of equipment used, the way that equipment is adjusted for the particular situation, its calibration and operation, and the environmental conditions under which the herbicide is applied all determine the final result.

All of these issues place great responsibility onto herbicide users who must not only demonstrate that they are aware of growing public concern of chemical and environmental issues, but also that they are taking positive steps to be knowledgable and skilled. Training must be based on sound education principles, good science and effective resources. It must be co-ordinated and conducted by competent instructors and most importantly, meet the needs of participants. Research (Kilpatrick 1996) has shown that participation in training has led to changed behaviours, and improved practices and profitability.

RECENT PROGRESS

The outlook is not all doom and gloom. Great progress has been made since many of these concerns were first raised (Kent and Pratley 1987). We have the foundation for the future.

The Agsafe farm chemical industry accreditation program, introduced in 1987, has successfully raised the standards of premises and professionalism of industry personnel handling and selling chemicals.

The Farmcare Australia Farm Chemical User Training Program has led the training and accreditation of applicators since 1990 through accredited short courses. Since its inception, over 110,000 people (Figure 1) have earned a certificate resulting in an enormous impact on how chemicals are used. Farmcare Australia is recognised by governments and industry as the peak body for training and accreditation of farm chemical users and the Farmcare certificate has become a standard qualification for employment of chemical applicators. The National Farmers’ Federation (NFF) have an agreed policy that any QA program requiring farm chemical use training be predicated on holding a Farmcare certificate ensuring quality, consistency and credibility (Craik, 1998). Farmcare certificates are also a requirement for using the more hazardous products and for participation in industry quality assurance programs. Advanced, industry-specific specialist modules, including programs for herbicide applicators, are planned or in development.

In 1996 the National Weeds Strategy was published to focus attention on weed problems and strategies to minimise their impact. Among other things it recommends greater emphasis on education and training (Anon 1996).

The Cooperative Research Centre for Weed Management Systems formed in 1995 is having a major impact through research programs focussing on key weeds in cropping, environmental and perennial pasture ecosystems in southern Australia. It has a major focus on adoption of new technology, education and training through an IWM text book, a tertiary level IWM subject which is taught at the University of Adelaide, Charles Sturt University and the University of New England, and short courses in weed identification and management (see paper by Moerkerk et al. 1999 and poster abstract by Kent et al. 1999, these proceedings).
The comprehensive National Strategy for Agricultural and Veterinary Chemicals (ARMCANZ 1998) developed through consultation between industry and state and territory governments aims to maximise agricultural sustainability by promoting best management practices, and to minimise risks to health, trade and the environment from misuse of agricultural and veterinary chemicals. The strategy emphasises the importance of education and training in sustainable resource management and innovation as does the Action Plan for Australian Agriculture (DPIE 1998).

National Weed Management Competency Standards and Agricultural Chemical User Competency Standards have been developed to document the skills required at the various levels of responsibility in these activities. Competency standards now underpin all industry training programs and are essential for accreditation and recognition of training.

Avcare in association with Agsafe, industry organisations and local, state and federal governments have introduced a world-leading three pillar waste management program. In February 1999, the drumMuster program commenced to overcome the problem of container disposal by using a levy on products sold to fund a collection, inspection and recycling program for empty containers. There are also targets to reduce packaging at source. The National Collection, Storage and Destruction Scheme (NCSDS), endorsed in 1998 by the Australian and New Zealand Environment and Conservation Council (ANZTEC) is a “one-off” collection of unused and unwanted agvet chemicals to be funded 50-50 by state and federal governments. Ratification by governments is eagerly awaited. The final pillar is the Chemclear Agreement to collect and dispose of all future unwanted agvet chemicals on conclusion of the NCSDS.

Codes of Practice for safe use and storage of chemicals in agriculture have been developed in a number of states while industry groups are developing best management practice programs.

THE NEXT DECADE?

Although there has been good progress and great change over the past decade, much still needs to be done. The next decade will continue the process at an even greater rate. Probably the most far reaching changes required involve a change in attitude by weed managers and those who advise them to adopt integrated weed management practices and to ensure all are well trained and competent - particularly when it comes to herbicide application.

Changes to pesticide policies in Europe and the United States will have a major impact on how chemicals are handled and used in Australia (Scott 1997). If we follow overseas trends, we will see more stringent registration requirements; financial incentives (tax on pesticides or deductions for integrated pest management systems); mandatory training and licensing of applicators - probably at different levels; workplace assessments of competency and chemical management practices; increased monitoring of chemical use; and obligatory chemical reduction targets. While some of these will be legislated, many will be integral components of quality assurance programs and environmental management systems.

We can no longer be complacent. We must have a professional attitude and take a risk management approach. If we are not proactive, unpalatable requirements will be forced on us. If spray drift continues to be a problem, or if chemicals contaminate waterways or public opinion is sufficiently anti-chemical, we will lose access to products. The challenge is for us to be aware of what the community will and won’t accept. Listen, anticipate and manage accordingly (Turner 1998). In 1995 Rowlands stated: “Australian agriculture needs to position itself to cope with changes in the political and regulatory environment, whereby access to pesticides will be increasingly restricted. Countries positioned through the adoption of a coherent and comprehensive national program to develop alternative crop protection methods and ensure that farmers are using best management practices will be well placed to gain advantage in the increasingly competitive world marketplace”. These words are still true although the focus is now shifting more to environmental issues.

We must embrace change and be proactive. Good self regulation is better than bad legislation, and above all weed managers must be competent.

REFERENCES


