TRAVEL GRANT REPORT:

Report on travel grant to attend the Fifteenth Asian-Pacific Weed Society Conference in Tsukuba, Japan, 24-28 July 1995

Peter Dowling

NSW Agriculture, CRC Weed Management Systems, Agricultural Research & Veterinary Centre, Orange NSW

I attended this conference as an official representative of New South Wales Agriculture, with financial support being received from the Grassland Society of New South Wales and the Weed Society of New South Wales. The conference was jointly organised by the Asian- Pacific Weed Science Society, The Weed Science Society of Japan, and the Japan Association for Advancement of Phyto-Regulators. There were 450 delegates present comprising mostly Japanese (42%), Pacific rim nations including New Zealand (10) and Australia (16), and a small number from the United Kingdom, USA and Europe. Six of the delegates from Australia were employed by a single chemical company.

My reason for attending was to get an indication of the progress being made with reducing chemical inputs in agriculture and an international perspective on attitudes toward herbicide resistance. This is particularly important with a crop like rice, where few alternatives to herbicide use are being considered and where herbicide resistance is becoming increasingly apparent. It was felt that the approaches taken for controlling weeds in rice, and temperate pastures where there are non-herbicide possibilities for weed management, would provide a useful contrast for evaluating herbicide resistance strategies in NSW.

Herbicide use

Major changes are occurring in Asian agriculture with the development and application of technology to rapidly growing non-agricultural sectors. The movement of the population away from agriculture has resulted in labour shortages and a consequent need for labour- saving technologies in the rice industry. The main impact has been with the development of direct seeding which is replacing transplanting. However, this change has led to a substantial modification in the associated weed flora resulting from the increased use of herbicides which substitute for manual weeding. Herbicides are necessary in direct seeded rice because the weeds are at a similar stage of development as the rice plant, and distinction between grassy weeds is difficult. In addition, the suppressing effect of submergence in water is lost.

Herbicides are now viewed as an essential part of Asian rice culture, and the herbicide industry is attempting to refine herbicide usage so that the dangers of herbicide resistance can be minimised, and environmental and health problems recognised and addressed. However, a disturbing message from the conference is that herbicide resistance is inevitable, and that integrated weed management strategies are a waste of time over the longer term. The emphasis on herbicides at both an industry and conference level was reflected in the number of delegates attending the conference who were affiliated with chemical companies (180), representing almost 40% of the delegates present.

The current trend with Asian rice growing is to rely on post-emergence herbicides (lowered environmental risk), use compounds that require application rates of lower active ingredient, and use formulations which place less reliance on skills and knowledge of the farmer (granules, flowable concentrates, bubbling tablets, water soluble bags). Intermediate application technology is avoided by applying the concentrate directly to the rice paddy and allowing the water in the paddy to disperse the chemical uniformly, and the development of 'one shot' formulations provide a broader spectrum of weed control. In addition, there has been a considerable input into the further development of herbicide safeners, which increase selectivity and can extend the use of existing herbicides that are environmentally friendly.

Importantly, environmental and health concerns, together with development of herbicide resistance in major weeds are having an influence on herbicide manufacturers. This applies particularly to approaches being taken in relation to application rates, application technology and the need to integrate other procedures which lessen the impact of weeds and augment the herbicide. The conference felt that ecological studies as the basis for weed forecasting

ence felt that ecological studies as the basis for weed forecasting is also a useful way of reduc-ing herbicide inputs. The significant influence of herbicides on rice farming can be seen from China and India alone, where expected expenditure on herbicides will rise from $67m to $550m by 2003. In that time, herbicides in developing countries will be the major area of growth within the pesticide industry.

Herbicide resistance

Resistance is being more frequently recognised in a wide range of species and from an increasing number of herbicide classes. Despite the increasing reliance on the use of herbicides (particularly in monocultures like rice) and the likelihood that increasing resistance in a many compounds and species is the inevitable result, there were surprisingly only four papers, including a review paper, addressing the topic of herbicide resistance.

The spread of herbicide resistance, both target site cross resistance and non-target site resistance/ multiple resistance, is spread mostly by seed. For weeds of rice, it was considered that two important practical recommendations for limiting the build-up in resistance is by rotating herbicides and preventing seed-set. The use of non-selective herbicides in herbicide resistant crops may provide another opportunity for delaying the progress of resistance. Previously it was thought that the resistant biotype was less fit than the susceptible type, but this is now less certain, meaning that the resistant biotypes may not disappear as quickly from the general population.

Implications

The increasing incidence of herbicide resistance in weeds has implications for Australian agriculture. Despite the significance of herbicide-resistance to their farming future, many farmers in NSW are seemingly unaware of its importance. The message about resistance is clear, but it needs to be continually reinforced so that the simplistic view of herbicide resistance that currently prevails in Asia cannot happen here. The CRC for Weed Management Systems is currently addressing this issue and is emphasising the need for an integrated approach to weed management. On-going farmer education on herbicide modes of action, herbicide families, and frequency of herbicide application as primary factors leading to the development of herbicide resistance, cannot be over-emphasised.

Acknowledgment

My attendance at this conference was made possible through financial assistance provided by the Grassland Society of NSW and the Weed Society of NSW. I am particularly grateful to both Societies for giving me this opportunity for international contact and professional advancement.