Some of the problems facing agriculture in New South Wales

Department of Agriculture, New South Wales

Introduction

The 109 research agronomists and horticulturists in the NSW Department are well supported by chemists, biologists, entomologists and advisory officers, so most problems are receiving attention. This paper aims to highlight some of the broader issues that may need additional inputs in future.

Environmental protection

The increasing community awareness of the need to protect the productive potential and stability of the environment has already had a profound effect on agriculture. The insistence by authorities on exhaustive testing of chemicals before release has led to higher costs; the withdrawal on health grounds of various cost-effective pesticides, as well as increased controls on pollution, are issues which have created new challenges for the agricultural scientist.

Pesticides

Far more information is still needed on the movement and ultimate fate of pesticides and their breakdown products in soil, water and foodstuffs. Improvements in spray application equipment and technology would be beneficial as this would permit a reduction in the amount of pesticide applied.

Farmers will respond to pressures to use less chemicals. Greater emphasis must be given to developing biological control agents for weeds and to more sophisticated systems of pest management.

Efficient Water Use

One of the most pressing extension problems is to promote more efficient use of increasingly scarce and costly water supplies. Agriculture has, to a degree, squandered irrigation water in the past and this has contributed to rising water tables, increasing salinity and declining subterranean reserves. Little is known about the long term assurance of ground water supplies or the effects of pumping deep water to the surface. The extension of rice cropping is aggravating problems in south western NSW and there is now a need to develop irrigation methods and systems to cater for poor-quality water and restricted allocations. It may be necessary to breed varieties of crops and pastures that have greater salt tolerance to permit some production from salt- affected areas.

Soil Fertility

Too little is known about the effects of intensive cropping on soil fertility, especially regarding physical aspects. Structural problems at depth are now evident in Namoi Valley cotton-growing districts and we do not yet have the necessary information to prevent this occurrence in other irrigated valleys.

Under dryland conditions an impacted layer has reduced sunflower yields in northern NSW.

The extension of cropping westwards to, and into, the Western Division is raising questions on what management practices are needed to maintain productivity in the long term.

On the North Coast cropping is expanding on some of the steeper slopes and appropriate practices are required to minimise erosion.

Acid Soils

Crop and pasture yields have been adversely affected by acid soils in higher rainfall country in the central and southern slopes and highlands. This is associated with minor element problems, especially Al and/or Mn toxicities. More data are required on the rate and frequency of lime applications in the short term and in the, longer term on management practices which will prevent or decrease the rate of acidification: for example, cropping:pasture ratios, length of fallow, use of deeper rooting species.

Further information is required on relative resistance between and within species to acid soils, especially to AI toxicity.

Minimum Tillage

Rising costs of machinery and energy and an increasing need to preserve soil structure have led to a rapid adoption of minimum tillage techniques, especially in southern New South Wales and the North Coast.

Satisfactory machinery needs to be developed to cope with a range of situations. Not enough is known about the effect of stubble retention and monoculture on disease incidence and whether the practice will lead to undesirable changes in the weed population.

Little information is available on fertilizer requirements and the water use efficiency of crops sown using minimum tillage techniques.

Plant protection

Pest and Disease Control

Consumers are being educated to expect higher standards in the produce they buy and this increases the pressure, particularly on horticulturists, to adopt a spray programme which minimises the effects of pests and diseases. Nevertheless costs must be contained. There is a place for greater development of integrated pest management programmes and disease forecasting systems.

Australian quarantine surveillance is good, but with ever-increasing international travel and use of air freight we must expect more exotic pests and diseases to become established in this country. Stripe rust in wheat, various exotic aphids, boil smut in maize and Helix aperta (green snail) are recent widely publicised introductions. Authorities have a responsibility to anticipate new pests and develop contingency plants to combat them.

The presence of pests and diseases severely reduces the efficiency of production and more research on better controls and/or development of resistance is essential. There is also a need to determine at what stage insect numbers represent an economic threat in crops.

Weeds

Most weeds of cropping country can be controlled, even if at considerable cost, but there are a number of significant weeds in non-cropping situations. Three affect water courses. Salvinia and alligator weed are presently on coastal waterways and effective and practical control is not yet available. Water hyacinth is a weed of coastal waterways but there are two inland infestations: one at Moree is being contained and one at Warren carefully monitored. The University of New England is investigating the seed dormancy and population dynamics of water hyacinth and biological control of the other two looks promising.

In western NSW, scrub is invading rangelands with disastrous effects on grazed species and thus on carrying capacity. Improved rangeland management practices must be developed and introduced. Blackberry is still a major problem in the more inaccessible highland country where it spreads steadily and harbours vermin. Recommended controls are costly and not fully effective. Serrated tussock is a serious weed but economic control is feasible except in the marginal country.

Weed research must be maintained and a better understanding gained of weed ecology.

Plant improvement/development

There can never be enough plant breeding to meet the demand for high-yielding, disease-resistant varieties with desirable agronomic characters. Much of the efforts of cereal breeders in NSW goes into maintaining yields and quality in the face of new strains of disease and changing market requirements. If adequate resistance against diseases such as stripe rust and stem rust cannot be maintained by breeding, farmers may become dependent on expensive chemical treatment. Wheat breeders are paying particular attention to meeting the need for a variety to sow early and for better frost tolerance. The barley breeder is endeavouring to release better-adapted varieties with a more flexible sowing time; this is also required for lupins.

The introduction of exotic aphids has been particularly devastating on native medic pastures and the reservoir of burrs in the ground is nearly depleted. There is a most urgent need for improved aphid-resistant varieties of annual medics and sub clovers. All breeders should learn from this and ensure that wherever possible lines resistant to diseases and pests not yet in Australia should be available or incorporated in their programmes.

There is not yet a satisfactory legume or grass to recommend in the marginal wheat belt nor is there a suitable range of high-quality persistent grasses on the central or northern plains.

In horticultural crops there is a need for virus-tested source material and, in many crops, for further introduction and evaluation of overseas strains. This applies to established crops facing changing markets like apples or peaches as well as for species new to NSW like litchi, guava, mango and various berry crops. Breeders are faced with new demands to meet changing production systems and harvesting methods. Plants and fruit must be more robust to suit a single harvest by machine. Co-operation with agricultural engineers is required.

Access to local seed collections and budwood repositories is essential for successful breeding and improvement programmes. The potential of tissue culture techniques must be further investigated.

New Crops

Availability of new crop legumes for dryland areas would help rotations and fertility. Soybeans and chickpeas appear to have potential but more selection and testing is required. Guayule is being investigated as a potential source of rubber but a major programme over many years will be necessary if an industry is to be established.

Some traditional horticultural crops are now less economic owing to changes in markets and consumer tastes. There is a need for alternative crops to be developed for growers affected by the changes and for assistance to be provided for rehabilitation as industries are restructured. The technical problems faced by the rapidly-expanding ornamental industry need more attention.

Harvest and post harvest

Increasing labour costs will speed the trend to mechanical harvesting and more research is required into new techniques, particularly tree management, in association with engineers.

The research and advisory effort to maintain product quality after harvesting must be maintained as there are still unacceptably high losses through downgrading and deterioration.