A Good Weed

the NEWSLETTER of
The Weed Society of New South Wales Inc
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NSW Weed Strategy Launched

The NSW Weeds Strategy was launched on 20 August 1997 by the Minister for Agriculture, Richard Amery, at Agquip, Gunnedah, with the aim of delivering a sustainable reduction in the negative impact of weeds on the economy, community, industries and environment of New South Wales. This article provides excerpts on the overall thrust of the Strategy.

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... NSW Weed Strategy Launched

Here are excerpts from the recently released New South Wales Weed Strategy.

The $600 Million Burden

Weeds are a huge environmental and economic burden on New South Wales costing $600 million per annum in control and lost production alone.

Most areas of the state have been invaded by a diversity of weed species affecting the environment, productivity and aesthetics of the infested area.

Setting Priorities

Any control strategy for weeds must depend on land-use objectives. In natural ecosystems, the weed strategy's priorities relate to reducing adverse impacts on the aesthetic and recreational value of public lands. In agricultural areas priority is given to controlling species which have significant economic impact. The resources available for controlling weeds need to be used effectively - focussing on programs that provide the greatest community benefit.

When considering serious weeds which are not present in New South Wales, the objective is to continue their exclusion. With weeds already present, the objective is to reduce their negative effect, either by reducing their distribution and/or by developing strategies to minimise their impact.

Sustainable Reduction

This strategy paper defines the major objectives and activities required to achieve a sustainable reduction of weeds in New South Wales. It does this by explaining ways stakeholders can improve the effectiveness and coordination of the fight against weeds. The strategy is linked to: the National Weed Strategy; weeds strategies in other states; and weed control and other environmental plans by local government, government and private landholders. This paper concentrates on the generic issues, rather than presenting action plans for specific weeds. More detail, including linkages to other strategies and action plans for individual weeds, is provided on NSW Agriculture's website homepage at:
http://www.agric.nsw.gov.au.

The New South Wales Weeds Strategy will be updated periodically. These updates will include local control authority programs and planning processes for major weeds. Other organisations will be invited to contribute information on their weed control activities.

Improvements

The New South Wales Weed Strategy was developed by the Noxious Weeds Advisory Committee, following workshops and submissions received from a number of sources. This process identified a number of improvements that could be made. The most important of these included:

- an injection of funds and resources,
- improved training for personnel involved in weed control programs,
- increasing the priority given to weed control by some agencies,
- increasing the emphasis accorded to environmental weeds,
- improving community understanding of weed problems and relevant legislation,
- better coordination of control programs, and
- increasing consistent implementation of noxious weeds legislations.

Declaration of weeds as 'noxious' ensures that all affected landholders participate in weed control programs, but this is only appropriate where there is a clear public benefit derived from the costs incurred by private landholders and the community.

Increasing Funds

The issue of funding and resources has been addressed through:

- an increase in the noxious weeds grant,

- recommendations to develop incentives for weed control,
- proposals to improve resource-sharing between public agencies, and
- more formal monitoring of outcomes from weed control programs to ensure that public funds are used efficiently.

The community now recognises the enormity of the problems caused by environmental weeds and the strategy endorses the need for significant additional resources to address this issue.

Dedicated Authorities

A key outcome of the strategy is to improve community education and to implement competency-based training programs for particular types of work. The strategy supports the current structure for the delivery and enforcement of noxious weed control programs by local government, with NSW Agriculture as the lead agency, assisted by a broad-based Noxious Weeds Advisory Committee.

To improve the effectiveness and coordination of noxious weed control programs, single-purpose weed control authorities will be promoted and incentives provided for their formation.

To improve the effectiveness and coordination of noxious weed control programs, single-purpose weed control authorities will be promoted and incentives provided for their formation. The strategy attempts to find a balance between the vital involvement of communities in deciding on local priorities with the need for statewide planning and coordination of programs to control weeds of major significance. Community input at all levels of planning and delivery of weed control programs will be promoted and coordinated between programs and improved through strengthening of the weeds regional advisory committee network.

The Minister for Agriculture, Mr Richard Amery, went on to say that to assist with implementation of the strategy and control of noxious weeds in NSW, the NSW Government has already increased the noxious weeds grant from $5 million to $6 million per year.

He also stated that NSW Agriculture has implemented several new initiatives as a consequence of the strategy.

- An additional noxious plants advisory officer was appointed at Windsor to support metropolitan councils and community groups.
- A Weeds Research and Demonstration Unit was established at Wagga Wagga to promote integrated weed management in southern NSW and to complement the existing units at Orange and Tamworth.
- The Noxious Weeds Act is being revised, in light of comments received during development of the strategy, and will be considered by Parliament in 1998.
- Procedures to identify and control new incursions of weeds have been implemented, with assistance from the Royal Botanic Gardens.
- A procedure for more formal auditing and benchmarking of outcomes from local control authority weed control programs is being evaluated.
- The process for declaration of weeds has been revised - to provide an opportunity for community input, better regional coordination and a requirement for quantifiable measures of outcomes.
- Action has been taken to strengthen the regional coordination of weed control programs, by giving responsibilities to existing regional advisory committees.

NSW Agriculture and other agencies will be releasing more specific plans and guidelines that relate to actions identified in this document.

While the specific aims and recommendations of the Strategy are too lengthy to reprint here, they are contained in the Strategy document which you can obtain by contacting the:

Secretary, Noxious Weeds Advisory Committee, Locked Bag 21, ORANGE NSW 2800 Telephone: (02) 6391 3638 Fax: (02) 6391 3740 ❑

Growth of Weeds under Elevated Atmospheric Carbon Dioxide Concentrations

By Claudia Tipping and David Murray

Introduction

At present the global average atmospheric carbon dioxide (CO_2) concentration is 360 parts per million (ppm) and the rate of increase is about 2 ppm per annum. If anthropogenic CO_2 production from fossil fuel combustion and forest destruction continues to increase exponentially, this concentration could 'double' from the 1958 value of 315 ppm before the end of the 21st Century. Some plants can utilise the extra carbon supply to increase biomass production and improve water-use efficiency. Annual crop species such as wheat, rice, soybean and maize can easily improve grain yields by about 50% with 'double' CO_2.

Some plants can utilise the extra carbon supply to increase biomass production and improve water-use efficiency.

These important food sources have received most of the publicity, generally from those favouring a 'laissez faire' approach to CO_2 emissions. Indeed, one of the myths that has grown up since the Earth Summit in 1992 is that cultivated species will universally benefit from the ever escalating atmospheric carbon supply, whereas wild species may be unable to do so. A similar presumption is that 'C3' plants can respond with extra growth, whereas 'C4' plants cannot. Both of these generalisations are incorrect. Within any particular grouping of plants, it is genotype that governs the ability to respond to elevated atmospheric CO_2. The purpose of this article is to point out how a variety of weeds might be advantaged by growing under elevated CO_2 concentrations.

The Grass Family (Poaceae)

Some plants belonging to this large family are always weeds, but grasses that are pasture plants can also be weeds under other circumstances. A classic example is paspalum (*Paspalum dilatatum*). Several tropical species of *Panicum* are similarly ambiguous. Torpedo grass (*P. repens*) and blue panic (*P. antidotale*) are widely acknowledged as weeds (Parsons and Cuthbertson, 1992; Lazarides *et al.*, 1997). Guinea grass (*P. maximum*) or green panic (*P. maximum* var. *trichoglume*) may sometimes be weeds, but they can also be used to rehabilitate areas recovering from lantana infestation (p.631 of Parsons and Cuthbertson, 1992). It is worthwhile noting that eleven species of *Panicum* are currently refused entry into Australia by the Australian Quarantine Inspection Service.

Recent studies of *P. antidotale* and two other potentially useful forage species, *P. decipiens* and *P. tricanthum*, have shown that above-ground biomass can increase by a factor of two as a result of growth with 900 ppm CO_2 compared to growth with ambient CO_2 (Tipping, 1996). A massive increase in starch content of the leaves (to >30% by weight) is part of this response.

An intermittent water supply (the norm in the absence of irrigation) is the key to improved productivity gains for 'C4' species like *P. antidotale*. A luxury (continuous) water supply substantially reduces their ability to make significant extra carbon gains under elevated CO_2.

This was first shown for a variety of C4 weeds by David T. Patterson and colleagues in the USA in the 1980s. These included barnyard grass (*Echinochloa crus-galli*), goose or crowsfoot grass (*Eleusine indica*), southern crabgrass (*Digitaria ciliaris*), pigeon grass (*Setaria faberi*), Johnsongrass (*Sorghum halepense*) and itchgrass (*Rottboellia exaltata*). All are likely to grow better than their crop competitors under conditions of water limitation and CO_2 enrichment.

In contrast to *Echinochloa crus-galli*, *E. glabrescens*, a weed of rice cultivation, does not show any marked improvement in carbon gain under elevated CO_2 at 27°/21°C (day/night temperatures). However, at the higher growth temperature range of 37°/29°C, the competitive ability of this weed is improved and that of rice deteriorates.

Rosette Weeds

Dandelion (*Taraxacum officinale*), *Plantago major* and *Rumex crispus* (curled dock) all show improved growth under elevated CO_2 and increased root/shoot ratios.

The strength of their tap-root systems and their capacity to regenerate after grazing or mowing are both enhanced. Another dock, *Rumex obtusifolius*, has been studied in relation to possible biological control by the leaf-eating larvae of the beetle *Gastrophysa viridula*. However, the 'grazing pressure' of the beetle is readily accommodated by a faster growth rate under elevated CO_2.

Woody Legumes

Prosopis glandulosa and other mesquites are weeds in many parts of the world. They respond well to elevated CO_2. Sicklepod (*Cassia obtusifolia*) and showy rattlepod (*Crotalaria spectabilis*) are weeds of soybean crops in the USA. Both show gains of 60-70% with elevated CO_2 and are extremely persistent, even under conditions of nutrient limitation.

A study of Noogoora burr (*Xanthium occidentale*) in Australia has found a moderate growth increase under elevated CO_2 accompanied by improved nitrogen-use efficiency of the leaves. This response could further advantage this weed in areas of marginal soil fertility.

Studies of the horticultural species *Opuntia ficus-indica* indicate growth enhancement of up to 70% with 700 ppm CO_2. There is no reason to suppose that weed species of prickly pear (*Opuntia* spp.) cannot respond in the same way.

Woody Vines

The introduced Japanese honeysuckle (*Lonicera japonica*) has been compared with an indigenous species in the USA, *L. sempervirens*. With elevated CO_2, the Japanese species branched earlier, producing a much greater leaf area. These responses reinforce its already superior ability to overtop and shade competing and supporting vegetation. Similar responses are displayed by *Pueraria lobata* (kudzu), another major weedy vine in parts of the USA.

... extra advantages will be gained by many important weed species over competing crop plants or desirable indigenous vegetation under future elevated atmospheric CO_2 concentrations.

Water Weeds

Water hyacinth (*Eichhornia crassipes*) and several 'duckweeds' (*Lemna* and *Spirodela* spp.) respond in contrasting ways to growing with elevated CO_2. Water hyacinth undergoes 'acclimation' - increased leaf area is balanced by lower photosynthetic rates and chlorophyll concentration, and there is, fortunately, no major increase in productivity.

Duckweeds show significant degrees of enhancement of photosynthetic rate and growth with elevated CO_2.

Conclusion

Studies to date indicate that extra advantages will be gained by many important weed species over competing crop plants or desirable indigenous vegetation under future elevated atmospheric CO_2 concentrations. Although this cannot be said for all weeds, research is necessary to identify those that will be advantaged. Research is also needed to clarify the effects of plant growth under

elevated CO_2 on species of leaf-eating insects used for biological control.

References

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Parsons, W.T. and Cuthbertson, E.G. 1992, Noxious Weeds of Australia. Inkata Press, Melbourne and Sydney.

(Dr Claudia Tipping and Dr David Murray are at the School of Horticulture, University of Western Sydney, Hawkesbury Campus, Locked Bag No. 1, Richmond NSW 2753. This article is based on information presented or reviewed in Claudia's Ph.D. thesis, or in David's recent book, which is distributed by John Wiley). ❑

Parthenium: the Situation in NSW

By Phillip Blackmore

The focus of the fight against Parthenium weed (*Parthenium hysterophorus*) in NSW has been on quarantine and the elimination of reported outbreaks. The first outbreak of the weed in NSW was reported in 1982. This was followed by a very large outbreak in 1983. A 1000 hectare area was infested and there was a very dense stand of the weed around a machinery shed (3 ha in size). Most of the 'on farm' outbreaks (39) have occurred in the Moree Plains Shire and the majority of these were caused by contaminated harvesting machinery (27). However, isolated sightings of the weed along roads are far more common. These account for 88.9% of all infestations and about half of these are along the Newell Highway, the stretch of road north of Narrabri being the most notorious for outbreaks.

In 1994, a large infestation was found at Cropper Creek in northern NSW, after a large advertising campaign which occurred after another outbreak was found. The number of outbreaks in NSW each year has decreased substantially over the last 5 years as methods of detection and machinery hygiene have improved. However, the grain harvest in Queensland has been relatively low during these years and it remains to be seen if the trend can be maintained during a good season.

At the moment, the weed is being defeated in NSW, with all but a couple of the outbreaks being completely eliminated.

There has been plenty of publicity about the weed, both in the media and through field days, etc. A couple of television commercials have been produced and shown and various pamphlets on the weed and machinery hygiene have been produced and distributed. At the moment, the weed is being defeated in NSW, with all but a couple of the outbreaks being completely eliminated. However, there is concern that this will no longer be the case if the weed does become endemic in southern Queensland.

(Reprinted from notes from a meeting of the Parthenium Study Group (based at the University of Queensland) on 14 August, 1997.) ❑

Rust for Intermediate Leaf Form of Skeleton Weed

Skeleton weed, *Chondrilla juncea*, is a competitive weed in cereal crops causing significant yield reductions. The wiry stems also cause problems for harvesting machinery. In the early 1970s CSIRO released a rust, *Puccinia chondrillina*, for the control of the most widespread form of skeleton weed in Australia. Initially, the

rust proved to be a spectacular success, producing an estimated annual saving to farmers of $18 million in 1975.

However, it was soon realised that because the rust strain only attacked one form of the weed (the narrow-leaf form), the two other forms (broad and intermediate leafed) which were not attacked, were gradually replacing the controlled narrow-leaf form.

After extensive work in Europe and, particularly, in western Turkey where there is the largest variety of rust strains, a new strand of rust was found which attacks the intermediate-leaf form of the weed. Trials to evaluate the new strain (known as TU788) have been set up at Piangil on the Victoria-New South Wales border and at Harden in southern NSW.

The initial results at Piangil are promising and further releases are planned for this coming autumn. To this end, CSIRO Division of Entomology would be pleased to hear from interested farmers who are keen on hosting a rust trial on their properties. For further information contact Paul Jupp, CSIRO Entomology, PO Box 1700, Canberra, ACT, 2601, ph (06) 246 4250, Fax (06) 246 177.

(Reprinted from Under Control, Pest Plant and Animal Management News, Keith Turnbull Research Institute for Integrated Pest Management, No. 1, February 1997.)

Biocontrol Implications of Genetic Variation in Blackberry and Rust

The genetic variation of the European blackberry (*Rubus fruticosus* L. aggregate) and blackberry rust fungus (*Phragmidium violaceum*) in Australia is currently being investigated by Dr Kathy Evans of the CRC for Weed Management Systems and Department of Crop Protection at the University of Adelaide.

Rubus fruticosus in Australia comprises a number of closely related species and hybrids. In Victoria, nine different taxa and some hybrids have been identified. They differ in such features as stem shape, type and shape or armature (prickles and stalked glands), hairiness of leaves and stems, and shape of leaflets and flowers. As a consequence of such variation, the susceptibility of the different blackberries to herbicide uptake and attack by the rust fungus also varies.

As a consequence of such variation, the susceptibility of the different blackberries to herbicide uptake and attack by the rust fungus also varies.

The blackberry rust does not affect all blackberry species to the same degree and, in fact, there appears to be at least three species that are resistant to it. These resistant species could gradually take over from the susceptible blackberry if left uncontrolled. Understanding and recognising the different *Rubus* genotypes is therefore important in investigating and implementing effective control strategies.

To complicate matters further, the genetic composition of the current blackberry rust population in Australia is unknown. One strain of the rust, F15, which is highly damaging to the main blackberry species *R. discolour*, was released in the early 1990s. An unknown strain, or possibly a mixture of strains, was also illegally released in the 1980s but this "illegal" strain has been found to be less damaging to *R. discolour* than F15.

The objectives of Kathy's research are to investigate (a) the taxonomy and distribution of genetic variation of *Rubus fruticosus* in Australia, and (b) the correlation between *Rubus* genotypes and their susceptibility to various *P. violaceum* strains. Virulent rust strains could then be investigated and possibly introduced to attack biotypes resistant to the present strains.

(Reprinted from Under Control, Pest Plant and Animal Management News, Keith Turnbull Research Institute for Integrated Pest Management, No. 2, May 1997.)

What is Integrated Weed Management?

By Brian Sindel

Integrated Weed Management (IWM) is an often quoted term these days. But what does it mean? IWM can be defined simply as 'a sustainable management system that combines all appropriate weed control options'. It does not rely solely on herbicides for weed control, nor for that matter on cultivation or biological control. It attempts to avoid the problems of herbicide-resistant weeds and contamination by herbicide residues by combining (or 'integrating') a suite of weed control measures each of which places different constraints on weed growth, reproduction and spread.

The development of the term follows that of 'Integrated Pest Management' (IPM) which has been used to describe management systems for insect pests of crops and pastures which do not rely solely on chemicals but which place more emphasis on biological control agents such as beneficial predatory insects.

The concept of 'integrated pest control' was first articulated by entomologists in the mid 1950s as an approach that applied ecological principles in utilising biological and chemical control methods against insect pests. It was subsequently broadened to include all control methods and adapted to the idea of 'managing' insect pest *populations* below an economic threshold level rather than 'controlling' pests *per se*. The concept of pest management was then broadened to include all classes of pests (including pathogens, insects, nematodes and weeds) and in this context is commonly referred to as IPM.

Some crop protection specialists regard the concept as representing only new jargon applied to long-established crop protection practices. Those who argue otherwise do so on the basis that IPM depends on an understanding of the population dynamics of current and potential pests, of the ecology and economics of the cropping systems, and of possible harmful effects to the environment.

IWM can be considered a subset of IPM that employs combinations of physical, ecological, biological, chemical and genetic methods to obtain effective and economical weed control with minimum effect on non-target species or the environment. It aims to spread the risk of control failure and increase the probability of overall success. The history of weed management shows that it is not altogether a new concept, but that it does need to be re-applied to farming systems in Australia and elsewhere if they are to remain productive.

IWM implies, notionally, that component weed control methods will be mutually supportive or perhaps even synergistic, whereas in reality it is possible for some control methods when combined to have conflicting effects. Research is needed to identify techniques which are complementary for specific farming systems and for target weed species and to combine these into effective weed management strategies. This is one of the main goals of the CRC for Weed Management Systems (see the following article by Nigel Ainsworth).

(Adapted from Sindel, B.M. (1995) Integrated weed management - a strategy for reducing herbicide use. In Herbicide-Resistant Crops and Pastures in Australian Farming Systems (eds G.D. McLean and G. Evans). Proceedings of a GRDC, CRDC, British Council, RIRDC, and BRS Workshop, Canberra, 15-16 March 1995, pp. 207-227. Bureau of Resource Sciences, Canberra.)

Integration of Herbicide use and Biocontrol of Horehound

By Nigel Ainsworth

The horehound plume moth, imported from France and Spain, has been released as a biological control agent for horehound in Victoria and South Australia. Moth larvae feed in and kill shoot tips, thus reducing plant size and seed set. Around 50% of shoots are affected at the best sites. Work is in progress to measure total plume moth impact on the weed.

Horehound plants are not long-lived, so if seed production can be reduced drastically, the weed population may decline. It might seem unwise to apply herbicides where a promising biocontrol is established, since killing the host plant could cause the moth population to crash. Few or no moths would then be around when new horehound seedlings appeared and horehound problems would continue.

Nevertheless, it is possible that the correct strategy for integrating herbicide use with biological control could produce better results in the long term than either method alone. Herbicide application might, for instance, help to reduce large infestations more quickly than biological control acting on its own, or could be used when weather conditions have been poor for biocontrol. Research on these questions, described below, is the first part of a CRC for Weed Management Systems program to integrate herbicides with biological control of a range of environmental weeds.

In a series of experiments, a lower than normal rate of 2,4-D has been applied to horehound in pots. This stunts their growth and prevents formation of seeds, although it does not kill the plants. Because the plants survive, larvae within them may be allowed to complete their development so the moth population may not be too much reduced. This is currently being tested.

In a field situation, the preference for unsprayed plants would ideally result in moths laying more eggs on plants that have been missed by spraying, or on plants in areas that are too difficult to spray.

Moths strongly prefer unsprayed plants to treated ones for egg-laying, but will lay some eggs on the surviving shoots of sprayed plants. So far, larval development appears normal from eggs laid on sprayed plants. Treated plants can thus maintain moths on the site without contributing to future problems by producing seed. In a field situation, the preference for unsprayed plants would ideally result in moths laying more eggs on plants that have been missed by spraying, or on plants in areas that are too difficult to spray. Thus, their effect would be concentrated where it is needed. Since moths do continue to lay some eggs on recovering plants, the larvae might substantially reduce regrowth later in the season and the last generation of the year could overwinter in sprayed plants, ready to resume feeding the following spring.

Whether anything so successful really happens will be tested by field experiments starting in spring. Ultimately, it may be possible to recommend herbicide application rates and appropriate timing which will complement the effects of horehound biocontrol agents.

(Reprinted from Under Control, Pest Plant and Animal Management News, Keith Turnbull Research Institute for Integrated Pest Management, No. 2, May 1997.)

Hardy Marsh Plants Gobble up Weedkiller

In an article printed in New Scientist on 22 March this year (p24) , the writer, Andy Coghlan, reports on work showing that yellow irises and bulrushes could be come potent weapons in the battle to avoid polluting watercourses with pesticides and herbicides.

Two researchers at the Scottish Agricultural College in Edinburgh, Rob McKinlay and Charlie Kasperek, have proposed that when someone needs to dispose of herbicides and other pesticides that marsh plants grown in special lagoons on farms could possibly do the job without contaminating water or harming wildlife.

Plants that draw heavy metals out of soil are already known, but according to Coghlan, McKinlay and Kasperek's plants are the first to actually degrade pesticides and herbicides.

In initial trials with atrazine, McKinlay and Kasperek grew four marsh plant species in water contaminated with around 6 parts per million of the herbicide. Common reeds (*Phragmites australis*) struggled to survive but the other three species thrived. The best performer was yellow iris (*Iris pseudocorus*), followed closely by the bulrush (*Typha latifolia*) and

common clubrush (*Schoenoplectus lacustris*). Their more recent work is said to show that microbes in the plants' root systems do most, if not all, of the work of decontamination, so that when treated with disinfectants to deprive them of their microbes, the plants failed to clean up the water.

The researchers have shown that root microorganisms evolve quickly to degrade each contaminant. The first time, it took 50 days to destroy the herbicide. After three successive exposures, the cleanup time had fallen to a week.

The conclusion drawn in this article by Coghlan was that farmers may be able to dig a shallow lagoon, line it with plastic to prevent leaks and plant it with the marsh plants where farm chemicals could then be detoxified.

Weed Society of New South Wales Inc. - Annual Report 1997

By Leon Smith (Secretary)

The highlight of the year was the formation of the Riverine Branch of the Society at Wagga Wagga in May. Over 40 people (30 apologies) attended the inaugural meeting and office-bearers were elected, including Richard Graham as President. The Branch has already conducted a very successful activity, the Wagga Weeds Expo at the Agricultural Research Institute. John Cameron and the people from Wagga Wagga are to be congratulated for their initiative in setting up this group.

As a result of the formation of the Branch and other promotions, a record number of new members joined the Society in 1997. Eighty-eight new members were admitted during the past year. Another major event of the year was the one day seminar on "Management of Weeds in the Urban Jungle" held at Taronga Park Zoo on June 10. Over 50 people attended, including several non-members of the Society. Jack Craw from New Zealand gave a very interesting talk on awareness/extension activities with urban weeds in that country. Thanks to Dan Austin for arranging this seminar and visit to Taronga Zoo.

An Aquatic Weeds ID Workshop and Field Trip "Weeds, Wet and Wild" was held in October. This event was jointly sponsored with the Australian Turf Research Institute and 24 people attended. Thanks to Mike Barrett, Peter Michael and Gary Beehag for organising this activity.

During the year: a Travel Study Grant of $500 was awarded to Greg Madafiglio from NSW Agriculture, Orange, to assist with travel to Great Britain to present a paper at the Brighton Conference (Weeds); Weed Society prizes ($100 each) were awarded to students from the University of New England, Charles Sturt University and Sydney University; and book prizes (total value $250) were awarded for the Weed Identification Competition at the Biennial Noxious Weeds Conference, Dubbo.

Dr. Jim Cullen, CSIRO Canberra, gave the after-dinner speech at the Annual Dinner on "Recent Developments in Biological Control of Weeds". CAWSS delegates Leon Smith and John Cameron participated in three phone hook-up meetings during the year.

The Newsletter "A Good Weed" continued its high standard and is the main information vehicle of the Society under the distinguished editorship of Dr Brian Sindel. A list of members and their interests was prepared by Mike Hood and will be distributed shortly. The Society made a submission to the draft NSW Weed Strategy document and helped with publicity for the national programme on weeds, "Weedbuster Week", in October. The Society is in a sound financial position thanks to Treasurer, Alec McLennan, but increased bank charges and printing costs may necessitate a future fee increase.

CRC for Weed Management Systems and Riverine Activities

By Toni Nugent

What is the latest issue that has united Federal, State and Local Government, as

well as those in the wider community? Would you believe the answer is WEEDS?

Weedbuster Week (12-19 October, 1997) was a huge success! Much enthusiasm and interest was shown amongst those in the Wagga district, with a number of activities occurring throughout the week. 'Woody the Weed' made an appearance at the Wagga Marketplace on Wednesday, 15 October.

Woody and I visited the children at Tarcutta Public School on the afternoon of Wednesday, 15 October. The children thought Woody was fantastic and were very keen to participate in various activities organised for the afternoon. I then returned to the school on Thursday, 23 October, to present prizes to the winners in the short story competition that was run during the week.

The Riverine Branch of the Weed Society, in conjunction with Charles Sturt University (CSU), NSW Agriculture (ARI) and the CRC for Weed Management Systems, held a Weeds Expo on Tuesday, 14 October. Approximately 50 people attended the expo. The day commenced at 9 am at the Equine Centre, CSU, where participants boarded a bus for two field trips visiting trial sites around the ARI farm.

The bus trip gave people the opportunity to view various trial sites and to speak with those involved in the trial work about forage legumes, crop competition, herbicide tolerance trial work, pastures and fumitory. A number of static displays were set up at the Equine Centre for people to look at throughout the day. A Weed Identification Competition and raffle was also held on the day. A big thank you to all those people who helped to organise the event.

A dinner was organised by the Riverine Branch of the Weed Society for 19 November, 1997, at the Commercial Club in Wagga. Other upcoming events include a walk in February on Willians Hill, Wagga, looking at weeds in an urban environment, an Information Day on weed control on small farms during June and a dinner in the Albury area during April.

(Toni Nugent is the Publicity Officer for the Riverina Branch of the Society and an Education Officer with the CRC for Weed Management Systems.)

Members Matter

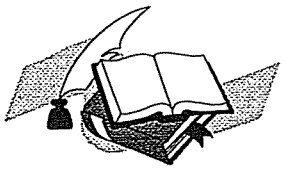
We welcome the following new members to the Society and ask that if you have any news or views which might be helpful if printed in *A Good Weed*, then please send them to the Editor (address page 2). All contributions and suggestions are most welcome.

M Bywater, Moorebank
V Brunton, Eastwood
R Coventry, Hawkesbury-Nepean Catchment Management Trust, Windsor
A Gesell, Sterling Group Services, Huntingwood
J Gregory, Pymble
A Hobson, Bombala
E Jack, Greenwich
D Langfield, Cowra
L Rew, Tamworth
W Shelton, Sterling Group Services, Huntingwood
A Shields, Globe Australia, Miranda
R Sim, Sydney Water, Rockdale
J Singleton, Clareville
A Umbers, Umbers Rural Services, Trundle

Though not a member of our Society, some members may be interested to know that Stephen Powles, the Director of the CRC for Weed Management Systems, will be taking up a new position next year as a Professor of the University of Western Australia. He will continue his research into herbicide resistance.

Newsletter goes far and wide

Associate Professor C. Xian Zhang from the Institute of Plant Protection, Beijing, China, recently wrote regarding membership of the Society saying that he found out about *A Good Weed* from the Resistant Pest Management newsletter published by Michigan State University. We're famous!



Other 'Good Reads'

Western Weeds. A Guide to the Weeds of Western Australia

By BMJ Hussey, GJ Keighery, RD Cousens, J Dodd and SG Lloyd. Western Weeds has 256 pages and describes about 800 weeds, of which 600 have been illustrated in colour. It has a comprehensive index with both common and scientific names of weeds and a plain English glossary of botanical terms is included.

Weeds are listed under four major groups - ferns, conifers, monocotyledons and dicotyledons. Plants are organised into families within each group.

Western Weeds is a comprehensive and very attractively presented guide to weeds from all types of land use and from all parts of Western Australia. It is published by the Plant Protection Society of Western Australia, PO Box 190, Victoria Park, WA 6100, and is available from Agwest Seed Quality on (08) 9368 3721 (ph) or (08) 9474 2658 (fax). Cost $30.

The Biology of Australian Weeds

Volume 2 of this great series is due out in December 1997 and will include: *Acacia nilotica* (prickly acacia), *Cytisus scoparius* ssp. *scoparius* (broom), *Cabomba caroliniana* (fanwort), *Cassinia arcuata* (sifton bush), *Chrysanthemoides monilifera* (boneseed, bitou bush), *Cryptostegia grandiflora* (rubber vine), *Emex australis* (doublegee), *Lantana camara* (lantana), *Oxalis pes-caprae* (soursob), *Parthenium hysterophorus* (parthenium weed), *Phragmites australis* (common reed), *Raphanus raphanistrum* (wild radish), *Rubus fruticosus* (blackberry), *Senecio madagascariensis* (fireweed), *Ulex europaeus* (gorse or furze), *Vulpia bromoides* and *V. myuros* (squirrel tail and rat's tail fescue).

The weeds viewed in Volume 1 (314 pages) are: *Alternanthera philoxeroides* (alligator weed), *Bromus diandrus* and *B. rigidus* (ripgut and rigid brome), *Carduus nutans* ssp. *nutans* (nodding thistle), *Carthamus lanatus* (saffron thistle), *Chondrilla juncea* (skeleton weed), *Echium plantagineum* (Paterson's curse), *Eichhornia crassipes* (water hyacinth), *Eremophila mitchellii* (budda, sandalwood), *Hydrilla verticillata* (hydrilla), *Hypericum perforatum* (St. John's wort), *Mimosa pigra* (mimosa), *Nassella trichotoma* (serrated tussock), *Reseda lutea* (cutleaf mignonette), *Salvinia molesta* (salvinia), *Typha domingensis* and *T. orientalis* (cumbungi) and *Xanthium occidentale* and *X. spinosum* (Noogoora burr and Bathurst burr).

The reviews were originally published in *The Journal of the Australian Institute of Agricultural Science* and *Plant Protection Quarterly*. They have been thoroughly updated by the original authors or by other researchers working in the same area.

Volume 1 is available for $59.50 + $10 postage from R.G. and. F.J. Richardson, PO Box 42, Meredith, Victoria 3333; Tel/fax: 03 5286 1533, Email: robfiona@iaccess.com.au. Payment by Cheque, Visa, Mastercard or Bankcard. If you would like to go on the mailing list for further information about Volume 2 contact Bob or Fiona Richardson on 03 5286 1533.

The Pesticide Manual

This world compendium, published by the British Crop Protection Council, is an essential reference book for anyone with a professional interest in pesticides. Now in its eleventh edition, *The Pesticide Manual* contains **759** detailed main entries as well as abbreviated details covering **583** superseded products. The book runs to over 1,500 pages.

Entries cover herbicides, fungicides, insecticides, acaricides, nematicides, plant growth regulators, herbicide safeners, repellents, pheromones, biological control agents, rodenticides and animal ectoparasites.

All 759 main entries include, as appropriate:

- chemical structure, discipline and class;
- nomenclature, including common, IUPAC and Chemical Abstracts names, CAS RN, EEC number and development code;
- full physical chemistry details;

- commercialisation information including patent, history and manufacturer;
- mode of action, biochemistry, uses, formulation type, mixtures and trade names;
- mammalian toxicology profiles;
- ecotoxicity data covering birds, fish, bees, worms, algae, etc.; and
- environmental fate information for animals, plants and the soil/environment.

The Pesticide Manual is the ideal reference book for anyone concerned with the discovery, development, sale, use or regulation of pesticides. The eleventh edition of *The Pesticide Manual* will be published in November 1997, ISBN 1 901396 11 8.

A pre-publication offer is available for orders placed and paid for before 20 November 1997 at £110. The price after this date is £135.

Please send your completed order form to : BCPC Publications Sales, Bear Farm, Binfield, Bracknell, Berks, RG42 5QE, UK. Tel: +44(0) 118 934 2727; Fax: +44 (0) 118 934 1998; Email: publications@BCPC.org.

Carbon Dioxide and Plant Responses

David R. Murray, University of Western Sydney (Hawkesbury), Australia

The fact that the concentration of carbon dioxide in the atmosphere is continuing to increase is a cause for deep concern worldwide. This book described how CO_2 has affected all life on earth since the earliest times and explores the responses of plants, particularly food plants, to the ever-increasing levels of carbon dioxide in the air. It explains why the impact of elevated CO_2 on food production will not be the panacea that some have predicted. Important features of the book include:

- Comprehensive assembly of the effects of carbon dioxide on plants of many kinds and clarification of some basic misconceptions about plants and CO_2.
- Identifies three distinct adverse 'greenhouse' effects associated with rising CO_2 levels which could make life on earth extremely difficult: warming enhancement brought about by CO_2 itself; warming of vegetation by restriction of transpiration, and nutritional erosion.
- Provides wide, up-to-date coverage of scientific literature in the field.
- Proposes that, for ecologically-sustainable development, there is an urgent need to slow the present rate of increase in levels of atmospheric CO_2. Ways of achieving this are considered.

The book will be of interest to all researchers and postgraduate students of plant physiology, agronomy, horticulture, ecophysiology, ecology and genetics.

RSP Series: Research Studies in Botany and Related Applied Fields, No. 14, Series Editor: Dr. P.S. Nutman, F.R.S. Return your order to: Dominic Rooke-Allden, John Wiley & Sons Ltd, Baffins Lane, Chichester, West Sussex PO19 1UD, UK. Cost £52.

Plant Pathogens and Plant Diseases

Edited by J.F. Brown and H.J. Ogle

A completely rewritten update of the 1980 textbook "A Course Manual in Plant Protection" with an Australasian emphasis. The book is designed to give students and researchers a background in the principles of plant pathology and of managing plant diseases. The agents of disease and their methods of infection, survival and dispersal are described, as well as the responses of plants to infection.

Descriptions of the factors affecting the development of disease epidemics and methods for forecasting disease outbreaks and assessing the effects of disease on yield lead into a discussion of the strategies used to manage plant diseases. The final section contains descriptions of diseases caused by the various groups of pathogens. The text draws on the expertise of teachers and researchers from throughout Australia. A must for Australian students of plant pathology and those interested in how diseases affect plants.

The text is endorsed by the Australasian Plant Pathology Society Inc.

ISBN - 1 86389 439 X Rockvale Publications, Published - October, 1997, 550 pp; over 140

illustrations and photographs, 250 x 176 mm softcover format, Price $49.00.

Send orders to: Rockvale Publications, 639 Rockvale Road, Armidale NSW 2350, Australia, including payment by cheque, money order or bank draft in Australian Dollars.

Upcoming Events

Nassella Workshop

26 February 1998

The *Nassella* Workshop is a joint effort between the Weed Science Society of Victoria and the St Albans Campus of the Victoria University (this is also the venue). The workshop aims to update and increase our knowledge of the distribution, impacts, identification, extension and management of *Nassella/Stipa* species with serrated tussock being the major species discussed. Secondly, it aims to define future policy directions for management and research on these weeds. The third aim is to create awareness and understanding of the other *Nassella/Stipa* species as they may become of economic and environmental importance in the near future.

Speakers from NSW include Randall Jones and Malcolm Campbell from NSW Agriculture, Orange and Mark Gardener from the University of New England, Armidale. Registration is $85.

For a full program and other information please contact the Weed Science Society of Victoria Inc PO Box 987, Frankston, Vic 3199 (Ph/fax 03 9576 2949) or Ros Shepherd (Ph/fax 03 9783 6876).

Workshop on Precision Weed Management

May 5 and 6 1998

At Charles Sturt University, Wagga Wagga, NSW, Convenors: Professor Jim Pratley and Dr Richard Medd

Workshop Aims:

Worldwide, interest is growing in precision agriculture technology. This workshop is being convened to assess the relevance of precision systems for weed management and to identify the opportunities in the endeavour of improving weed management practices and systems. By assembling the expertise it is intended to review the technology and assess its potential with the objective of setting priorities to direct research, advisory efforts and policy making.

Expressions of Interest:

The committee invites prospective participants to register their interest in this workshop by submitting to the convenors a title and a 200-word (maximum) precis of their proposed subject contents. Contributors will be encouraged to present reviews, illustrated where beneficial by case studies, of subjects embraced by the following topics. Innovative research reports will also be considered along with industry views and a consideration of pertinent policy issues relating to precision weed management.

Expressions of interest should be with the convenors by ***Friday, December 12, 1997.***

Participants who are selected to attend the workshop will receive detailed instruction early in 1998 with regard to preparation of manuscripts. It is intended that manuscripts will be published in *Plant Protection Quarterly* as edited proceedings in the CRC for Weed Management Systems Workshop Series. It is anticipated that there will be a registration fee of around $100 (excluding accommodation and transport). The workshop will address each of the topics with a view to compiling recommendations to assist research direction, allocation of resources and to influence policy direction.

For more details please contact Professor Jim Pratley, Dean, Faculty of Science & Agriculture, Charles Sturt University, WAGGA WAGGA NSW 2678, Phone: +61 (0) 26933 2864, Fax: +61 (0) 26933 2868, email: jpratley@csu.edu.au, OR Dr Richard Medd, Orange Agricultural Institute, Forest Road, ORANGE. NSW 2800, Phone: +61 (0) 263913800, Fax: +61 (0) 63913899, email: meddr@agric.nsw.gov.au

Proposed Session Topics:

1. ***Detecting, mapping and spatial application (i.e. technological) capability***
The ability to detect weeds, or to map their distribution (using a range of techniques) and to act on this information on paddock, farm or district scales is fundamental to precision weed management. State of the art "sensing" and "responding" capabilities for weeds in cropping, pastures, rangeland, aquatic and natural ecosystems are of interest. Where are we at and where are we headed?

2. ***Economic feasibility***
The high capital investment and the spatial variability of weeds are two main issues affecting the economic feasibility of precision weed management. Will it be affordable and will the returns be sufficient to encourage wide scale adoption?

3. ***Policy considerations***
Are there additional public benefits to be gained from precision weed management, for example in respect of reducing land degradation, drought-proofing properties, improving water quality, or a long term reduction in herbicide usage? Is there a case for the formulation of policies to encourage the adoption of precision weed management? If so, what policy options are available?

4. ***Ecology of weed patchiness***
An understanding of factors influencing the dispersal and distribution of weeds is also fundamental to precision weed management. What models are appropriate and what information is required to predict weed distribution in order to make precision management more effective?

5. ***Variable herbicide dose rate***
Precision agriculture is generally synonymous with variable rate technology. Is variable herbicide dose rate the way to go? If so, what needs to be done to encourage the adoption of variable dose rates? For example, how can differences in product efficacy in response to environmental influences and weed density be incorporated into precision weed management?

A Good Weed

the NEWSLETTER of
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