NEWSLETTER

Number 3 September, 1994

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THE WEED SOCIETY
OF NEW SOUTH WALES

This issue contains some papers presented at the recent seminar sponsored by the Society 'Whats New in Chemical Weed Control'

New book: Herbicide resistance in plants, edited by Powles & Houltum

Future Meetings

Herbicide & Weed Control Industry Liaison Day - Wagga Wagga 15
Wednesday 12 October (contact Deirdre Lemerle 069 381 999)

Scotch thistle field day - Boorowa
Thursday 27 October (contact Jim Dellow 063 913 889)

WHAT'S NEW IN HERBICIDES FOR WINTER CROPS

Col Mullen
District Agronomist
NSW Agriculture
DUBBO NSW 2830

This is quite a broad area to cover, however there are several new developments in winter crop weed control which I have attempted to cover in the following paper.

NEW HERBICIDE REGISTRATIONS

Crop Care have registered **Touchdown® Broadacre** (600g/L glyphosate trimesium) for **fallow** weed control as a competitor for glyphosate CT. It is claimed to be more active, more rainfast and more compatible than glyphosate. Rates are similar to Roundup CT® ie 0.4 - 1.6L/ha and user price is around $12.50/L.

Nufarm have registered **Weedmaster®** (850g/kg glyphosate) which is a water soluble granule. It has a similar label to **Pacer®** (Monsanto) with a similar weed spectrum and rates ie 0.21 - 0.85kg/ha for **fallow** weed control. Wetting agent must be added. User price is $22/kg.

Nufarm have registered **Associate®** which has an equivalent label to **Ally®.**

Surpass® (Nufarm) is a 225g/L 2,4-D formulation as the isoprophyamine salt. This product is compatible with glyphosate. Rates when tankmixing with glyphosate range from 0.8 - 2.4 L/ha. User price is around $3.00/L.

Buttress® (Nufarm) is a 500g/L 2,4-DB formulation with similar label to **Trifolamine®** which is registered in **cereals undersown** with lucerne, clover and medics.

Bayer has registered **Tough®** (Pyridate 450g/L) for early post emergent seedling broadleaf weed control (capeweed, fumitory, corn gromwell, toadrush, amsinkia, deadnettle, sowthistle, prickly lettuce) in **chickpeas**. Rates vary from 1-4L/ha and user price is $21.65/L.

Crop Care have registered **Achieve® WG Herbicide** (400g/kg Tralkoxydim) for post emergent control of wild oats and ryegrass in **wheat, barley, triticale and rye.** Use Supercharge adjuvant at 0.75 - 1%. Rates are 380 - 500g/ha. Better crop safety than **Grasp®**.

Crop Care also have registered **Fusilade WG** (212g/kg Fluazifop-p) for grass control in **lupins, fieldpeas, chickpeas, fababeans, canola and linseed.** Wetter plus oil must be added.

Dow have replaced Tordon 50-D with **Tordon 75-D** for broadleaf weed control in **cereals**. The new formulation contains 75g picloran + 300g 2,4-D/L. The new rate is 0.3L/ha and user price is $33/L.

Dowelanco have **Broadstrike** (800g/kg **Flumetsulam**) which is a water dispersible granule formulation for the early post emergent control of broadleaf weeds (mustard, turnip weed, wild turnip, volunteer lupins and suppression of wild radish) on **wheat** and **wheat undersown** with **annual medics, sub clover** and **white clover** (lucerne pending). Rates will be 15-25g/ha.

Eclipse (714g/kg **Metosulam**) is also a water dispersible granule formulation for the early post emergent broadleaf control (turnip weed, wild radish, Indian hedge mustard, volunteer canola, wild turnip, amsinkia) or suppression (volunteer medics, peas and sub clover) in **winter cereals** (wheat, oats, barley, triticale, rye) and **lupins** (Danja only). Rate is 7g/ha used with Uptake spraying oil or DC Tron (not lupins).

Both the above herbicides could be useful in tank mixes.

Sertin Plus® new formulation to give better wild oat control in broadleaf crops.

PRODUCT LABEL EXPANSIONS

Fusilade® is now registered on **linseed/linola.**

Harmony®M has expanded label claims to cover fumitory and turnip weed in **wheat, barley and triticale.**

Brodal® which is registered in **lupins** and **fieldpeas**, now claims control of charlock, deadnettle and wild lettuce as well as suppression of a number of other weeds (amsinkia, capeweed, corn gromwell, paterson's curse, rough poppy, shepherds purse, toadrush and wireweed). Rates for mustard and wild turnip control are now 0.15 - 0.2L/ha.

Tigrex® has registration on new claims in **wheat, barley, oats, triticale, cereal rye** and on **undersown clovers**. New weeds include charlock, fumitory, mustards, paterson's curse, rough poppy, saffron thistle, skeleton weed, sowthistle, spiny emex, toadrush, turnip weed, variegated thistle, and wild lettuce. Rates vary from 0.5 - 1L/ha.

Jaguar®- new registrations on **wheat, barley, triticale, cereal rye and cereals undersown with clover and lucerne**. New weeds include paterson's curse and rough poppy and rates on some other weeds have been varied. Suppression of many other weeds are claimed including fumitory, milk thistle, prickly lettuce, skeleton weed, sorrel, toadrush and mintweed.

Spinnaker® Pre-emergent application in **fieldpeas** and **fababeans** - paterson's curse added but saffron thistle and sowthistle removed from list.

Registration now cleared for **post-emergence** application on **fieldpeas** on deadnettle, mustards, toad rush and wireweed with weeds from cotyledon to 3 leaf stage. Add wetter.

Stomp® 330 E is now registered for pre-emergence use in **chickpeas, safflower, fieldpeas, fababeans and lupins.**

Select® - application has been made to expand range of grass weeds controlled at rates from 0.25 L/ha in **chickpeas, fieldpeas, lupins and fababeans.**

NEW CHEMICALS

Clomazone (Command®).This chemical was developed for the soybean market in the United States. It is being aimed at some of the grain legume crops particularly fieldpeas, as well as established lucerne and possible canola. Its weed spectrum includes wireweed, Paterson's curse, ryegrass and possibly shepherds purse, Vulpia and thistles (variegated and saffron).

Mr Barney Milne, Weeds Research and Demonstration Unit, NSW Agriculture at Orange is doing some work with this herbicide.

Nufarm are developing two new trifluralin products:

i) **Granular Trifluralin** formulation (100g/kg trifluralin) which will be suitable for stubble farming situations.

ii) **Controlled release Trifluralin** (260g/L) which will allow additional time for soil incorporation.

Nufarm are also registering a 2,4-D powder product (800g/kg) as the diethylamine salt) in water soluble bags.

WILD OAT CONTROL

i) The wild oat herbicide **Mataven®** has now been taken over by CYANAMID. The price will dramatically reduce this season to around $6.70/L (down from $11/L) making it the cheapest wild oat herbicide available. It can be used in wheat from the 3L stage and could make a significant contribution in herbicide resistance strategies.

ii) **Selective Spray Topping** of wild oats in wheat crops with a late post emergent application of selective herbicide could be a useful strategy for managing wild oat populations generally.

RW Medd and AS Cook (NSW Agriculture) are researching this technique which could have important implications for combating resistant populations.

The optimum spraying time for this technique is at stem elongation (20% of wild oat tillers with first node). Using label rates of Mataven L® and Puma S® results have been very encouraging with a high reduction in wild oat seed set. Excellent control has also been obtained with combinations of early and late herbicide applications.

TRIAZINE RESISTANT CANOLA

Siren is a triazine resistant variety which has been released on a commercial trial basis. It was released by AgSEED Research in association with DUVURO PTY LTD and the Victorian Department of Agriculture.

Ciber Geigy have obtained clearance for the use of GESATOP 500FW (simazine) and GESAPRIM 500 FW (atrazine) on SIREN.

Simazine or atrazine can be applied either pre-emergent or post sowing-pre emergent at rates of 1.5-4L/ha depending on soil type. They can also be applied post emergent at 4L/ha up to 4 weeks after seeding.

Siren will provide an option in regions where brassica weeds are a problem or in rotations after crops such as lupins where there may be residues of simazine or atrazine.

Siren has 85% of Oscar yield and 1% higher oil content. It is 2-4 days later maturing than Oscar.

INTEGRATED WEED CONTROL

With the increasing threat of herbicide resistance it is important to develop integrated weed control programs where possible.

The use of more competitive crops and varieties are emerging as being a very useful tool in weed control strategies. Observations by farmers and agronomists in the past have indicated that oats and barley are much more competitive against weeds than wheat and some of the grain legumes.

Research work currently being carried out by Dr Deirdre Lemerle at Wagga Agricultural Research Centre is identifying the more competitive crops and varieties and quantifying yield loss differences.

Her work is highlighting some dramatic differences in their ability to complete with ryegrass. For example yield losses in less competitive varieties of wheat were 50% higher than more competitive varieties such as Dollarbird.

Dr Lemerle's research indicates that herbicide application combined with a more competitive variety can result in increased weed suppression and reduced weed seed set.

Crops such as oats, triticale, canola and barley were much better competitors against ryegrass than wheat, lupins and field peas. Average yield losses where ryegrass numbers were around 300 plants/square metre are shown in the table.

CROP	GRAIN YIELD LOSS %
Oats	10-15%
Triticale	10-15
Cereal Rye	10-15
Canola	15
Poor Competitive Barley	50
Strong Competitive Barley	10
Poor Competitive Wheat	40
Strong Competitive Wheat	20

This research is continuing.

GAPS IN CHEMICAL WEED CONTROL

Several important gaps exist in chemical weed control in the following crop situations:

- Saffron thistle control in grain legumes generally (chickpeas, lupins, fababeans, fieldpeas).
- Wild radish control in canola.
- Post emergent ryegrass control in cereals and broadleaf crops away from herbicide groups A (FOPS AND DIMS) and B (Sulfonylureas).
- Paterson's curse control in lupins (PE).
- More options for broadleaf weed control in winter cereals undersown with lucerne, clover, medics, serradella and vetches.
- Registration of **Yield®** in oats and canola for ryegrass, annual phalaris, and wireweed control (and fumitory).
- Registration of simazine in fababeans for broadleaf weed control.
- Rapid simple test to determine Glean/Logran residue levels present in neutral-alkaline soils.
- Granulated pre-emergent herbicides for use in stubble situations ie. Trifluralin and triallate.
- Registrations for Vulpia control in canola and cereals.

ABSTRACT

Pasture Weed Control Advances

J J Dellow
Weeds Agronomist
NSW Agriculture
AR&VC
Orange

There have been fewer developments in herbicide weed control for pasture weeds than for winter crop situations. The recent developments have included the registration of:

- grass selective herbicides such as Verdict®, Sertin® and Fusilade®
- the more recent selective broadleaf herbicides, Jaguar®, Tigrex® and Brodal® (narrow weed spectrum)
- the selective broadleaf herbicide Trifolamine® (amine salt)
- the selective pre and post emergent herbicide Spinnaker®; primarily for broadleaf weeds in pastures

Other ongoing developments have been -

- crop oil inclusions with a wide range of herbicides
- mixtures of the "older proprietary" herbicides
- the use of the "spray-graze" technique, utilizing grazing livestock with strategic herbicide application
- the pending registration of selective herbicides (eg Broadstrike®) which have low phytotoxicity problems with pasture legumes. The current standards are Bromoxynil and 2,4-DB amine (Trifolamine®)
- the potential for the development of herbicide resistant weeds in pastures
- changes in registered use patterns of herbicides as a result of environmental concerns

Herbicides in the Australian Turf Industry- Where are We Going?

Gary W. Beehag, Senior Turfgrass Consultant,
Australian Turfgrass Research Institute, ATRI, (Sydney).

Australia, having a relatively small and concentrated turfgrass market, imposes severe economic restrictions on those agrochemical companies considering investing in local product development. The first attempt to quantify the size of the Australian turf market was initiated by ATRI in 1989 in the publication, "Turf Market" which recognised the market size as well as voids and problems of pest control within the turf industry. The profitability of agrochemical companies has fallen further restricting P D. As a consequence of a restricted market many pesticides having been previously trialed and which have shown to possess good efficacy have not gained a turfgrass label registration.

With respect to herbicides, whether experimental or having an existing label registration they have and will continue to come over from agriculture where the large markets are in this country. For example, Fenoxyprop-ethyl, Oxadizon and Sulformeturon methyl, remain without a turf label. Unfortunately other herbicide formulations have been ruled out of further development work due to an unacceptable degree of turfgrass phytotoxicity. Fortunately, some agrochemical companies have invested in P D, despite the many difficulties of doing so.

The development of turfgrass herbicides has mirrored that in agriculture since WW11 when it was relatively easy and at a low cost to achieve selective control of broadleaf species in grass crops with the use of products like 2,4-D. Post-emergent control of broadleaf species in both cool and warm seasons turfgrass swards is well catered for by many herbicide active ingredients, notably of the phenoxy types. Active ingredients for the pre-emergent control of broadleaf weed species in turfgrass swards is however lacking. The later development of grass weed herbicides in specific agricultural grass crops, as well as broadleaf crops, saw the use of products such as trifluralin. Other dinitroanaline herbicides have been trialed in turfgrass, for use as pre-emergents and the most recent herbicide of this group, Pendamethalin, ("Stomp, Pendulum") is now registered for use against Winter grass (*Poa annua*). DCPA (Dacthal) has been registered in turf for many years as a pre-emergent against two significant annual grass weeds, *Digitaria* spp. and *Eleusine* spp. in warm season swards.

One significant problem with respect to phytotoxicity and herbicide formulation within this country is the distribution of so many cool and warm season turfgrass cultivars. All of the world's turfgrass species are cultivated in Australia and so we can gain an insight into the potential for phytotoxicity. Turfgrass phytotoxicity varies between turfgrass cultivars and within species, for example, the common and hybrid *Cynodon* spp. (Couchgrass). The common couchgrasses generally possess a lower level of phytotoxicity to most herbicides than do the hybrid couchgrasses. The greatest challenge to phytotoxicity is seen in turfgrass blends, particularly cool season species, where there are a number of different turfgrass species and/or cultivars. This is particularly so in the southern states where it is common to use mixtures of Ryegrasses, Fescues and Kentucky bluegrasses all of which possess differing degrees of phytotoxicity.

The Australian turfgrass industry has traditionally controlled weeds in turfgrass after their emergence. So we have relied upon post-emergent herbicides rather than use pre-emergent products. This traditional attitude, though changing, presents another problem. The number of post-emergent, selective grass herbicides are few and the industry has relied upon the arsenical herbicides, like DSMA and MSMA, principally for use in couchgrass (*Cynodon* spp.) turfgrass. Diclofop-methyl ("Hoelawn") by Hoescht and most recently, Dithiopyr "Dimension" by Monsanto

have somewhat eased the problem facing turf managers of controlling summer annual grass species using post-emergent herbicides in warm season swards. However, selective control of some significant perennial grasses, for example Lovegrass (*Eragrostis spp.*) and Paspalum (*Paspalum spp.*) within both cool and warm season turfgrass swards, remains unresolved.

The use of herbicides possessing both pre and post emergent properties, for example Atrazine, ("Flowable Nutrazine" and others), Pronamide ("Kerb") and Exporsan, ("Presan") is restricted to specific turfgrass cultivars and the interference to turfgrass root initiation has been documented with long-term application of many soil-applied herbicides. The number of pre-emergent turfgrass herbicide formulations are few and differential phytotoxicity between cool season cultivars within the one turfgrass sward again poses significant problems when it comes to the selective removal of grass weeds in the southern regions of Australia.

The most significant weed problem in southern Australia within finely mown, cool season swards, like that throughout the world, is without doubt Winter grass (*Poa annua*). Winter grass remains the most significant invader within cool season turfgrass swards and the recent availability concerning "Endothal" further restricts the choice of Winter grass herbicides. The annual and perennial forms of *P. annua* in sportsturf further present control problems. There is worldwide interest for the development of plant growth regulators (PRG.s) in turfgrass, particularly for use against *P. annua*. Ciba-Geigy have invested in a PGR formulation, for use in turfgrass. Registration is pending.

A recently released group of herbicides in the imadazolinones, such as Imazaquin ("Sceptar") and Imazaqyr ("Arsenal") are now available for use in agriculture, some of which have been trialed in turf. These herbicides possess pre and post-emergent activity and as a group have wide efficacy including activity as leaf suppressants. We now see many new grass herbicides coming along, such as Sethoxydim ("Sertin") in the cyclohexanadione group and Haloxyfop ("Verdict") and quizalofop-ethyl ("Agil") in the aryloxphenoxy group. These herbicides do offer some potential scope in selective control of annual grass weeds in turfgrasses. Concurrent research has been directed to broad spectrum herbicides possessing both pre and post-emergent properties for use in specific crops. The newer sulphonyl ureas, such as Chlorsulforon ("Glean") are biologically active against many dicotyledonous and monocotyledonous species at low rates of application.

The selective removal of kikuyu (*Pennisetum clandestinum*) and couchgrass (*Cynodon* spp.) from many turfgrass swards, as well as each other, remains both a challenge for the agrochemical industry and a frustration for turf managers and turf farmers. The selection pressure as a result of Siduron ("Tupersan") has produced a dilemma in wanting to control *Cynodon* spp. in bentgrass putting greens. Some trial work has been conducted by ATRI in controlling *Cynodon* spp. within bentgrass *Agrostis* spp. turf using existing agricultural herbicides with good promise. The problem of warm season cultivar invasion into bentgrass putting greens is not only restricted to Australia, but wherever the two species are cultivated worldwide. We in Australia have yet to see a product containing two active ingredients, a pre emergent and a post emergent, the likes of which are being trailed overseas for the selective control of annual grass species. Granular formulations are used extensively overseas but not here and this is one trend that could be reversed given products of suitable efficacy.

ABSTRACT

'URBAN NOXIOUS WEEDS' - A NEW PERSPECTIVE ON BUSHLAND MANAGEMENT

by Judith Rawling, *Urban Bushland Management*, Sydney

Weed invasion into native bushland poses one of Australia's most serious conservation problems. Many familiar weeds are escapes from agricultural land (*agrestals*) and others are confined to wastelands and highly disturbed sites (*ruderals*) but many, possibly as much as two thirds of our weed flora, have been deliberately imported into Australia for ornamental or utility purposes. These bush invaders are called *environmental weeds*, or more simply, *community pest plants*.

Environmental weeds are plants that readily invade native vegetation, almost always adversely affecting the regeneration and survival of the indigenous flora and fauna. Often a serious invasion will threaten the survival of the whole community. Nowhere is this more evident than in Kakadu where *Mimosa pigra* has rapidly overtaken vast areas of tropical wetland or on the east coast of New South Wales where Bitou Bush is present in over 60% of the coastal vegetation and on 80% of the state's coastal headlands.

Naturalised species in the Australian flora range from about 5% in the Northern Territory to 31% in Tasmania and overall, constitutes about 15% of our indigenous flora. Of the total weed flora, about half readily invade native bushland and probably about a quarter are considered to be serious environmental weeds.

Every state and district in Australia could nominate its own list of environmental weeds because what is weedy in one region may not necessarily be a problem in another. Undeniably many nominated weeds would be agrestals or ruderals - plants that are readily recognised as "weeds" - but in bushland around urban areas, and increasingly in national parks and wilderness areas, the major weeds are quite simply - *garden escapes*.

To compound the problem, many environmental weeds in this category are readily available in local garden centres and some are still used quite regularly in landscape design. A third, often overlooked point of distribution are the local fetes or markets where anything from Wandering Jew to Bridal Creeper and Privet can be bought for a few dollars, carefully potted into yoghurt containers or milk cartons.

As the great majority of these pest plants are not declared as *noxious*, there has been no legal impediment to their sale and distribution throughout the community or even farther afield. The costs of controlling environmental weeds (through individual weed eradication and bush regeneration programs) is enormous. Sydney currently spends over $7 million/annum on bush regeneration activities alone and both state and federal governments contribute $3-5 million each year to New South Wales for similar bushland rehabilitation programs.

In New South Wales the introduction of a new *Noxious Weeds Act (July 1993)*, allows local council authorities (LCAs) to declare certain plants as community pest plants and provides them with the 'legal teeth' to enforce the containment and/or removal of those plants on private (and public) land. The Act allows plants that "pose a threat to agriculture, the environment or the community, which have the potential to spread and for which there is a specific action" to be declared as *W4 Noxious Weeds*. The W4 category is an entirely new concept which allows LCAs to declare plants which pose a special problem in their own areas - and to design management strategies within their own needs and resources.

W4 Category Weeds may vary within a locality or region. For example, recent W4 declarations on Sydney's North Shore differ somewhat from plants considered to be problematic in the Western Suburbs - although there is some overlap - and certainly the W4 weeds west of The Divide will differ enormously from weeds in the Coastal Zone.

On Sydney's North Shore the Lane Cove Catchment Committee met recently to formulate a list of problem weeds in the larger catchment. Some six LGAs and the NPWS share the responsibility for land management in the Lane Cove Catchment and after lively discussion, a list of twenty species was finalised (list attached). The list was submitted to the relevant Councils for approval and subsequently forwarded to NSW Agriculture to be declared as W4 Noxious Weeds. There are many advantages to declaring W4 species on a catchment basis, including administrative, managerial, ecological and financial benefits.

Such co-operation between LCAs in urban and rural catchments is to be encouraged. In fact, it is doubtful if really effective land management strategies can be put in place without this co-operative effort. This paper discusses some of those strategies and makes recommendations towards more effective weed control programs.

HERBICIDE RESISTANCE - NEED WE WORRY?

J.E. Pratley
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Summary: Herbicide resistance has been with us since the late 1970s. Its incidence is increasing and the range of species involved is extending year by year.

Resistance in annual ryegrass is now fully established across southern Australia on more than 3000 farms. There are options for its management but these are not being used by farmers.

Greater attention needs to be given to the prevention of resistant seed introduction to properties and to prevention of seed production within properties.

Of current concern is the development of resistance in aquatic weeds of rice. Farmers have very little room to manoeuvre and our level of knowledge of the biology of the weeds is poor.

Yes, we do need to worry about herbicide resistance since it threatens our ability to produce high yielding, high quality crops.

Integrated Urban Weed Management
A Case Study

Summary of a Presentation by Ian Perkins to The Weed Society of New South Wales Seminar - "What's New in Chemical Weed Control". Flemington. 21 July 1994.

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Introduction

The changing face of urban weed management

- Growing community concern and increases in environmental accountability (eg. Environmental Planning and Assessment Act. Protection of the Environment Act. Local Government Act etc.)
- Growing range of urban environmental weeds (see Judy Rawling's Paper)
- Changing the way weeds in urban areas are managed - forcing professions responsible for weed control to adopt or asses alternative weed control strategies.
- Push for integrated weed management. To be responsive to changing attitudes and legislation. the new. "integrated" weed manager needs to be lateral thinking, strategic and systematic in approach.

An example:

- Chemical control is now questioned in many situations e.g. Steam control of weeds in Leichhardt.

Context of this presentation

- Based on several case studies - Mainly natural area and open space based.

What is Integrated Weed Management?

A definition:

> *An integrated weed [management] system is a methodical arrangement of the various available weed control techniques to fit the individual problem. The system is more than the sum of its parts because they interact to support each other. A weed [management] system can only be developed when the manager has sufficient information about his [sic] property. crops. the weeds to be controlled. and the possible methods of control.*
>
> *An integrated weed [management] plan and system must be individual. practical. economically sound and flexible. Individuality is necessary because the problems and possibilities differ from property to property with soils. crops and climate. The system must be both practical and economically sound and must also be flexible because it will need to be adapted from year to year as the problems change and as new herbicides and equipment become available.*
>
> (Parsons 1992)[1]

1 Parsons. J. M. ed. (1992) *Australian Weed Control Handbook (Ninth Edition)*. Inkata Press.

Key points raised in the above definition:

- The process is methodical
- Individual strategy for individual problem - aims must be clearly defined
- Information requirements - understand the weed, the environment, control techniques

Additional Points which I believe should be added:

- The integrated weed management system must not only be economically sound, it must be environmentally sound.

- It must be responsive to community attitudes (sometimes we need to be pushed to view problems in a different context and develop new approaches)

"Reasonable people adapt themselves to the world;

Unreasonable people persist in trying to adapt the world to themselves.

Therefore, all progress relies on unreasonable people."

George Bernard Shaw

- Public land is essentially community land - why shouldn't we be directed more by community desires for their land?

- It must be responsive to changes in our understanding of the system and the way it functions.

Application of Integrated Urban Weed Management

A Process

Step 1 - Identify aims - yours and the community's

- do you wish to control or eradicate?
- what will replace it?
- why do the community wish a weed controlled?
- are you being "weed phobic"? Does it really need to be controlled?

Step 2 - Understand the system you are dealing with.

- natural systems and ecological processes
- social systems
- what are key contributing factors?
- what interactions are taking place?

Step 3 - Identify a strategy for achieving the aims

- which techniques are best?
    - Chemical?
    - Mechanical?
    - Biological?
    - Physical?
    - Education + Training?
- establish performance indicators based on current knowledge

Step 4 - Implement Strategy

- Short, medium and long term strategies

Step 5 - Assess effectiveness

- Provide feedback to the system
- Modify strategy or aims if required

Case Studies - Natural Area and Open Space Management

Bankstown City Council

Open Space Management - Native Grasslands + Remnant Vegetation in Recreational Open Space
Local Government Land Management

Management Aims:

- improvement of aesthetics / recreation opportunities + quality
- improvement of habitat values
- promotion of biodiversity.
- effective weed control

The System and Issues:

Several Reserves containing Cumberland Plain woodland and Recreation facilities

- Mowing - influencing spread of exotic species (ironically. many turf grass species which on other sites were being managed to be free from other weeds)
- Fire - frequency influencing spread of some weed species (eg. Fireweed - *Senecio madagascariensis*)
- Which species were controllable within economically / environmentally feasible limits?
- In which areas could/should native communities be restored?

Management Strategies:

- Modify mowing practices
- Modify user patterns and adjoining influences
- Bush regeneration
- Chemical weed control
- Fire management

Implementation:

- Education and Training Implement informal training sessions with individual field staff
- Remove mowing from large areas of reserves
- Encouraged staff to be more lateral thinking
- Implemented target weed control and bush regeneration (physical/chemical treatments) in key locations
- Trailing of specific herbicides for controlling weed competition during restoration works. C3 / C4 specific and broadleaf selective.

Assessment:

- In some areas mowing was re-introduced due to increased proliferation of weeds
- In other areas mowing was further reduced
- Staff were able to make finer management decisions in relation to work practices influencing weed spread
- Fire management strategy largely ineffective due to arson
- Use of selective herbicides show promise in certain situations

Horsley Park Corridor

Broadscale Land Management Project - Native vegetation and agricultural systems
Community based project jointly between Greening Australia (NSW) and the NSW Department of Planning

Management Aims:

- Integrate agricultural productivity with environmental enhancement / repair and recreation provision

Short Term

- Create more stable environmental condition
- Reduce degrading influences

Long Term

- Reconstruction of Woodland Communities
- Increase biodiversity

The System and Issues:

- Noxious weed species - positive interactions with native fauna
- Past and existing land use practices and boundaries influencing weed spread
- Rising water table and dryland salinity - influencing spread of some weed species
- Former heavy cultivation and overgrazing

Management Strategies:

- Redefine land units
- Habitat reconstruction
- Modify leasing structures / conditions
- Target weed control

Implementation:

- Fencing
- Herbicide
- Cultural / Management changes
- Bush Regeneration techniques
- Use of Fire
- Revegetation and "do nothing"

Assessment:

Still early stages for most strategies to be assessed, however several trends are apparent:

- Restricted stock access to creeklines / ridgelines has resulted in less soil erosion, hence less vacant niches which can be occupied by invasive weeds
- Management changes have reduced likelihood of overgrazing occurring and now exclude heavy cultivation
- Weed:Native ratio in many sites appears to be strengthening in some circumstances where shading is introduced (via revegetation)
- Use of fire appears to show potential for increase native grass and herb contents of grassland understorey (work continuing with Uni. of Western Sydney)

Special Thanks:

Debra Little, Bush Management Field Manager, Bankstown Council.

Tein McDonald, Consultant and PhD Student, University of Western Sydney

Greening Australia Western Sydney Corridors Project Team (Michael Adams, Edgar Freimanis, Brendan Higgins, John Diamond and several hundred community volunteers)

You are invited to attend a Herbicide and Weed Control Industry Liaison Day

Agricultural Research Institute, Wagga Wagga, NSW

9 am, Wednesday 12 October 1994

Morning Program: Conference Room (Resellers, agronomists, chemical company reps.)

9.00	Welcome.	Deirdre Lemerle, ARI
9.05	Herbicide resistance update - research & extension.	Jim Pratley, CSU/Jim Dellow, NSW Ag
10.00	Integrated control of vulpia in pastures.	Peter Dowling, NSW Ag, Orange
10.30	Improving public perceptions of pesticides.	Harvey Baker, Cotton Foundation
11.00	How does organic farming fit into it all?	Michael Burlace, NSW Ag, Orange
11.30	Current weeds research at Rutherglen.	Greg Code, DARA Victoria
11.50	Future training needs in herbicide application.	John Kent, CSU
12.10	Weed survey of southern wheat-belt.	Deirdre Lemerle, ARI
12.25	New herbicide products.	Alan Umbers, Umbers Rural Services
12.45	Free Sausage Sizzle lunch outside Conference Room. (RSVP D. Lemerle)	

Afternoon Program: Field demonstrations (farmers, agronomists, resellers etc)

1.30	Herbicide x crop cultivar program.	Bruce Hinkley/Deirdre Lemerle
2.30	Annual grass control for pasture seed production and herbicide damage to sub clover.	Graeme Stewart/Graeme Sandral
3.15	Competitive crops for weed suppression.	Deirdre Lemerle/Birgitte Verbeek
3.45	Forage legumes and green manures for N input and weed control.	Jeff Evans/Alan Kaiser/Deirdre Lemerle
4.00	Bedstraw - a threat to cropping.	Michael Moerkerk, DARA Victoria
5.00	Free BBQ dinner outside the ARI Conference Room. (RSVP D. Lemerle)	

Displays and posters at ARI Conference Room: herbicides resistance (Peter Baines); Wild oat resistance (John Broster); Allelopathy in silver grass (An Min); weed control in rice, (Ric Graham); alligator weed (Hugh Milvain); identification of cruciferous weeds

Bruce Hinkley will show chemical company people the herbicide tolerance program in more detail if requested on Tuesday 11th or Thursday 13th October. Contact Bruce on phone (069) 381938 or 381999; fax (069) 381809.

NSW Agriculture

Weed Society of NSW

THE WEED SOCIETY OF NSW NEWSLETTER
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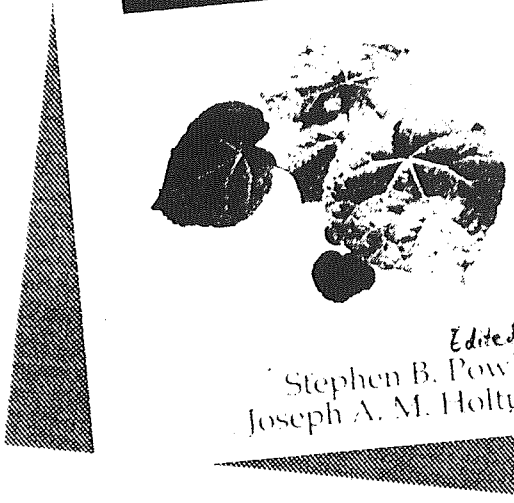
Introducing

HERBICIDE RESISTANCE IN PLANTS:

Biology and Biochemistry

Edited by Stephen B. Powles & Joseph A. M Holtum.



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New agricultural chemicals, drugs, and other xenobiotics have played a major role in ensuring a secured food supply and protection against the ravages of pests, diseases, and weeds. Abundant and sustained food production has been achieved, in part, due to the success of modern herbicides in controlling weedy plant species infesting crops and pastures. While not as visual as some other pests, uncontrolled weed infestations decimate yields and cause many other problems.

Weed control by herbicides is now an integral part of most modern agronomic systems delivering food and fibre. Additionally, it is acknowledged by practitioners, but not by all sectors of the community, that herbicides contribute to sustainable land use in that weed control can be obtained with minimal destructive soil cultivation in many systems. However, the persistant use of herbicides has resulted in the appearance of herbicide resistant weed populations. This adverse development is most dramatic in Australia, with resistant populations very numerous and widespread. This is the stimulus for this timely book.

Resistance to various herbicides is discussed in detail, as well as the mechanisms responsible for cross resistance and multiple resistance. This important reference book will prove to be invaluable to those interested in evolution and the ability of species