

URBAN WEED CONTROL: AN APPROACH TO ADDRESS THE ISSUES CONFRONTING THE PRACTITIONER IN THE FIELD

R. Wood

Camp Mount Road, Samford, Queensland 4520, Australia

Summary The author has been involved in the control of urban weeds in Brisbane for over 30 years. This area of weed control is not without problem and many of these problems have been around for as long as he can recall.

In this presentation he outlines the approach adopted to address the many issues and includes some data gathered from field trials and standard operational procedures that have been developed to address the issues being raised in the community against herbicide usage.

INTRODUCTION

Urban weed control is perhaps the most difficult area of weed control in which to operate. These difficulties arise largely from peoples perceptions, their expectations, close proximity of operations to people, their pets and plants and their fears or concerns regarding technology.

These difficulties have been present during the 30 odd years that I have been involved in the field and no doubt the practitioners here today have had to deal with these same difficulties.

Shortly before Christmas last, the floor covering (at the office where I am stationed) was lifted up and renewed. Removal of the old floor covering exposed a copy of the Brisbane Telegraph dated 3 January 1946. In the 'Letters to the Editor' column of that edition a very interesting article was encountered:

'City Amenities

Sir – Congratulations on your editorial, "Amenities Expected by People" (1/1/46). We really have had a surfeit of promises from the City Council and, considering the high rates and the money in hand, suburban footpaths are, in many districts, disgraceful.

We have weeds nearly waist high for months. Then a gang of men chips them, breaks the surface of the path, leave the roots in position, and pass on. The relief is short lived, the cost is considerable, and the waste of labour and money senseless. Could not weed-killer be applied?

It is to be hoped that not one alderman miss (on account of the holiday) reading and digesting your editorial.

TOWNSMAN'

Now days the usual letter to the Editor is the complete reverse calling for the banning of chemicals which are perceived to be dangerous and toxic.

I thought it may be of some value to look back over the past 30 years to see what has been done by my organization to address the concerns of the population.

MATERIALS

Firstly, in the area of chemical control we looked at the materials being used. When I first became involved, diesel oil was being applied to the weeds in the kerb and channel. This was messy leaving an oily film over every thing that then rubbed off on ladies skirts, socks, men's long trousers, etc. Its effect was short lived and was expensive. More suitable herbicides such as 2,2-DPA, amitrol and later glyphosate were introduced.

Specification for herbicides were written to address a range of issues such as odour or wetting agent incorporated. It was believed that the major cause of odour when using several herbicides was the volatile fraction, i.e. the excess amine remaining in the formulations (usually dimethylamine). Council used other formulations where available such as Na⁺ salts or diethenolamine salt or more recently the pan dried crystal of the dimethylamine salt formulation.

Wetting agents were also included in this examination and it was found that a number of the products contained such solvents as 21% of methyl alcohol or 10% acetone. Also the amount of active ingredient varied widely and Council was paying good money for a lot of water. A new specification was drafted to include:

- 100% active,
- low foaming,
- low toxicity,
- compatibility to a range of materials,
- 80% biodegradable as determined by the STCD presumptive tests,
- non-flammable, and
- presented in liquid form for ease of measurement in the field.

Long before MSDS sheets became available or even mandatory I would insist on a whole range of data being made available before I would ever consider trialling a new product. Much of the data these days is contained in the MSDS sheets, however I still ask for information on the mode of action of the material offered, its fate in the environmental and the toxicology of the metabolites of the active constituents.

EQUIPMENT

At the same time we looked at the equipment and asked what is the most suitable equipment for the particular job. The hydraulic equipment was upgraded with diaphragm pumps. Better hoses were introduced and they were fitted with quick release couplings which allowed the rapid change of brush guns or wands to suit the particular job. Specialized equipment was introduced to particular jobs. In many cases new equipment was invented to suit the purpose.

Raindrop nozzles, air entrainment nozzles venture injector systems were introduced to allow application with minimal drift or potential pollution to be undertaken in certain areas. Also a mechanical sub-merged aquatic weed harvester was developed and put to service to deal with submerged and emergent aquatic weeds.

Wick wipers both hand held and vehicle mounted were examined. Many of the early hand held wick wipers, whilst satisfactory for the home garden situation, were of little value on the scale required by our operations, due mainly to the inability to retain adequate supply of material. The wick material depended solely on capillary activity. The vehicle mounted models were even worse, ropes pulled out and grommets leaked leaving a trail of high concentrate herbicide behind. Another device looked at relied on surface tension to retain the herbicide on the surface of long nylon bristles. When the vehicle moved forward the bristles contacted the weeds, but it tended to flick the herbicide in all directions.

More recently a rotating wick wiper was trialled and adopted.

TRAINING

As new materials and new equipment were introduced all the crews were fully trained to take advantage of the new technology or new system.

All the crews undertook training and became unrestricted licence holders under the ACDC. Training is ongoing and is very largely directed towards safe usage and handling of herbicides and equipment, and an understanding of the environmental impact.

ALTERNATIVES

In 1994 my Council undertook a 12 month trial of a hot water treatment system. Two units were put into service. Council did not take that system into full service.

In January 1995, a rotating wick wiping applicator was put into trial for six months. This proved successful and has been taken into services this year.

With this machine, herbicide is applied by a wick wiping process. By having the rope wicks threaded onto a disc, the rope ends embedded into the chemical reservoir in the centre of the disc and by rotating the disc the

rope wicks have a positive feed of herbicide by centrifical force. This feed can be adjusted according to the number of revolutions per minute of the disc. By adjusting the height of the disc, products such as Roundup can be applied as a selective herbicide only to the taller growing species. In K&C, a triple hinged frame has been constructed to conform with the profile which will allow the three discs to be matched. These discs have a ground clearance of only 5 mm and the frame is made in such a way that it automatically changes to conform with the profile of lay-back kerb to vertical kerb and back as required.

Council was approach in December 1994 by a company called GameCo to trial their Weeddragon – JET4. This equipment was nothing more than a naked flame fuelled by LPgas. JET4 was trialled in February 1996. The results were on a par with the hot water treatment. It was far less costly to use, however the hazard factor to the operator, the public and the environment was considered to be unacceptable - because of the possibility of petrol fumes around parked cars or wind blowing the flame uncontrollably. This could possibly ignite synthetic clothing on a passer-by.

As a result of the trials over the past 2½ years or so the rotating wick wiper (Gutterbug) has proven the most effective. Some of the advantages with this equipment are:

1. No odour associated with chemical application.
2. No drift associated with chemical application.
3. Reduced lost time as wind has no influence on application.
4. Reduced amount of chemical applied.
5. Increased safety to the operator, the public and the environment.
6. Maintained efficiency.

During this process Trial Methodology were drawn up in each case and agreement reached before any trial. It produced a framework to work to and a means of assessing the outcome of the trial.

PROCESS

In many instances management as one of the tools available for the control of weeds has not been used at all or only on a limited scale. Over recent years more attention to detailed in the design stage is given to minimize sites likely to become weed problem areas and surveillance on a regular basis has allowed weeds to be detected and dealt with at a much earlier stage. This has been the approach for example in controlling weeds in our ornamental lakes. In many instances the weed has been removed by hand at time of inspection. This approach has not only reduced the need for chemical but has maintained aesthetic appeal.

Weed management plans have been developed for several bush land areas. A strategic weed management plan for the whole of Brisbane is presently being drafted.

A Standard Operational Procedure for the Minimization of Environmental Risk has been written. This SOP

Table 1. Background levels of glyphosate in the environment.

Location	Glyphosate mg L ⁻¹	
	Left hand side	Right hand side
Brook Street	<0.05	<0.05
Drury Street	<0.05	<0.05
Reid Street	<0.05	<0.05
Antill Street	<0.05	<0.05
Eight Avenue	<0.05	<0.05
Flushing Water	<0.05	

Table 2. Levels of glyphosate detected one hour after application.

Location	Residual glyphosate mg L ⁻¹	
	Treatment via spray truck	Treatment via Gutterbug (wick wiping)
Brook Street left hand side		15
Brook Street right hand side	73	
Drury Street left hand side	48	
Drury Street right hand side		6.5
Reid Street left hand side	85	
Reid Street right hand side		30
Antill Street left hand side		13
Antill Street right hand side	31	
Eight Avenue left hand side		20
Eight Avenue right hand side	56	
Flushing Water	<0.05	

Table 3. Levels of glyphosate detected seven days after application.

Location	Residual glyphosate mg L ⁻¹	
	Treatment via spray truck	Treatment via Gutterbug (wick wiping)
Brook Street left hand side		0.20
Brook Street right hand side	1.35	
Drury Street left hand side	1.30	
Drury Street right hand side		0.15
Reid Street left hand side	1.35	
Reid Street right hand side		0.65
Antill Street left hand side		0.15
Antill Street right hand side	0.80	
Eight Avenue left hand side		0.50
Eight Avenue right hand side	2.80	
Flushing Water	<0.05	

not only covers chemical weed control procedures, but also biological and mechanical means. The idea is for each job to be examined before commencement and based upon the environmental impact of each method of control a decision is made which is site specific as to which method or combination of methods will be used to achieve the desired result. This approach is in response to our obligation as a local authority under the Queensland Environmental Protection Act.

In September 1995 a trial was conducted to compare residues of herbicide using two different methods of application. This trial was conducted to determine under field conditions the likely range of residues remaining on suburban kerb an channel following application of Roundup by:

- a. conventional hydraulic application, and
- b. wick wiping application using Gutterbug.

The results obtained are set out in Tables 1–5:

Following that trial in November 1995, a further trial was carried out using the same wick wiping technology to determine under field conditions the likely range of residues of Roundup detectable on plant growth.

The trial area was sampled every 10 minutes for the first 2 hours and every 30 minutes for a further 2 hours. Part of the sample was set aside and examined under a microscope. The results tend to indicate that the small amount of herbicide applied by this wick wiping process had dried within approximately 20 minutes of treatment. Also on examination of the samples to determine the residue levels of herbicide, it appears that the residue levels dropping be approximately 50% over the same time frame.

Two days after treatment 23 mm of rain was recorded at the trial site. Soil samples were then collected and examined. No residues of Roundup were detected in these soil samples. In June 1996, further field trials were carried out to assess the possible movement of Roundup off the treated sites and into the local water courses. At the time of writing the analytical results have not become available.

Table 4. Hydraulic application.

mg L ⁻¹					
1 hour after application			1 week after application		
Max	Min	Average	Max	Min	Average
85	31	59	2.8	0.80	1.52

Table 5. Gutterbug application.

mg L ⁻¹					
1 hour after application			1 week after application		
Max	Min	Average	Max	Min	Average
30	6.5	16.9	0.65	0.15	0.33

THE FUTURE

If I could with certainty look into the future and see what it holds I would be most pleased. But as I cannot the best I can offer is the obvious, that is, the difficulties of the past will remain. What I have briefly outlined above has allowed us in some part to handle some of these difficulties. These measures will continually require re-examination and up dating. As new technology becomes available it will need critical objection evaluation and if applicable adoption.

I believe also that we will need to look more closely at weed prevention measures and that should include very close examination any new or proposed plant introduction and assessment of its future weed potential.