
President: Mr. J.M. Swain
Hon. Secretary: Mr. W.J. Burke

Newsletter No: 5/82
Price: 10 cents

November, 1982

Summary of Talk by Dr Ray Hance,
Weed Research Organisation, United Kingdom
to Weed Society of New South Wales
at University of Sydney on 21st October

"Some Aspects of Herbicide Residues in Soils"

Dr Hance spoke on 3 topics

- Consequences of long-term use
- Carry over problems
- Herbicides in minimum tillage

Consequences of long-term use

Dr Hance told the meeting about the long term trial which has been in progress for 18 years at Begbroke Hill where MCPA, triallate, simazine and linuron have been in continual yearly use on wheat/barley, maize and carrots respectively.

To date no effects on yields of the crops have been noticed except in 2 separate years when individual yearly treatments of linuron caused phytotoxic effects on carrots.

With regard to effects on crop quality (i.e. malting, chemical composition, nutritional tests, baking test, taste tests, aromatic oils, carotene content) only 2 effects have been noticed

- i) the milling and baking quality of wheat flour was of better quality from triallate treated plots than untreated plots.
- ii) The carotene content of carrots was higher in plots treated with linuron.

Actual Residues in Soil

- i) MCPA - was soil residual, but the soil showed "adaptation phenomena" where soil micro-organisms capable of breaking it down increased in the soil. This was not seen with simazine, triallate or linuron.
- ii) triallate had a residual life of 33 weeks, so no residues on a yearly basis.
- iii) Simazine - 90-95% was lost within the year, therefore no accumulation.
- iv) Linuron - did not accumulate.

In passing Dr Hance mentioned that it had recently been shown that EPTC exhibited the adaptation phenomena, but the effect in this case showed "cross adaptation" in that it conferred the ability on soil to breakdown rapidly all related compounds - amides, carbamates, and the efficiency of these chemicals has been shown to be reduced i.e. carbofuran an insecticide cannot be used on many soils in USA now because of this effect where EPTC has been used.

Soil Fertility

No significant differences were shown due to herbicides on

- soil structure
- organic matter
- earth worms
- micro-organisms

The conclusion was that on a long-term basis there are no soil residual problems associated with continual usage of the four herbicides tested. However, Dr Hance pointed out this was one experiment under one set of climatic conditions which are considerably different from Australian conditions.

Short-term or Carry-over Problems

These are effects carried over from one treatment to one crop to the succeeding crop which is usually a different crop.

Dr Hance briefly dealt with the processes which affect the disappearance of chemicals in the soil i.e.

plant uptake - at most 1-2%

volatilisation - controlled by formulation and incorporation

leaching - not an important process of loss

chemical - not important in UK but could be in Australia

photochemical - not important in UK but could be in Australia

* microbial - in UK contributes most to residue losses in soil

Factors influencing microbial activity are :-

- availability of chemicals - adsorption, soil moisture
- quantity of organisms present
- activity of organisms - temperature
 - nutrients
 - soil moisture

i.e. Soil temperature and moisture are the major factors affecting microbial activity and thus herbicide breakdown. If this is the case then from meteorological data we should be able to predict the actual breakdown of herbicides in soil. Some good correlations have been obtained in modelling experiments based on these factors, the W.R.O. are now trying to do this on a world basis to improve predictions. At the moment they can only predict in which years a chance of residues exists from normal rates of usage.

The levels of herbicide in the soil at which we can expect damage are :-

atrazine 0.1 mg/kg (ppm)
 metribuzen 0.08 mg/kg (ppm)
 propyzamide 0.1 mg/kg (ppm)
 linuron 0.2 mg/kg (ppm)
 lenacil 0.15 mg/kg (ppm)
 trifluralin 0.2 mg/kg (ppm)

However in Dr Hance's experiences in the U.K. it has been very difficult to find actual examples of carry over residue problems except for

- over laps of spray applications
- malicious application or misuse

Only in horticultural crops have any carry-over effects been seen and these were rare.

linuron	}	vegetables	→	strawberries
trifluralin				
triazines				
lenacil		strawberries	→	tomatoes
propyzamide		lettuce	→	tomatoes

Other examples included :-

- straw for mulching from crops treated with TBA (trichlorobenzoic-acid)
- possibly glyphosate in straw used for mulching in Holland.

Herbicides in Minimum Tillage

There is no real evidence that the main herbicides - diquat, paraquat, glyphosate used for minimum tillage show any residual problems.

The only example of a problem is associated with decaying couch grass rhizomes treated with glyphosate. This problem is associated with the breakdown of vegetable matter and the toxicants produced.

Also in the UK associated with the practice of minimum tillage the resulting straw after harvest is usually burnt. It has been found that this practice increases the adsorptive properties of the soil. Poor herbicide performance has been associated with this practice when soil active chemicals are used in succeeding crops. Both the ash carbon plus adsorptive changes in the soil surface account for this phenomenon.

Dr Hance concluded that from the work at W.R.O. and experienced in the UK, there are no major difficulties associated with herbicide residues in soil in cropping situations provided the recommended rates are used.

It should be pointed out that Dr Hance was referring to UK experience and not Australian, where climatic conditions are quite different. He did not deal with non-crop application of herbicides where rates of usage are much higher on other specialised uses.

CAWSS News

The following recommendations have been accepted by CAWSS for awarding the CAWSS Medal.

1. There should be a medal to be called the CAWSS Medal.
2. Any costs associated with the production or award of the medal to be met from CAWSS funds.
3. A Medal Committee should be established as a sub-committee of CAWSS. It should consist of the President and Immediate Past-President of CAWSS and one other person, not necessarily a delegate to CAWSS but who should be elected by CAWSS.
4. The Committee at its discretion may recommend that one or more medals be awarded three months prior to each Australian Weeds Conference and presented publicly at a session of the conference.
5. There should be a standing invitation for names of possible recipients of the medal to be submitted in confidence to the Medal Committee but the Committee should have the power to initiate its own nomination.
6. A nomination should be made to CAWSS which personally or by post would vote to ratify the nomination. In the event of the nomination not being ratified, the award shall lapse for that particular conference. Regardless of ratification or otherwise there should be no discussion of any candidature at any meeting of CAWSS or its constituents.

7. The nominee should be any person who has fulfilled the qualifications regardless of his membership status with CAWSS or its constituents.
8. The medal should be awarded for distinguished contributions in Australia, to Weed Science research, extension, administration or operation in the ten years prior to the award.
9. The award should be prestigious only and not associated with a monetary or any other material award.

Editors Note

Any comments send to Weed Society of N.S.W.

New Members

Anthony M. Feez - a QAC Crop Protection Graduate who is working with Dow Chemicals, Sydney.

Geoff A. Jacobs - DuPont (Aust) Ltd who has been transferred to Sydney from Brisbane.

Subscribers needed for "Australian Weeds"

Every member of the Weed Society of New South Wales should subscribe to Australian Weeds. However a check of the records shows that only $\frac{1}{4}$ of the members have actually taken out a subscription.

The cost is \$20/year. The value is excellent. If the journal is to survive we must have more subscribers. Volume 2, No. 1 has just been published. Contact for information

Inkata Press Pty Ltd.,
4 Longbourne Avenue,
NORTH CLAYTON, VIC. 3168.

The ICI Electrodynamic Spraying System

Electrodynamic spraying is a completely new system developed by ICI for the controlled application of crop protection chemicals. In trials for Heliothis on cotton, the Electrodyn sprayer put more active chemical on the target than any other currently available system.

Electrodynamic spraying achieves this by :-

- producing optimum size droplets;
- creating a "wraparound" effect of droplets on the target surfaces; and
- minimising drift to non-target areas (such as the soil between the plants or rows of plants) by targetting the droplets to the crop.

These unique characteristics offer farmers the prospect of new standards of efficiency in pesticide application, whilst substantially reducing the potential for undesirable environmental side effects.

Principles of Electrodynamic Spraying

The Electrodynamic sprayer nozzle is unique. No mechanical energy is required for droplet formation. In its simplest form no compressors, motors, or pumps are required. So for hand held equipment, the system has no moving parts.

When liquid emerges from the nozzle electrode, it is subject to an intensely divergent electrical field of 25 kv or so, giving rise to a charge injection effect.

By careful formulation, most chemicals can be given the right electro-physical properties to allow efficient droplet formation.

A number of stable ligament zones are electrically established at the nozzle electrode gap, and droplets are subsequently formed by electro-hydrodynamic growth waves on the surface of the ligaments. Droplet size and distribution are determined by electric field strength, liquid resistivity, viscosity, dielectric constant, surface tension and liquid feed rate to the nozzle. Laboratory measurement of drop size, indicate an unparalleled uniformity.

Since the nozzle potential is high, a strong electric field is established between the nozzle and the crop target. For small droplets, say 50 micron diameter, the electric field force is over 200 times greater than gravity.

Electrically propelled droplets follow the curved flux lines between the nozzle and plant surfaces. Consequently, they can cover hidden surfaces and be deposited on the "other side" of plant surfaces.

More information will appear on this system in the next Newsletter.

Overseas News

FAO/IWSS Expert Consultation on Weed Management Strategies for the 1980s

Thirty five weed control specialists from 20 countries met in Rome for one week in September to draw up recommendations aimed at improving weed management in developing countries.

More than 100 recommendations were approved by the group under such categories as research, extension, the chemical industry, and conservation tillage. Appropriate recommendations will be sent to FAO, governments, research and educational institutions, donor organisations, and the agrochemical industry.

FAO will publish all of the recommendations and background papers within the year.

Changes in the Tropical Weeds Group at WRO

The tropical weeds liaison unit at Weed Research Organisation, Oxford, UK has unfortunately ceased to function for the time being following the withdrawal of financial support by the UK Overseas Development Administration (ODA). Alternative funding is being sought from various sources and it is hoped to resume the information, advisory and herbicide evaluation activities on tropical weeds in due course. Meanwhile ODA are continuing to fund the striga research project at WRO, for a further three years and some of the liaison team, including Chris Parker, have been partially re-deployed into that project. ODA are also funding a three project on the biology and control of Imperata cylindrica in Indonesia. The project is led by WRO staff member John Terry, based with BIOTROP, Bogor.

Towards the ideal weed killer

Herbicides, observes an industry representative, need, "to have a wider spectrum of activity, more persistence, a higher level of activity, and to be better adapted to the crop cycle." J.P. Loubaresse, in Can Herbicides be Improved? (Shell in Agriculture, May 1981), answers his own rhetorical question by suggesting "room for creativity within the existing concept of weed control."

Loubaresse lists the main areas for improvement in existing herbicides, as attributes of the ideal (chemical) weed killer, but doesn't rule out the need for more difficult and fundamental innovations in weed control. Safety, both to the environment and the crop itself, tops his list.

Despite gloomy prospects for the future of new herbicides and expanded use of present compounds, industry - according to Loubaresse - is still allocating 40% of its research investment to the search for new herbicides.

National Workshop on Weeds in Reduced Tillage Cropping Systems

Horsham, March 22-23, 1983

A national workshop focusing on weeds in reduced tillage systems will be held in Horsham early in 1983 and will be open to participants from the chemical industry as well as governmental agencies.

Topics to be covered in the two day workshop include the ecology of weeds in reduced tillage systems, the role of herbicides, new application techniques, the risk of residual herbicide carryover, and experimental techniques for the meaningful measurement of these aspects. Other points to be considered are the possible build-up of perennial weeds in reduced tillage systems and the effect of retained stubbles on herbicide efficacy.

The organisers of the workshop are hoping that at least one overseas visitor, actively involved in the development of reduced tillage systems, will contribute to the workshop.

The number of participants will be limited to 35-40, but intending participants should register their interest with :-

Mr. P. E. Ridge,
Victorian Crops Research Institute,
Private Bag 260,
HORSHAM. Vic. 3400

Mapping out a weeding strategy

Agronomists at the University of Wisconsin are advising farmers to make a weed map of each paddock, showing where particular weeds grew well.

They say the map could be the basis for the commencement of the following year's weed control measures.

They point out maps are especially helpful to locate patches of perennial weeds which often warrant special control measures.

The agronomists add that a map helps making sure the rights areas are treated.

Note for your Diary

The Annual General Meeting will be held on Friday 25th February, 1983.

Venue and Programme will be advised in next Newsletter.

* The Editor wishes all members of the Weed Society of New South Wales a Merry Christmas and Happy New Year.

Good Luck in 1983 and may it rain again some time.
