

# Technology for controlling weeds in vegetable production

Carl Larsen

28 August 2019

Integrated  
Crop Protection

PROTECTING CROPS



Soil Wealth

NURTURING CROPS

Hort  
Innovation



RMCG

# What we'll cover today

Integrated  
Crop Protection  
PROTECTING CROPS



Soil Wealth  
NURTURING CROPS

- Steam saturation – development of chemical free weed management
- WEEDit and Recapture technology – what are they and how do they work?
- Precision implement guidance in row crops using radio frequency – evolution and lessons from overseas
- Q&A session
  - A chance to engage with our panel presenters





# The Soil Wealth and ICP project

- Improve soil management and plant health
- Research to practice focus on-farm
- Work directly with vegetable growers and advisors
  - Phase 1: 2014-2017
  - Phase 2: 2017-2022
- Responding to industry needs
  - Demo sites, events & resources

The screenshot shows the website's 'Demo Sites' page. At the top, there are navigation links: Home, Events, Demo Sites, Resources, About Us, Contact. The main heading is 'Demo Sites'. Below it, a paragraph states: 'The Soil Wealth and Integrated Crop Protection teams work with vegetable growers across Australia to integrate profitable and sustainable practices into modern vegetable production systems. Click on the current demonstration sites below to find out more information.' The page displays a grid of nine demo site images with 'MORE' buttons. The sites listed are:
 

- Bendalong, QLD
- Cooka, NSW
- Sydney, NSW
- Northside, TAS
- Girgin, WA
- Richmond, TAS
- Sydney Basin, NSW

 Below the grid, the 'Events' section is active, showing:
 

- Webinar: The role of soil DNA testing in managing the risk of soilborne diseases - how is it being used and what can it do?** (Thursday, 2nd August 2018)
- Webinar: Future focus - robotics and intelligent systems in Australian vegetable production systems** (Thursday, 23rd August 2018)
- Soilborne Disease Master Class 2018** (3 Sep 2018 to 4 Sep 2018)

 A calendar on the right shows the month of August 2018, with event icons on the 2nd, 23rd, and 3rd.



# Jeremy Winer, Weedtechnics

- Satusteam© - weed killer safe enough to drink





# Steam saturation technology

Table 13. Cost of products when applied at label rates used in the trial.

Input	Input cost	Cost/ha (input only)
224 g/L sodium chloride (Nontox <sup>®</sup> )	\$240/20 L	\$238
525 g/L nonanoic acid (Slasher <sup>®</sup> )	\$286/20 L	\$298
680 g/L pine oil (Bioweed <sup>™</sup> )	\$330/15 L	\$436
790 g/L acetic acid (Contact Organics <sup>™</sup> )	\$220/20 L	\$163
Flame	\$15.95	\$579
Mulch	\$33/m <sup>3</sup> delivered	\$5,049 (~\$1,683/ha/yr)
Steam SW2800	\$39,600/unit	~\$87.00 water and diesel
Straw	\$70/4 x 4 round bale delivered	\$3,500 (~\$1,166/ha/yr)





# Dave Farmer, Croplands

- WEEDit and Recapture technology – what are they and how do they work?





# WEEDit and Recapture technology

## What is it and why bother?

- At its most basic form WeedIT is a system that uses near infrared (NIR) technology to identify a living weed in a fallow paddock and sprays only that weed.
- The concept of using a sensor or camera to identify and spray only weeds has been around for a long time and is still a hot topic but many systems have failed to get off the ground mainly due to accuracy (missing weeds) and efficiency (too slow) problems.
- Croplands has been actively selling WeedIT sprayers for over 5 years now with major growth over the past three years. The product is seen as a commercially viable option.
- Substantial return on investment by reducing input costs and controlling hard to kill weeds.
- Combats resistance while remaining economically viable. Different (usually more expensive) chemistries can be used and weeds can be repeatedly and cheaply targeted when they are young, easy to kill and unable to set seed.
- Allows the operator to approach the job aggressively with a "no escapes" attitude.
- Clear environmental advantages by using less chemical
- Direct from manufacture supply with a national dealer network
- Croplands relationship with Nufarm in regards to chemistry, registrations and label directions gives us a complete approach



# WEEDit and Recapture technology





# WEEDit and Recapture technology



# WEEDit and Recapture technology





# WEEDit and Recapture technology



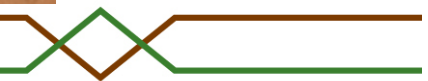


# WEEDit and Recapture technology





# WEEDit and Recapture technology





## Robert Tucker, AEGIS

- Precision implement guidance in row crops using radio frequency – evolution and lessons from overseas



# Radio frequency technology



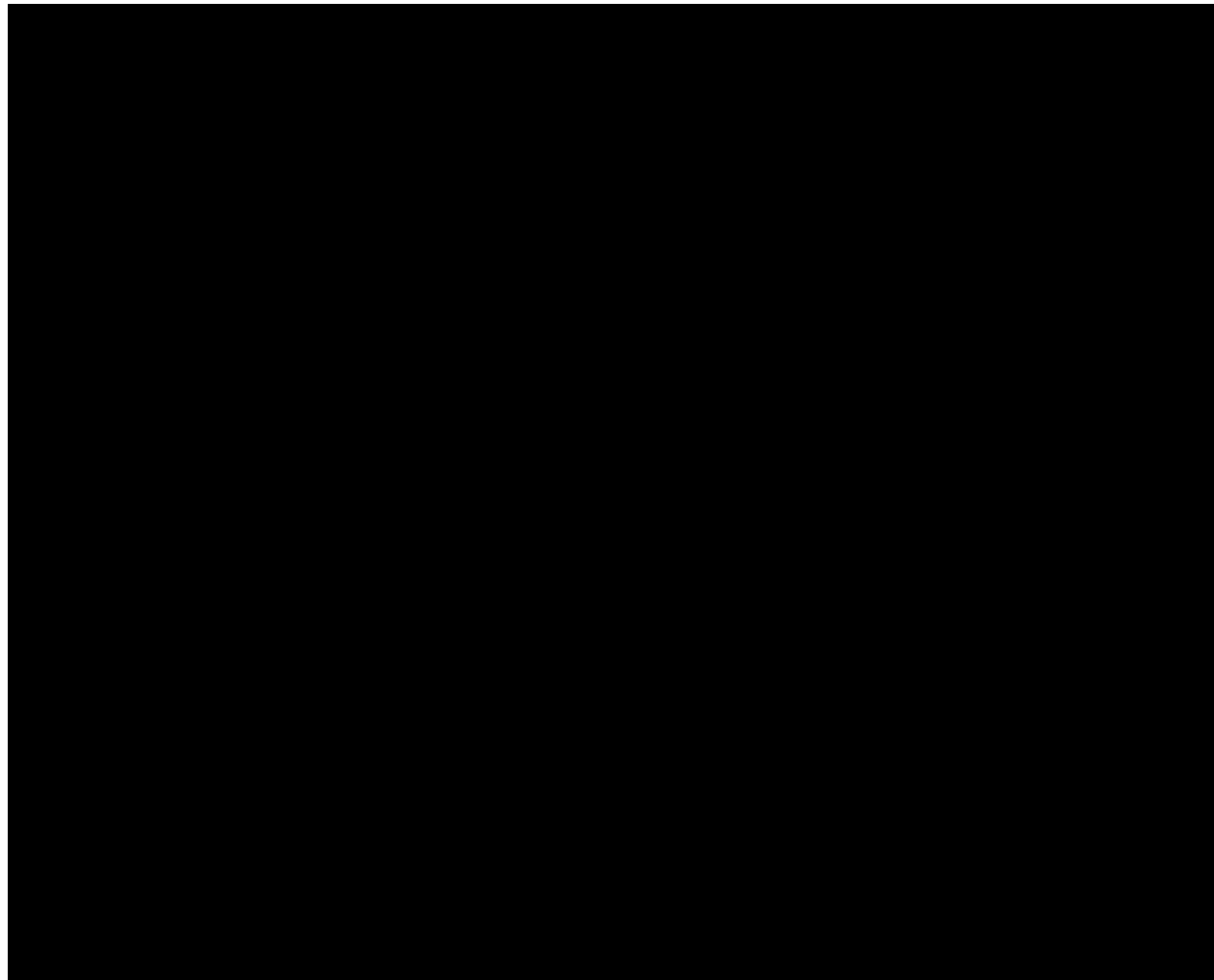


# Radio frequency technology

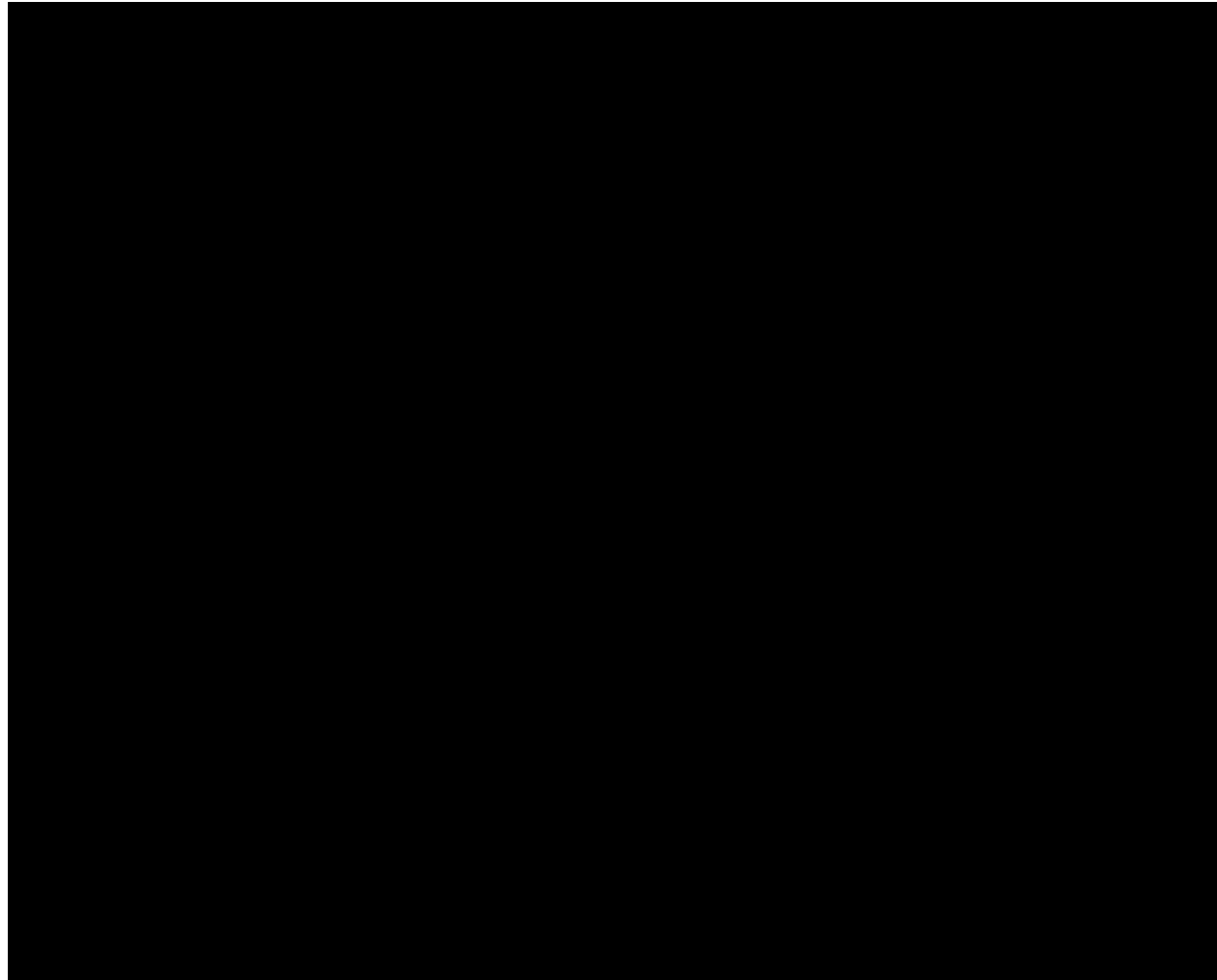




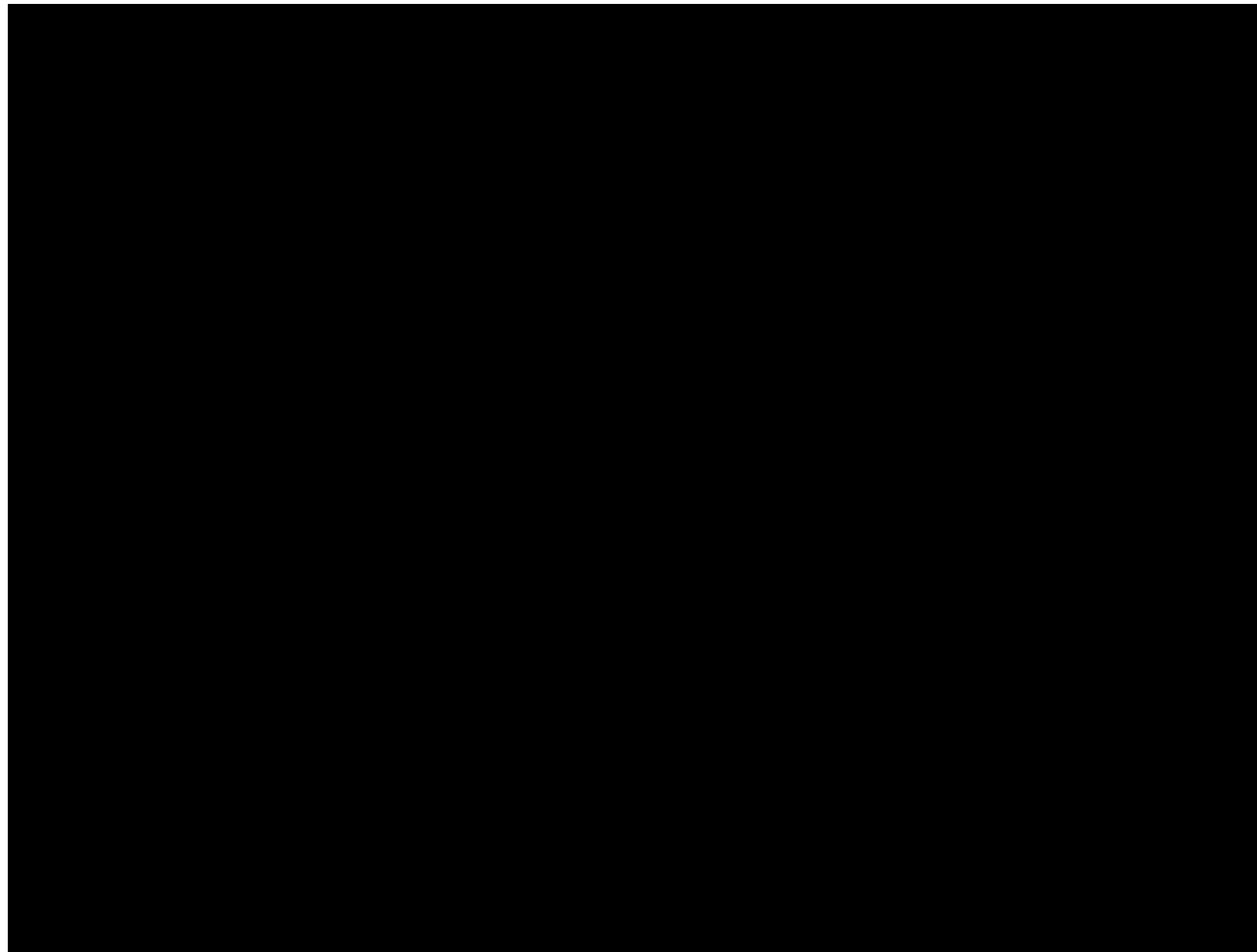
# Radio frequency technology



# Radio frequency technology



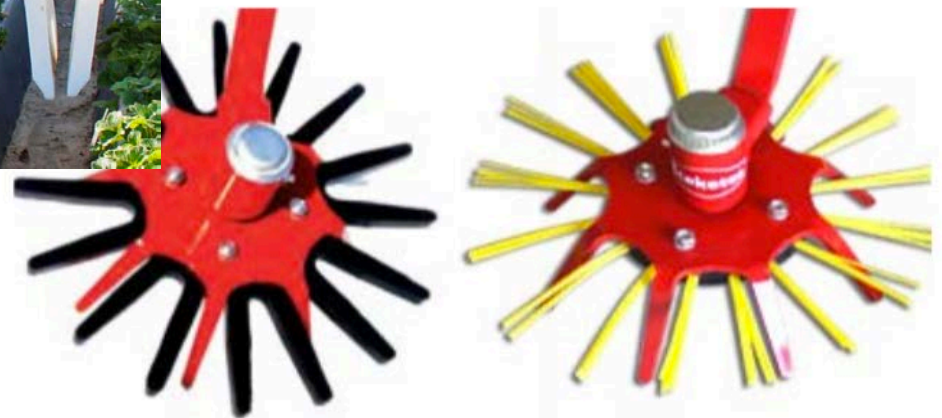
# Radio frequency technology



Let's get the conversation started ...



- Q&A session





# Resources and events

- Fact sheets
- Global scan and reviews
- Past webinar recordings
- Videos
- Visit [www.soilwealth.com.au](http://www.soilwealth.com.au)



## Weed management in vegetables

### Overview

Weeds increase the cost of growing vegetables, reduce crop yield and quality, and impact farm management decisions, such as timing of harvest and choice of herbicide options.

The growth of weeds in vegetable production systems is enhanced by soil disturbance, irrigation and the application of fertilisers. Weeds harbour many vegetable diseases, nematodes, mites and insects, especially aphids and thrips that transmit viruses. Weed pressure is generally higher when soil conditions are poor due to heavy cropping.

This fact sheet provides growers and advisors with an overview of:

- Important weed species in Australian vegetables and their impact on profitability
- Weed control methods and critical success factors
- Key features of an Integrated Weed Management approach.



Figure 1: Important weed species, vulgaris planting plastic, in a vegetable crop (above left) and far left (below right). (Source: Smith et al 2011, Kitchener 2016)

### Key messages

- Weeds increase the cost of growing vegetables, reduce crop yield and quality, and impact farm management and profitability.
- Weed management is an important component of the integrated crop protection approach – combines chemical, cultural and biological methods to keep weeds, insect pests and disease pressure low enough to prevent



## Spray Application Basics

Chemicals play an important role in vegetable production and are regularly used to control insect pests, diseases and weeds. When applying chemicals, aim to maximise the amount reaching the target and minimise the amount reaching off-target areas.

The majority of chemicals used in vegetable production are delivered in the form of droplets produced from different types of nozzles and spray booms. To maximise spray efficiency, spray droplets must be uniformly distributed on a target surface with minimum losses due to drift, evaporation or splash. Droplet size is a key factor in determining the suitability for any given spray job.

Droplets are very small and usually measured in microns (µm) with one micron equalling 0.001mm. When operating at any given pressure, hydraulic nozzles produce a range of droplet sizes. The British Crop Protection Council (BCPC) has classified these ranges of droplet sizes into different classes. This classification is included in most nozzle catalogues and is a useful guide for assessing the suitability for any given spray job.

NOZZLE CATEGORY	DRUPELET SIZE	DESCRIPTION	USERS IN AGRICULTURE SPRAYING
Very fine	< 10µm	Mist or fog	
Fine	10-20µm	Fine spray	Insecticides and contact herbicides
Medium	20-30µm	Medium spray	Residual herbicides
Coarse	30-40µm	Very fine rain	Residual herbicides and foliar fertilisers
Very coarse	40-50µm	Fine rain	Foliar fertilisers
Extremely coarse	> 50µm	Heavy rain	Foliar fertilisers

Note: Droplets smaller than 10µm cannot readily be seen by the naked eye.



Home Events Demo!

Home | Resources | Webinar recordings | Integrated Weed Management for the Australian Vegetable Industry with Dr Paul Kristiansen, Dr Kelvin Montagu and Marc Hinderager

## Integrated Weed Management for the Australian Vegetable Industry with Dr Paul Kristiansen, Dr Kelvin Montagu and Marc Hinderager



### KEY MESSAGES

- ✓ Weed-free technology for controlling weeds will be a positive step forward for soil health and the environment.
- ✓ Technology will play an important role in our fight against herbicide-resistant weeds.
- ✓ Some technologies will reduce and/or eliminate herbicide use, helping to reduce the impact of herbicide resistance on the environment, human and animal health, and the safety and security of our food.
- ✓ Some weed control technologies will improve safety and increase the range of herbicide options available to growers.

### GLOBAL SCAN AND REVIEW

Recently you have 9 information in total of 10 and learning the internet to find the forum by total product has done and the information provided. The information has been shared from around the world in Australian vegetable growers and advisors.

A few have been on the market for many years with constant improvements being made, and other technology is newly emerged. We have grouped them into three segments:

- I. Non-selective fallow paddocks
- II. Selective in-crop weed control
- III. Delivery technology

The team has given each technology a Soil Wealth and an ICP rating on a scale of 1-5 with "5" being the best. The Soil Wealth rating is focused on the technology's impact on the soil in terms of toxic residues, nutrients, soil biology, and the ICP rating is based on reduced chemical use, effect on the environment, and minimising risks to the current crop and crop rotations.

**I. NON-SELECTIVE FALLOW PADDOCKS**  
WeedSeeker and WEEDS weed management have been



# Thank you

[www.soilwealth.com.au](http://www.soilwealth.com.au)

**Integrated  
Crop Protection**

PROTECTING CROPS



**Soil Wealth**

NURTURING CROPS

**Hort  
Innovation**



**RMCG**