

Steam and fish fertilisers: A potential organic systemic herbicide?

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Presentation to the 7th workshop of the
EWRS working group:

Physical and Cultural Weed Control

11-14 March 2007

Introduction / background

- Due to the avoidance of synthetic herbicides organics has an increased reliance on soil tillage / cultivation for:
 - Seedbed preparation
 - Weed management
- This can damage soil, especially when compared with minimum tillage approaches

Introduction / background

- Protecting soil quality is at the heart of organics, e.g., FOAM Principle of health
“Organic Agriculture should sustain and enhance the health of soil, plant, animal and human as one and indivisible.”
- ‘Conflict’ between practical need for soil cultivation for weed management and one of organics central aims

Introduction / background

- A method of systemically killing weeds without soil tillage that was organically acceptable it could address this 'conflict'
- A number of claims have been made in NZ that using foliar fish fertilizers in conjunction with a steam weeder achieved a systemic weed kill

Introduction / background

- Two main parties making the claims
 - BioSea – trading name of the fish processing, fertilizer by-product division of Sea Lord Group Ltd.
 - Thermal Options Ltd. designed and manufactures the VaporJet H1200 ® steam weeder *



VaporJet H1200® steam weeder. © Thermal Options Ltd.

Introduction / background

- Parties fell out over patent

NEW ZEALAND
PATENTS ACT 1953

10 No: 513609
Date: 20 August 2001

INTELLECTUAL PROPERTY
OFFICE OF NZ
20 NOV 2002
RECEIVED

15

**THERMAL WEED, FUNGAL, INSECTICIDAL AND STERILISATION
METHOD**

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I, RICHARD JOHN NEWSON a New Zealand citizen of 24 Fulford Road, Havelock North, Hastings, New Zealand do hereby declare this invention to be described in the following statement:

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Introduction / background

- Despite strong claims for effectiveness and patenting no rigorous demonstration of effectiveness made
 - Welte A (2005) Organic weed control using BioSea product and VaporJet steam system. (IFOAM Conference)
- If truly effective implications could be huge
- Clearly needed scientific testing

Introduction / background

- BioSea claimed it was the omega-3 and omega-6 essential fatty acids that were the 'active ingredient'
- That steam facilitated their entry into the plant vascular tissue
- Chose four products to test with either high or low omega essential fatty acid content

Methodology

- RCB split plot design, four reps
- Main plot: two fish fertilizers & two veg. oils
 - BioSea Omega +
 - Simply Organic (second fish fertilizer)
 - Raw organic linseed / flax oil (*Linum usitatissimum*)
 - RBD canola cooking oil (*Brassica napus*)
 - Steam only
 - Null control
- Sub plot: product application position
 - Before steam application
 - Applied in the steam stream
 - After steam application

Methodology

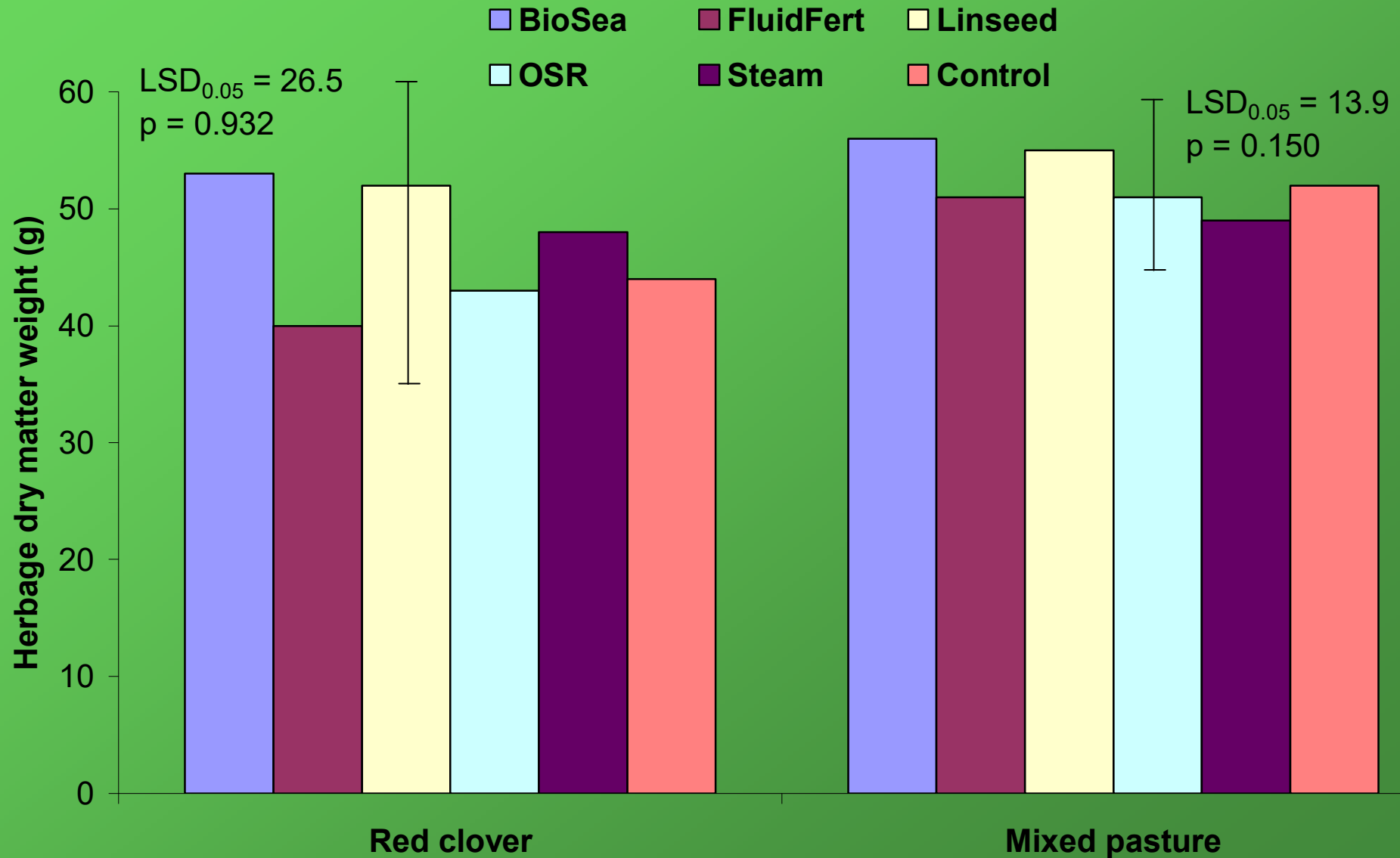
- Used the prototype direct-fired steam weeder*



Methodology

- Three separate trials on different pastures
 - Predominately *Lolium perenne*, *Trifolium repens*, *Cichorium intybus*, *Trifolium pratense*
- For two of the trials herbage samples were taken
- All trials visually assessed
- Analysis by ANOVA

Results



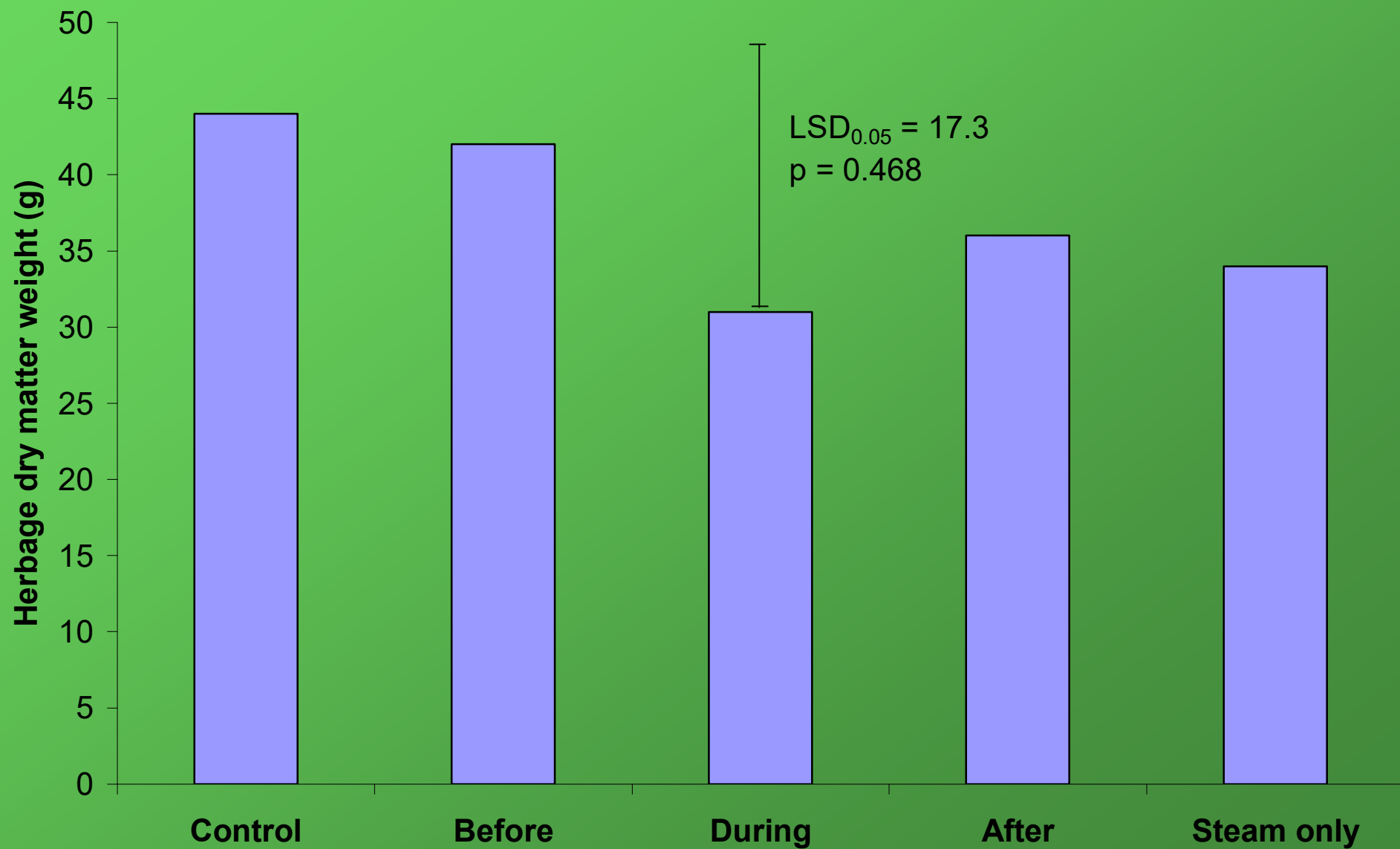
Results

- No visual sign of any systemic plant death
- However...
- Additional claims were made that steam made the certified organic contact herbicide Interceptor® systemic

Methodology

- RCB design using Interceptor
- Treatments
 - Before steam application
 - Applied in the steam stream
 - After steam application
 - Steam only
 - Null control

Results



Results

- Foliage initially destroyed but quickly regrew
- No visual sign of any systemic plant death

Mode of action?

- Claims of systemic plant death are not correct
- What about the claims that steam facilitated entry into plant tissue?
- Can steam can stop a known systemic herbicide from working?
- If so, claims that steam can make non-systemic substances systemic appear unfounded

Methodology

- RCB design using glyphosate
- Treatments
 - Glyphosate applied after steam
 - Steam only
 - Glyphosate only
 - Null control
- Applied to a *Lolium perenne* pasture

Results

- Plots visually inspected for plant death
 - Glyphosate only → complete kill
 - Glyphosate and steam → complete kill
 - Steam only → no kill
 - Null control → no kill

Conclusions

- Inability to prevent glyphosate working unexpected
- Claims steam can make a range of products into systemic herbicides unfounded but not 'disproven'
- What were they based on? *





Conclusions

- Further research in this area unwarranted

Acknowledgements

- The Sustainable Farming Fund (SFF), Ministry of Agriculture for funding the trial.
- The Biological Husbandry Unit Organics Trust for hosting the trials and being the SFF fund manager.
- Ivan Barnett at the BHU for his extensive help with the practical implementation of the trials and sampling.
- The Biological Husbandry Unit Organics Trust, Heinz Wattie's Ltd., Tim Chamberlain, Kelvin & John Hicks, Functional Wholefoods Ltd., Midlands Seed Ltd., John Christy and Mark Malcolm, who funded the prototype steam weeder and agreed to its free use and modification for this trial.
- BioSea, Fluid Fertilisers NZ Ltd., and Functional Wholefoods Ltd. NZ for product supply.
- Alison Lister for statistical help.
- Kowhai Farm for allowing a trial to be conducted on their property.

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