

**Are we making significant  
progress in mechanical weed  
control research?**

Jesper Rasmussen

**Are we making significant  
progress in mechanical weed  
control research?**

Yes we are, if our perception of  
good research (*ideals*) is in  
agreement with our current  
research actions (*reality*)

# Our perception of good research

- Questionnaire consisting of 28 items related to
  1. attitudes to alternative and conventional agriculture
  2. research methodologies
  3. research priorities
  4. quality criteria of publications
  5. future developments in technology and agriculture
  6. personal engagement
- Questionnaire was sent to 140 individuals on the mailing list of this working group
- Sixty completed questionnaires

1	More research should be multidisciplinary to facilitate broader perspectives on weed control	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	More research should go in depth to improve basic understanding of mechanisms related to weed control
2	More research should adapt theories and methods from basic disciplines in natural sciences	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	More research should adapt systems approaches that include whole agro-ecosystem
3	Farmers' knowledge and attitudes are critical to progress in weed control	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	Research is critical to progress in weed control
4	Researchers should aim to develop "product in a package" in order to provide the best option for farmers	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	Researchers should emphasise the importance of evaluating series of alternative solutions in order to provide the best option for farmer's own choice
5	More research should be done in strictly controlled environments to make results more precise	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	More research should be done on working farms to make results more realistic
6	Future research priorities should be given to direct control methods (curative methods)	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	Future research priorities should be given to indirect control methods (preventive methods)
7	Future research priorities should be given to chemical weed control	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	Future research priorities should be given to none-chemical weed control
8	Future weed management practices in industrialised countries will mainly be based on physical and cultural methods	1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/>	Future weed management practices in industrialised countries will mainly be based on herbicides and/or gene modified crops

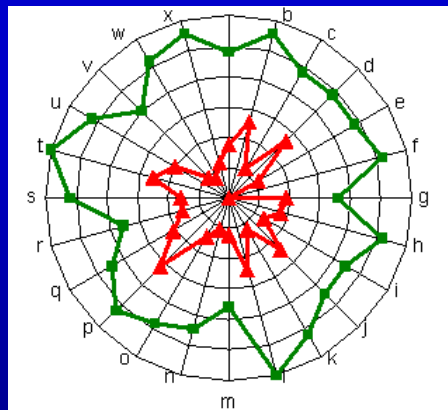
# Hypothesis

- Each individual has an affiliation to an agricultural paradigm which is reflected in the perception of "good research methodologies"

## Paradigms

**Dominant**  
Conventional

**Alternative**  
Organic



## The agricultural paradigms

ACAP-scale

**Dominant**  
Conventional

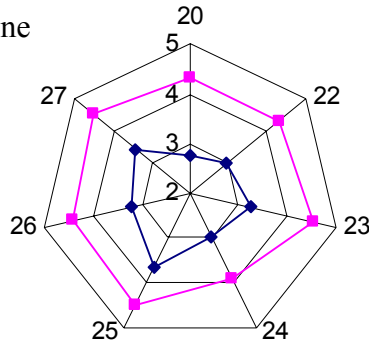
**Alternative**  
Organic



## We hold agricultural paradigmatic positions

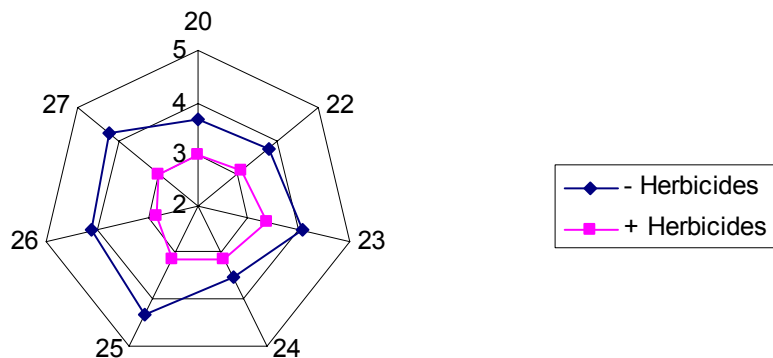
Respondents divided into two groups according to paradigmatic position (most alternative and most dominant)

7 items were included to determine the agricultural paradigmatic position



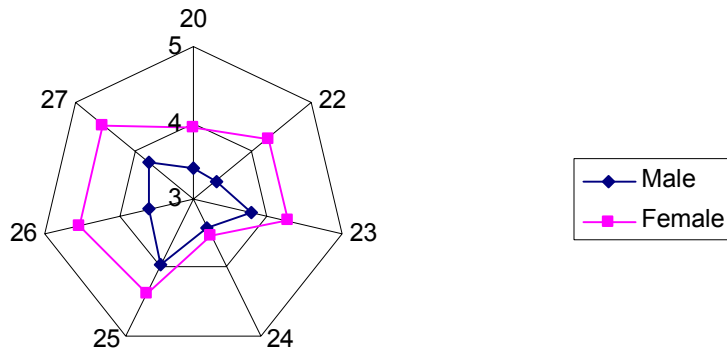
## We hold agricultural paradigmatic positions

Respondents divided into two groups according to research engagement



## We hold agricultural paradigmatic positions

Respondents divided into two groups according to gender



## Research methodology

### Alternative position

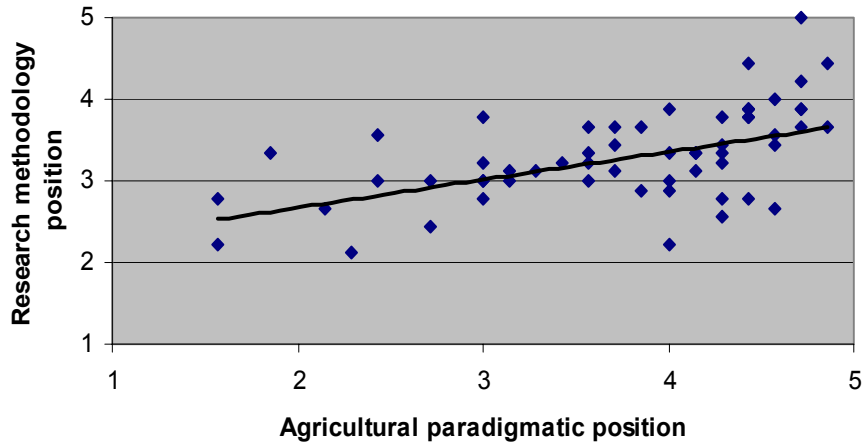
- Broader perspectives
- Systems approaches
- Farmers' knowledge and attitudes is critical
- Evaluate alternative solutions
- Research on working farms
- Value-laden aspects are important
- Holistic approaches
- Objectivity is without much relevance
- Societal context

### Dominant position

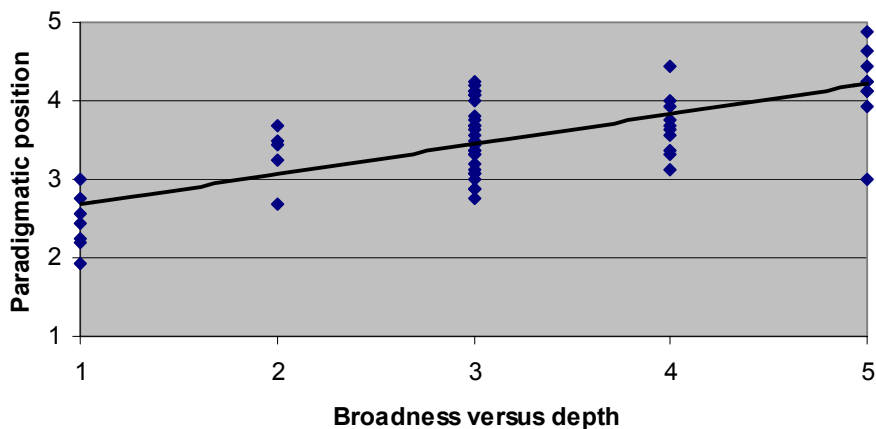
- Deeper mechanistic
- Basic disciplines
- Research is critical to progress
- "Product in a package" is the aim of research
- Strictly controlled environments
- Research should exclude value-laden aspects
- Holism is without much relevance
- Objectivity is a core value
- Scientific context

# Agricultural paradigmatic positions is related to research methodology

9 items express view on research methodology

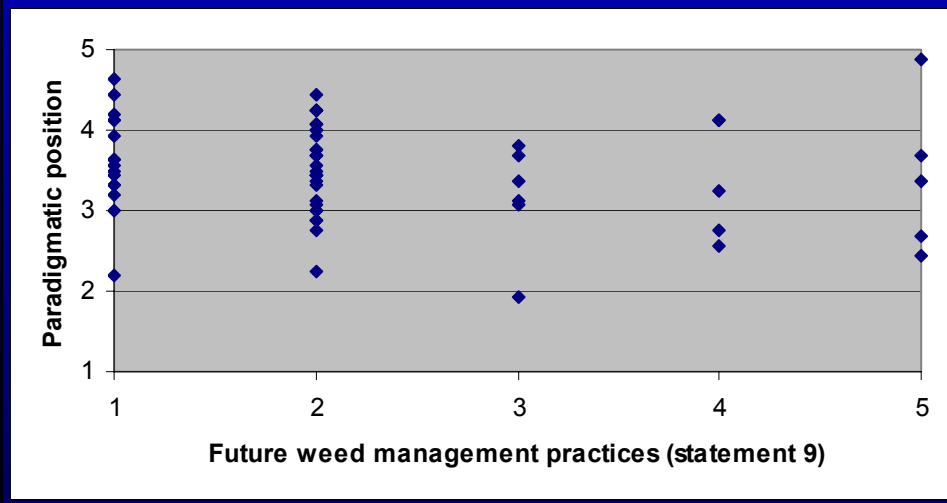


All paradigmatic issues (7+9 items) were highly correlated to paradigmatic position



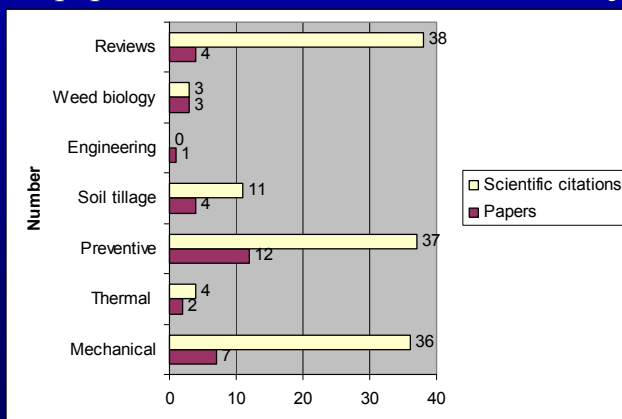
## A number of "open" issues were not correlated to paradigmatic position

Physical weed control will expand within conventional agriculture or will be restricted to organic farming



## Our current research practice

- An analysis of all *Weed Research* papers in the period 1998-2003
  - 33 papers – cited 129 times in scientific journals



## Four views on research focus and methodologies

(After Bawden, 1999)

Human aspects      Non-human aspects

HOLISM

SUBJECTIVE/  
PARTICIPATIVE

1. COMMUNAL  
(THE COMMON  
GOOD)  
Critical and Soft  
Systems Approaches

2. ECOLOGICAL  
(THE OPTIMAL  
SYSTEM)  
Hard Systems Approaches

OBJECTIVE/  
CONTROL

3. PERSONAL  
(THE SATISFIED  
SELF)  
Reflective Approaches

4. TECHNICAL  
(THE EFFECTIVE  
TECHNOLOGY)  
Experimental Scientific  
Approaches

REDUCTIONISM

## Four views on research focus and methodologies

(After Bawden, 1999)

Human aspects      Non-human aspects

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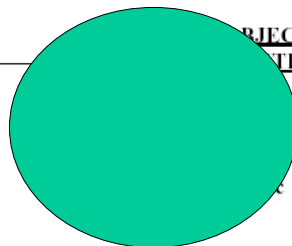
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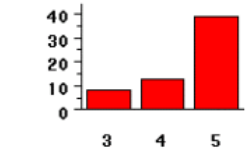
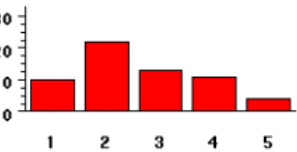
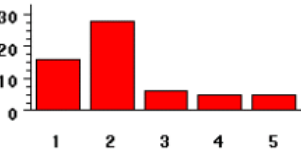
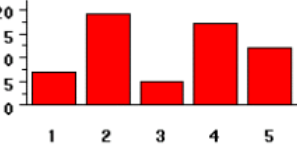


## **Are we making significant progress in mechanical weed control research?**

...it depends on paradigmatic perspective.  
From an alternative perspective – the systems perspectives and the participative perspectives need to be developed.

## **Challenges**

- If farmers' knowledge and attitudes are critical to progress
- If more research should be done on working farms
- If holistic approaches should be integrated in research
- If value-laden issues are important
- Farmers and other stakeholders should be included in research
- Systems approaches should be emphasised
- The human aspects should be emphasised

7	Future research priorities should be given to chemical weed control	 <table border="1"> <thead> <tr> <th>Category</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>10</td> </tr> <tr> <td>4</td> <td>15</td> </tr> <tr> <td>5</td> <td>40</td> </tr> </tbody> </table>	Category	Value	3	10	4	15	5	40	Future research priorities should be given to non-chemical weed control				
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Thank you to all respondents