

# Reduced till

## - is it a viable option for Organic Systems?

### What is reduced till? (there are no set definitions)

- **Reduced till** can be defined as any form of tillage which is less intensive than inversion of the top 20+ cm (8") of soil with a mouldboard plough
- **Minimum tillage** for combinable crops involves tillage of the top 5-10 cm (2- 4") of soil without inversion, using disks and/or tines. 'Minimum' tillage for root crops may be more intensive
- **Zero tillage** involves no soil disturbance at all beyond that during drilling

### What are the potential benefits of reduced till?

- Higher work rates
- Lower fuel use
- Soil organic matter concentrated in the surface layer (top few cm)
- Increased soil biological activity
- Improved soil structure

### What are the potential problems with reduced till?

- Soil can become compacted at depth
- Weed pressure can increase - particularly perennial weeds
- Pest and disease pressure can increase in some circumstances
- New machinery may be required



Ploughing remains the main form of primary cultivation on most organic farms.

### Origins and history of reduced till

- Reduced till was developed in North America (where it is often referred to as conservation till) to combat soil erosion and drought
- Reduced till has been adopted in many parts of the world
- 60 million hectares are farmed using reduced till worldwide (according to the UN Food and Agriculture Organization (FAO))
- Reduced till (mainly in the form of direct drilling) was introduced into the UK in the 1970's
- Problems with weeds and compaction, particularly where direct drilling was used, led to the widespread abandonment of reduced till in the UK

### Why is reduced till back on the agenda?

- Pressures to reduce costs
- Concerns about soil quality
- Changes to subsidy payments

Simba solo heavy disk and packer - shallow non-inversion tillage



### What about the failures of the 1970's and 1980's?

- Lessons have been learnt
- Emphasis is on reduced till, not direct drilling
- New more effective machinery is available

### Is reduced till a viable option for organic systems?

- Incorporation of leys and green manures requires effective inversion of soil by ploughing
- Non inversion tillage provides poor weed control
- Rotational ploughing will lose some of the soil quality benefits
- Shallow ploughing may provide a compromise

### What do organic farmers say?

- Improved timeliness of cultivations
- Costs are reduced
- Weeds are the main problem

### What does the research say?

- Evidence from organic experiments is limited
- Weed control is the main problem
- Perennial weeds are most problematic
  - Couch and creeping thistle are especially difficult to control



Plough and power harrow produces a clean seedbed but is damaging to soil structure and biological activity and costs are high

The table below shows those factors which favour the adoption of reduced till and those which indicate it is less likely to be suitable

Reduced till may be suitable	Reduced till is probably not suitable
<i>Farm size &gt; 200 ha, expansion likely</i>	<i>Farm size &lt; 200 ha, expansion unlikely</i>
<i>Mainly combinable crops</i>	<i>Mixed roots and cereals or vegetables</i>
<i>Straw removed</i>	<i>Straw incorporated</i>
<i>Soils stable</i>	<i>Soils unstable, liable to compaction, slumping or capping</i>
<i>Drier climate</i>	<i>Wetter climate</i>
<i>Willing to increase management time</i>	<i>Un-willing or unable to increase management time</i>
<i>Low weed pressure</i>	<i>High weed pressure</i>

#### Are organic farms good candidates?

- Farms are often small
- Mixed cropping is the norm
- Tillage is an important part of weed control

...so on balance organic farms as a whole may not be ideal, but some crops in the rotation may be established with reduced till, especially green manures



If perennial weeds like creeping thistle are a problem then reduced till may not be for you

#### How to proceed if reduced till appears to be an option

- Obtain as much information as possible
- Make sure information is relevant to your soil type and climate
- Speak to/visit local farmers using reduced till
- Make use of professional advice and training
- Draw up a management plan, with particular emphasis on weed control
- Consider adjusting system to make it more suitable for reduced till

For further information on weed management go to [www.gardenorganic.org.uk/weed-management](http://www.gardenorganic.org.uk/weed-management). There you will find the following:

- ◆ Advice on over 130 individual weeds, from Black Grass to Yarrow [www.gardenorganic.org.uk/weeds-list](http://www.gardenorganic.org.uk/weeds-list)
- ◆ Advice on cultivation controls, such as crop rotation, tillage and hygiene [www.gardenorganic.org.uk/cultural-weed-controls](http://www.gardenorganic.org.uk/cultural-weed-controls)
- ◆ Direct control methods, such as mulching and mechanical control [www.gardenorganic.org.uk/direct-weed-controls](http://www.gardenorganic.org.uk/direct-weed-controls)
- ◆ Crop weeding strategies, in field vegetables, fruits and grasslands [www.gardenorganic.org.uk/crop-weed-management-strategies](http://www.gardenorganic.org.uk/crop-weed-management-strategies)
- ◆ Further reading in research papers.



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#### Disclaimer

The information contained in this leaflet has been compiled from a range of sources. It is accurate to the best of our knowledge. Authors are not responsible for outcomes of any actions taken based on this information.