



Information Sheet

6.17 Minimum tillage

Minimum tillage is a soil conservation system using a minimum disturbance of soil for the successful establishment of a crop. Using this system, the soil is not turned over as with conventional ploughing and both the number of tillage operations and area tilled is kept to minimum. Soil disturbance is thus greatly reduced when preparing the land for planting. It is especially recommended during the summer period when high intensity storms occur, as it greatly reduces the risk of soil erosion.

This information sheet highlights key considerations and steps to successfully implement a minimum tillage system.

Advantages of minimum tillage

The main advantages of minimum tillage include:

- It is a simple system, very often only requiring light machinery and reduced in-field traffic.
- Greatly reduced soil erosion by retention of stubble and conservation of soil structure.
- Improved soil moisture retention.
- Conservation of soil organic matter and nutrients.
- Lower cost than conventional tillage.
- Enhanced yields, particularly on poorer soils.

Application of minimum tillage

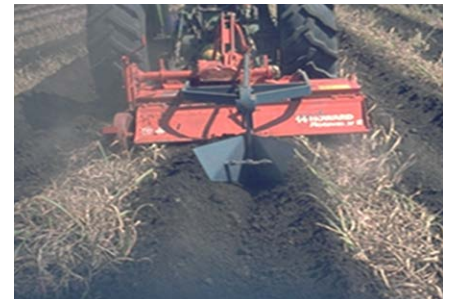
There are three main steps to replanting cane:



1) Killing the crop using a herbicide with the bulk of the weight carried by the tractor.



2) Preparing the interrow for planting using a combination modified rotovator followed by a two-row furrow opener. Note the previous crop is left intact after killing and the tractor wheels are in the interrow prepared for planting.



3) Preparing the interrow for planting using a combination modified rotovator followed by a single-row furrow opener. Note the previous crop is left intact after killing and the tractor wheels are on the dead crop which will become the new interrow.

These steps typically involve some form of tillage to destroy the previous crop and for seedbed preparation for the new planting. Conventional land preparation by ploughing and discing the land has several disadvantages:

- Ineffective or only partial destruction of the previous crop, which may increase exposure to pests and diseases that may be present in the old crop and increase volunteers.
- Increased erosion risk on sloping land.
- Faster breakdown (thus loss) of soil organic matter.
- Breakdown of soil structure.
- High cost of seedbed preparation.

However, there are minimum tillage options to limit the impact of more aggressive tillage operations on the soil:

1) **Eradication of previous crop**

There are four recommended practices that are effective without significant disturbance of the soil:

- Chemical (herbicides).
- Mechanical (plough-out of rows).
- Combination (chemical and mechanical).
- Manual (hand chipping).

2) **Soil preparation**

Research has shown it is normally not necessary to use deep ploughing and discing to successfully establish a crop. However, where there are signs of compaction, a rip operation to a depth deeper than the thickness of the compacted layer would suffice. A rip operation shatters the compacted layer without inverting the soil and causes minimum surface disturbance.

Consideration should be given to combining minimum tillage with controlled traffic. The advantage is that the production area (as appose to the trafficked interrow zone) is not compacted and only light cultivation might suffice to establish the crop.

3) **Planting**

In most soils, a relatively simple minimum tiller can be used to prepare a suitable planting tilth. This implement opens a furrow of the required depth in the old interrow and creates tilth without causing major soil disturbance. After the cane is planted, the setts are covered by hand or mechanically. If clods are still a problem, then a pressure wheel behind the implement covering the setts will improve contact between the setts and the soil. If a controlled traffic system is employed then replanting will be on the production bed, where this was retained from the previous cycle.

Recommendations

Minimum tillage is a highly recommended practice at all times. There are only two situations in which it is not suitable:

- Where the row alignment needs to be changed for conservation or mechanisation purposes.
- Where lime or other soil ameliorants must be incorporated to overcome major crop growth limitations such as acidity.

Note

Minimum tillage must be practised under the following conditions:

- Erodible soils - slopes greater than 11%.
- Moderately erodible soils - slopes greater than 13%.
- Resistant soils - slopes greater than 16%.

Rian van Antwerpen (Senior Soil Scientist)

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