

## Soil Cultivation and Tillage in Organic Agriculture

T. Bharath<sup>1</sup>, G. Vijay Krishna<sup>2</sup>, Harshad Singh Thakur<sup>1</sup> and N. Nalini<sup>3</sup>

<sup>1</sup>PJTSAU, Hyderabad; <sup>2</sup>SKLTSHU; <sup>3</sup>Ph.D Scholars, Hyderabad

\*Corresponding Author E-mail: [bharath032@gmail.com](mailto:bharath032@gmail.com)

Received: 27.07.2017 | Revised: 4.08.2017 | Accepted: 5.08.2017

### CREATING GOOD GROWING FOR CONDITIONS FOR PLANTS

There are many reasons for cultivating the soil. The most important ones are to

- Loosen the soil to facilitate the penetration of plant roots
- Improve the aeration (nitrogen and oxygen from the air)
- Encourage the activity of the soil organisms
- Increase infiltration of water
- Reduce evaporation
- Destroy or control weeds and soil pests
- Incorporate crop residues and manures into the soil
- Prepare the site for seeds and seedlings
- Repair soil compaction caused by previous activities

### MINIMUM DISTURBANCE

- Any soil cultivation activity has a more or less destructive impact on soil structure. In tropical soils, regular tillage accelerates the decomposition of organic matter which can lead to nutrient losses. The mixing of soil layers can severely harm certain soil organisms. Soil after tillage is very prone to soil erosion if left uncovered before the onset of heavy rains

- Minimum tillage systems on the other side help to build up a natural soil structure with a crumbly top soil rich in organic matter and full of soil organisms. Nutrient losses are reduced to a minimum as there is no sudden decomposition of organic matter and nutrients are caught by a dense network of plant roots. Soil erosion won't be a problem as long as there is a permanent plant cover or sufficient input of organic material. Last but not least, farmers can save a lot of labour
- Thus, each organic farmer will have to assess the soil cultivation practice which is most suitable for his/her conditions. To minimize the negative impacts of soil cultivation while benefiting from its advantages, the organic farmer should aim on reducing the number of interventions to the minimum and choose methods that conserve the natural qualities of the soil.

### SOIL COMPACTION

If soils are cultivated in wet conditions or burdened with heavy machinery, there is a risk of soil compaction which results in suppressed root growth, reduced aeration and water logging.

**Cite this article:** Bharath, T., Krishna, G.V., Thakur, H.S. and Nalini, N., Soil Cultivation and Tillage in Organic Agriculture, *Int. J. Pure App. Biosci.* 5(4): 1097-1098 (2017). doi: <http://dx.doi.org/10.18782/2320-7051.5685>

Where soil compaction is a potential problem, farmers should be aware of the following aspects:

- The risk of soil compaction is highest when the soil structure is disturbed in wet conditions
- Do not drive vehicles on your land soon after rains
- Ploughing of wet soils can lead to a smearing of the plough sole
- Soils rich in sand are less prone to soil compaction than soils rich in clay
- High content of soil organic matter reduce the risk of soil compaction
- It is very difficult to restore a good soil structure once soil compaction took place

#### **TYPES OF SOIL CULTIVATION**

Depending on the aim of the soil cultivation, different cultivation practices are implemented during different stages of the cropping cycle: after harvesting, before sowing or planting or while the crop stands.

#### **POST HARVEST**

In order to accelerate decomposition, the residues of the previous crop are incorporated into the soil before preparing the seedbed for the next crop. Crop residues, green manure crops and farmyard manure should be worked only into the topsoil layer (15 to 20 cm), as decomposition in deeper soil layers is incomplete, producing growth inhibiting substances which can harm the next crop.

#### **PRIMARY TILLAGE**

In annual crops or new plantations, primary tillage is usually done with a plough or a similar instrument. As a principle, soil cultivation should achieve a flat turning of the

top soil and a loosening of the medium deep soil. Deep turning soil cultivation mixes the soil layers, harms soil organisms and disturbs the natural structure of the soil.

#### **SEED BED PREPARATION**

Before sowing or planting, secondary soil cultivation is done to crush and smoothen the ploughed surface. Seedbed preparation has the purpose to provide enough loose soil of appropriate clod size. If weed pressure is high, seedbeds can be prepared early thus allowing weed seeds to germinate before the crop is sown. Shallow soil cultivation after some days is sufficient to eliminate the young weed seedlings. Where water logging is a problem, seedbeds can be established as mounds or ridges.

#### **IN BETWEEN THE CROPS**

Once the crop is established, shallow soil cultivation (e.g. by hoeing) helps to suppress weeds. It also enhances the aeration of the soil and at the same time reduces the evaporation of soil moisture from the deeper soil layers. When crops are temporarily lacking nutrients, shallow soil cultivation can stimulate the decomposition of organic matter, thus making nutrients available.

#### **TOOLS FOR SOIL CULTIVATION**

Tools for primary cultivation:

- pole plough, mouldboard plough, digging fork, spade
  - Tools for secondary cultivation: cultivators, harrows, rakes
  - Tools for inter-row cultivation: inter-row cultivators, hoes
  - Tools for land forming: ridgers, hoes