

Improving soil fertility using Woodchip Compost +Propagation media Duchy Trials

Tolhurst Organic Partnership CIC



The problem

- Horticulture demands on fertility
- Problems of importing fertility
- Soil structure
- Soil carbon
- Substrates



Solution?

- Composting waste materials
- Woodchip
- Green waste

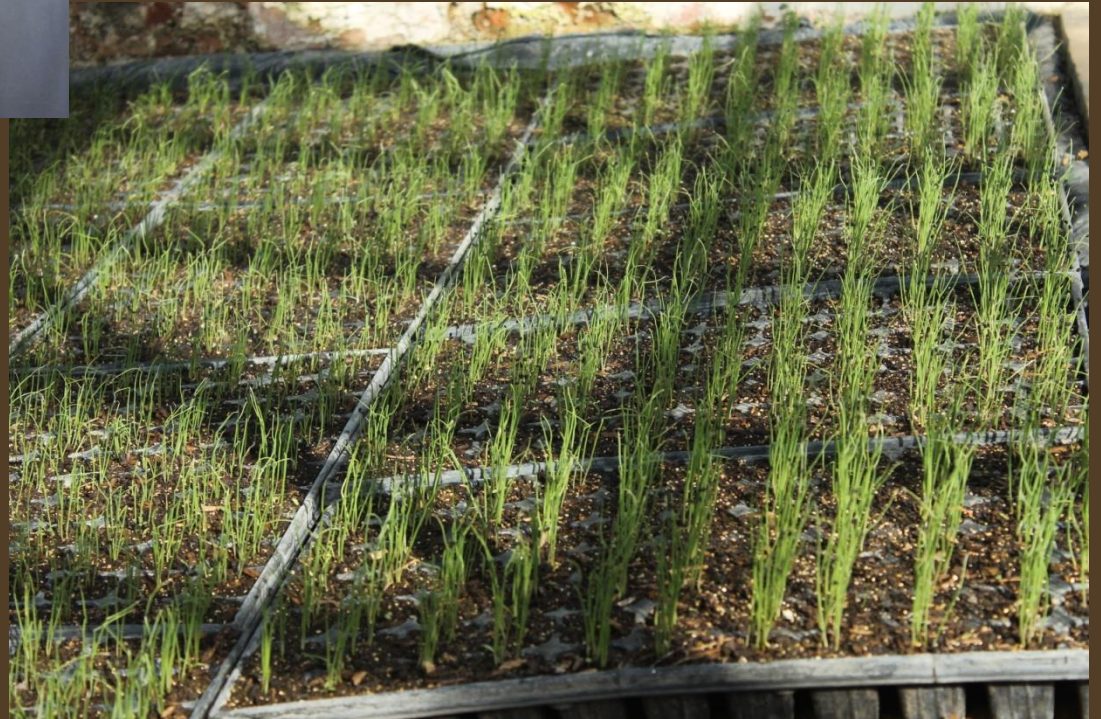


Plant propagation

- Warmth
- Food
- Moisture
- Air
- Light
- Shelter
- Love
- All of this needs to be in balance



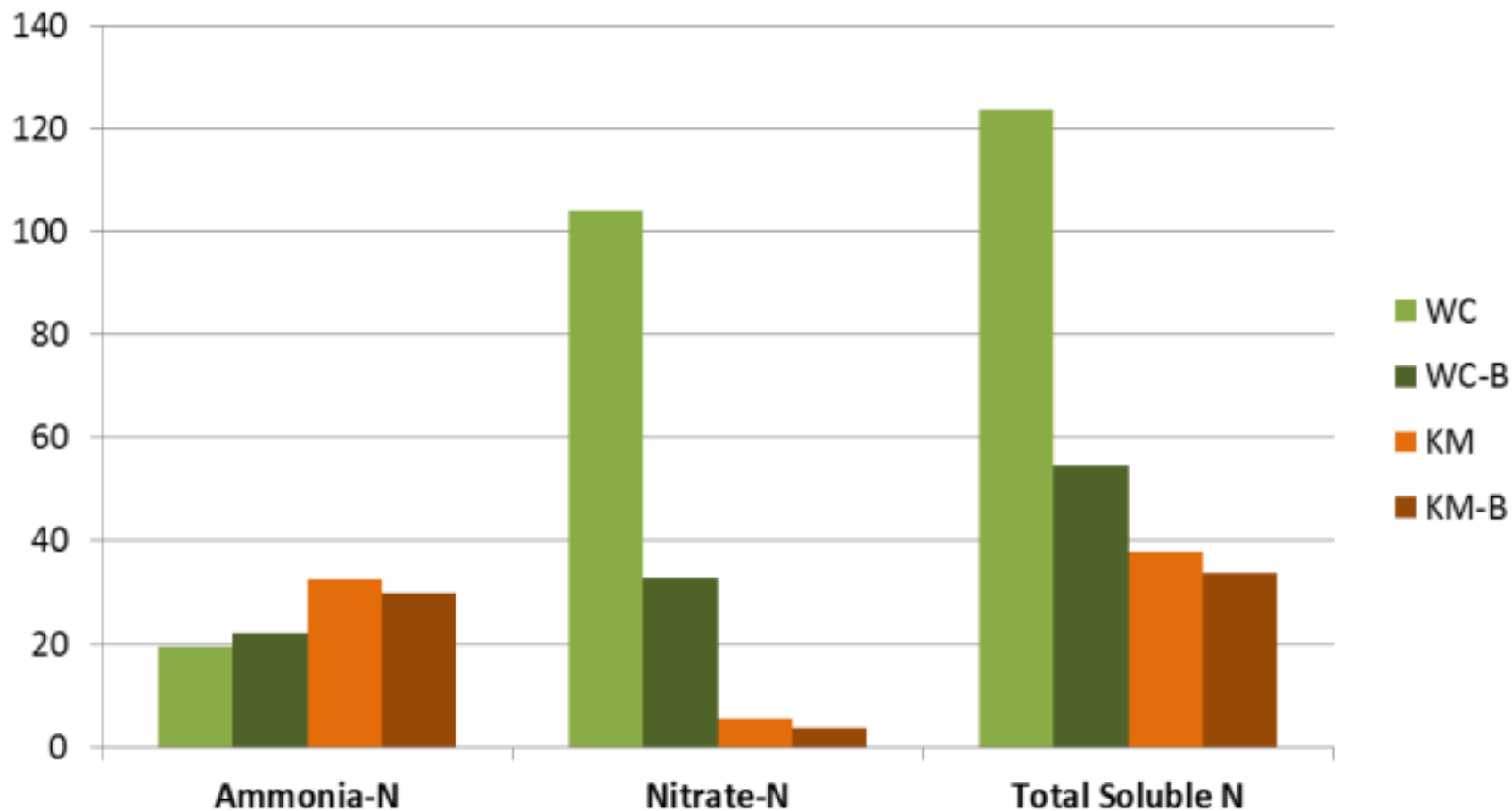
Duchy trials propagation substrates



Nitrogen content of the four substrates

[in mg/l]

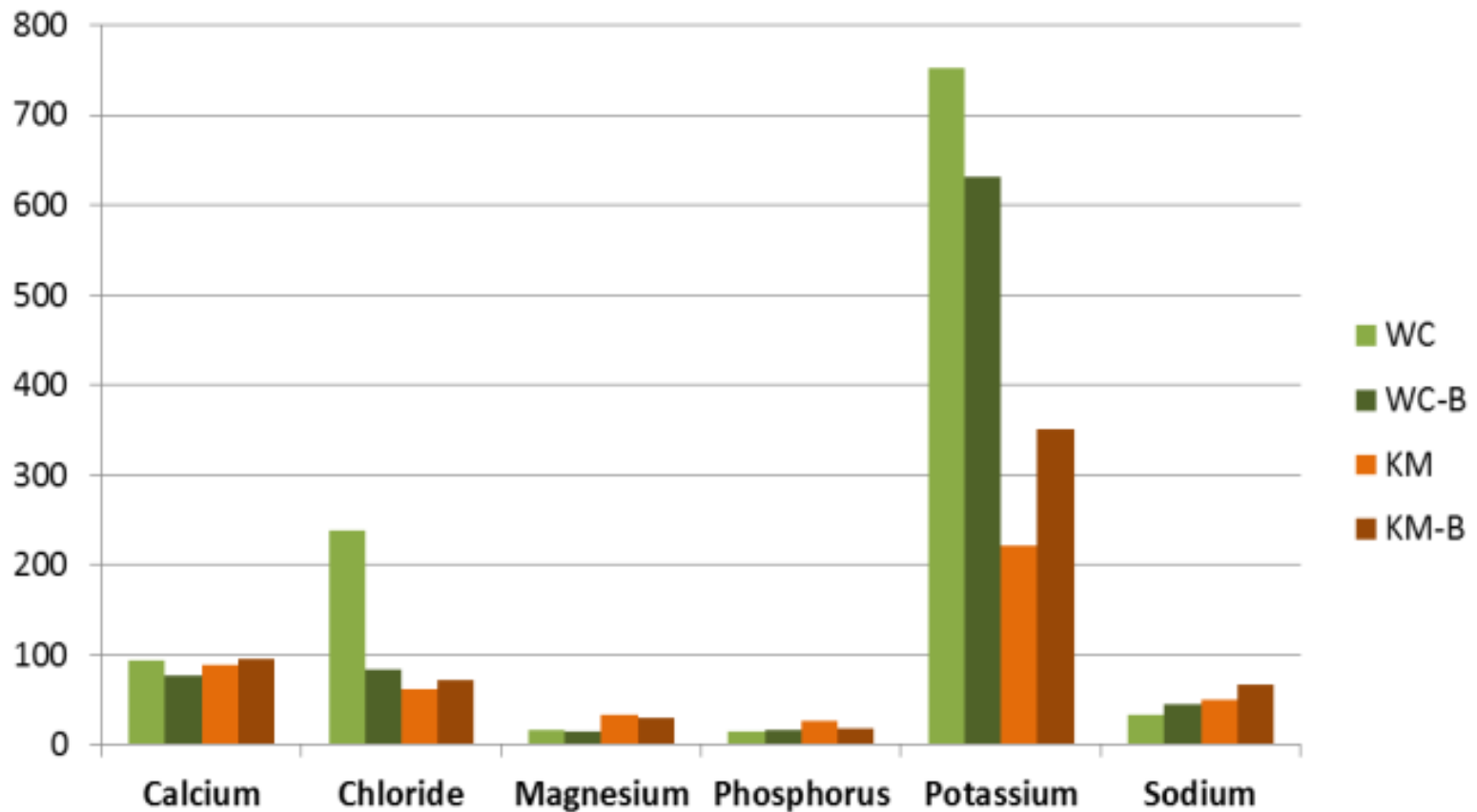
WC=woodchip; WC-B=woodchip+biochar; KM=klaasmann, KM+B=klassmann+ biochar



Main elements content of the four substrates

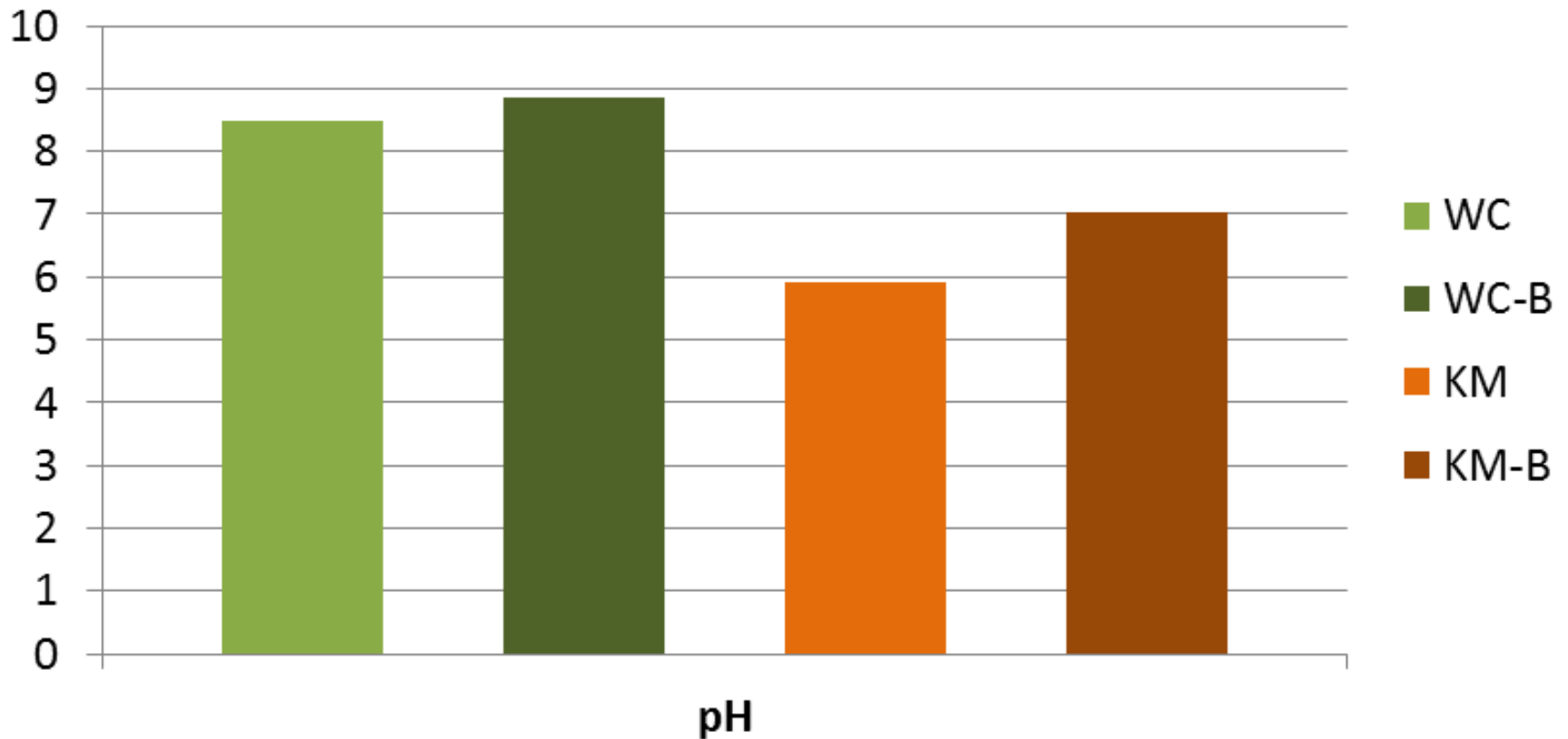
[in mg/l]

WC=woodchip; WC-B=woodchip+biochar; KM=klaasman, KM+B=klassmann+ biochar



pH of the four substrates

WC=woodchip; WC-B=woodchip+biochar; KM=klaasmann,
KM+B=klassmann+ biochar





Composting woodchip



Application

- Rates of 50 cubic metre/ha (25 tonnes)
10 cubic metres per ha = 1mm

So 50 cubic metres = 5mm thick

Apply when crop is able to take up nutrients

Tunnel applications up to 200 cube /ha
(20mm)



Energy and compost?

Ramial Wood

- Branchwood < 70mm
- Max. 20% coniferous wood.
- Applied to soil surface
- Suitable min/no till
- Excellent source of carbon
- Improves soil fauna
- Improves nutrients



Stages of RW decomposition

- Fungi colonise the RW thanks to the mycelium and start to decompose the non-structured wood's elements (primary metabolism).
- When there is no more nitrogen available, the fungi attack the lignin (secondary metabolism) and expose to the other micro-organisms the most fragile part of the wood (hemicellulose and cellulose).
- When the wood is decomposing it will produce available molecule for the soil's bacteria.
- The fauna of the soils will eat the funguses, which decompose the RW, and produce faeces which will feed the bacteria of the soils.

The relation between nitrogen and RW

The RW can limit the nitrogen leaching by trapping it in the first part and then release it either for the plant or for the organic matter construction

Stage 1

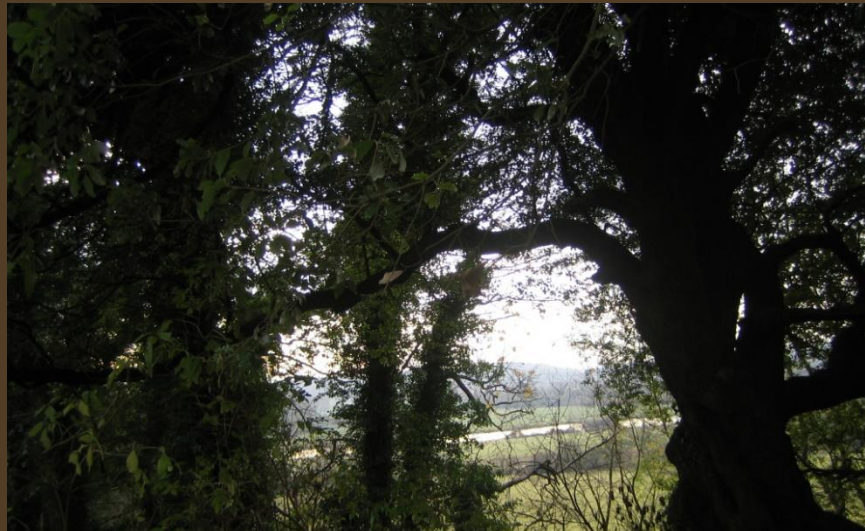
- During the primary metabolism fungi will use the RW to develop themselves and to generate some proteins. During the first stage (approx. one year) the nitrogen will be locked up.

Stage 2

- When the secondary metabolism starts all the wood's components become available, and all the soil microbes are fed in this process. The old mycelium is eaten by the fauna (earthworms, mites, arthropods) and the faeces of these will feed the bacteria which will give nutrients to the plants.

Recommended species:

- Oak *quercus* Maple *acer* Ash *fraxinus*
Birch (*betula*) acacia Willow *salix* Alder
alnus Hornbeam *carpinus*
- Non recommended species:
- Aesculus Hippocastanum, Eucalyptus
- Too high ratio of coniferous woods <20%



Source of material-Coppicing



7-10 cubic metres per year



Source of material-hedges/woodlands

