

How to use the agroforestry trees in the field?

Gliricidia sepium:

Begin pruning when the trees are greater than one meter in height. This size will allow sufficient root development and resilience.



Prune and leave the branches in the alleys.



Before ridging: distribute the leaves in the furrows with crop residues and make the ridges.

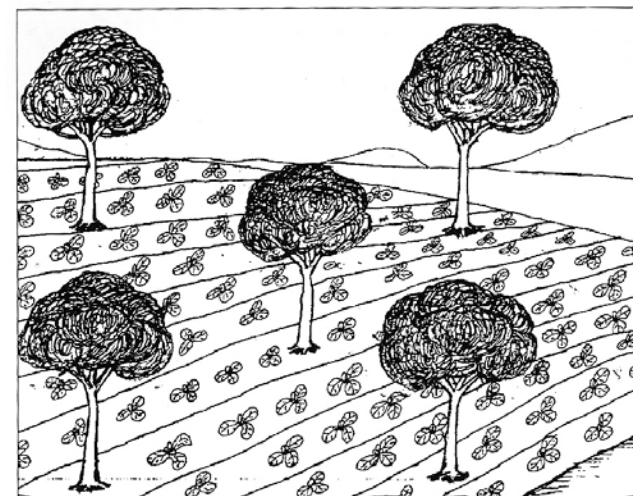
If the ridges are already done: distribute the leaves on the ridges and incorporate them into the soil.

Do this immediately after pruning to avoid nutrient losses from leaching and exposure to the sun, rain and wind.

The remaining wood can be collected as firewood.

Improving soil fertility with agroforestry

ENGLISH



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About soil fertility

To grow well, a plant needs sun, water, soil and nutrients (NPK, organic mater).

Nutrients and organic mater are kept into the soil. A lack of these results in problems of soil fertility.

Of course NPK can be brought by the chemical fertilizer. But they are expensive and they can not bring organic mater.

The organic mater is what keeps moisture in the soil. It also keeps the other nutrients in the soil, like the NPK brought by the fertilizers.

In Malawi, the main problem is the lack of organic mater in the soil.

If organic mater can be brought back into the soil, then yields will be better in a sustainable way and the fertilizers will be less needed and will be more efficient.

How can we improve the fertility of our soil?



Leguminous trees can be used in the fields to solve efficiently this problem. They can bring both organic mater and nitrogen nutrients.

References:

- (1) "Agroforestry practices in Malawi", Malawi Agroforestry Extension Project - Government of Malawi, USAID, Washington State University
- (2) "Tephrosia in pest control", ICRAF Southern Africa

How to use the agroforestry trees in the field?

Fedherbia albida:

Use for adding soil fertility:

The fall of leaves at the beginning of the rainy season naturally enriches the soil and improves the micro-environment.

Other uses:

This tree produces abundant, quality fodder during the dry season, mainly in the form of pods. It also provides good fuelwood and building material.

Since it is one of the few trees in leaf during the dry season, it also provides valuable shade to people and livestock.

Tephrosia vogelli:

Use for adding soil fertility:

Cut the trees down at ground level just before the 2nd season. After sun-drying for 2-3 days, shake the leaves off and remove woody branches for fuelwood or other uses. The leaves may be left on the surface, buried in the ridges or lightly covered with soil. Follow this practice every season.

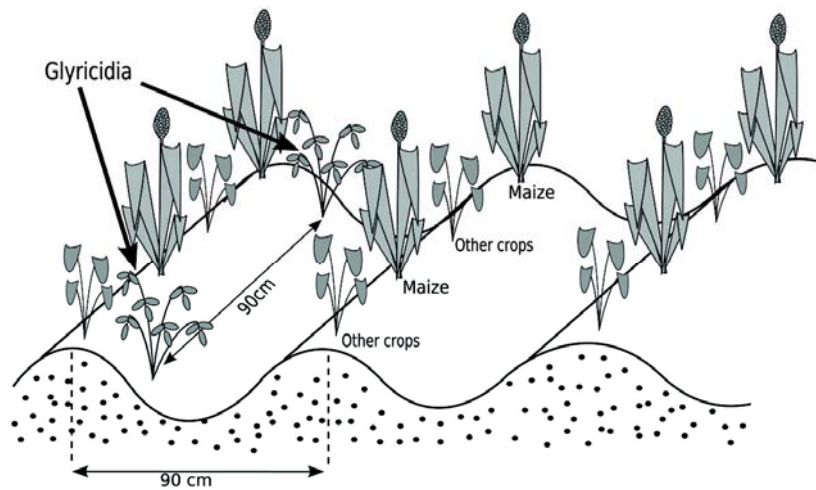
Use as an insecticide:

Harvest leaves and pound it in a mortar. Soak the leaves in water for 2 hours or boil them for 30 minutes (the effective concentration is 1 Kg of leaves for 5 L of water).

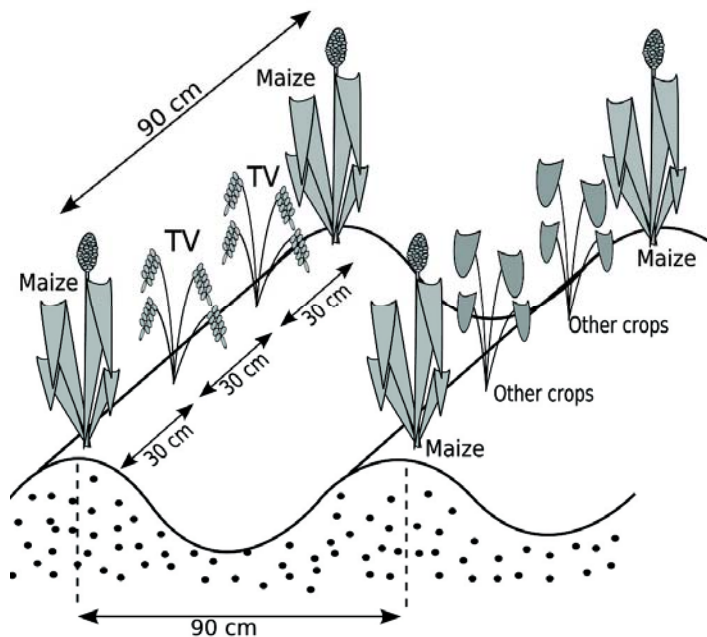
Filter the juice through a cloth and use directly in the sprayer. Add a bit of soap to help the spray stick to the plant. It is important that the sprays have direct contact with the pests. The treatment is effective during 7 days and must be repeated after that time.

Examples of sowing

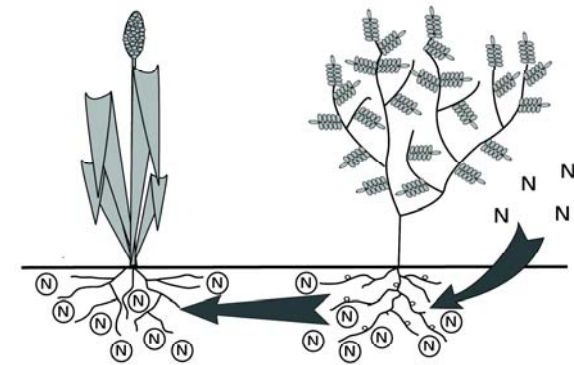
Sowing of *Gliricidia sepium*:



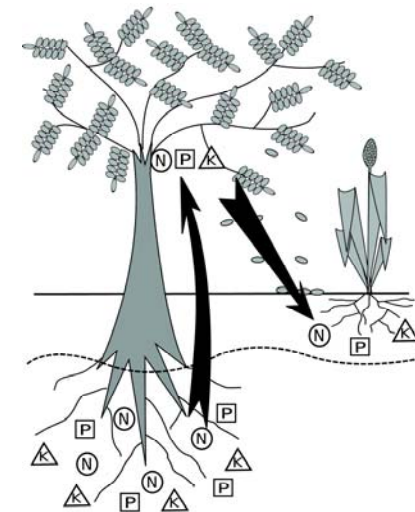
Sowing of *Tephrosia vogelli*:



How do the leguminous trees work?



Leguminous fix nitrogen from the air thanks to small organism (bacteria) which live on the roots. Those bacteria process the nitrogen from the air to a form of nitrogen that can be absorbed by the plant. Then, nitrogen is available for the crops.



Trees with deep roots help to recycle nutrients from the deep soil to the top soil. The nutrients go from the roots to the leaves. When the leaves fall to the soil, then the nutrients are available for the crops.

Which species can be used?

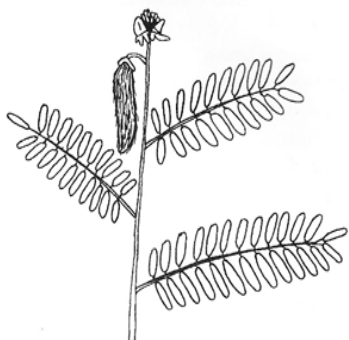


Fedherbia albida:

a big tree that can fix nitrogen and give it back to the soil during the rainy season thanks to its nutrients-rich leaves. Its roots are deep and can collect nutrients from the deep soil. It has a deep impact on the soil fertility in the long term.

Gliricidia sepium:

this small tree fixes nitrogen into the soil. It is also very good for shade, for manure making and for fuelwood. It provides good improvements of soil fertility from the second year.



Tephrosia vogelli:

a shrub that can improve soil fertility thanks to its important nutrients-rich leaf-fall. It can also be used as an insecticide. It provides good improvements of soil fertility from the second year.

How to sow those tree species ?

The agroforestry species can either be sown in a nursery or directly in the field. This last method has the advantage to take less time, as no work is done at the nursery level. Nevertheless, it requires more care in the field, especially during the weeding or banking.

Direct sowing: the above mentioned agroforestry tree species are sown in the following manner:

Species	Seed Pretreatment	No of seeds per station	Spacing of stations
Fedherbia Albida	Nicking	2	10m x 5m on the ridge
Gliricidia Sepium	Soak in cold water for 24 hours	2	Every 3 ridges of main crop. Every 90 cm on the side of the ridge.
Tephrosia Vogelli	No treatment	3	Every 2 ridges of main crop. Every 30 cm on the ridge, alternating with the main crop (ex: 2 TV/1 main Crop/2 TV...)

Depth of planting: the depth of planting should be 1.5 – 2cm. If the seeds are planted too deep, they won't germinate.

Thinning regime for Fedherbia albida (after establishment of 100 trees/ha):

Tree canopy radius	Spacing	Density
5m	10m x 20m	50 trees/ha
8m	20m x 20m	25 trees/ha
Over 20m	As above but selectively thin trees or prune lower branches	15-20 trees/ha