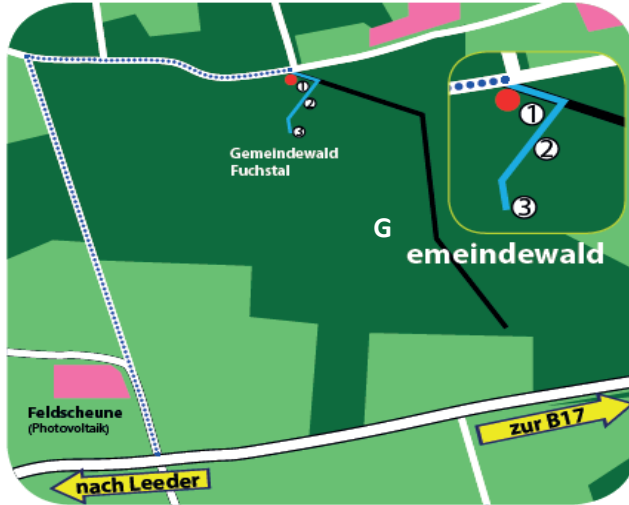


Dear Forest Visitors,

The short path with its three stations shows you a view of the "underground forest" at the bottom of the ground.

You can experience which influence the choice of tree species on the condition of the humus soil has. The quality of the humus is of utmost importance for an intact, strong and well-growing forest.



How to get to the soil profiles

Arriving from the B17 in the direction of Leeder follow the dirt road at the barn in the forest. At the next road junction, turn right again until you come to the first stop where the nature trail starts.

From here ● follow the forest trail in a southeastern direction.

On the right, you see a dirt path where trunks are transported from the forest. Here you will reach the first soil profile ① in the spruce forest and opposite, among young beeches ② the next one. Follow the dirt path to see the next profile of the sycamore ③ tree round the corner.



How does humus arise?

Soil biotas like earthworms and millipede, but also bacteria, algae and fungi decompose needles and leaves of the trees lying on the ground and mix them with the soil materials. The result is humus. This can be seen in the blackish coloration of the soil.

Needles decompose slowly

Spruce needles contain little basic nutrients such as calcium, magnesium or potassium. When they die at the age between four to seven years, they need up to five years on the soil until they are completely decomposed. It is only then that their nutrients get into the deeper soil with the leachate. Due to the long decomposition time, more powerful humus packets form on the ground surface over the years. There the humus is unprotected against erosion by water or wind.

Leaves decompose well

On the other hand, the leaves of trees and shrubs contain a lot of basic nutrients and are decomposed quickly within a year (e.g. sycamore) and within a maximum time of three years (e.g. beech). This job is done mainly by earthworms which eat up the leaves to digest humus in the upper parts of the soil. There humus is protected.

Intact humus, intact forest

Humus contains nutrients and water. Both are absorbed by the tiny roots of the trees. Humus keeps hold of pollutants (e.g. lead, cadmium) and so protects groundwater.

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Changing forest soils

How the correct choice of trees influences the quality of soils

Living soil for the future forest

BAYERISCHE
FORSTVERWALTUNG
IdeenReich.Wald

Pure spruce stands on the Lech terrace
- Capability of the soil is limited

The aim:
Intact mixed forest

It is possible to improve the acid upper soil by building up a mixed forest from beech, sycamore, basswood and ash tree and so the forest becomes more resistant against extreme climate changes.

Forestal soil:
 Moderately fresh, podzolic stony loam with carbonate in the lower soil.

Type of soils:
 (Para)braunerde from wet loess loam lime gravel of the river Lech.

Ecological rating:
 Pure spruce stands led to:

- On the forest soil form huge humus packets (rotting substance), which accelerate the acidification of the upper soil
- Roots can be found only in the upper soil. Therefore Spruce trees can't resist wind or snow easily
- There are only few soil biotas which can help to decompose needles

Consequences:
 It is absolutely necessary to grow trees with deep roots, which are able to use nutrients from lower than 60 cm. these are beech, sycamore, basswood, cherry and ash trees. Spruce and pine are inappropriate because they accelerate the acidification with low basic needles. Spruce trees can't resist wind well and suffer from water shortage in dry years. So it is vulnerable to bark beetles.



Young beeches
- Soil begins to recover

The aim:
Intact trees and shrubs

A broad-leaved forest with beeches, sycamore, basswood and cherry trees protects the soil against dehydration and acidification.

Forestal soil:
 Moderately dry to moderately wet, stony loam with carbonate under the surface

Type of soils:
 Parabraunerde from loess loam lime gravel of the river Lech

Ecological rating:
 Former spruce trees areas led to inappropriate rotting humus surface and acidification of the upper soil.

In the course of time the deeper beech roots absorb basic nutrient from the limy subsoil add them to the leaves.

This process, however, will last another few years, therefore the upper (dark) and basic soil is still very thin.

Consequences:
 Trees with leaves decomposing quickly like sycamore, basswood, cherry or ash tree are able to improve the condition of humus.

Spruce and fir trees suffer from water shortage on stony soils.



Young sycamore
- Soil recovers

The aim:
Intact trees and shrubs

Only robust trees like beech, sycamore or basswood are able to produce more humus on stony soils, to resist longer dry periods and to protect soil from acidification.

Forestal soil:
 Moderately dry (moderately wet) stony loam with carbonate under the surface

Type of soils:
 Parabraunerde from loess loam lime gravel of the river Lech

Ecological rating:
 Despite large fir tree areas with its acid needles sycamore with its leaves (easily to be decomposed highly basic) has managed within well two years to improve the upper soil. You can see this from the huge, dark (from humus) upper soil up to 15 cm depth. This could be achieved by very fine roots (to be found in all soil horizons) and a very quick absorption of basic nutrients.

Consequences:
 By growing trees with leaves which can be composed easily and with thick root systems like beech, sycamore, basswood it will be possible to continue advantageous growing of humus. Even the ash tree is appropriate, but should only be sparsely grown because of the low capacity of saving water in the soil. Common oak, pine trees or douglas fir can't get along with the high lime content.

