

## Cultivation of truffles and conditions of achieving a success

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Truffles are probably the best known among fungi species because of their taste values generated by unique aromatic substances. They are very difficult to pick and their occurrence is in many areas not common, therefore their market price is rather high.

Recently truffles have gained popularity among professional growers as well as amateurs who are interested in a possibility of growing these fungi.

Truffles are classified as Division Ascomycota all are ectomycorrhizal fungi which form their fruiting bodies under the soil surface. Mycelium of truffles overgrows the soil (soil has to have a specific features) and during growing period creates structures where fruiting bodies are generated. Fruiting bodies (sporocarps) are surrounded by dark "pseudobark" and inside show structures similar to marble where spores are present. Fruiting bodies have a shape similar to tuber and are able to achieve size of hen's egg.

Among truffles species most appreciated are: black truffle (*Tuber melanosporum*), winter truffle (*Tuber brumale*) and summer of burgundy truffle (*Tuber aestivum*).

Mediterranean climate conditions are preferred by the following species summer of burgundy (*Tuber aestivum*), and black truffle (*T. melanosporum*) whereas in more colder climate zones the more typical are *T. mesentericum* and *T. excavatum*.

The essential element for truffle cultivation is presence of trees in environment –most common host plants for truffles are: hazels, oaks, hornbeams, beeches, limes because their roots create the conditions for growth and fruiting of truffles. Anyway because of growth rate and canopy structure the best for amateur cultivation of truffles appeared to be hazels. Truffles like all other mycorrhizal fungi demand carbohydrates delivery from higher plants for growing and for effective sporocarps formation. Carbohydrates are main products of host plant photosynthesis and there are source of energy for fungi. Trees like hazels have a high growing potential and therefore they are effective host plants for truffles. Benefits are mutual because higher plants receive additional water and nutrients sorption capacity. There is also an important effect of roots of improving soil texture in rhizosphere what makes the better growing environment for fungal mycelium.

The optimal growing conditions for truffles there is soil of good air and water permeability and neutral or basic soil reaction and soil temperature between 11 and 14 centigrade what can be achieved under condition of temperate climate in Poland. It is confirmed by the fact of occurrence of truffles in natural forest in Częstochowa region as well as in Białowieża Primeval Forest.

The specific conditions of medium for truffles cultivation are as follows: pH between 7.5 and 8.0, medium humus content and well aerated. Medium should contain 40-50% of gravel and

sand fraction but at least 10% of clay particles share is necessary. If these demands can be expressed as recipe for 100 liters of growing media for truffles it is as follows:

- 60 liters of medium and coarse sand;
- 10 liters of granulated clay;
- 5 liters of keramzyte or similar gravel-like material;
- 20 liters of limed peat;
- 5 liters of dolomite gypsum,

The container of the capacity of 100 liters if Turkish hazel (*Corylus colurna*) has to be grown should have height of 50-60 cm because of good soil aeration only to the depth of 25-30 cm of the soil.

If cultivation in the field has to be started (only on small plot) soil has to be limed and well aerated. All truffles species for given climatic zone can be cultivated. Bigger plots can be established only when climatic and soil conditions are appropriate for truffles growth and inoculation can be performed before planting or on existing hazel (or other trees living in symbiosis with truffles) plantations.

There is one more important factor for successful truffles cultivation. There is litter of leaves which keeps moisture in the soil and makes a natural barrier protecting fungi against drying out. Anyway it has to be remembered that litter can inhibit process of gas exchange in the soil and therefore only litter from given plantation is recommended. The best results were observed when litter from the big woodchips of the following trees was applied: poplar, limes, aspen etc. Such a mulch keeps water and gives good aeration and in the process of slow decomposition turns into humus.

The main benefit of truffles cultivation is yield of fruiting bodies. Therefore we feel that we give possibility of growing interesting fungi which are protected in their natural habitats so in Poland they can be picked only in our own plots.