

The technical framework of truffle cultivation

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Two famous methods: "Pallier" & "Tanguy"

Since the introduction of mycorrhized plants, the development of truffle production in France has been based on two main methods of cultivation which have replaced the traditional model. The 'Pallier' method was inspired by arboriculture, with working of the soil, pruning the trees and irrigation. The 'Tanguy' method was based on habitat changes during the formation of natural truffle grounds.



Truffle trees cultivation or «Pallier» method

 Truffle cultivation in lawn ecosystem or «Tanguy» method



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Truffle trees cultivation or «Pallier» method

- •Seedlings with checked mycorrhizas
- •Annual tilling
- •Irrigation
- Different treatments



Truffle cultivation in lawn ecosystem or « Tanguy method »



Truffle cultivation in lawn ecosystem are like to cultivate wild or natural truffières.



Dordogne (South-West)

Other new methods: Angellozzi, JAAD, etc.

Recently other models have challenged them. Technical guidelines can be defined from the results obtained with different types of farming to best adapt to different environmental conditions.

Angellozzi method: high density plantation, tilling the soil by hand, watering, pruning a lot to keep the conquest space JAAD method: creating a mount on the row of plant and tilling the soil deep (20 cm) to cut roots and regenerate the root system.

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The JAAD aim is to renew the root system like Angellozzi in Italy.

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This framework – or precautionary technical plan – includes five phases:

- 1. the moment of planting
- 2. Maintenance before fungal fruiting
- 3. Cultivation during the harvest
- 4. Renovation or regeneration
- 5. Grubbing-up.









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Phase 1 : the moment of planting

At the beginning of the 1st phase an assessment is carried out on the soil's potential, the availability of water resources for irrigation and the presence of woods around the plantation. These factors will govern the improvements made to the soil (sub-soiling, crushing, lime fertilisers), the choice of tree species, planting density, orientation of the rows of trees and the clearance between the outer rows and the surrounding woods.









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Phase 2 : maintenance before fungal fruiting

Phase 2 is the most debated (because it is the most influential) and is very variable with regard to soil maintenance. Grassing over creates biodiversity conditions at ground level close to those of natural truffle grounds. On the other hand it can hamper the growth of host trees and in some cases limit the spread of the truffle mycorrhized root system in the surface layer.



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Tilling deep soil in Touraine

Phase 3 : cultivation during the harvest



Phase 3 doesn't seem to vary much between the different methods of truffle cultivation tested in France and abroad. It consists of keeping the soil aerated, controlling the truffles' water requirements and limiting the closing-up of the plantations by pruning or lopping the trees.



Phase 4 : renovation or regeneration

The goal of the 4th phase is to recover space for the truffles to invade by removing trees, thereby getting closer to the pioneering system preferred by *Tuber melanosporum*.



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Identification and control of interacting factors to define his own method of truffle cultivation at a local level.

- The aim is to find a good balance between
- 1.Soil (limestone, aerated, good drainage, pH8)
- 2.Climate (dry period and freezing period)
 3.Tree mycorrhized with *Tuber melanosporum*4.Environment with contaminating fungi
 5.Technical equipment and practical methods





- 1. Soil
- 2. Water and climate
- 3. Growth of the tree and mycorrhizas propagation







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- 1. Growth of the tree and mycorrhizas propagation
- 2. Contaminating fungi



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Pressure of contaminating fungi

Pressure of contamination is dangerous for *Tuber melanosporum* trees when there is a wooded environment.

Burnt area provoked by different mycorrhized fungi on old oaks roots.

- 1. Growth the of the brûlé
- 2. Lasting of the truffle fruiting



As long it is possible to keep a conquest space for the brûlés, truffle fruiting can exist with *Tuber melanosporum*

Tuber melanosporum is a fungus of early stage or a pioneer in the limestone environment. Truffle needs a young environment.

The conquest space between 2 brûlés

- 1. Growth of the tree
- 2. Virulence of the truffle





Truffle virulence on shallow soil. We don't need to prune Weak virulence on deep soil. We need to prune

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Conclusion

Definition of his own technical framework of truffle cultivation consists in finding and adjusting many balances between different factors.

Thank you for your attention



Gratitudes



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