Europe, a continent with high potential for the cultivation of the Burgundy truffle (*Tuber aestivum/uncinatum*)

GÉRARD CHEVALIER

Résidence Cristelle, 33 rue des Vergers, F-63800 Cournon d’Auvergne, charlemagne33@orange.fr


The Burgundy truffle (*Tuber aestivum/uncinatum*) grows, in Europe, in the most varied soils from a physical and chemical viewpoint. The only common point is the presence of a minimum level of exchangeable calcium in the soil. The truffle soils in Europe can be classified in two categories: the soils coming directly from the parent rock, and those formed from deposits covering the parent rock. The first group corresponds to most traditional truffle areas, France, Italy and Spain. It is also true for some soils from Ireland to Eastern Europe (Romania, Bulgaria), from Southern Europe (Greece, former Yugoslavia) to Northern Europe (Sweden, Baltic countries). The sedimentary layers that cover most areas are from the secondary and tertiary era. The primary parent rocks are less frequent. The second group means quaternary or recent alluviums covering the parent rock on huge surfaces and at great depth sometimes. They characterize mainly countries Eastern and Northern Europe.

By bringing within reason limestone, it is possible to cultivate *T. aestivum/uncinatum* on sedimentary soils non-calcareous or decalcified or even on soils issued from magmatic rocks (granite) or metamorphic (schists). The possibilities of truffle cultivation in Europe are therefore enormous, the limiting factors not being the soil but the climate.

**Key words:** truffles, soil, calcium, liming, truffle cultivation

INTRODUCTION

Hundreds of soil analyses carried out from the 1970’s show that the Burgundy truffle (*Tuber aestivum/uncinatum*) grows, in Europe, in the most varied soils from a physical and chemical viewpoint, far more than the soils for *T. melanosporum* and even more for *T. magnatum*. The only common point is the presence of a minimum level of exchangeable calcium in the soil (Chevalier 2011).

The nature of the parent rock conditions the soil physico-chemical characteristics. The soils derived from calcareous parent rock, named calcimagnesic soils
or calcimorphic soils are “intrazonal” soils, that are linked more to the nature of the parent rock they were derived from, than the climatic zone where they reside (Mathieu 2009). Under humid temperate climate, the evolution of the calcareous parent rock is linked to the decarbonatation of this rock.

TRUFFLE SOILS

The truffle soils in Europe can be classified in two vast categories: the soils coming directly from the parent rock, and those formed from deposits covering the parent rock (Fig.1).

The first group corresponds to the most traditional truffle areas, France (Chevalier 2008, 2010a; Chevalier, Frochot 1997; Chevalier, Palenzona 2011; Chevalier et al. 1979) (Fig.2), Italy (Bencivenga 2008; Granetti et al. 2005; Gregori 1991, 2010; Raglione et al. 2011; Zambonelli, Di Munno 1992) and Spain (De Miguel et al. 2008; Honrubia et al. 2011). It is also true for some soils in the United Kingdom (French 2008), Ireland, Germany (southern half) (Fig.3), Switzerland (Groux, Keller 2008), Austria (Urban, Pla 2008), Czech Republic, Slovakia (Gazo, Miko 2008, 2010), Southern Poland (Hilszczana, Sierota 2010; Lawrynowicz 2011) (Fig.4), Hungary (Bakony Mountains) (Bratek 2008; Bratek et al. 2010), Romania (Carpathian Mountains), Bulgaria, Greece, former Yugoslavia (Marjanovic 2008), Sweden (Isles of Gotland and Oland) (Wedén, Danell 2010; Wedén et al. 2004), Baltic republics. The sedimentary layers that cover most areas are from the secondary and tertiary era. The primary parent rocks are less frequent: Ireland, northern United Kingdom, the Ardennes and Eifel hills, Rhenish schist massif, the Harz, southwest of Saxony and southeast of Thuringia, Bohemia, southern Poland (Silesia, Katowice region, Lysa Gora), Swedish isles, Baltic republics.

The second group means quaternary or recent alluviums covering the parent rock on huge surfaces and at great depth sometimes. They characterize the Po Valley, southern Germany (glacial till), the Austrian, Slovak, Hungarian and Romanian plains. Large areas also are found above the glacial line showing the maximal advance of the quaternary glaciers. This is valid for the northern half of the Netherlands, Denmark, Northern Germany (Fig. 3), Poland (Fig. 4), Belarus and Ukraine. In this second group the alluviums which cover the parent rock are calcareous or calcic (loess) and the truffle can grow; the alluvium are free of limestone or calcium and the truffle fails to develop, even though the parent rock may be calcareous but deep.

By bringing within reason limestone, it is possible to cultivate *T. aestivum/uncinatum* on sedimentary soils non-calcareous or decalcified or even on soils issued from magmatic tocks (granite) or metamorphic (schists) (such a cultivation in France from the 2000’s) (Chevalier 2003, 2010b). The sedimentary soils of this type cover large surfaces in Northern Europe, North of the glacier most advance demarcation.
Europe ... for the cultivation of truffle

Fig. 1. Geologic map of Europe.
The northern part is characterized by soils originated from deposits covering the parent rock (in beige and grey). The soils of the southern part are more various. Southern limit of the quaternary glaciation (black line in dash).

Fig. 2. Truffle soils of France.
The truffle soils are very various. Many of them are suitable for the growth of *T. uncinatum*. Only some soils of the West (Bretagne), Central Massif, East (Vosges) and South (Pyrénées and Corse) are unsuitable without liming (in red, violet and purple).
Fig. 3. Truffle soils of Germany.
Germany presents the two types of soils: deposits covering the parent rock in the north (in beige and grey); soils originated from breaking up of the parent rock in the south. The soils of the southern part are more suitable for truffles.

Fig. 4. Truffle soils of Poland.
The great Poland plain is covered by quaternary deposits from glacier or wind origin. The soils of the southern Poland are quite different and closer to those of Southern Europe but their surface is more limited. They are originated from the breaking up of the parent rock that can be Jurassic (north-west of Krakow, in blue), Cretaceous (Beskides, south and south-east of Lublin, in green) or Tertiary (Polish Carpathians). The areas of the Southern Poland are much more favourable to the truffles than those of the great plain.
The possibilities of cultivation in Europe are therefore enormous, the limiting factor not being the soil but the climate (considerable heat in summer, summer drought, and severe cold in winter). Preempting the cold, the heat, drought is possible by adaptive cultivation methods (in depth work of the soil) and the temporary cover of the soil (mulching). The damaged caused by the drought can also be mitigated by a controlled irrigation.

REFERENCES


