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CROP & FOOD RESEARCH
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Tuber magnatum - Italian white truffle

The Italian white truffle (*Tuber magnatum*) is found primarily below 600 m in Northern Italy and up to 900 m in Central Italy. It is also found in Istria, Croatia, and in small areas of south-eastern France and the Ticino Canton of Switzerland.

The mean January temperatures in these areas range from -2 to 8°C and mean July temperatures from 18 to 26°C. The mean annual precipitation varies from 500 to 2000 mm, which is spread more or less evenly throughout the year, although in summer this tends to be in thunderstorms. Because of high summer temperatures and insolation, summer evapotranspiration is high, leading to sub-humid climates with aridity indices of 15 to 60.

In Italy the Italian white truffle is found in woods with more or less closed canopies as well as areas with relatively sparse vegetation around stream beds. Host plants include Italian alder (*Alnus cordata*), hazelnut (*Corylus avellana*), hop hornbeam (*Ostrya carpinifolia*), poplars and aspens (*Populus* spp.), willows (*Salix* spp.), small and large-leaved limes (*Tilia* spp.) and oaks (*Quercus* spp.). The most productive hosts are poplars, willows and limes.

The Italian white truffle can be harvested from August until the end of December but in August and early September the fruiting bodies are usually severely infested by insect larvae such as *Suillia univittata*. Unlike the Périgord black truffle the Italian white truffle is used either uncooked or added to dishes after cooking, for example, as a flavouring for pasta or salads, to retain the delicate, volatile aroma. As the Périgord black truffle is usually used in cooked dishes and is harvested between December and February there is little competition in the marketplace between the two species.

Typical wholesale prices can be up to Lire 5,000,000 per kg (US$2000) but in November 2000 at the Alba truffle festival prices topped US$13,000/kg. Generally large truffles in excess of about 250 g and up to 2 kg command relatively higher prices. The harvesters receive about 60% of the wholesale price. In Italy, to avoid tax imposed on truffle sales (paid by the seller), as much as half of the crop is sold on the black market.

Sold for up to US$9000/kg, *Tuber magnatum* (Italian white truffle) is the most expensive of the truffles.

Tuber magnatum (Italian white truffle) has not yet been cultivated and so supplies are restricted to what can be harvested from natural truffières like this one in northern Italy (with thanks to Dr A. Zambonelli).

White truffles are commercially canned and bottled but the aroma is changed and the quantity fixed when the truffle is preserved and they are quite inferior to fresh truffle. Cans and bottles of "white truffle" may also contain other morphologically similar species such as *Tuber dryophilum*, *Tuber borchii* (bianchetto) or *Tuber maculatum*. While white truffle oil is widely sold in delicatessens most of these flavoured olive oils have never seen a truffle, with the volatile aromas being derived from the chemicals industry. Such is the widespread use of these "truffle oils" that the inexperienced are sometimes disappointed when they are presented with a meal containing white truffle that has been adulterated with chemicals. Despite the high demand and prices, the production of Italian white truffle, like the Périgord black truffle, has declined over the past 100 years.

Although the techniques used commercially to produce Italian white truffle-infected plants have not been published, mother plant techniques and cloned host plants are used by some. Until recently morphological techniques based on the length of aciculate projections on the surface of the mycorrhizas and minor differences in mycorrhizal structure were the only diagnostic characters. Perhaps because of this there have been some problems with plants purported to be infected with Italian white truffle being contaminated with bianchetto, *Tuber dryophilum* and *Tuber maculatum*. However, biochemical and molecular techniques can now be used to identify truffle mycorrhizas and should help improve the quality of Italian white truffle-inoculated plants.

Areas where the Italian white truffle grows in Italy are not unique. In New Zealand the deep, free draining soils around Gisborne and in the Hawke's Bay, where the climate is not dissimilar to the areas in Italy where Italian white truffle grows, appear suited to the cultivation of this edible mushroom.

Further reading

Hall, I.R.; Zambonelli, A.; Primavera, F. 1998: Ectomycorrhizal fungi with edible fruiting bodies. 3. *Tuber magnatum*. *Economic Botany 52*:192-200.