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P (ID 131)

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The black truffle *Tuber melanosporum* is an ectomycorrhizal ascomycete of commercial value. Few is known about the reproductive biology of this famous edible mushroom. It is potentially hermaphroditic but reproduction – i.e. formation of the fruitbody (ascocarp) and production of meiotic spores (ascospores) within the later – requires mating between two individuals with opposite mating types[1,2]. At fruiting, a maternal parent forms the ascocarp, whereas the paternal one only leaves genes in the ascospores. In addition, beyond ascocarps, maternal genotypes also form surrounding ectomycorrhizas, suggesting that they are established as tree symbiont[3].

We summarize here novelties issuing from five years of sampling over France. In order to characterize the genetic structure of populations for both parents, we conducted genotyping analyses using 12 microsatellites to characterize maternal and paternal genotypes in ascocarps from seven truffle grounds[4]. This revealed high inbreeding and a strong isolation by distance for maternal and paternal genotypes, ruling out the possibility of gametic gene flow. Maternal individuals were bigger and more perennial than paternal ones, more numerous and transient. Paternal genotypes were never found on surrounding ectomycorrhizas. This suggests that the two partners have different developments and niches.

We also investigated herbaceous plant roots as a potential niche for the two paternal partners by barcoding and, when possible, by genotyping *T. melanosporum* from these roots. Although the black truffle infects the herbaceous plants of truffle grounds, only maternal genotypes were again found here. We thus suggest that germinating ascospores could act as paternal parent[5].

References:

[1] Riccioni et al. (2008), *Tuber melanosporum* outcrosses: analysis of the genetic diversity within and among its natural populations under this new scenario. New Phytologist 180, 466–478.

[2] Martin et al. (2010), Périgord black truffle genome uncovers evolutionary origins and mechanisms of symbiosis. Nature 464, 1033–1038.