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Poster Abstract – D.05

SSR MARKERS DISCLOSE NEW SCENARIOS ON TRUFFLE REPRODUCTIVE SYSTEM AND LIFE CYCLE

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Tuber spp. are ectomycorrhizal ascomycetes that produce ascocarps known as truffles. Thanks to their distinctive taste and aroma, the fruit bodies of some truffles are greatly appreciated and commercialised worldwide. Many basic aspects concerning these fungal species have not been fully elucidated yet. One of the most elusive goals has been discerning the *Tuber* spp. reproductive system. As a matter of fact, the reproductive structures of these species have not been described in pure culture, axenic spore germination remains an unresolved problem and the mating type genes have never been characterized in truffles. To date, *Tuber melanosporum* Vittad. and *Tuber magnatum* Pico, the finest black and white truffle species, respectively, have been regarded as selfing species. This model was based on evidence that neither SSR, SNPs nor allozyme markers were heterozygous in either *T .magnatum* or *T. melanosporum* truffles and on the assumption that the ascocarps are diploid (dikaryotic) structures (Lanfranco et al. 1995; Bertault et al 1998; Bertault et al. 2001; Mello et al. 2005). We recently used simple sequence repeat markers and a large survey of natural populations to show that extensive genetic exchange occurs within *T. magnatum* populations,which suggests that this truffle outcrosses (Rubini et al. 2005). We interpreted the lack of heterozygotes to mean that haploid, maternal tissue is the dominant component of truffle ascocarps while paternal DNA is not easily recoverable. Such partitioning of genetic material typifies many ascomycetes.

To test this hypothesis, we used polymorphic species-specific microsatellites (Rubini et al. 2004) to compare the allelic configurations of asci with those from the network of the surrounding hyphae in single *Tuber magnatum* truffles. We then used these truffles to inoculate host plants following the procedure described by Rubini et al (2001) and evaluate the SSR configurations of the resulting mycorrhizal root tips.

These analyses provided direct evidence that *T. magnatum* outcrosses and that its life cycle is, differently from what reported previously, predominantly haploid (Paolocci et al. 2006). In addition to its scientific significance, this basic understanding of the *T. magnatum* life cycle may have practical importance in developing strategies to obtain and select nursery-produced mycorrhizal plants as well as in the management of artificial plantations of this and other *Tuber* spp.

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