Proceedings of the 53rd Italian Society of Agricultural Genetics Annual Congress
Torino, Italy – 16/19 September, 2009
ISBN **978-88-900622-9-2**

Poster Abstract – 7.73

SELF-INCOMPATIBILITY IN OLIVE (*OLEA EUROPAEA* L.)

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gametophytic self-incompatibility, SRNase, SLF, cyto-histology

Olive is among the oldest known cultivated trees in the world and it represents an important economic factor in the rural balance, particularly in Mediterranean basin, such as Italy. In spite of its cultural and economic importance few studies are carried out on reproductive barriers in this species. Particularly poor knowledge is available in literature about main problems of this species and its productivity. Although flowering is often abundant, poor fruit set, abortion of ovaries, self-sterility and self-incompatibility frequently occur. We focused our attention on the self-incompatibility, the less studied barrier, in order to shed light on the process as a whole. Comprehension of the genetic and molecular bases of this process should allow an increase of yield and a fundamental step forward the understanding of this very spread phenomenon in tree fruit plants. On the basis of the current knowledge, there are two big systems of self-incompatibility: sporophytic and gametophytic self-incompatibility (termed SSI and GSI, respectively). Within these groups, variants for incompatibility mechanisms are possible: one in SSI and two in GSI.

Despite the physiological importance and economical impact of this process in olive fruit yield, the definition of the compatibility behaviour is still not clear for many cultivars. From the literature, we hypothesize that olive is characterized by GSI, but no experimental data are now available and information is scanty. Through an accurate search of references, we decided to follow different experimental ways to investigate self-incompatibility in olive. We started our study by taking into account the GSI system by retrieving records in the NCBI databases belonging to species taxonomically related to olive (e.g. *Prunus* spp., *Petunia* spp., *Anthirrinum* spp., etc.) showing this trait. We designed degenerate primers on consensus sequences obtained by multiple alignments in order to isolate the candidate genes, that is the female and male genetic determinants, typical of this kind of incompatibility: the S-RNase protein, a ribonuclease, and the SLF (S-locus F-box containing) protein, involved in the SCF (Skp, Cullin, and F-box proteins) complex. As biological system, two putative self-compatible (Frantoio and Kalamata) and two self-incompatible (Leccino and Moraiolo) cultivars were analysed. Furthermore, the extensive sequencing of the transcriptome of the olive flower at different developmental stages is in progress by means of a 454 pyrosequencing approach. At the same time, cyto-histological analyses by means of stain-clearing and aniline blue staining of pistils are currently performed in self-compatible and self-incompatible cultivars to check the pattern of growth of pollen tubes through the stigma surface and eventually the transmitting tissue of the style until ovary. Overall results are presented and critically discussed.