IMPACT OF RAV1 ENGINEERING ON BIOMASS PRODUCTION OF A POPLAT SRC FIELD TRIAL

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Plantations of Populus spp, Salix spp, or Eucalyptus spp. are established to produce wood. Poplars are cultivated with cycles of 15-18 years to obtain saw timber and peeler logs and, when grown for biomass production as short-rotation coppice (SRC), cutting back/coppicing cycles are reduced to 2-5-years intervals. Syllepsis and winter dormancy are among the valuable traits that can be targeted to enhance biomass yield of SRCs. Syllepsis, i.e. the outgrowth of lateral buds into branches the same season in which they form without an intervening rest period, increases carbon fixation and allocation in the shoot and hence the general growth of the tree. A high degree of sylleptic branching is known to be positively correlated with biomass yield when these plantations are grown under optimal conditions. In 2012 we established in Madrid (Spain) a SRC field trial with genetically engineered poplars, previously shown to develop sylleptic branches when cultivated in growth chambers, under optimal conditions. The aim of starting up this field trial was to test whether a plastic trait as syllepsis was maintained over the time under natural conditions and eventually resulted in an enhanced biomass production. During two growing seasons after the establishment year, we have monitored the evolution of several productivity determinants (stem dimensions, syllepsis, phenology). After a first coppicing cycle, we have analyzed the anatomy and chemistry of the wood of these trees, and have determined their aerial biomass yield and calorific value. We will discuss whether RAV1 may become a target gene to be used as biotechnological tool to enhance biomass yielof poplar SRC plantations.

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