A New Paradigma on the Plant Evolution: From a Natural Evolution to an Artificial Evolution?

Abstract. After evidencing the great importance of plants for animals and humans in consequence of the photosynthesis, several considerations on plant evolution are made. One of the peculiar characteristics of the plant is the sessile property, due especially to the cell wall. This factor, principally, strengthened by the photosynthetic process, determined the particular developmental pattern of the plant, which is characterized by the continuous formation of new organs. The plant immobility, although negative for its survival, has been, in great part, overcome by the acquisition of the capacity of adaptation (plasticity) to the environmental stresses and changes, and the establishment of more adapted genotypes. This capacity to react to the external signals induced Trewavas to speak of “plant intelligence”. The plant movement incapacity and the evolution of the sexual reproduction system were strongly correlated. In this context, the evolution of the flower in the Angiosperms has been particularly important to allow the male gamete to fertilize the immobile female gamete. Moreover, the formation of fruit and seed greatly improved the dispersal and conservation of the progeny in the environment. With the flower, mechanisms to favour the outcrossing among different individuals appeared, which are essential to increase the genetic variability and, then, the plant evolution itself. Although the Angiosperms seem highly evolved, the plant evolution is not surely finished, because many reported morpho-physiological processes may be still considered susceptible of further improvement. In the last years the relationships among humans, plants and environment are becoming closer and closer. This is due to the use of the DNA recombinant techniques with the aim to modify artificially plant characters. Therefore, the risk of a plant evolution strongly directed towards practical or commercial objectives, or “an artificial evolution”, may be hypothesized.