UNIVERSITÀ DEGLI STUDI DI PADOVA
DAFNAE
Department of Agronomy Food Natural resources Animals and Environment

HIERACIUM IT'S A MESS

ITalian' Species, Apomictic Mechanisms,Evolutionary SystematicS

Hieracium L. (Asteraceae) is one of the most diverse plant genera among the angiosperms. Its extreme morphological variability is caused by complex reproductive strategies, massive interspecific hybridization in the past and polyploidization, making Hieracium one of the best examples of a 'botanist's nightmare'. Variation in ploidy levels is associated with differences in modes of reproduction, few sexual diploids and numerous apomictic polyploids are known. In Italy, more than 1.300 taxa have been reported; however, the relationships among the species are unknown and the current taxonomic treatment has not substantially changed in the last 100 years, despite the availability of modern investigation techniques, like molecular biology or advanced microscopy. This project aims to contribute to shed light on taxonomic classification and phylogenetic relationship of Italian Hieracium adopting an integrated approach. Three young scientists with different backgrounds will combine their experience to unravel the complex evolutionary tangle of Hieracium. The project will be organised in three main parts. Firstly, a classical taxonomic approach will compare morphological data collected from herbarium specimens e new field collections. Secondly the ploidy level and genome size of apomictic and sexual Hieracium accession will be identified with flow cytometry and used as a model for cytological studies of mechanism of apomictic behaviour, as well as characterize with molecular phylogenetic methods. In the end, assembly of the Hieraciumgenome and transcriptome analysis will be performed to identify key regulators of apomictic behaviour that will be studied in the future. Training of young postdocs in the field of evolution of development and to the use of the latest technologies to answer biological questions will be one of the objectives of the project. Project coordination will be guaranteed by regular meetings. Moreover, prestigious external referees in the field of Hieracium systematic and evolution (Dr. Patrik Mráz) and in plant reproduction and molecular genetic basis of apomixis (Prof. Charles J Underwood) will ensure exchange of ideas that will lead to high level publication. Finally, the better understanding of the underlying mechanisms that regulate asexual reproduction through seed (i.e.: apomixis) has great potential for applications in evolution, plant breeding and crop science.

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