B·DEBATE International Center for Scientific Debate BARCELONA

CRAG CENTRE DE RECERCA EN AGRIGENÒMICA CSIC IRTA UAB

PAM SOLTIS

ABSTRACT

PARTICIPANT AT:

EVOLUTION OF PLANT PHENOTYPES
FROM GENOMES TO TRAITS

March, 17th-18th, 2015, Barcelona

Pam Soltis, Distinguished Professor and Curator, University of Florida, USA

Polyploidy and Novelty: Concepts, Meta-Analyses, and Phenotypic Studies in Tragopogon Allopolyploids

Allopolyploids are typically considered to be morphologically intermediate between their diploid parents, although individual traits may exhibit a range of phenotypes, from parental to intermediate to transgressive. Here, we extend the concept of evolutionary novelty for morphological features in allopolyploids to a range of genetic and ecological features. We observe that the dynamic nature of polyploid genomes – with alterations in gene content, gene number, gene arrangement, gene expression, and transposon activity – may generate sufficient novelty that every individual in a polyploid population or species may be unique. Whereas certain combinations of these features will undoubtedly be maladaptive, some unique combinations of newly generated variation may provide tremendous evolutionary potential and adaptive capabilities. Tragopogon mirus and T. miscellus, recent allotetraploid species that originated in the early 1900s, provide models for investigating phenotypic novelty in a suite of characters. We explore specific patterns of phenotypic variation in allotetraploid species of Tragopogon and their diploid parents. Morphological, physiological, and chemical traits in the allotetraploids exhibit a range of phenotypes from parental to intermediate to transgressive. Furthermore, reciprocally formed natural and synthetic T. miscellus individuals differ morphologically. Ecological niche models for the allotetraploids share attributes with both parental species but do not fully overlap the parental niches. We conclude that allopolyploid Tragopogon individuals are mosaics of parental, intermediate, and novel phenotypes that collectively form genetically and phenotypically variable populations.

B·DEBATE IS AN INITIATIVE OF:

biocat "la Caixa" Foundation