



HAL
open science

Is there a phylogeny behind this diversity? A molecular assessment of *Romulea* in the Mediterranean

Alex Baumel, Frédéric Médail, Anouar Toumi, Cécile Chemin, Manon Candas, Virgile Noble, Henri Michaud, Katia Diadema, Germain Waroquier, Annie Aboucaya, et al.

► To cite this version:

Alex Baumel, Frédéric Médail, Anouar Toumi, Cécile Chemin, Manon Candas, et al.. Is there a phylogeny behind this diversity? A molecular assessment of *Romulea* in the Mediterranean. XX International Botanical Congress, Jul 2024, Madrid (ES), Spain. hal-04674057

HAL Id: hal-04674057

<https://amu.hal.science/hal-04674057v1>

Submitted on 20 Aug 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License

Is there a phylogeny behind this diversity? A molecular assessment of *Romulea* in the Mediterranean

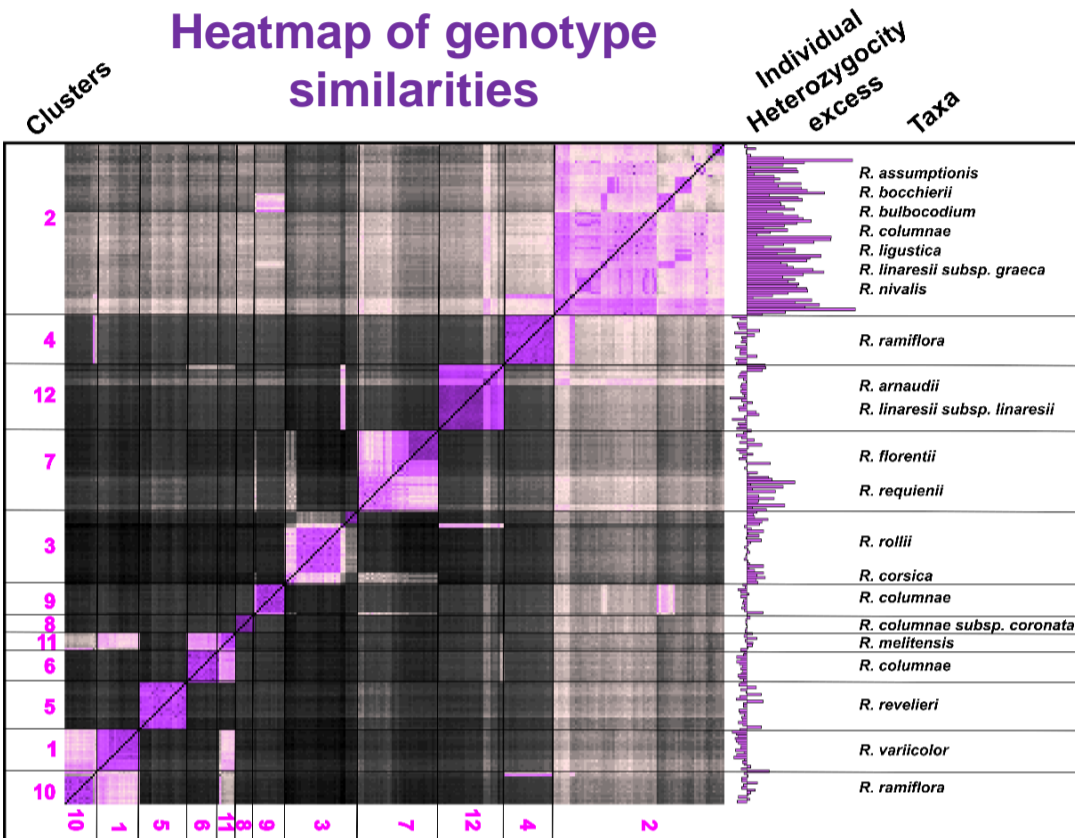


Romulea arnaudii

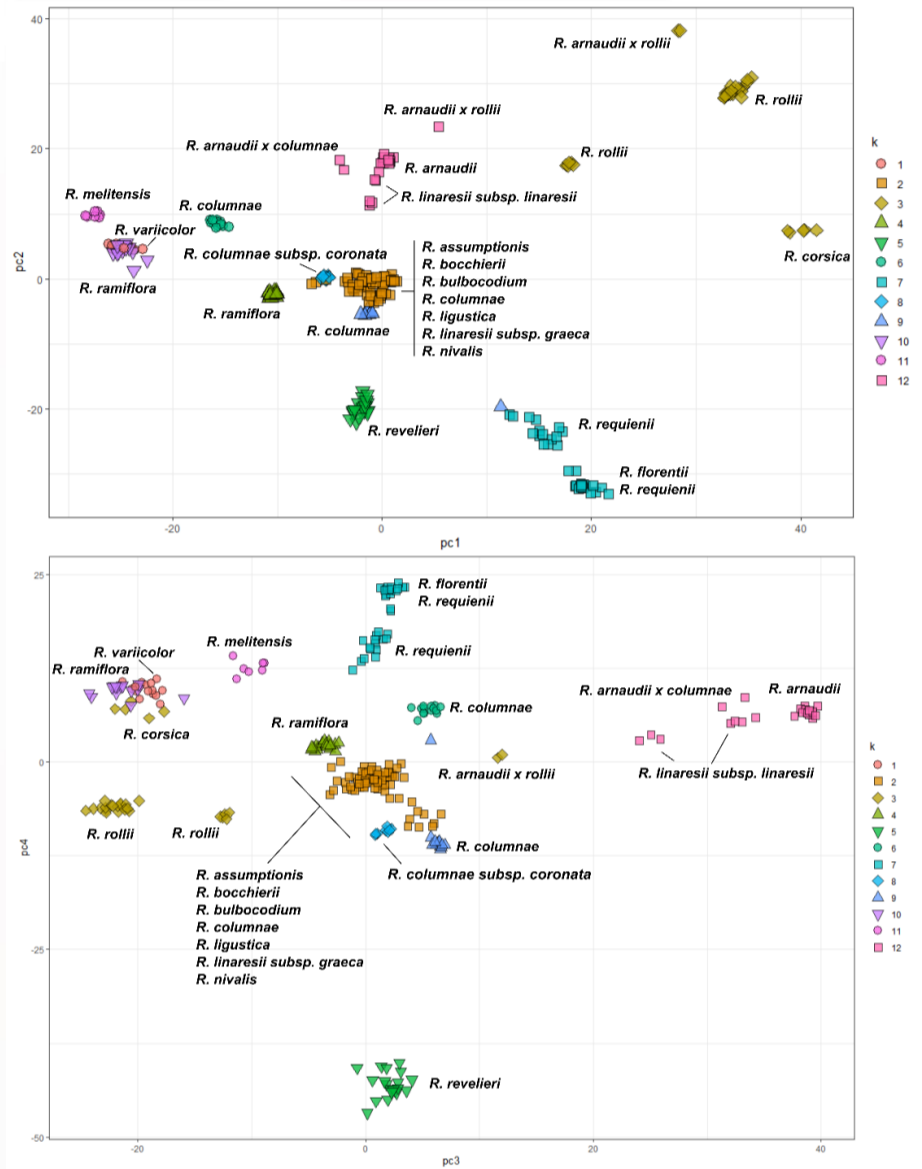
Alex Baumel¹, Frédéric Médail¹, Anouar Toumi¹, Cécile Chemin¹, Manon Candas¹, Virgile Noble², Henri Michaud², Katia Diadema², Germain Waroquier², Annie Aboucaya³, Alain Delage⁴, Lisandru Leandri⁴, Mathieu Chambouleyron⁵, Jean-François Léger^{5,6}, Stephen Mifsud⁷, Andrea Lallai⁸, Gianluca Iiriti⁸, Gianniantonio Domina⁹, Gabriele Casazza¹⁰, Baptiste Pierre¹¹, Juan Viruel¹²

The genus *Romulea* (Iridaceae) comprises ca. 90 species distributed in two hotspots of diversity: South Africa and the Mediterranean. Hybseq data using the Angiosperm353 baitset were generated to disentangle the relationships between 288 *Romulea* samples belonging to 18 taxa from Mediterranean. Our results are based on (1) 4K SNPs following a tetraploid genotyping approach using FreeBayes from 331 nuclear genes and (2) 652 informative SNPs obtained from plastomes of 120 individuals.

Heatmap of genotype similarities



PCA of genotypes



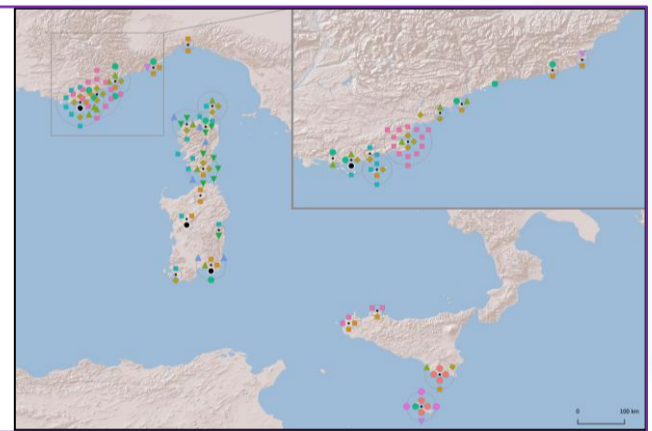
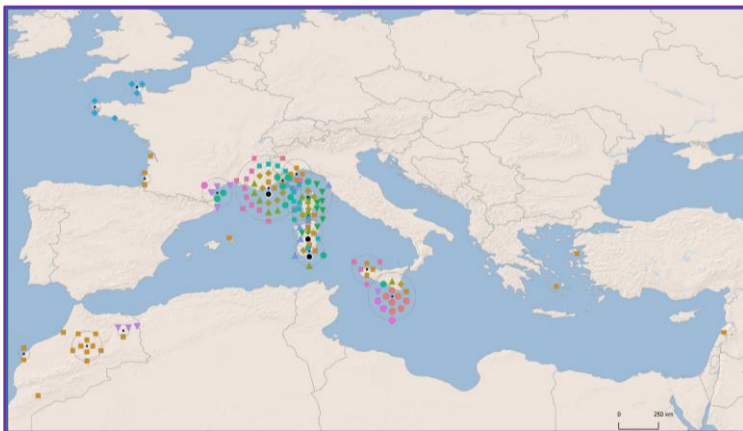
Results

- 10 taxa are congruent with 7 unique clusters (clusters: 1, 3, 5, 7, 8, 11, 12)
- One cluster (n°2) comprises 7 taxa
- Genotypes similarities suggest or confirm hybrids (e.g. *R. melitensis*)
- Excess of heterozygosity (Hind/He), not compatible with auto-tetraploidy, is associated to hybridization

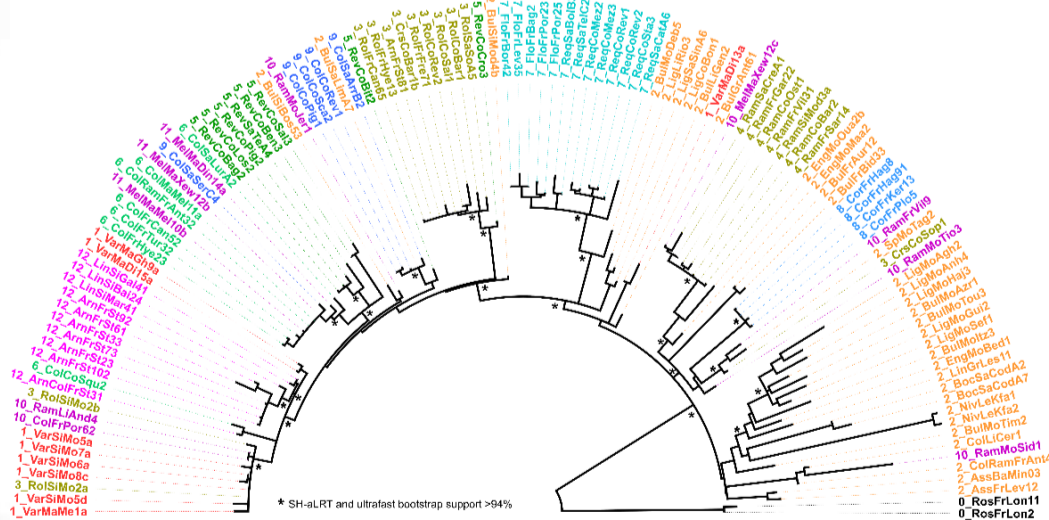
Maps of genetic clusters

Cluster 2 is widespread all over the Mediterranean region

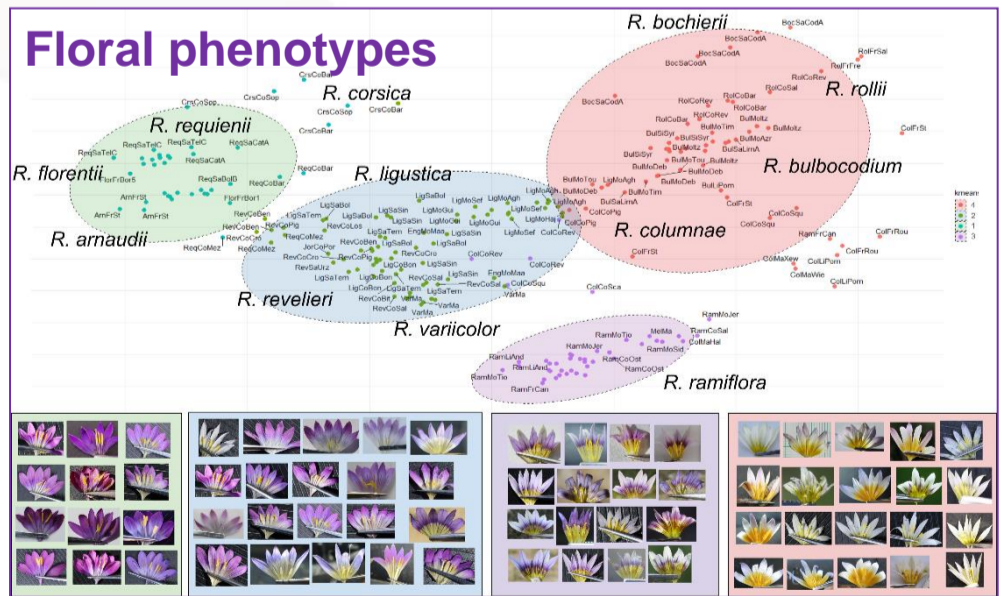
The Tyrrhenian sector has several endemic clusters with low differentiation between disjunct populations or taxa



Plastid phylogeny



Floral phenotypes



- ➔ Nuclear, plastid and floral data mismatch but some congruences were also observed and need further investigations.
- ➔ Allopolyploidy with multiple origins is suspected, and separating homeologs is required to better understand the phylogenetic relationships between the Mediterranean *Romulea* taxa.
- ➔ Incongruence between taxa and genetic clusters highlight the need for a taxonomic revision.