

Monitoring system and in situ conservation of endemic and threatened *Beta patula* Aiton populations in Madeira Region

- [H. Nóbrega,](#)
- [G. Freitas,](#)
- [M. A. Zavattieri,](#)
- [C. Ragonezi,](#)
- [L. Frese](#) &
- [M. A. A. Pinheiro de Carvalho](#)

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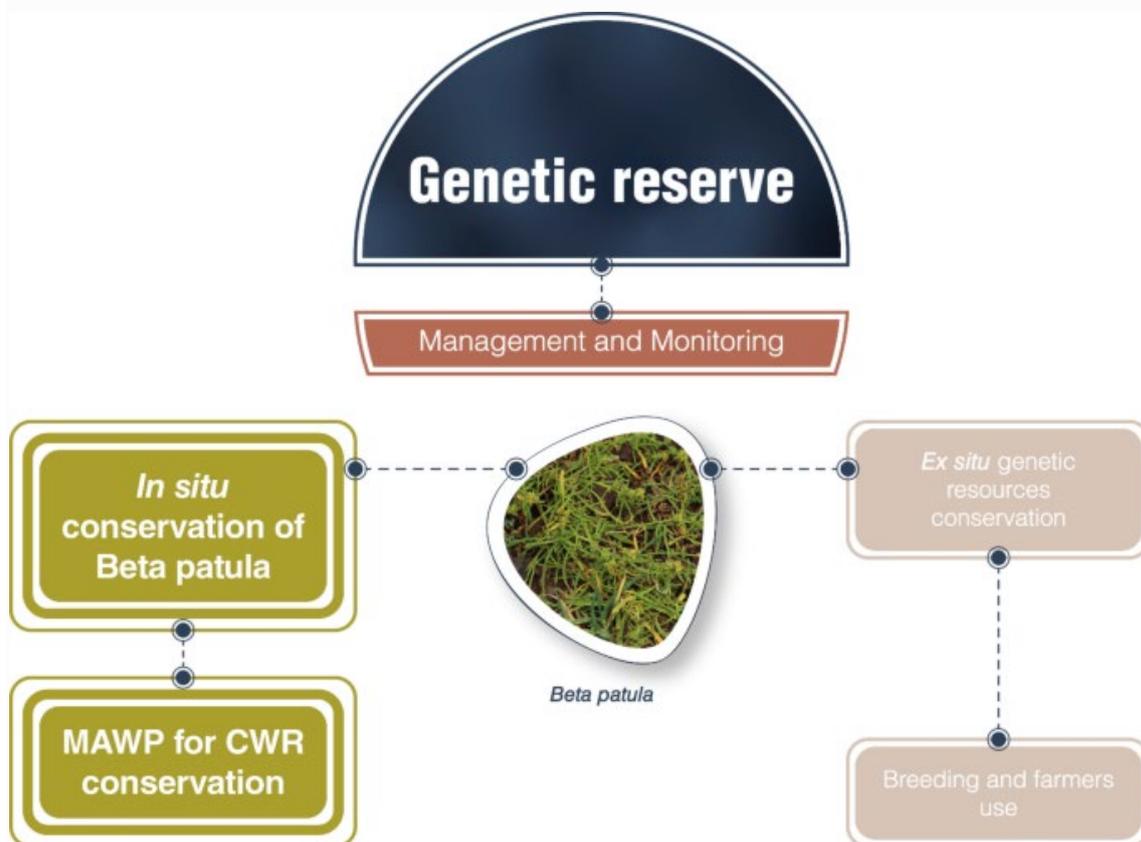
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Abstract

Madeira Archipelago is a hotspot for crop wild relatives (CWR) of crop cultures. Some of these CWR are present in very specific environments, such as, in Ponta de São Lourenço or Desertas Islands. One such species is *Beta patula* Aiton, a Critically Endangered species which belongs to the Gene Pool 1b of cultivated beets. A continuous effort has been developed for its ex situ conservation through the storage of accessions (ISOP2512 and ISOP1911) in the ISOPlexis GeneBank at the University of Madeira. Simultaneously, a series of studies have been carried out to understand the species' ecogeographic and ecological requirements, to validate populations' boundaries and sizes, and to establish population dynamics. This study includes a complete floristic survey at the *B. patula* locations of, Desembarcadouro islet (DI) with 12 (DI1–DI12) sampling sites, and Chão islet (CI) with 3 (CI1–CI3). Several

Biodiversity indices were calculated for these locations. Plot DI3 exhibited the highest values for Corrected Evenness ($E' = 0.77 \pm 0.07$), Shannon–Weaver Diversity Index ($H' = 2.48 \pm 0.12$), and Hill's Index ($N_2 = 4.47 \pm 0.72$), with a total sum of 306 individuals of *B. patula*. The demographic status of *B. patula* populations in DI and CI was determined yearly between 2014 and 2018. The results show an average population size of 16,906 and 2917 plants, respectively. These data will be used for the establishment of a protocol to monitor and manage a genetic reserve for *B. patula* and other CWR. By doing so, our work will contribute to the implementation of the European genetic reserve network.

Graphic abstract



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