

Master en Biologie orientation

Biodiversité & Systématique

Population genetics survey in *Trachycarpus fortunei*, an invasive palm in Southern Switzerland : impact of the demographic and range expansions on mating system

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The Central-Eastern Chinese palm *Trachycarpus fortunei*, one of the most cold-tolerant cultivated representatives in the family has become an aggressive invasive plant in southern Switzerland and Northern Italy. This palm displays an intermediate sexual expression strategy in which dioecy dominates.

Historical literature dealing with the flowering behaviour of cultivated individuals of this species and our own preliminary research highlighted the sudden and striking appearance of female or hermaphroditic flowers, developing into slightly smaller fruits, on staminate inflorescences or complete change of pistillate into staminate plants from one year to the next.

Several studies have shown that a liable reproductive strategy may play a major role with respect to colonizing new habitats and this phenomenon makes of *T. fortunei* an interesting case-study towards our understanding of the developmental and structural basis responsible of floral sexual dimorphism in Angiosperms. Recent studies have also suggested that invasions might favour genetic revolutions, and this might therefore be the case of the flowering behaviour in *T. fortunei* in Switzerland.

This project aims to explore the early development of floral organs in male and female flowers of this invasive species, looking for specific ontogenetic stages leading to morphological and histological differentiation responsible of sexual dimorphism (cell death vs. cell cycle arrest hypotheses). A population genetic approach will be used to analyse the demographic regime within the species in southern Switzerland while characterizing the distribution of genetic variation within and among populations in the frame of the historical and contemporary events, and their implications for the management of this species. More specifically, we will try to trace back the origin of the invasive populations by comparing the Swiss populations to referenced individuals.

Methodologies:

- Sampling in Southern Switzerland (Canton Tessin) and eventually Northern Italy for genetic analyses and morphometric records (dioecy vs hermaphroditism)
- Micromorphology and development of reproductive organs following classical histological and anatomical methods.
- Microsatellite genotyping and chloroplast marker sequencing to analyse the genetic structure, infer the recent demographic regime and possibly assess the origin of the species in South Switzerland (using additional samples for outside Switzerland).

