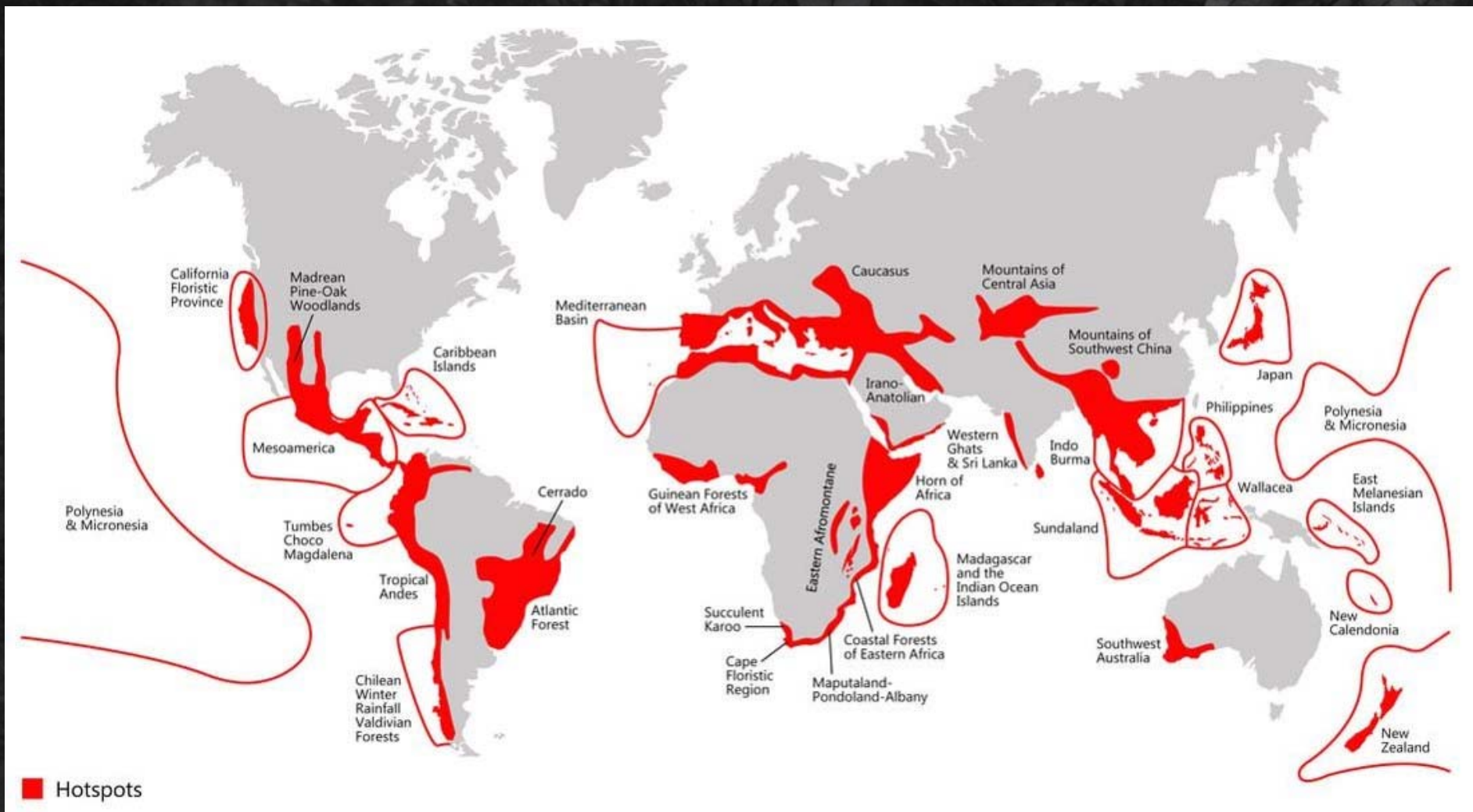
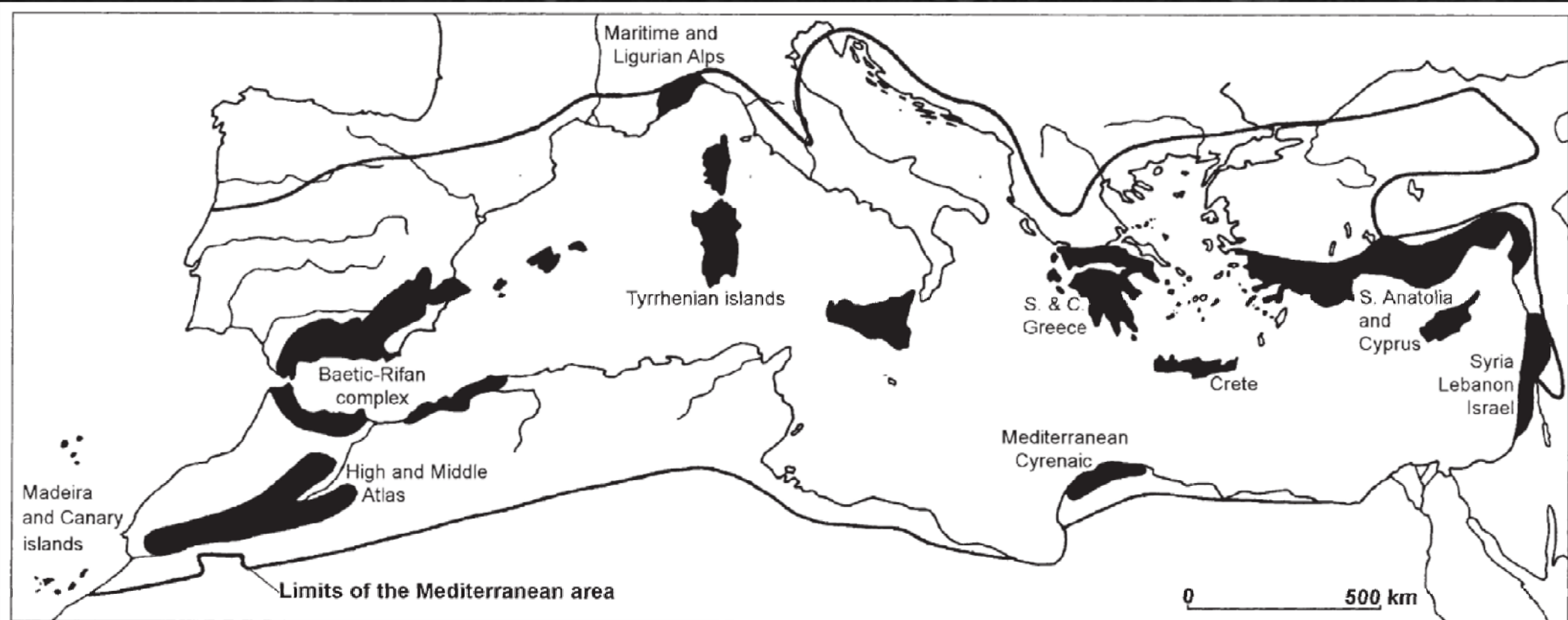


Mass extinction events in geological past (CNX OpenStax)



Biodiversity hotspots in the World (www.tropicalconservationfund.org/biodiversityhotspots.html)



Médail & Quezél, *Conservation Biology*, 1999



Karstic dry grassland in NW Adriatic with showy *Iris illyrica*, *Paeonia officinalis* in the front



Traditional land use (mowing) on dry grasslands of NW Adriatic



No limits (<https://www.facebook.com/photo/?fbid=1212289565464360&set=a.592375374122452>)



Tachymarptis melba (photo: Patrick Donini)



Bubo bubo (photo: mairie-alib.fr)



Vrbas gorge, Bosnia and Herzegovina; cliffs with *Moehringia bavarica*



Destroyed cushions of an endangered chasmophyte below the climbing route, Mirna valley, NW Adriatic, Croatia

Population size as a major determinant of mating system and population genetic differentiation in a narrow endemic chasmophyte

Authors

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Ivan Radosavljević, Živa Fišer, Nataša Fujs, Silvia Castro



4th Mediterranean Plant
Conservation Week

VALÈNCIA | 23-27 OCTOBER | 2023



Moehringia tommasinii (photo: Slavko Brana)



Distribution range of *Moehringia tommasinii*; EOO: 53.1 km², 60-530 m a.s.l., 6 extant populations along 25 km from NW-SE



Črni kal in NW Adriatic, Slovenia (photo: Jakub Botwicz)
Asplenio lepidi-Moehringietum tommasinii Martini 1988



Premise of the study

- mating system is primary, yet not the only, force regulating patterns of genetic variation
- confounding effects: specifics in site ecology, history, evolution, interaction with other taxa...

Moehringia tommasinii – study system

- Narrowly distributed chasmophyte
- Included all known populations
- Human-free (preserved) habitat
- Ecologically specific but homogenous, albeit extreme habitat

Questions to be answered

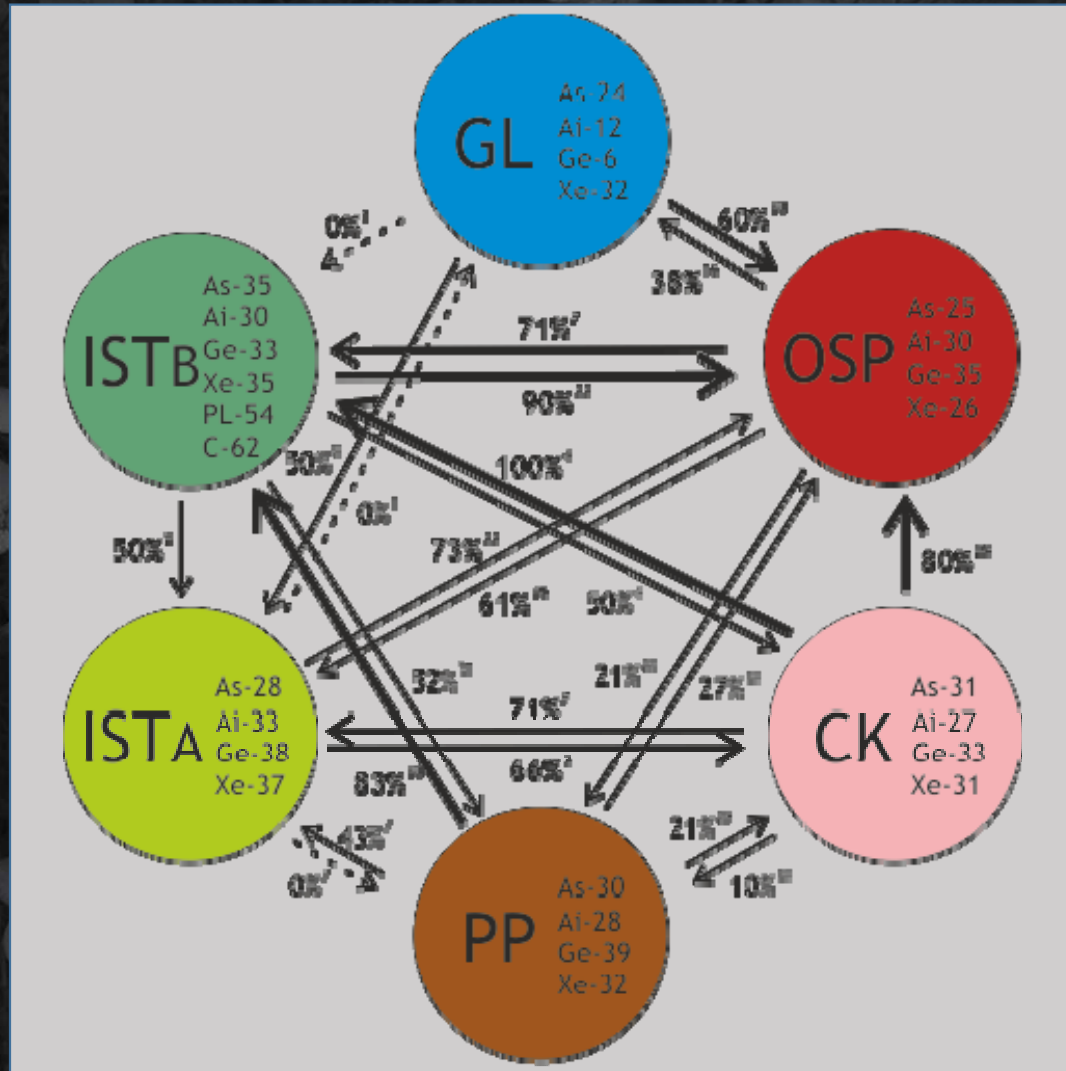
- What is the extent of variation in mating systems among populations?
- Do mating systems and population size effect population genetic parameters?
- Any evidence of selfing syndrome (pop. size, in/outbreeding depression)?
- Does outcrossing with relative effect mating system of a model plant?



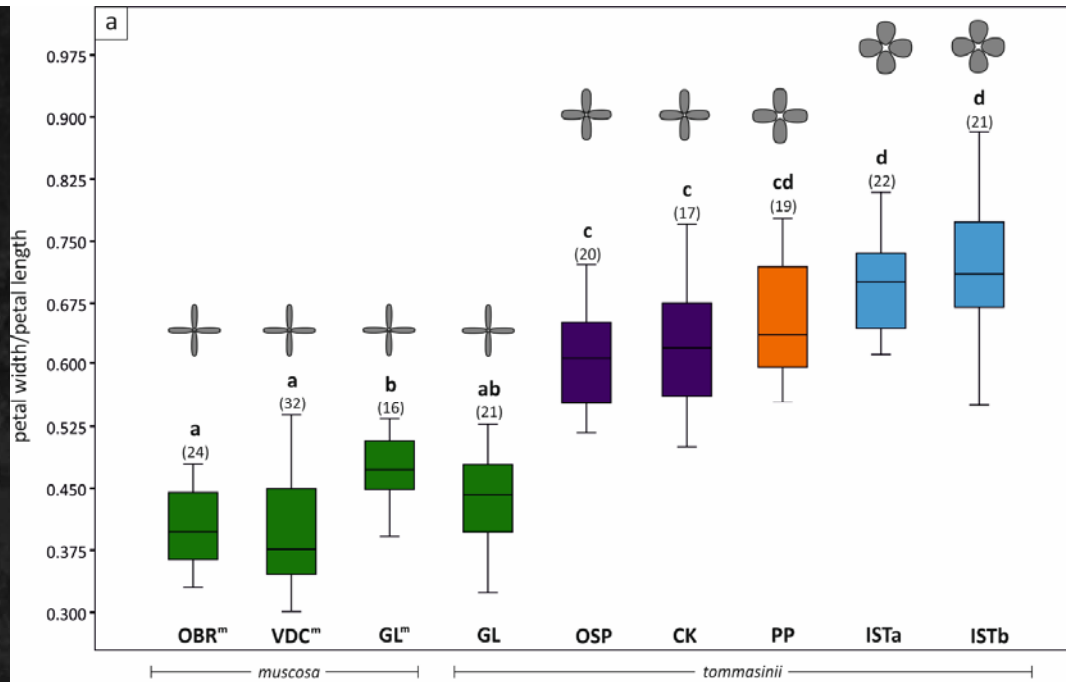
In situ crossing experiment, cliffs above Mirna valley, NW Adriatic, Croatia



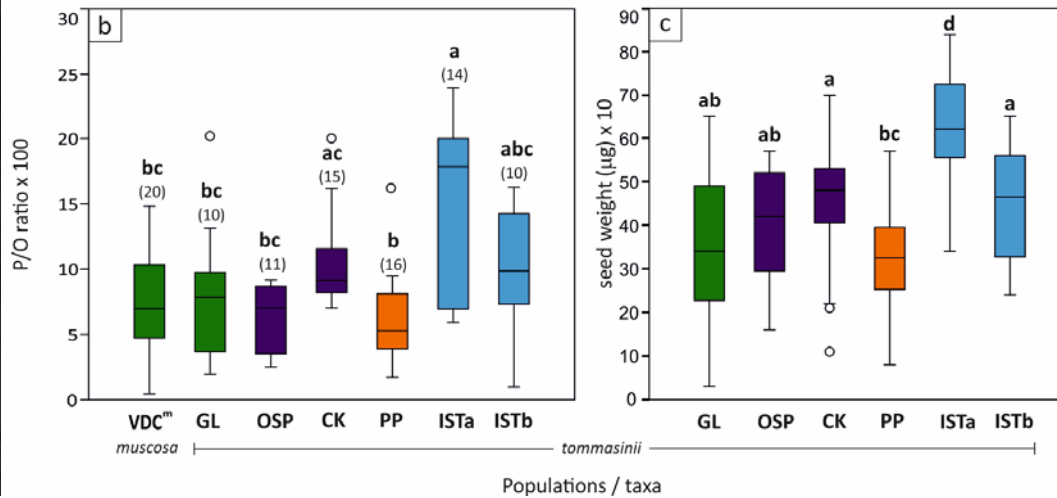
Sampling seeds and tissue of *Moehringia tommasinii*, cliffs above Mirna valley, NW Adriatic, Croatia



Ex situ plant cultivation and common garden experiment design, Natural History Museum Rijeka, NW Adriatic, Croatia

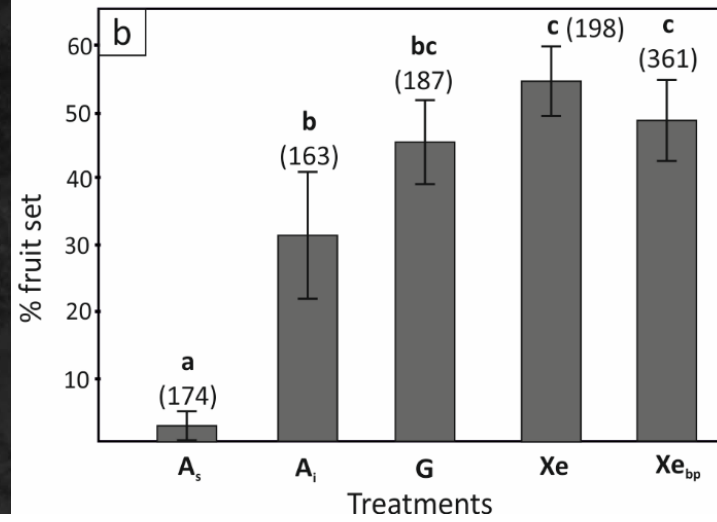
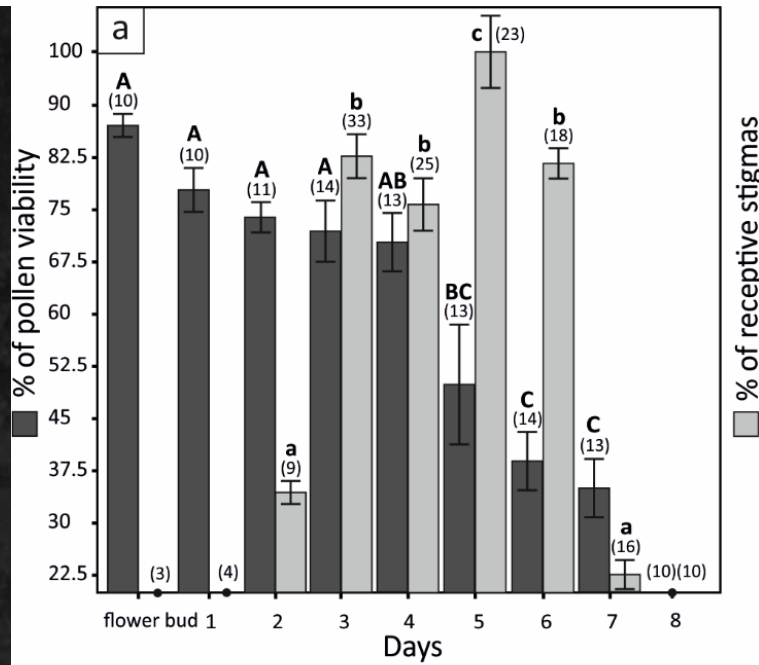


(a) Petal index – width/length



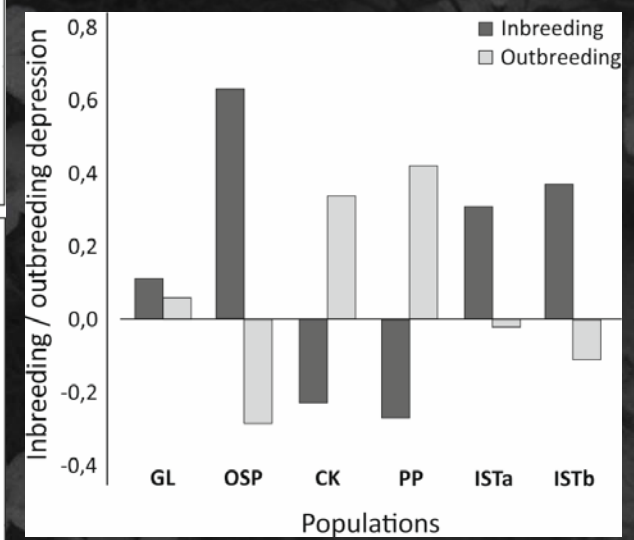
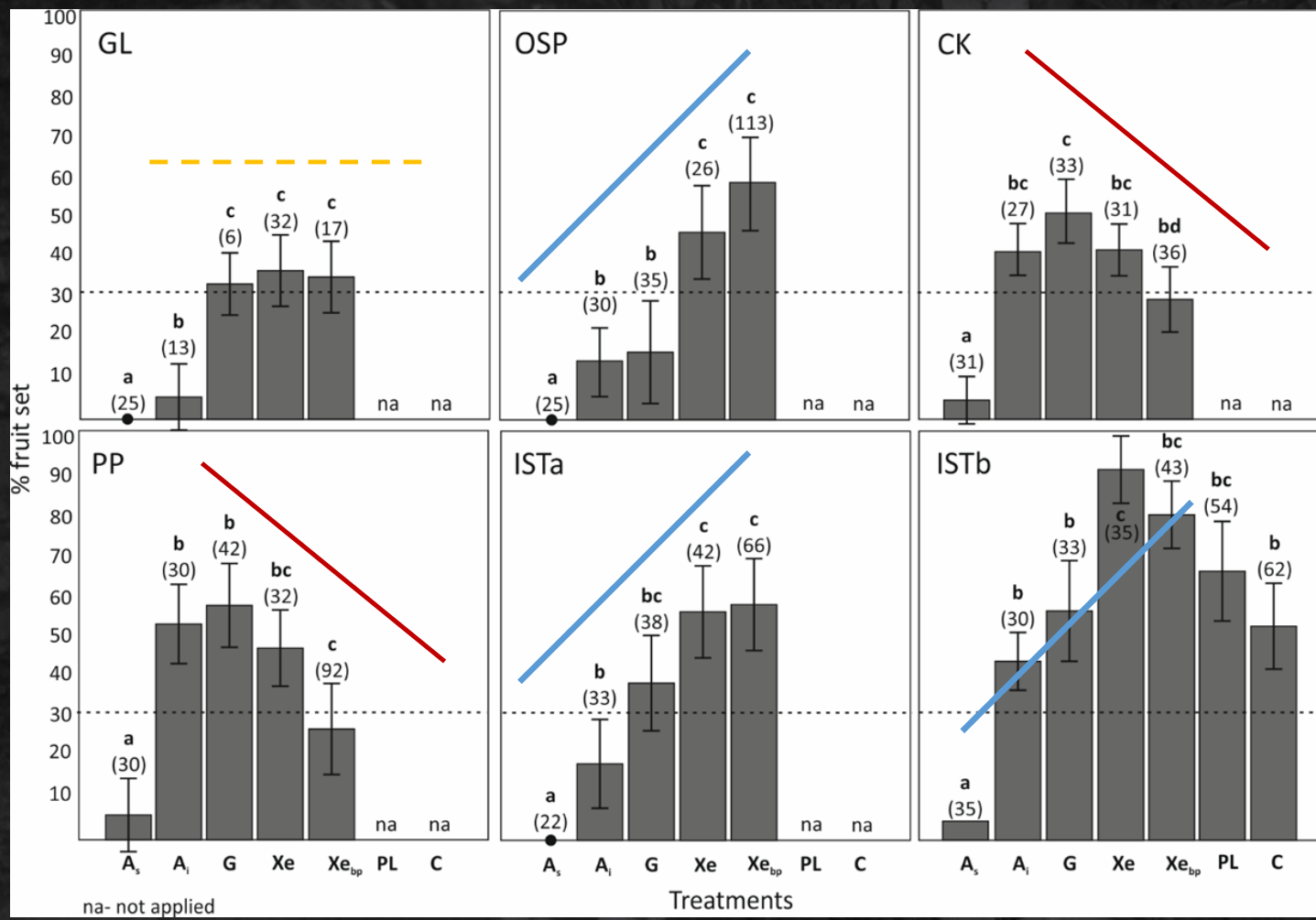
(b) Pollen-to-ovule ratio

(c) Seed weight



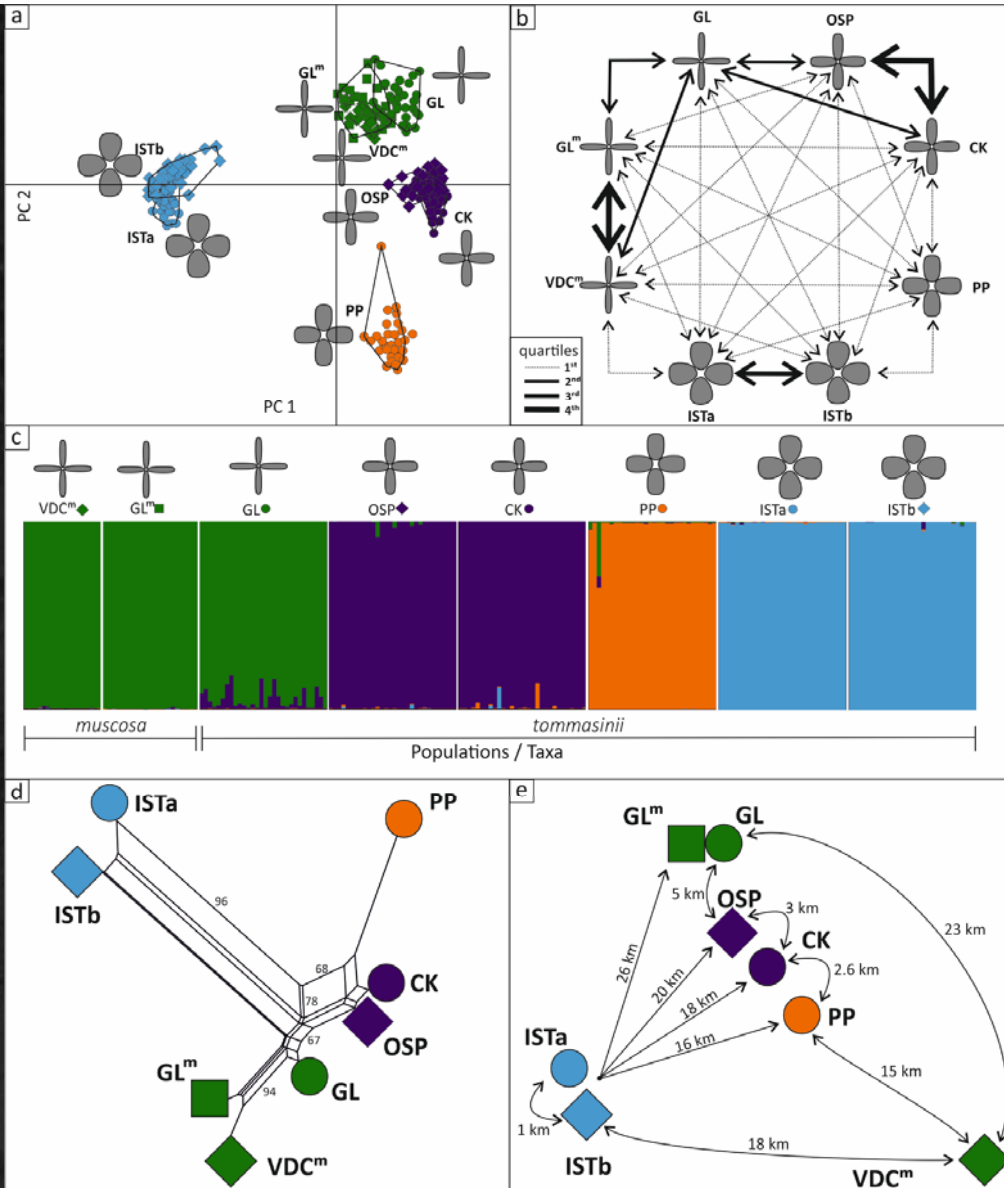
Flower biology – sexual functioning (allogamy) of *Moehringia tommasinii*

Mating system of *Moehringia tommasinii* drawn across all (6!) populations



Mating system of *Moehringia tommasinii* in each population

Coefficients of in/outbreeding depression for all populations



Population genetics of *Moehringia tommasinii* for all populations, and *M. muscosa* (two populations)

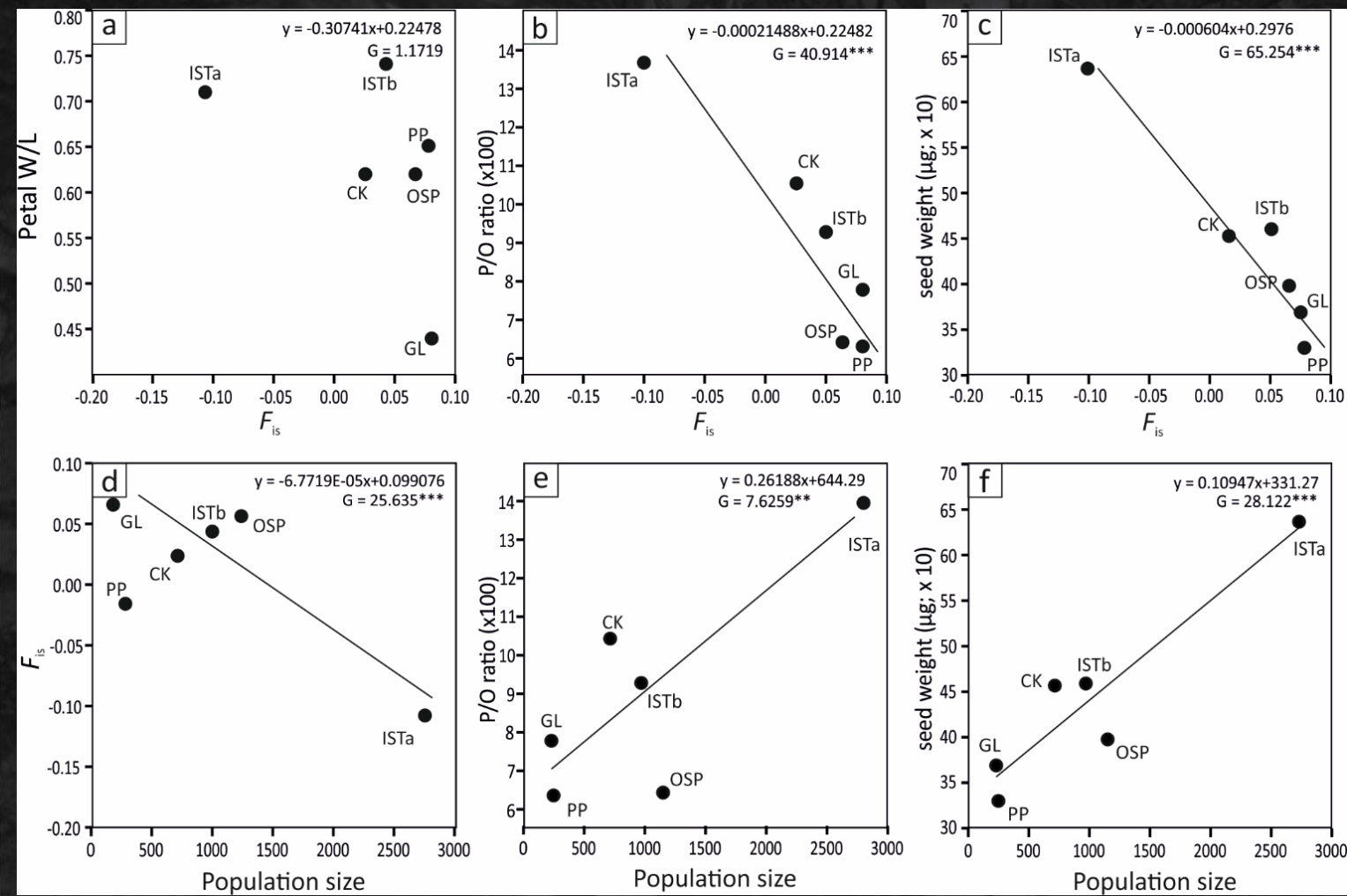
(a) PCA

(b) Pairwise gene flow

(c) Genetic structure and assignment of individuals

(d) neighbour-joining network

(e) Distances among pop.



General linear models of within population fixation index (a-c) and population size (d-f)

Conclusions

- Surprisingly high variation in mating systems among populations.
- Populations size proved to be the most important factor affecting mating system in genetically structured populations.
- No evidence of selfing syndrome despite significant differences in pollen production and flower size among populations.
- Molecular and morphometric data provide evidence of hybridization with close relative followed by local extinction.
- *M. tommasinii* faces threats not only from human activities but also from natural hybridization with its close relative.