TEL AVIV UNIVERSITY
UNIVERSITY OF WARSAW

Katarzyna Roguz
Yuval Sapir

k.roguz@biol.uw.edu.pl
sapiry@post.tau.ac.il

Plants taking charge: autonomous self-pollination
as response to plants-pollinator mismatch in *Fritillaria persica*

Floral colour is a visual cue to pollinators and of great importance in shaping plant-pollinator interactions. In the geophyte *Fritillaria persica*, both cream-greenish and purple floral colour morphs were described. We aim to test if existence of both colour morphs is maintained through differential pollinator spectrum and visitation rate, due to differences in colour perception and nectar properties. We propose also increased autonomous self-pollination is response to seasonal mismatch between flowering and pollinator emergence, and/or to differences in the pollination efficiency in studied species. Studying preferences of pollinators and chemical analysis of floral reward properties may help us to understand the role of this factors in distribution and frequency of flower colour polymorphism in *F. persica*.

Materials & methods

To analyze the reproduction process of *F. persica* morphs we will:

- video-record flower visitors on both colour morphs
- assess attractiveness of experimental flowers with all nectaries accessible (in *F. persica* flowers three out of six nectaries are covered with tepals)
- cover flowers at the bud stage and count number of seeds produced via autonomous self-pollination
- analyze nectar properties, including volume, sugar and amino acids concentration and composition

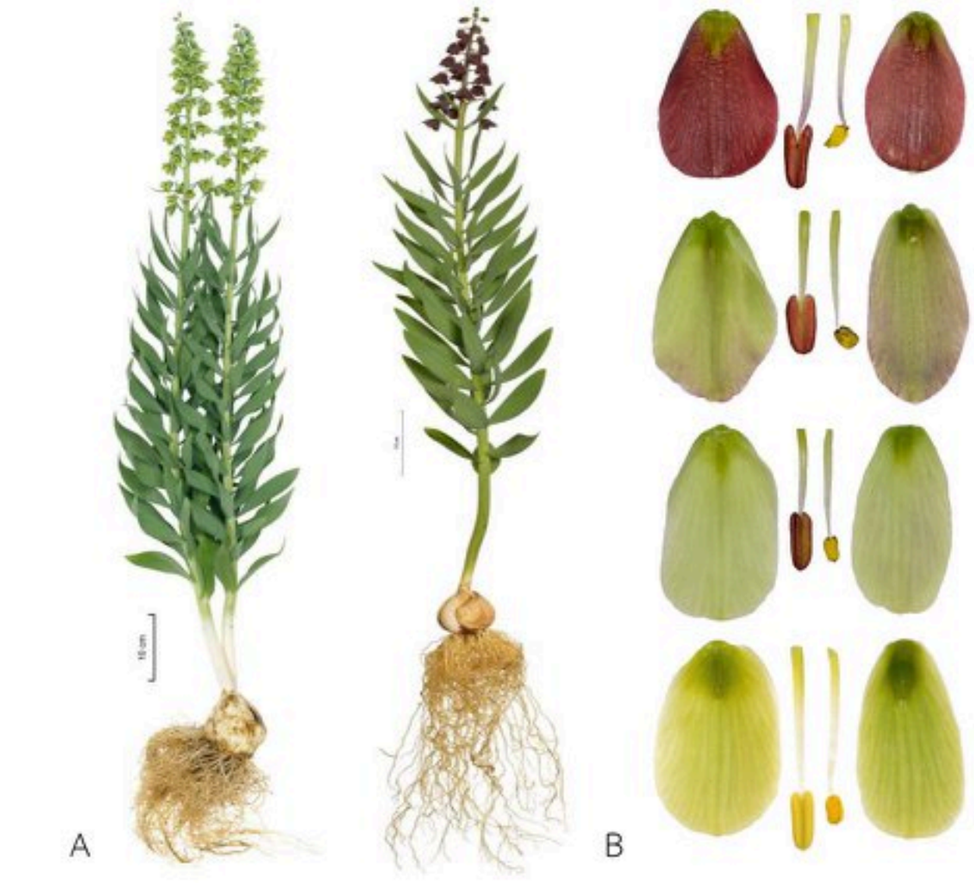

Fig. 1. *Fritillaria persica* in natural habitats occurs in two floral colour morphs, cream-greenish and purple. [A] Plants with flowers of different colour, [B] tepals of anthers from from plants with different flower colours.

Questions

Flower colours is an important attractant for pollinators. Are the two floral colour morphs of *F. persica* visited and pollinated by different pollinators?

Nectar is one of the most important rewards for pollinators. Do studied morphs vary in terms of nectar characteristics?

Fig. 2. Flower colours are important attractants for pollinators. Variability in flower colour in *F. persica* may result in different attractiveness for potential pollinators.

Nectar from outer tepals of *F. persica* flowers is not visible, and probably hardly accessible for pollinators. Will removing part of the tepal and uncovering nectaries increase attractiveness of experimental flowers for pollinators?

Fritillaria persica flowers early in the spring, when risk of mismatch between flowering and pollinator emergence is high. Is autonomous self-pollination a way to assure seed production in studied species?

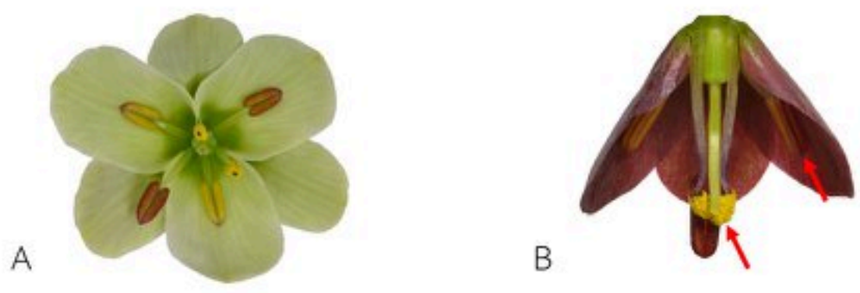

Fig. 3. [A] Nectaeries located on outer tepals in *F. persica* flowers are not visible, and therfore probably hardly accessible for pollinators, [B] during the anthesis anthers in *F. persica* flowers move towards stigma (arrows) and cover it with pollen.

Expected results

Floral colour is of great importance in shaping plant-pollinator interactions. We expect divergence in pollination system (different pollinators species) and attractiveness (different frequency of visits) in *F. persica* colour morphs.

Flower colour in the studied species (dark vs light) may influence nectar properties for example due to temperature within the flowers. Possible result of this variability may be higher attractiveness of one studied morph.

The amount and the properties of nectar may be key factor deciding about flower attractiveness. We expect more frequent pollinators visits on experimental flowers (all nectaries visible and accessible).

Autonomous self-pollination may be a way to assure seed production when pollinators are scare. This seems to be a strategy of *F. persica* as the anthers change their position during anthesis. Initially, they rest on the tepals, but with the progress of anthesis they move towards stigma and cover it with pollen.

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University of Warsaw Botanic Garden
Aleje Ujazdowskie 4, 00-478 Warsaw, Poland
www.ogrod.uw.edu.pl
Tel Aviv University Botanical Garden,
Ramat Aviv, Tel Aviv 69978, Israel
https://labsapir.wixsite.com/labsapir

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