POLLEN DISPERSAL

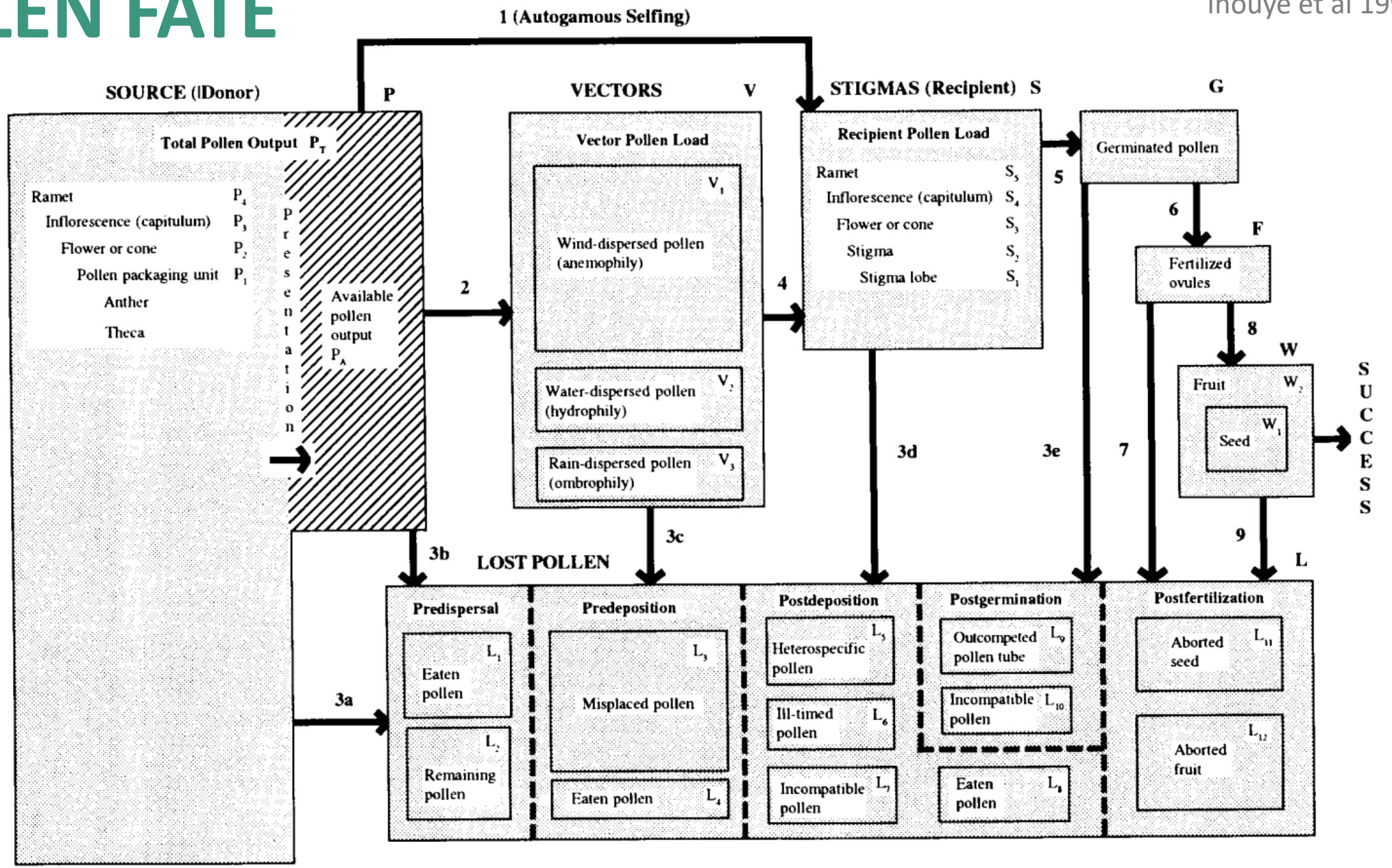
PATTERNS OF POLLEN DISPERSAL

… HANDS-ON!

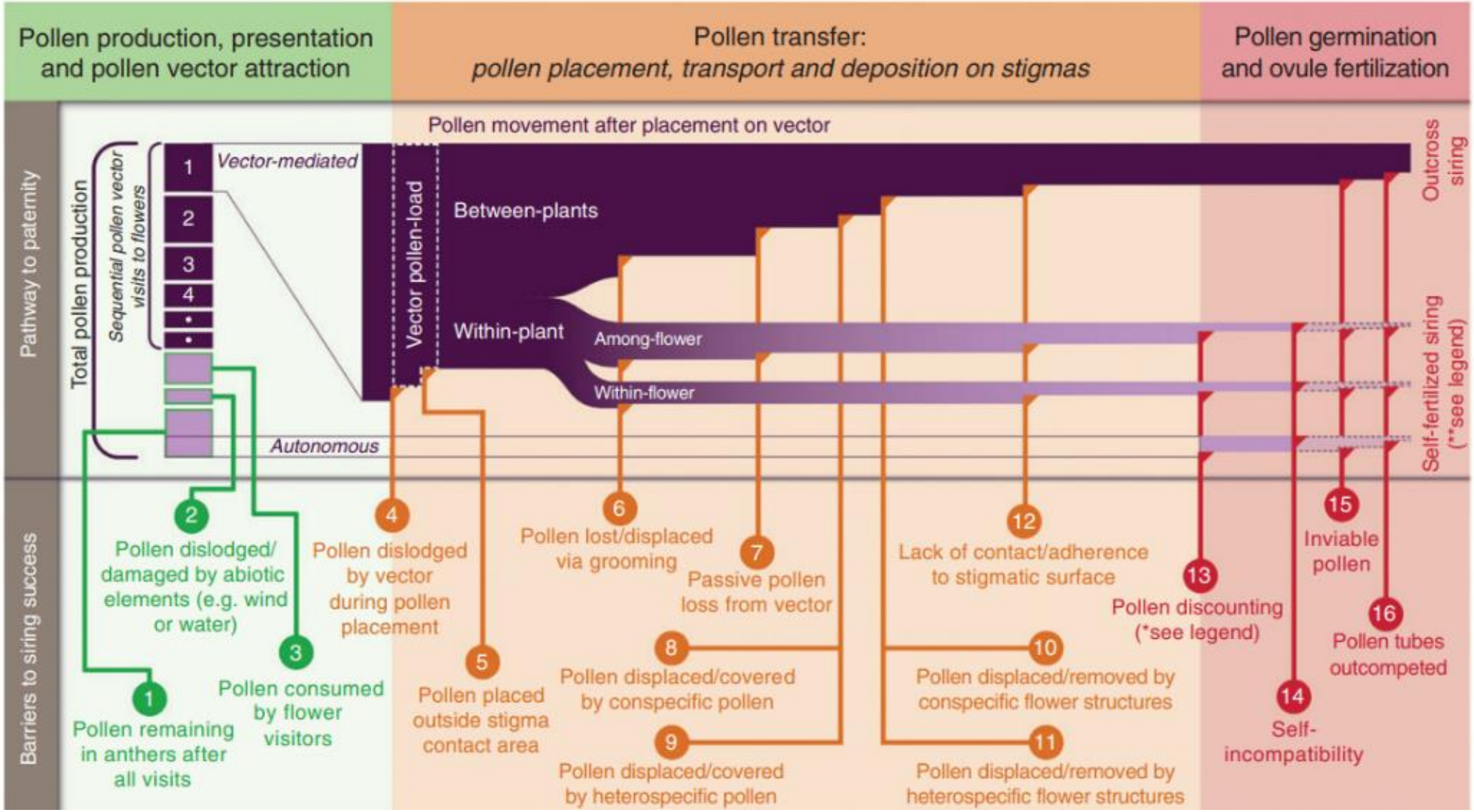
MALE versus FEMALE FITNESS

POLLEN FATE

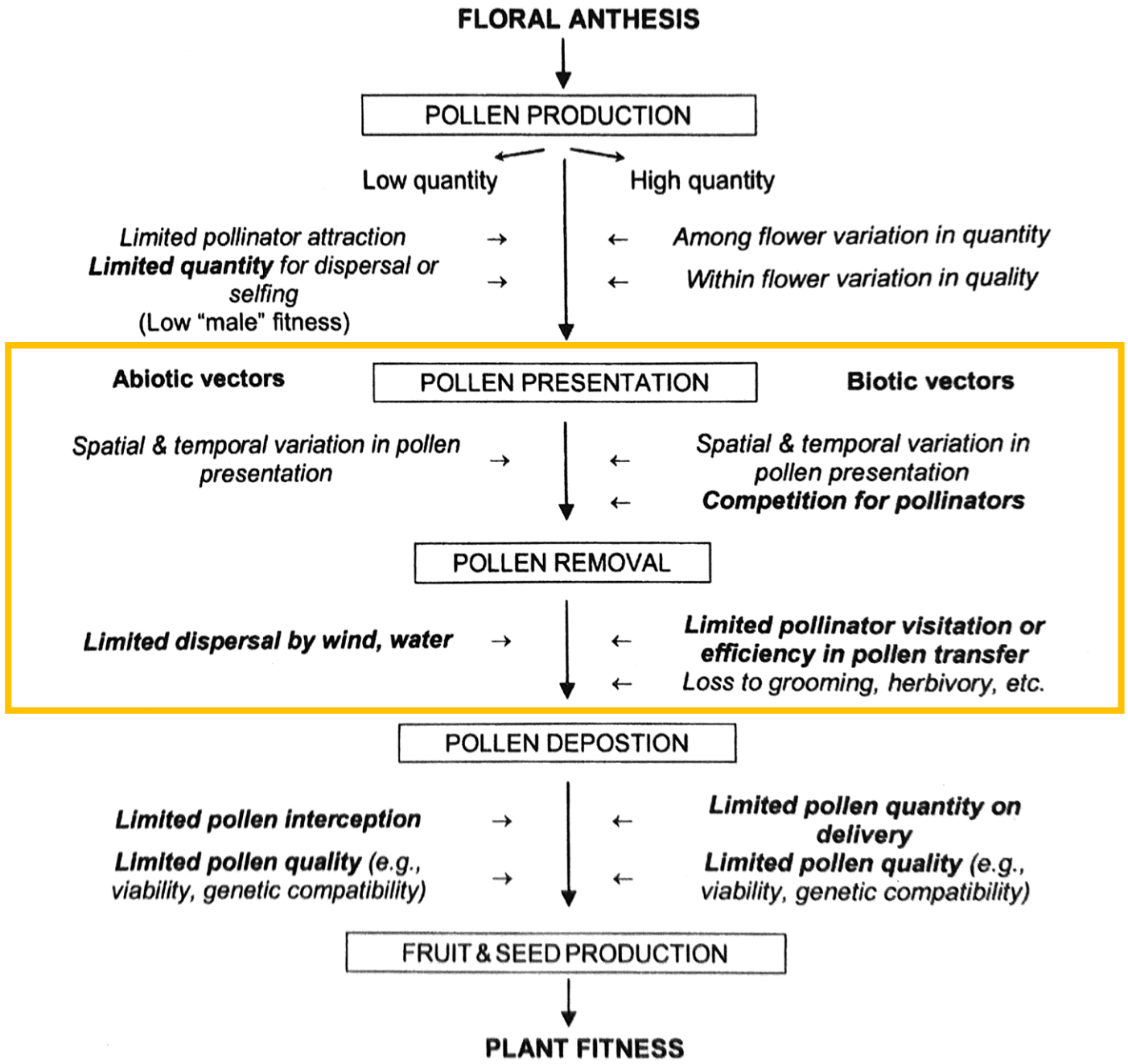
Inouye et al 1994



POLLEN FATE



Minnaar et al. 2019



Dafni et al. 2005

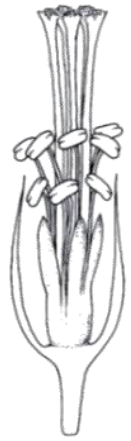
… HANDS-ON!

EXPERIMENT

Observation of floral morphs in field samples

OBSERVE FIELD SAMPLES

CHARACTERIZE FLORAL MORPHS from population collected in the invaded range of the Mediterranean basin in TRANSECTS across the population



Methods for pollen dispersal

Measuring pollen transfer among floral positions or between individual plants:

- **POLLEN ANALOGUES** – fluorescent powdered dyes (e.g., Black Ray©, Day Glo©, Radian Colour©) or ordinary dye powders (methylene blue, carmine acetate, neutral red, Evans blue, Bismarck brown) – replacement of the pollen by the powdered dyes
- **HISTOCHEMICAL STAINS** – 1-2 ul injected into each of the anther sacs to color-label the pollen (fast green 1%, gentian violet, neutral red 1%, Rhodamine B 0.2%) – staining the pollen grains

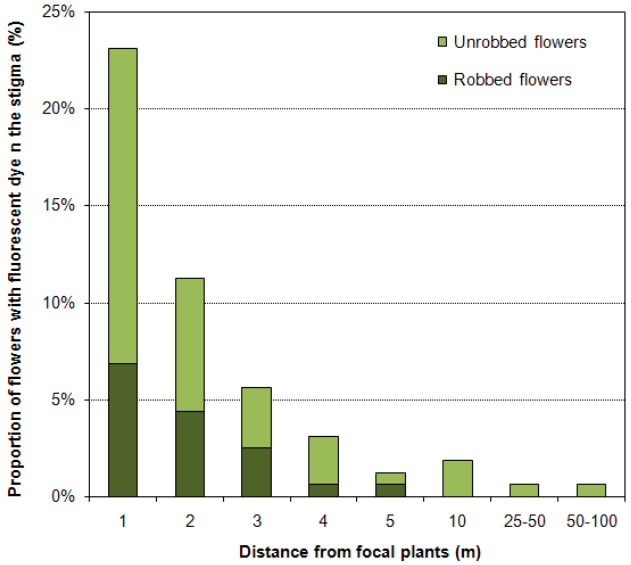
Methods for pollen dispersal

Impact of nectar robbing

Does the nectar robbing affect the reproductive outcome of this species?

Pollen analogues – fluorescent powdered dyes to assess male fitness

PLANT FITNESS



NECTAR AVAILABILITY

Table 4.3.1 Nectar available in robbed and non robbed flowers of *Polygala vayredae* in Colldecarrera population during spring of 2007.

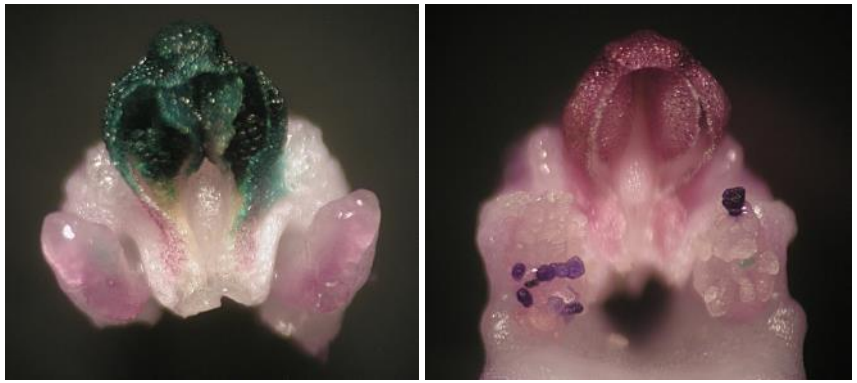
Treatment	n	Volume (µl)	Nectar concentration (%)	Sugar amount (mg)	Proportion rewardless flowers (%)
Robbed flowers	95	0.34 ± 0.772	70.2 ± 19.99	0.15 ± 0.266	44.2
Non robbed flowers	20	0.67 ± 0.597	71.5 ± 23.41	0.33 ± 0.322	15.0
Comparison test		T = 1,593.5***	t = 0.24 *n.s.*	T = 1,552.0**	z = 2.18*

Table 4.3.2 Fruit set, seed ovule ratio and seed weight in open pollinated flowers of *Polygala vayredae* subjected and not subjected to nectar robbing.

Treatment	n	Fruit set (%)	Seed ovule ratio (%)	Seed weight (mg)
Robbed flowers	200	15.5[a]	12.3[a]	8.23 ± 1.425
Non robbed flowers	200	25.0[b]	18.8[b]	7.86 ± 1.099
Control	100	26.0[b]	17.5[b]	8.27 ± 1.396
Comparison test		χ^2 = 6.94*	χ^2 = 23.39***	F = 1.83 *n.s.*

Castro et al. 2008

Methods for pollen dispersal



Pollen exchange (pollen labelling experiment)

CxC + DxD vs. CxD + DxC
minimum estimate of hexaploid production: 14%
(without selfing:62%)

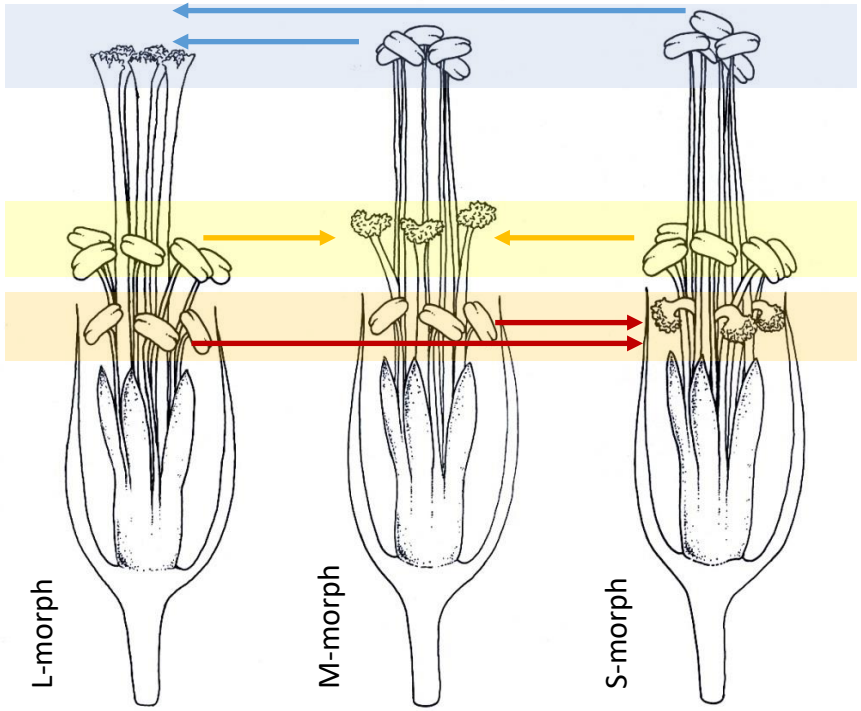
Histochemical stains – 1-2 ul injected into each pollinarium to color-label pollinia and track labeled masses of pollen

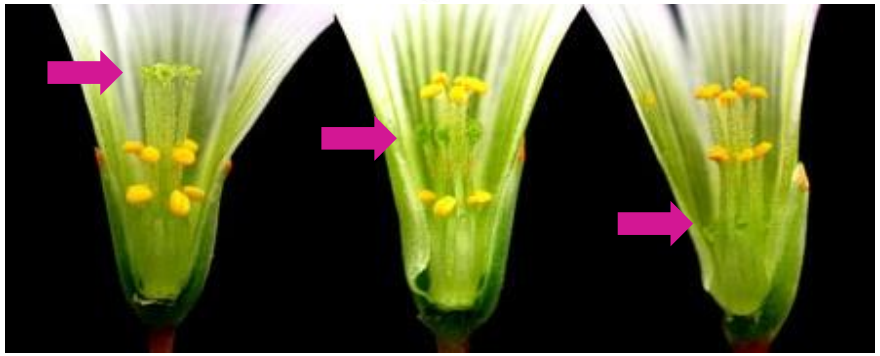
POLLEN DISPERSAL

EXPLORING PATTERNS OF POLLEN DISPERSAL IN *Oxalis pes-caprae*

… HANDS-ON!

Oxalis pes-caprae L.





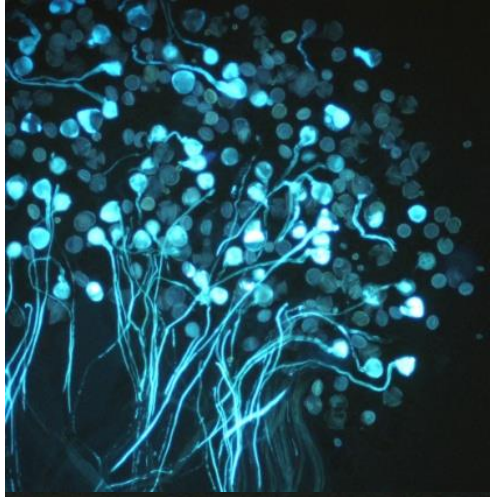
TRISTYLOUS SPECIES

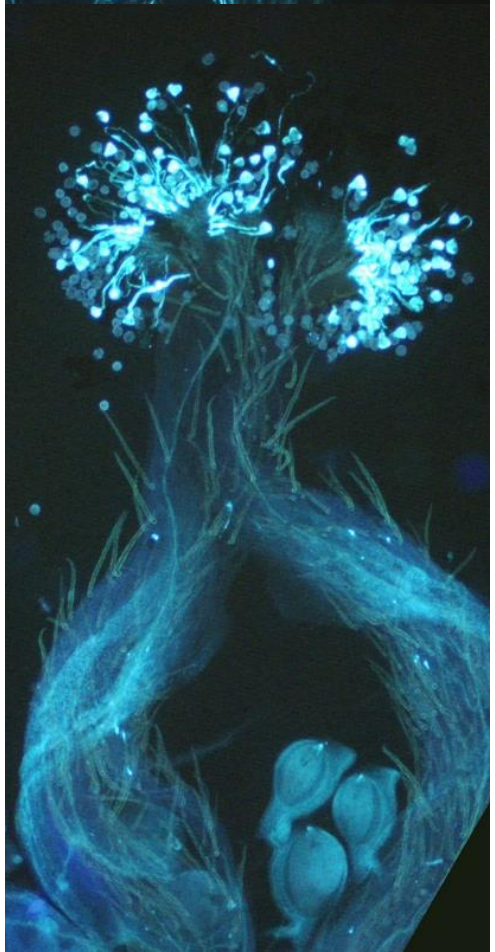
Populations with three floral morphs: long-styled, mid-styled and short-styled in even proportions – frequency dependent selection

TRIMORPHIC INCOMPATIBILITY SYSTEM

Recognition and blocking of self and intra-morph pollen

Ornduff R. 1987. Annals of Missouri Botanical Garden 74:79-84.





… HANDS-ON!

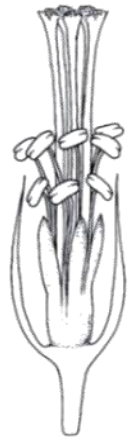
Oxalis pes-caprae L.

South Africa

L-morph

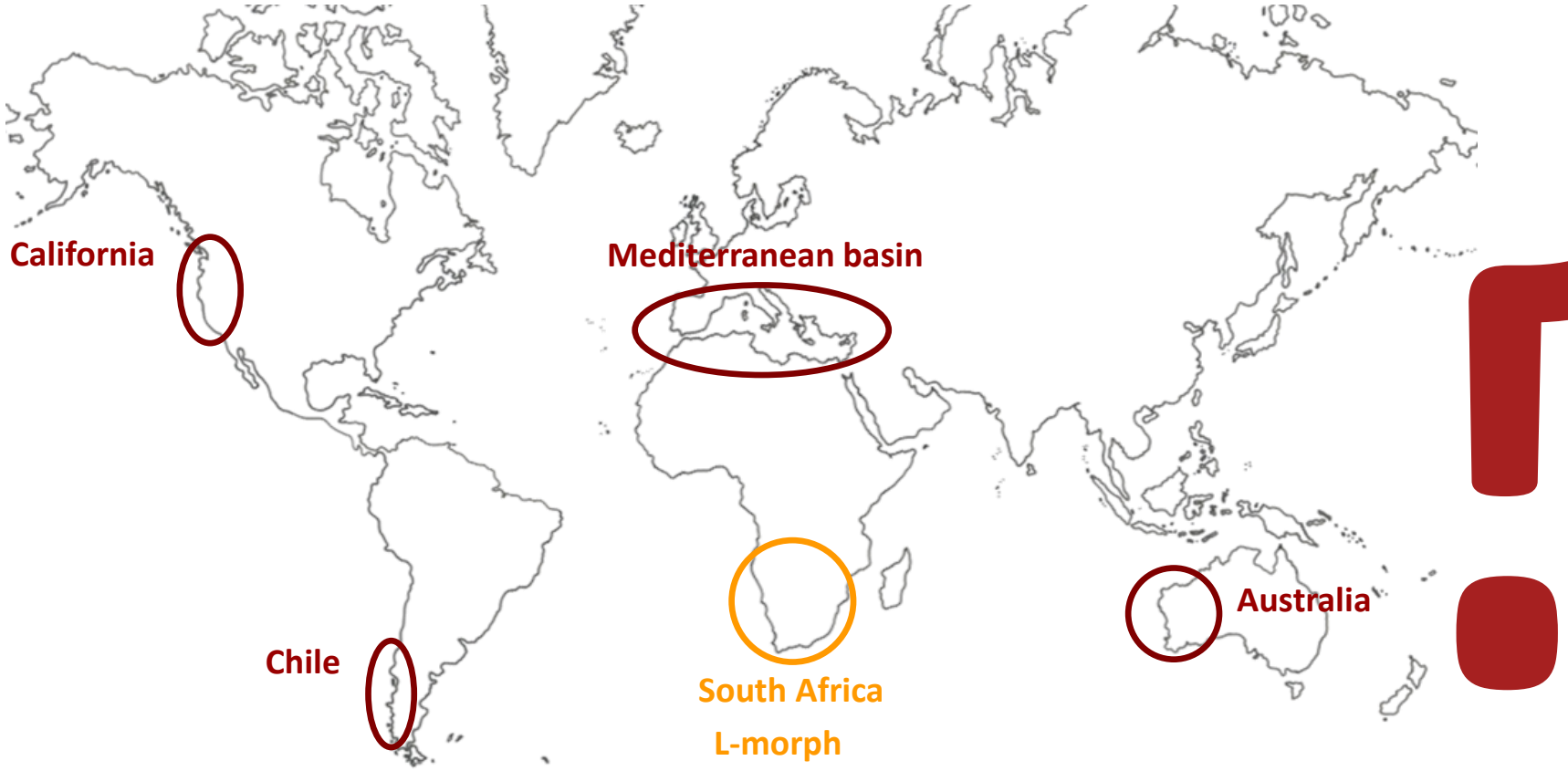
M-morph

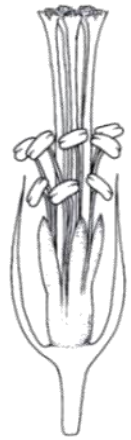
S-morph



… HANDS-ON!

Oxalis pes-caprae L.





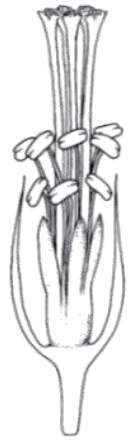
… HANDS-ON!

EXPERIMENT

Observation of floral morphs in field samples

OBSERVE FIELD SAMPLES

CHARACTERIZE FLORAL MORPHS from population collected in the invaded range of the Mediterranean basin in TRANSECTS across the population



… HANDS-ON!

EXPERIMENT

Observation of floral morphs in field samples

CHARACTERIZATION OF THE POPULATION

OBSERVATION AND DESCRIPTION of floral morphs in *Oxalis pes-caprae* invasive populations

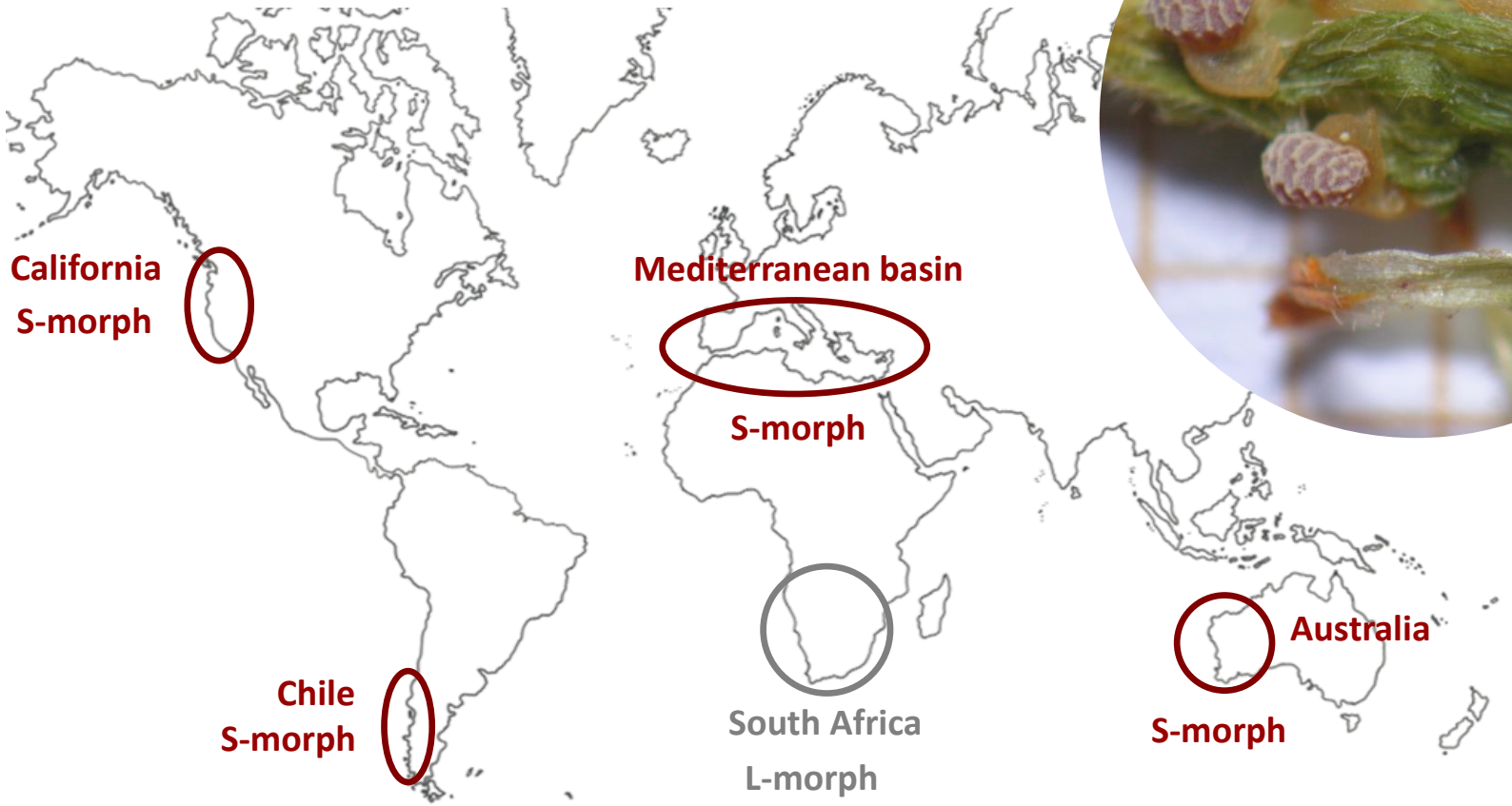
DERTEMINATION of morph frequencies in the populations

CALCULATION of the percentage of each morph & test for deviations from 1:1 proportions

… HANDS-ON!

DOMINANCE OF SS MORPH and observation of FRUIT AND SEED production

Oxalis pes-caprae L.



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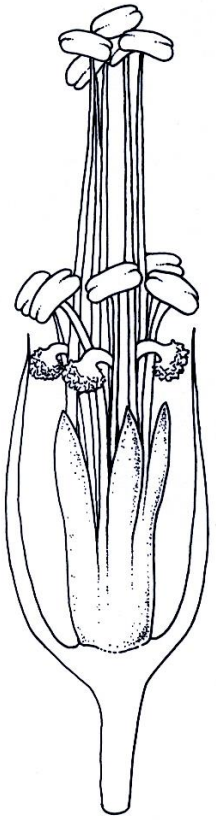
EXPERIMENT

Assess pollen flow patterns from mid- and long-anther levels

SS

Short-styled floral morph



How efficient is each ANTHER LEVEL in contribution to POLLINATION of SS morph?

EXPERIMENT

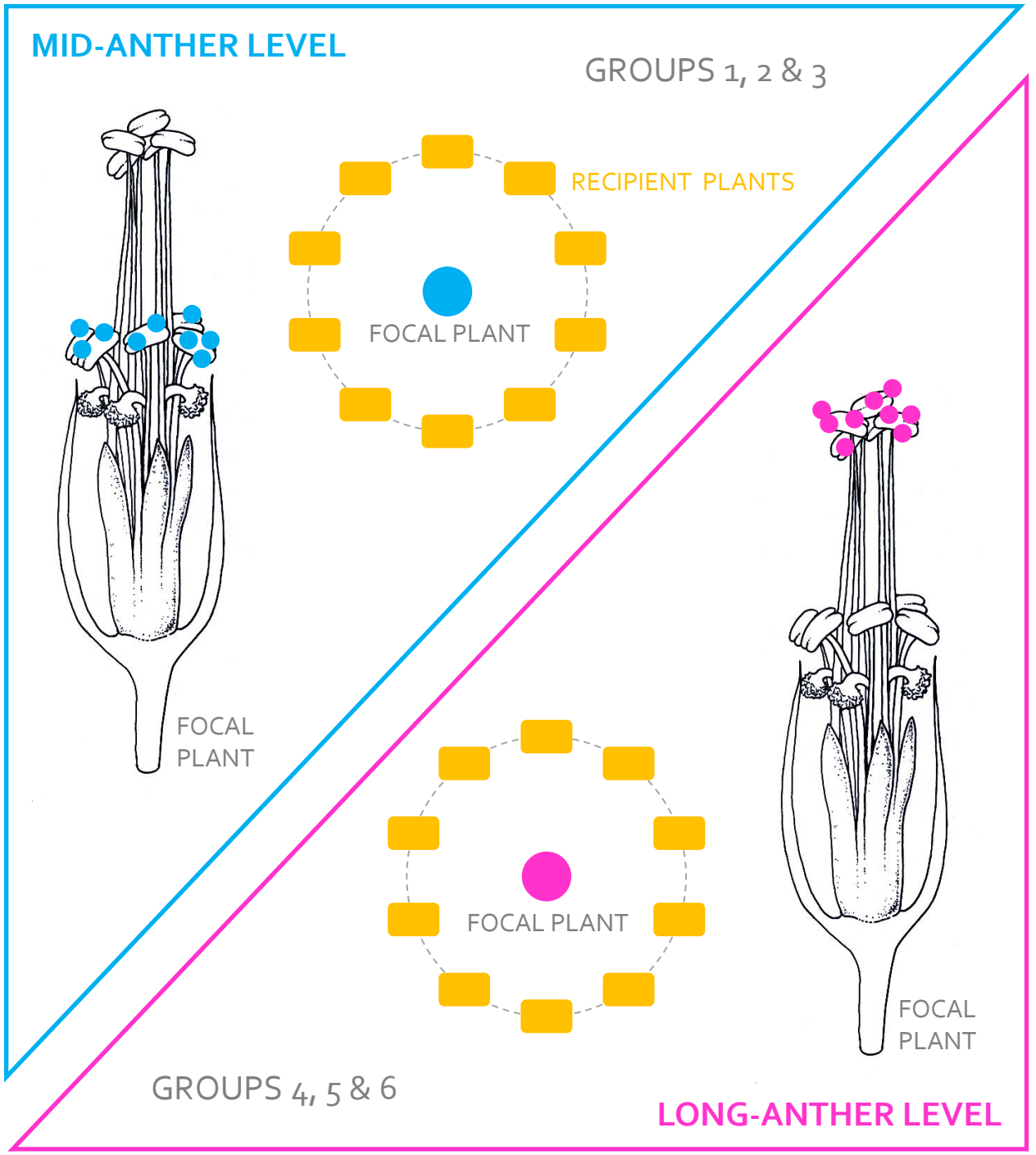
Assess pollen flow patterns from mid- and long-anther levels

- Build ARTIFICIAL ARRAYS of inflorescences
- Pollen analogues – FLUORESCENT POWDERED DYES
- Two DIFFERENT COLOURS – one per anther level

… HANDS-ON!

EXPERIMENT

Assess pollen flow patterns from mid- and long-anther levels

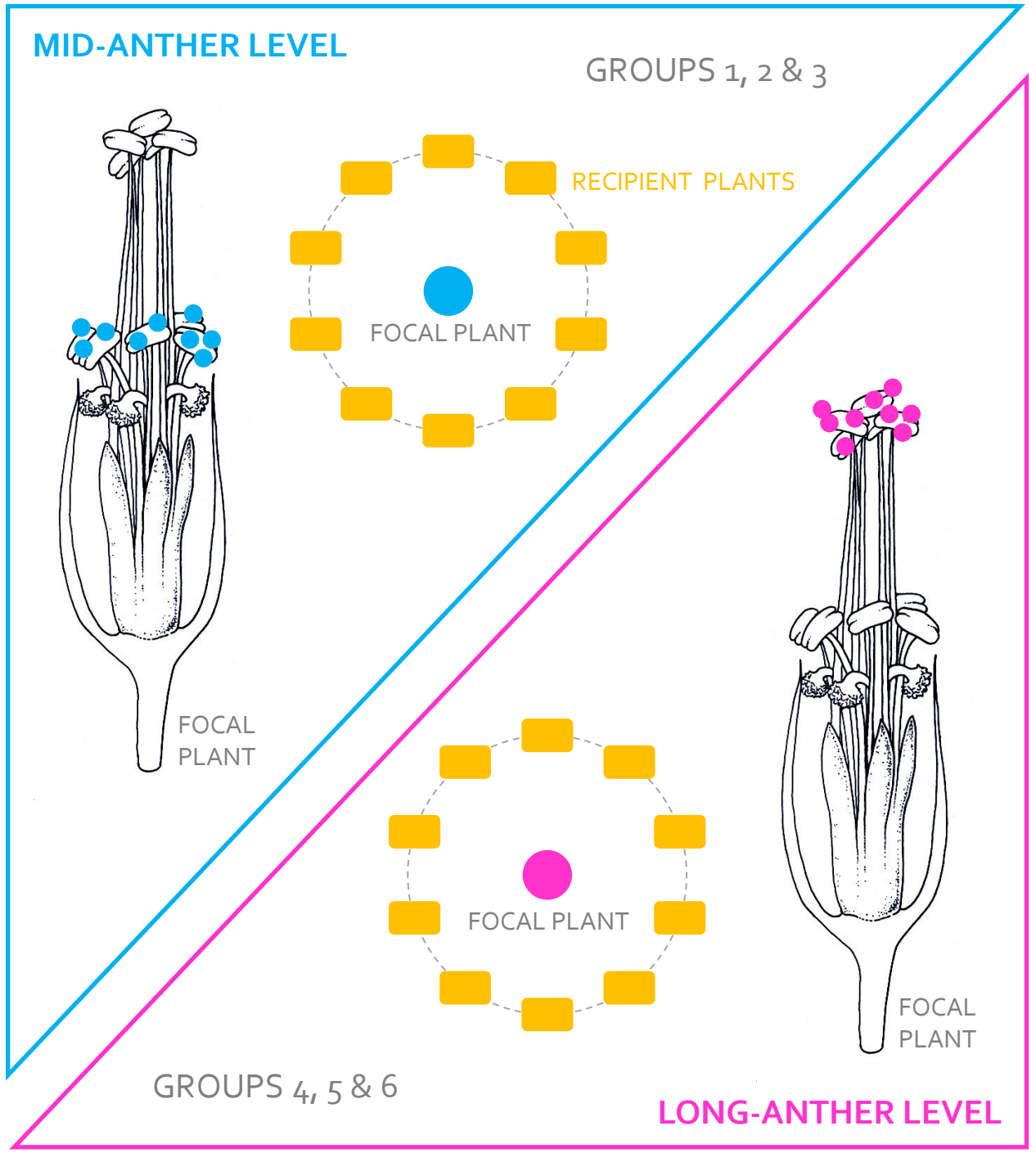


… HANDS-ON!

EXPERIMENT

Assess pollen flow patterns from mid- and long-anther levels

- Work in GROUPS OF 3 OR 4 – total 6 groups, each with one replicate
- Prepare the EXPERIMENT – three replicates per anther level



… HANDS-ON!

EXPERIMENT

Assess pollen flow patterns from mid- and long-anther levels

- Work in GROUPS OF 3 OR 4 – total 6 groups, each with one replicate
- Prepare the EXPERIMENT – three replicates per anther level
- The ARTIFICIAL ARRAY – 1 focal plant plus 10 recipient plants
- Expose to POLLINATORS for 24h & collect open flower for observation