

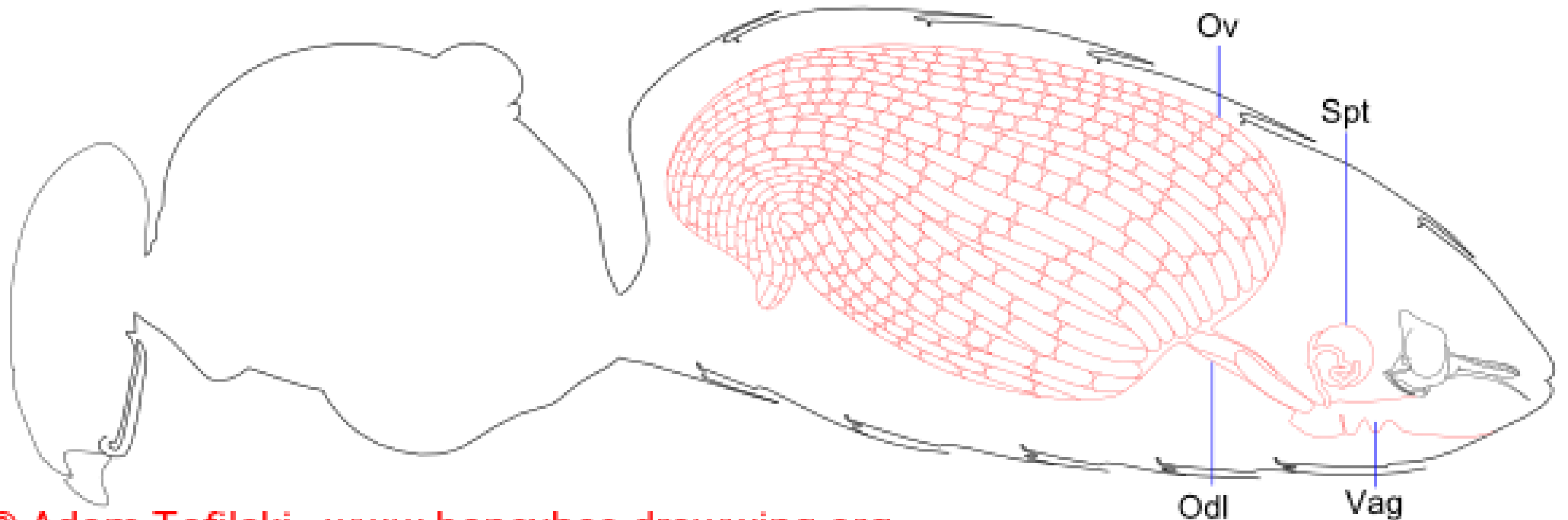
THEORETICAL INTRODUCTION TO INSTRUMENTAL INSEMINATION IN HONEY BEES (AND SOMETHING ON REPRODUCTIVE BIOLOGY)

Janez Prešern



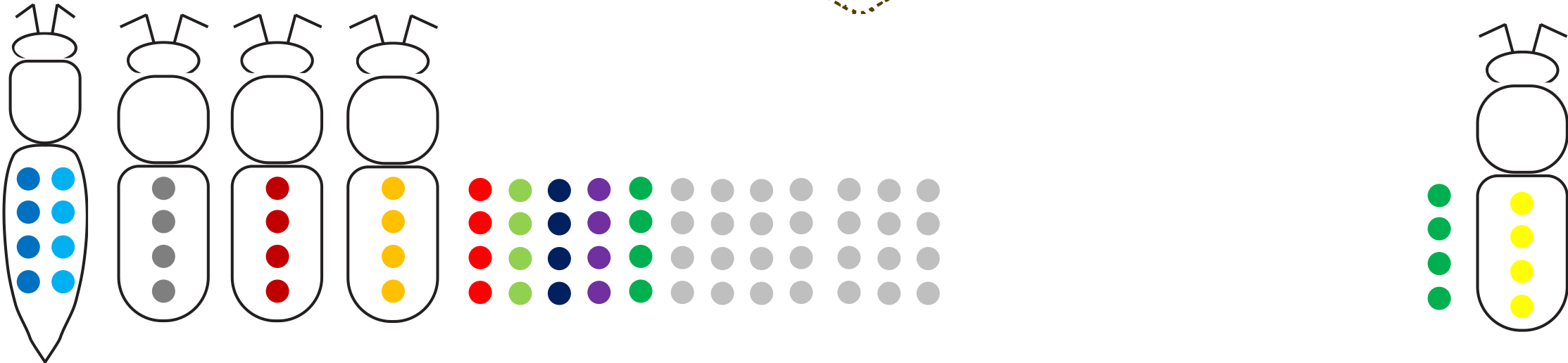
Reproductive biology

- Queen bee
 - Source of female gametes
 - Vector of male gametes



Reproductive biology

10 – 20 (77) *drones*

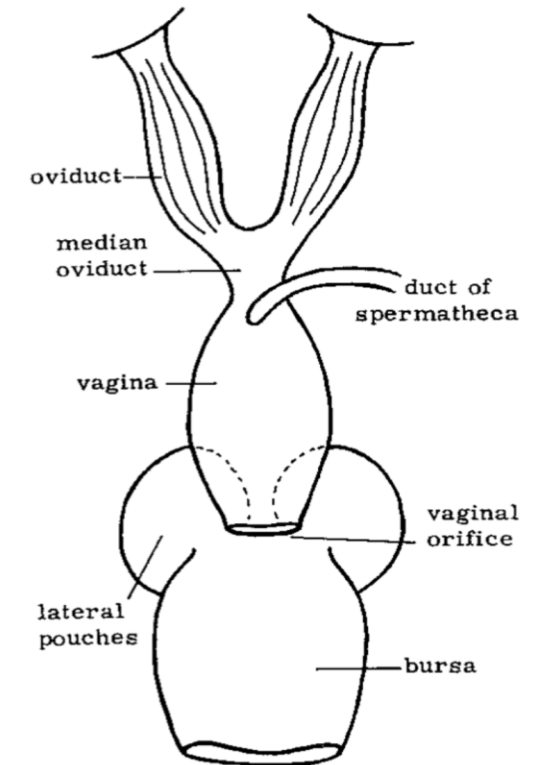
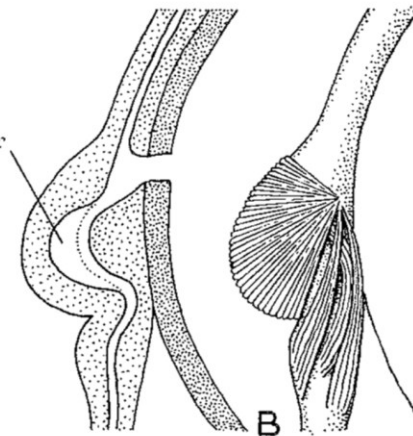
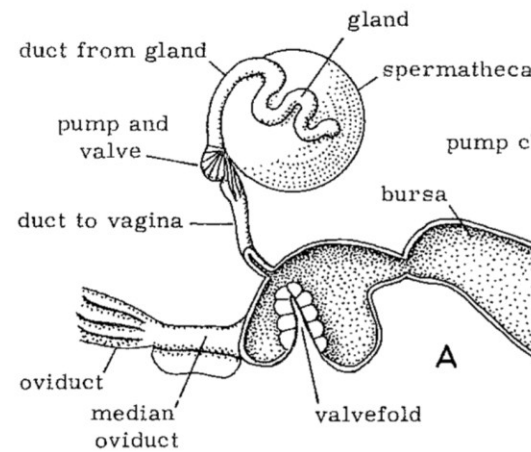


How to ensure mating control in polyandric species?

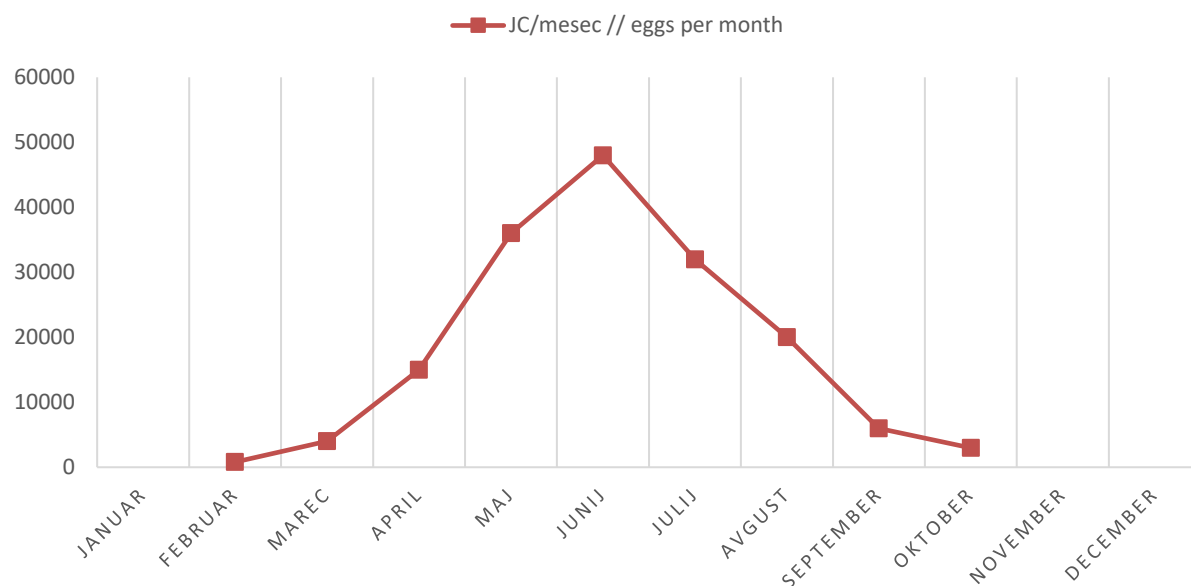
Reproductive biology

- $\sim 1 \mu\text{L}$ semena | sperm

volume of spermatheca: $\sim 0.6 \mu\text{L}$



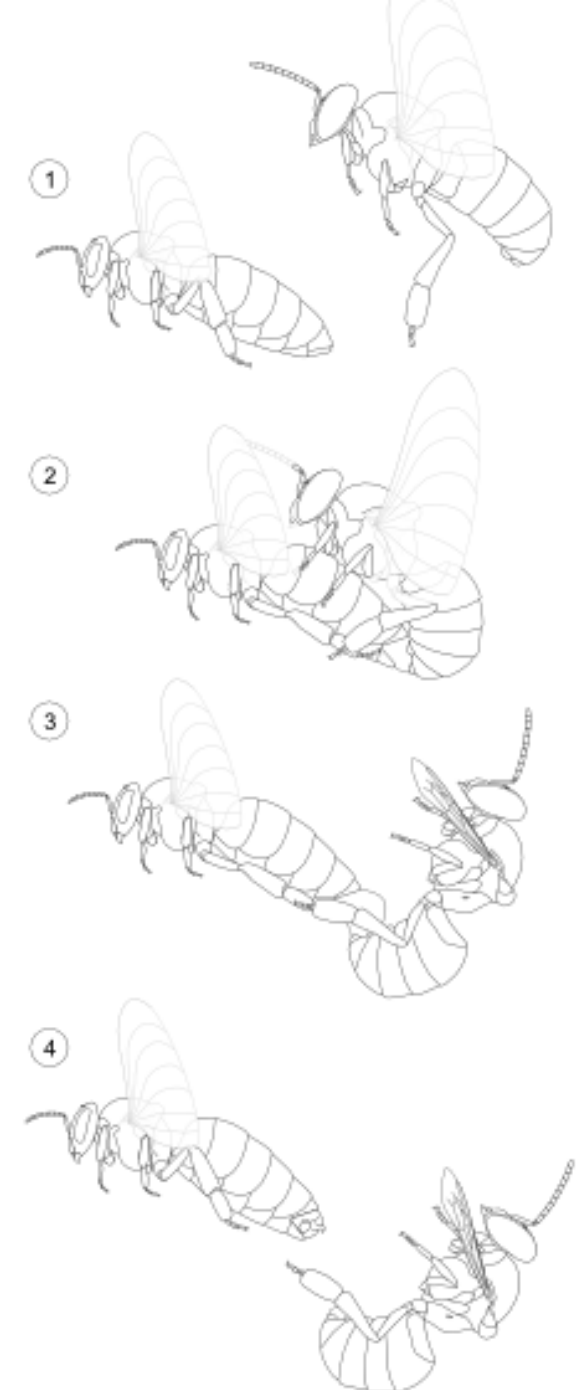
Reproductive biology



	eggs/day	eggs/month	brood (dm2)	N bees
15. Jan				17500
15. Feb	30	800	2	17500
15. Mar	140	4000	10	20000
15. Apr	500	15000	38	32000
15. May	1200	36000	90	56000
15. Jun	1600	48000	120	75000
15. Jul	1100	32000	80	65000
15. Aug	700	20000	50	50000
15. Sep	200	6000	15	35000
15. Oct	100	3000	8	25000
15. Nov				20000
15. Dec				18000

Reproductive biology

- Mating
 - in the air – nuptial flights
 - cca 6 days after hatching



Reproductive biology

- Trotišče | *Drone Congregation Area (DCA)*

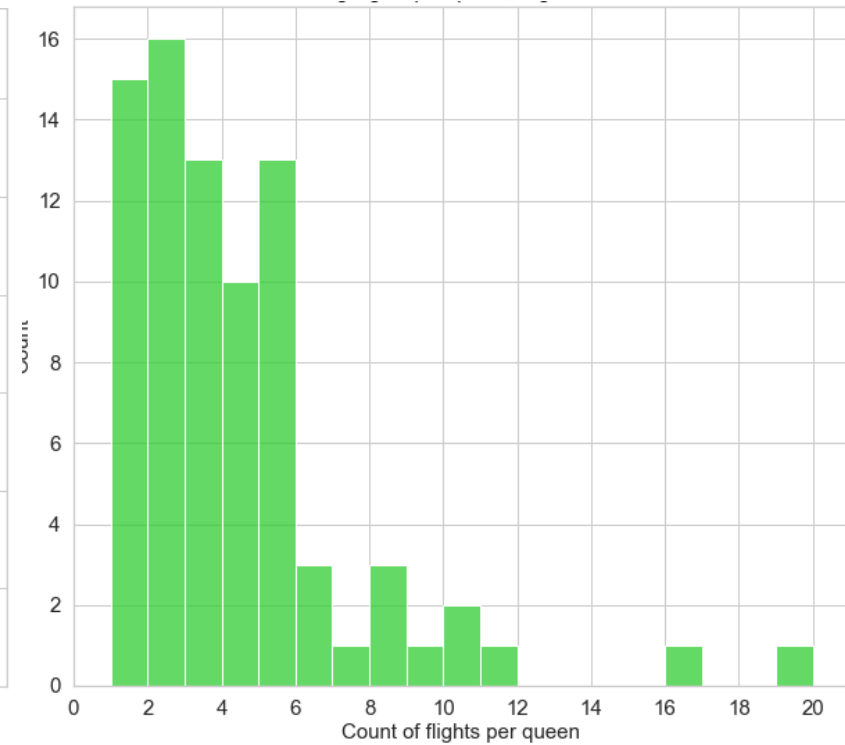
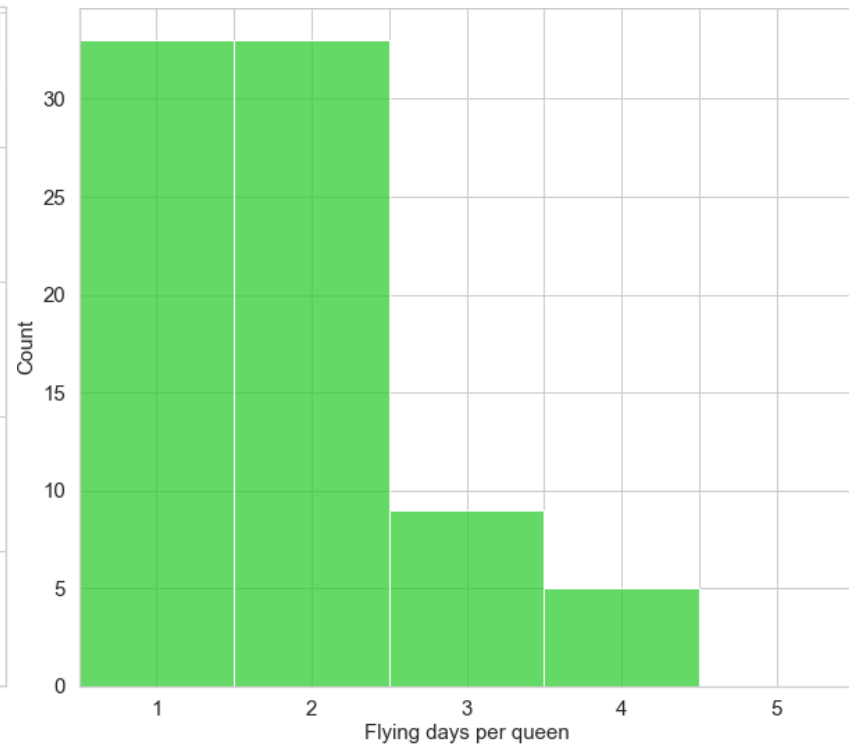
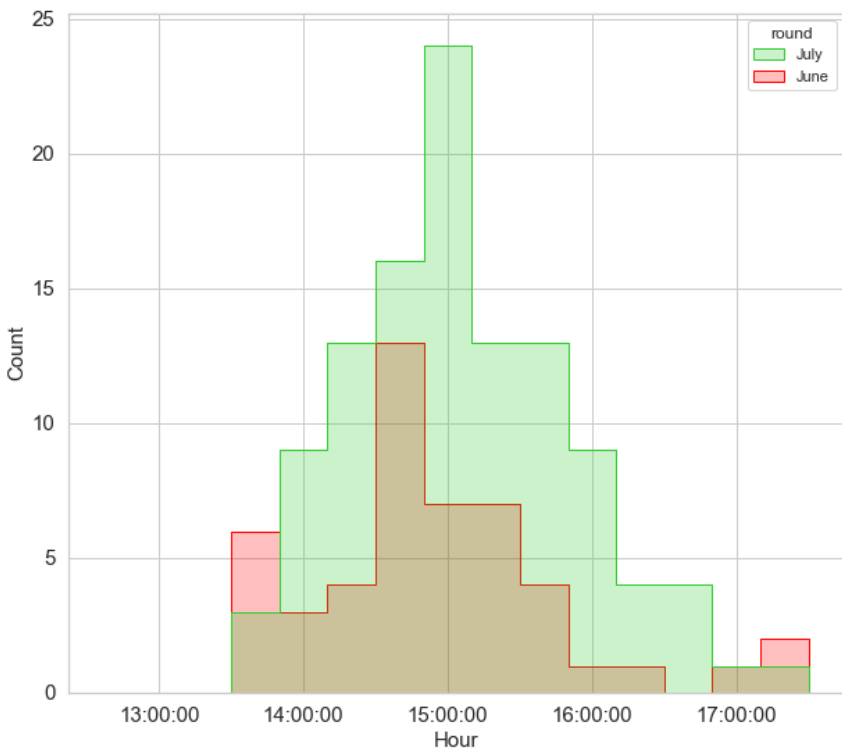


Reproductive biology

- Trotišče | *Drone Congregation Area (DCA)*



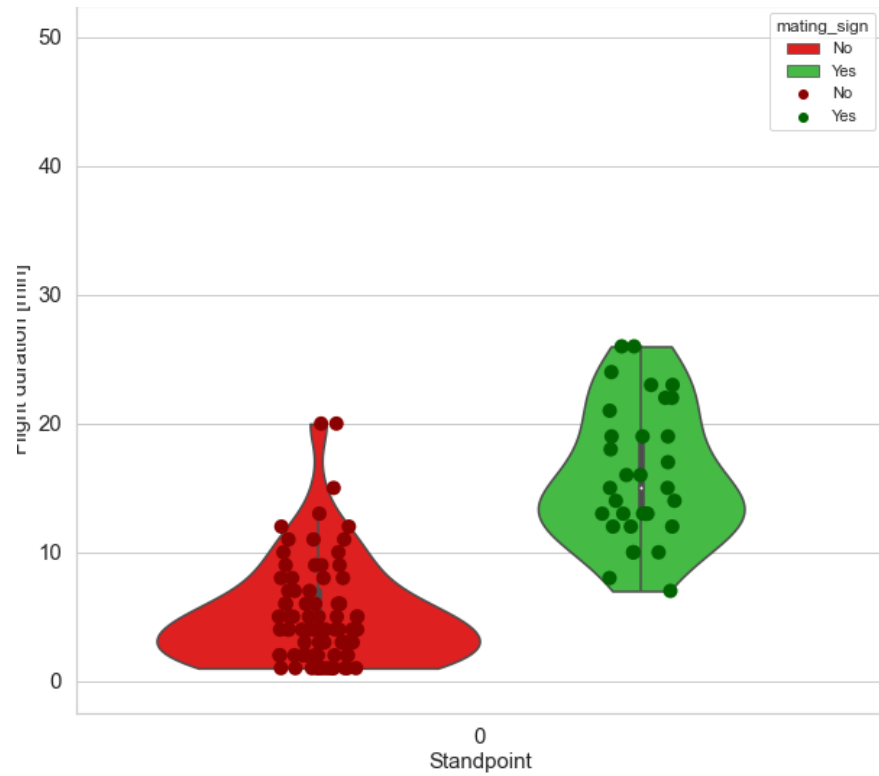
Reproductive biology



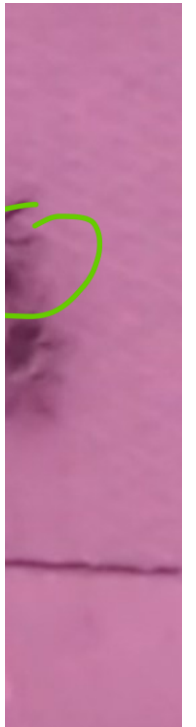
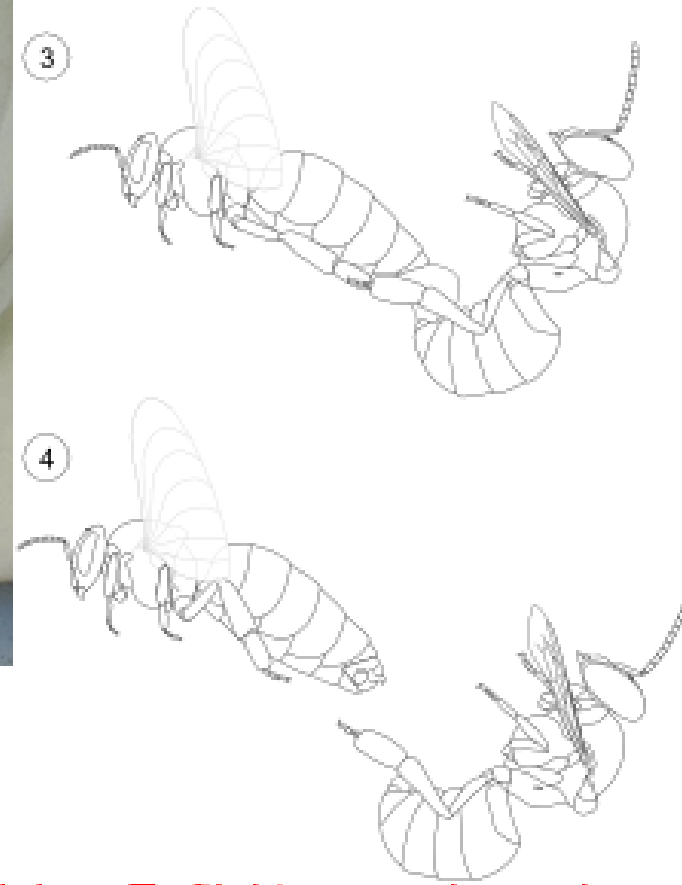




Reproductive biology

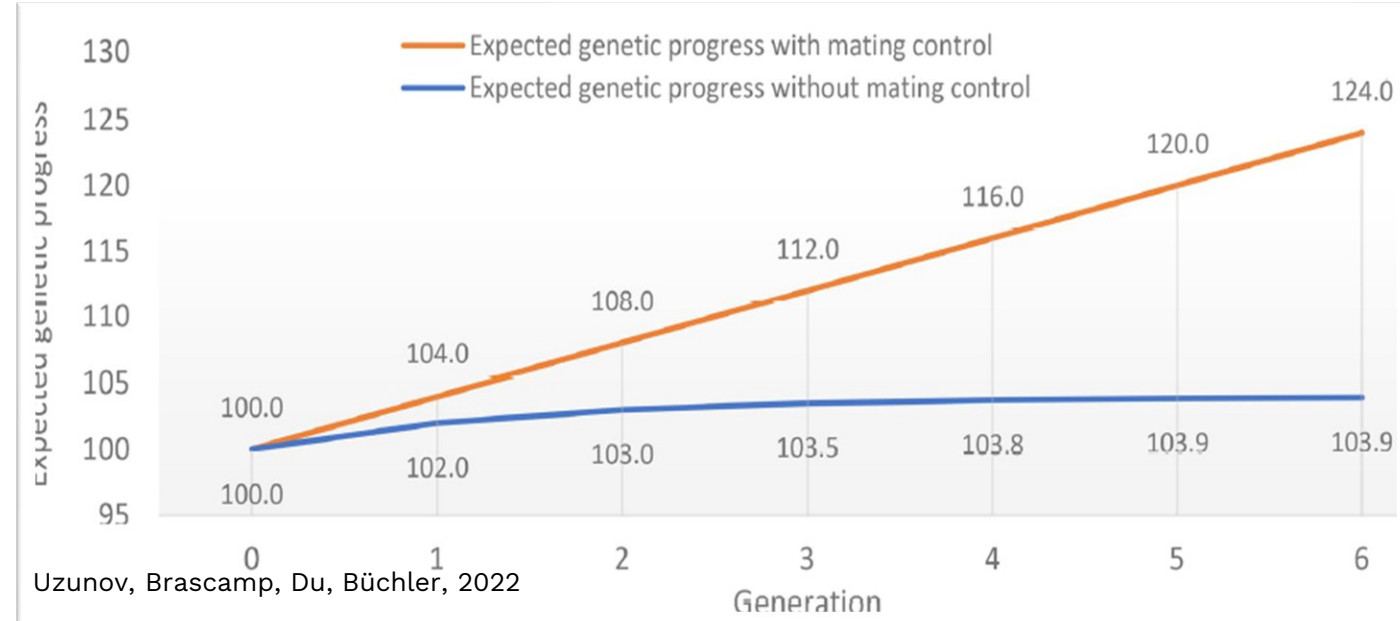
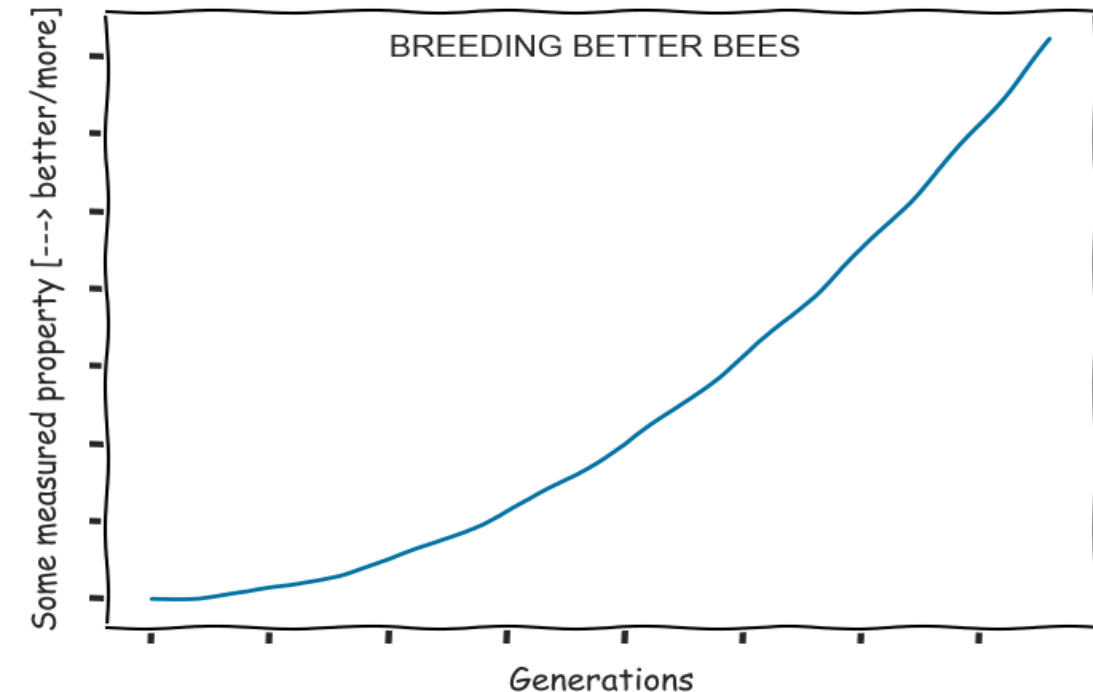


Reproductive biology



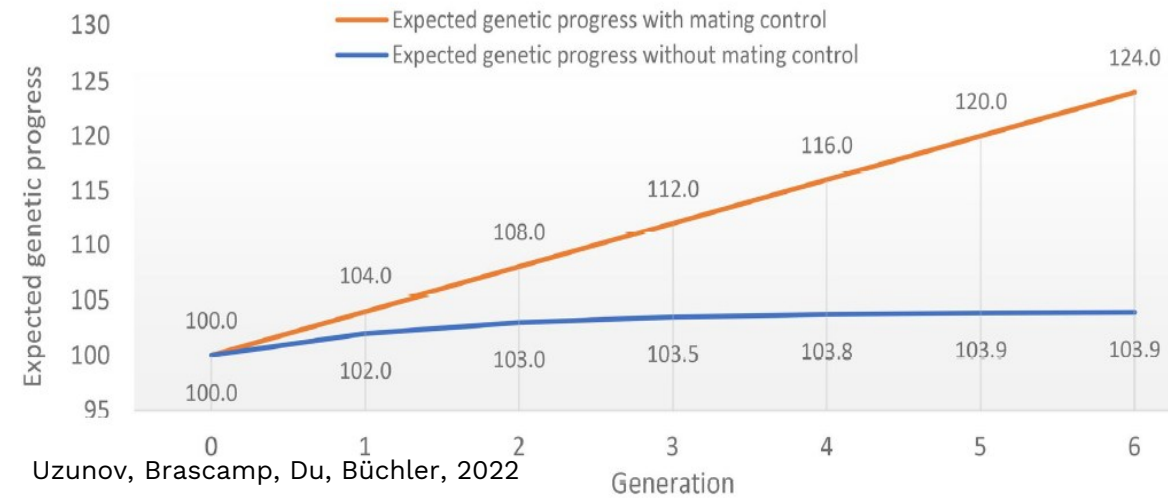
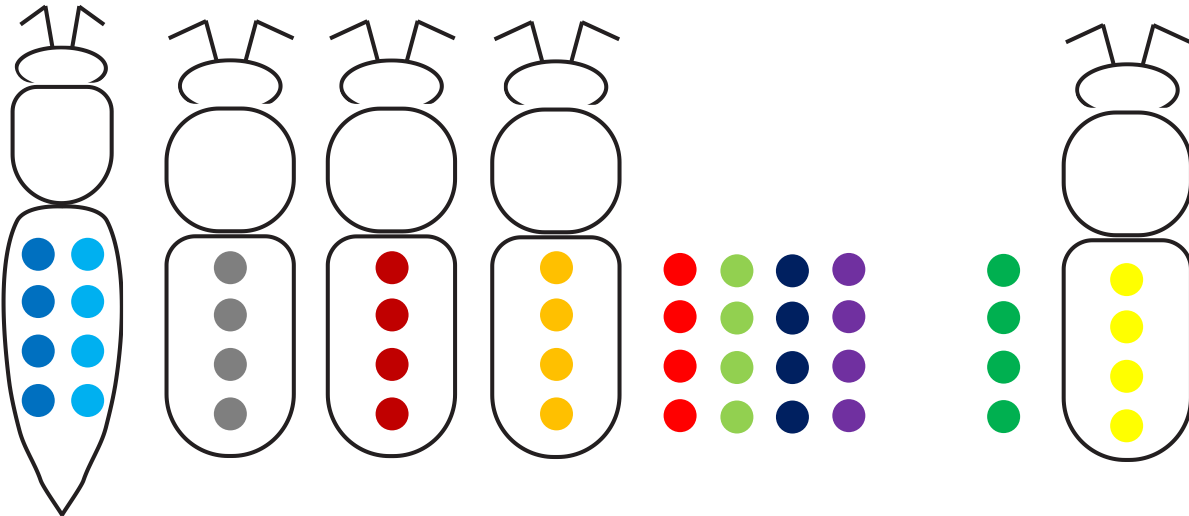
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Selection in apiculture : mating control importance



Reproductive biology

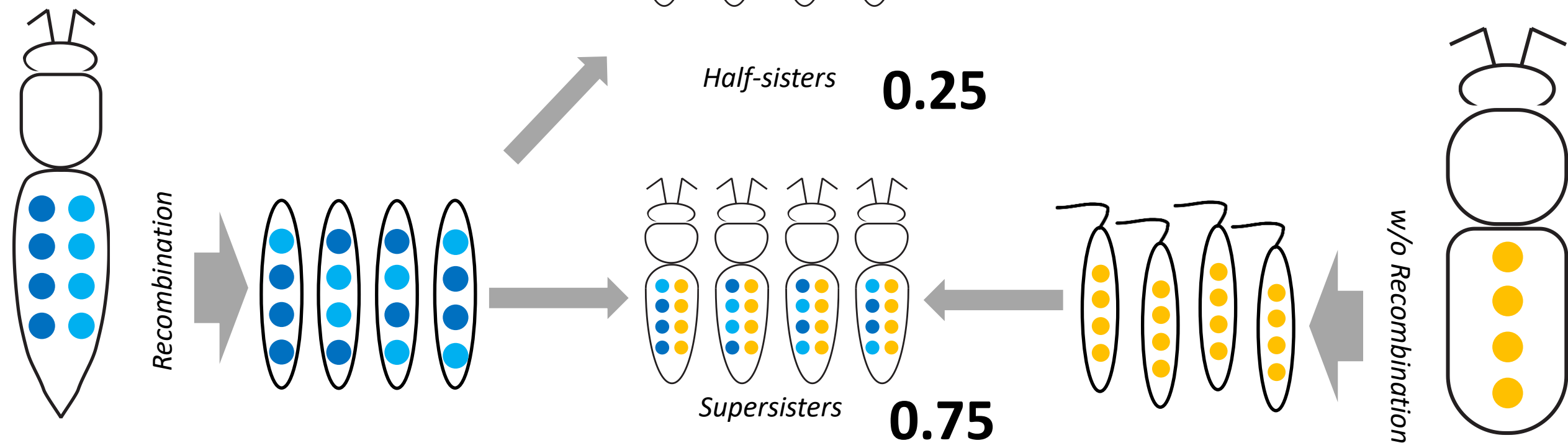
10 – 20 (77) *drones*



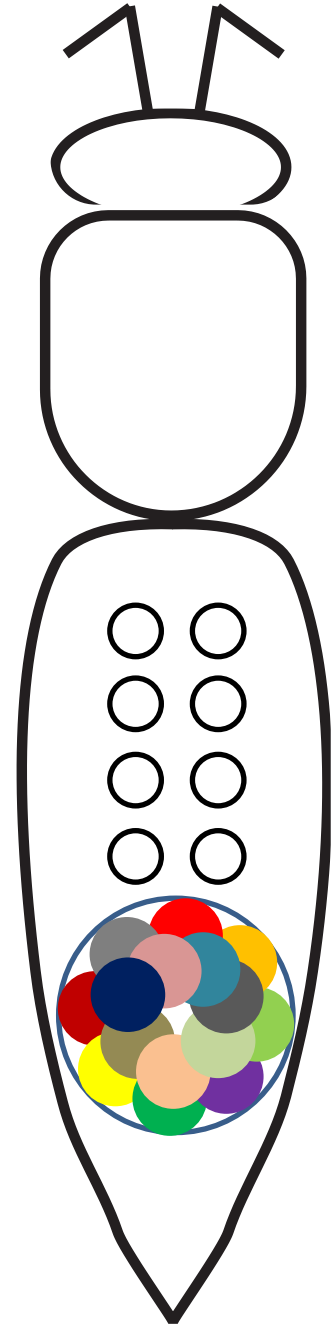
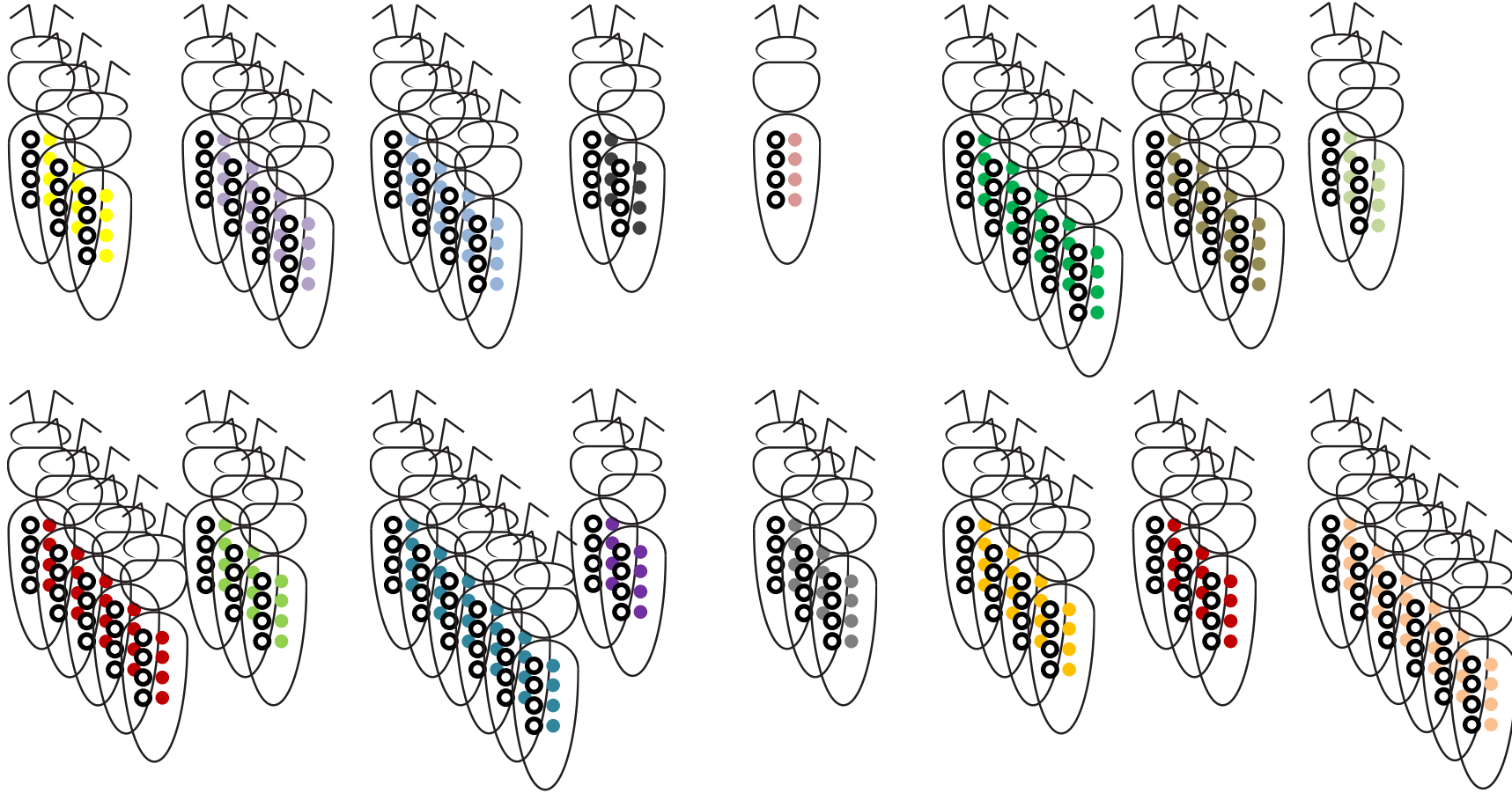
How to ensure mating control in polyandric species?

Open mating: kinship

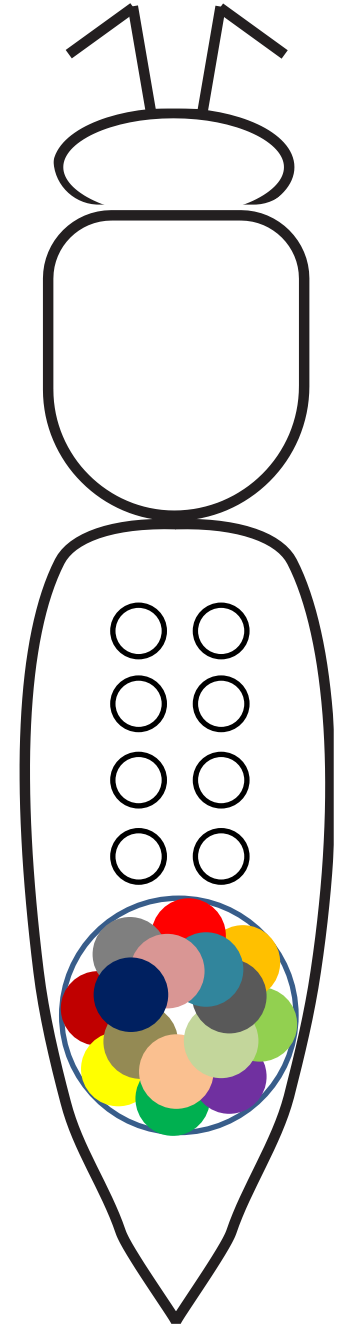
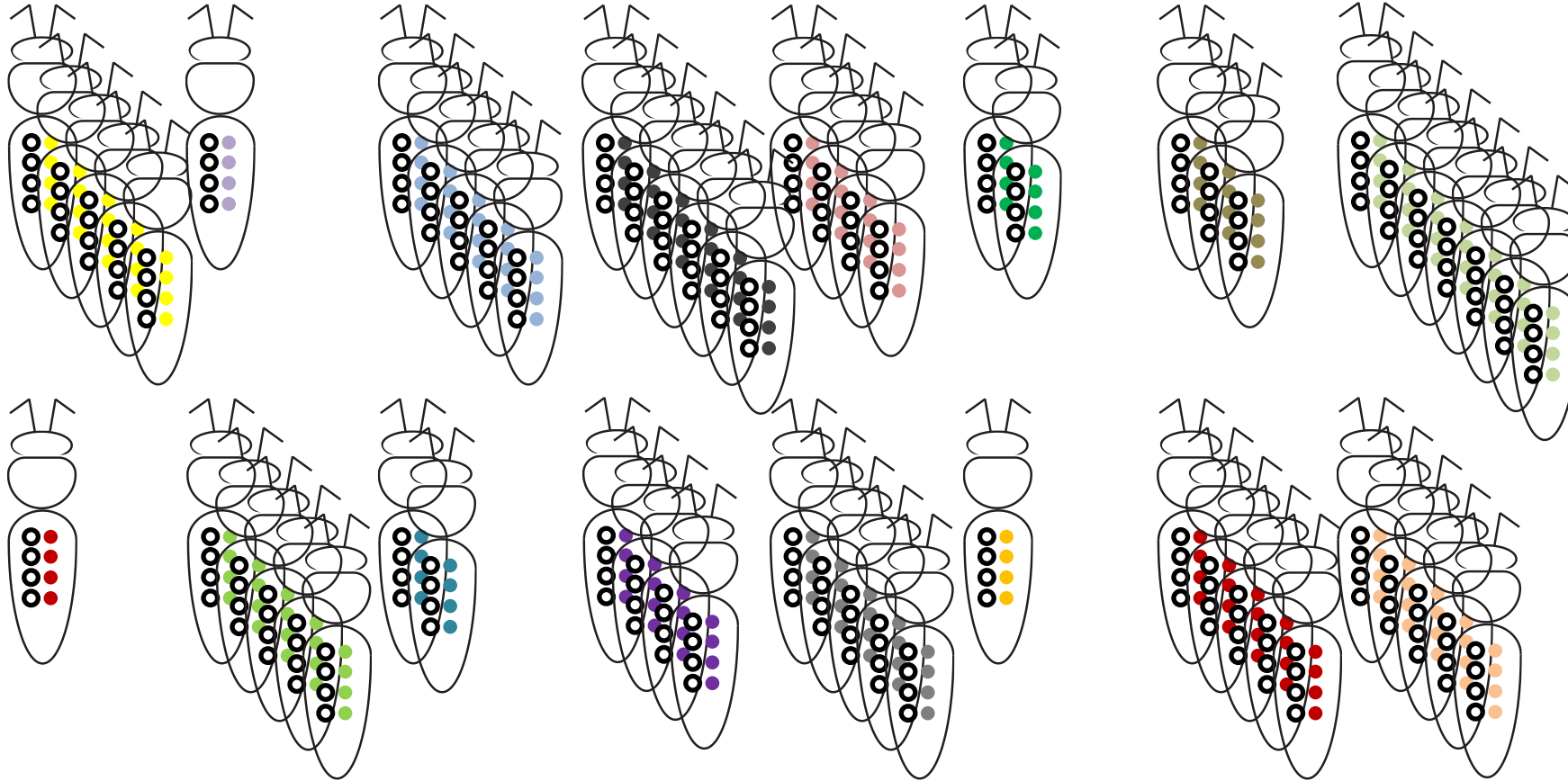
Open mating



Kinship : patriline

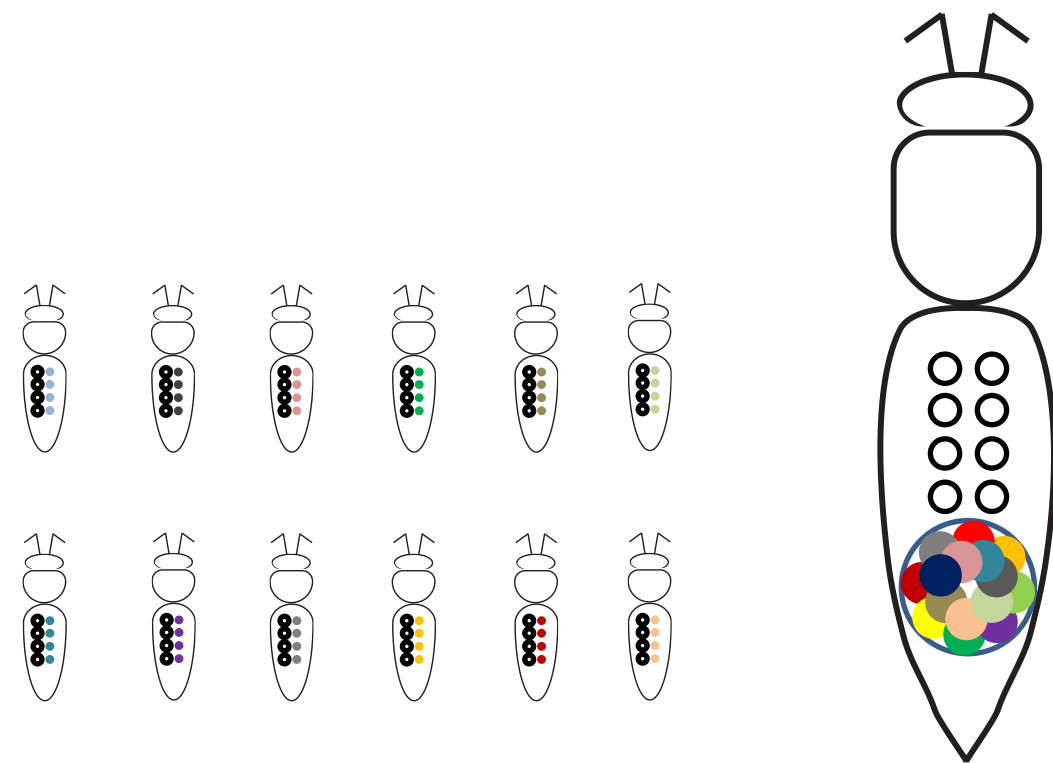


Kinship : patriline

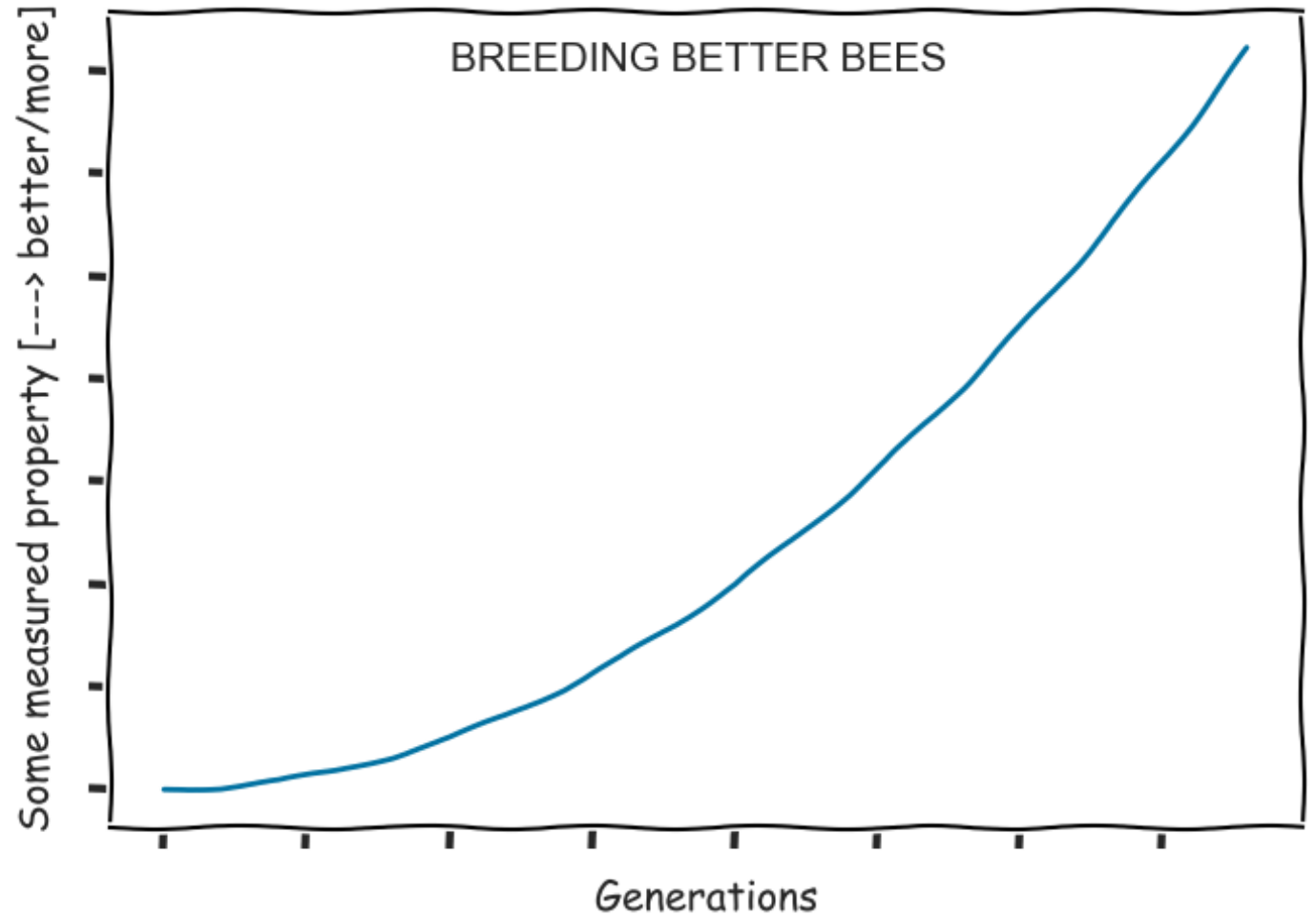
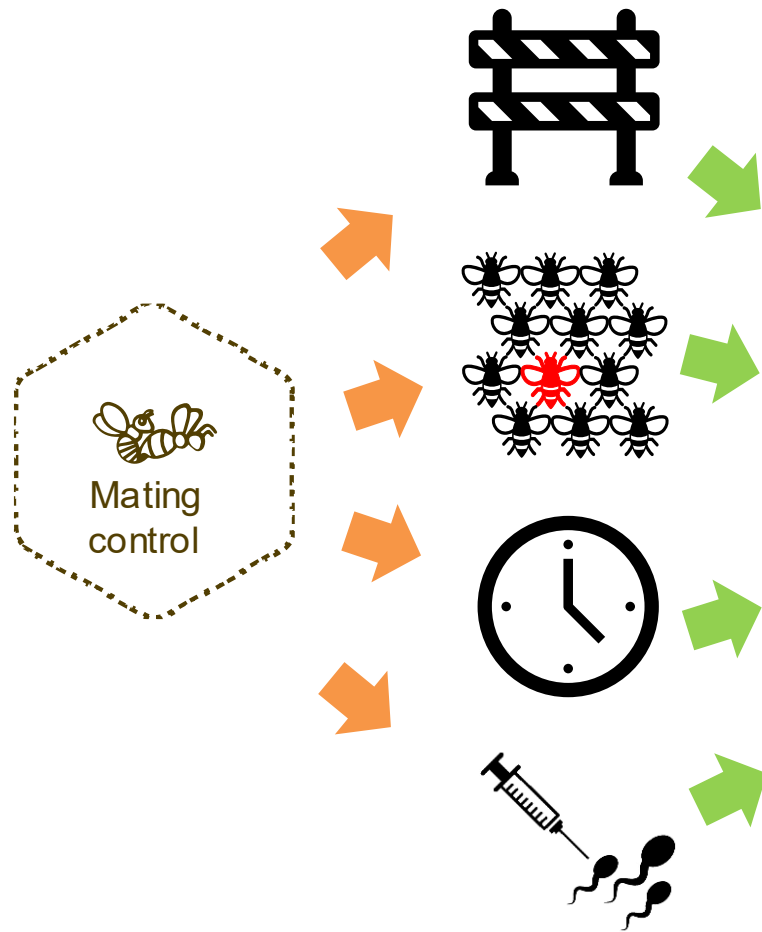


Kinship : *patrilines*

Patriline	Young bees	Water collectors	Nectar/pollen collectors	Scent bees	p
1	6	18	13	11	=0.067
2	3	2	3	8	=0.234
3	17	2	14	4	≤0.001
4	0	2	5	2	=0.166
5	3	1	2	9	=0.038
6	2	2	2	0	=0.568
7	1	11	9	13	=0.006
8	0	1	0	0	=0.236
9	7	3	2	0	=0.014
10	13	47	14	5	≤0.001
11	1	0	0	1	=0.604
12	13	1	1	0	≤0.001
13	6	13	8	10	=0.329
14	45	9	67	57	≤0.001
15	6	16	10	10	=0.130
16	13	7	5	21	=0.002



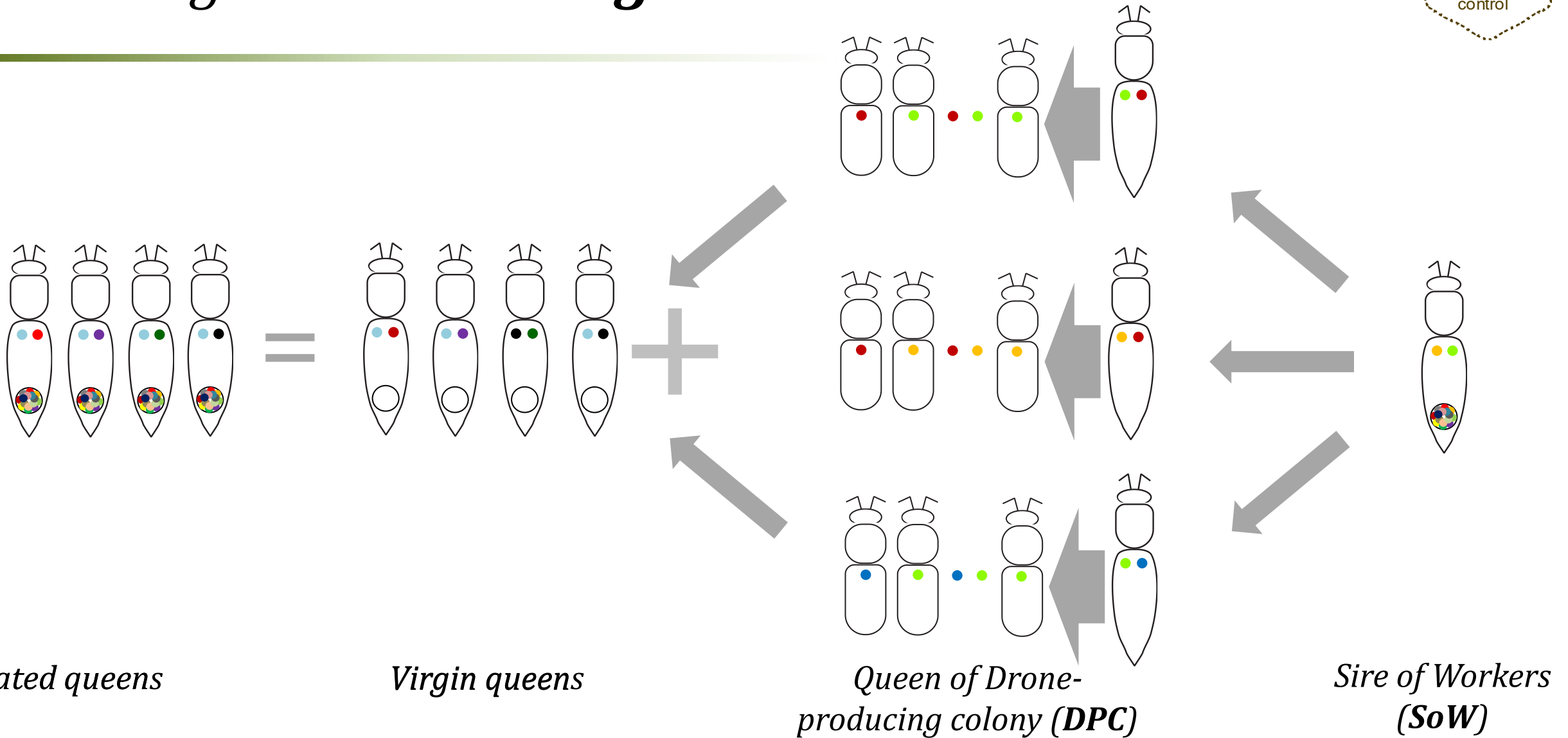
Mating control



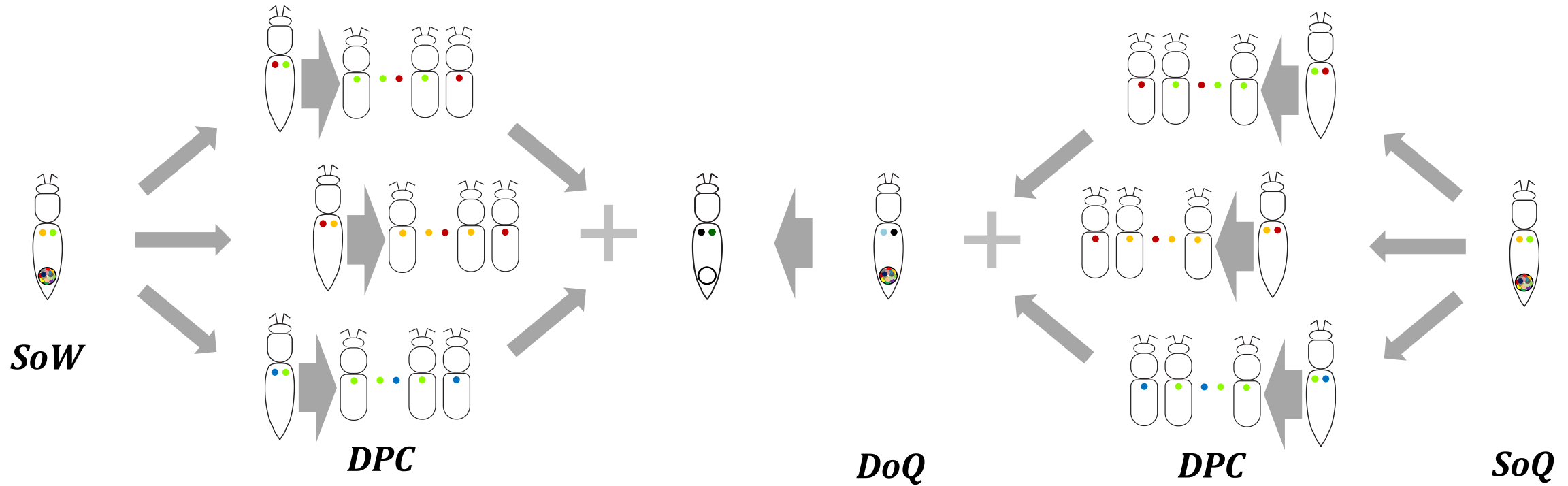
Mating control: mating station



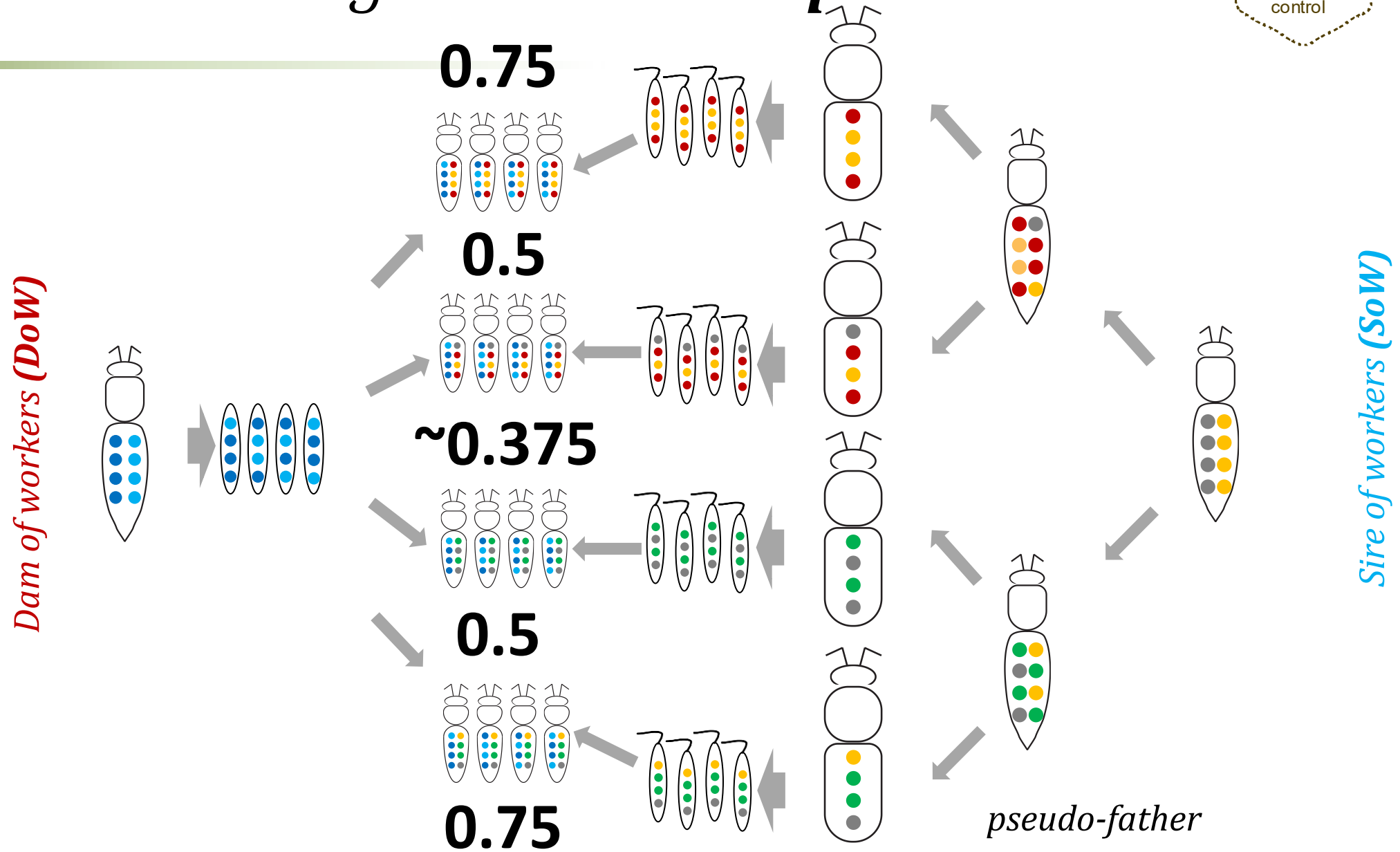
Mating control: mating station



Mating control: mating station: *father?*



Mating control: mating station: *kinship*

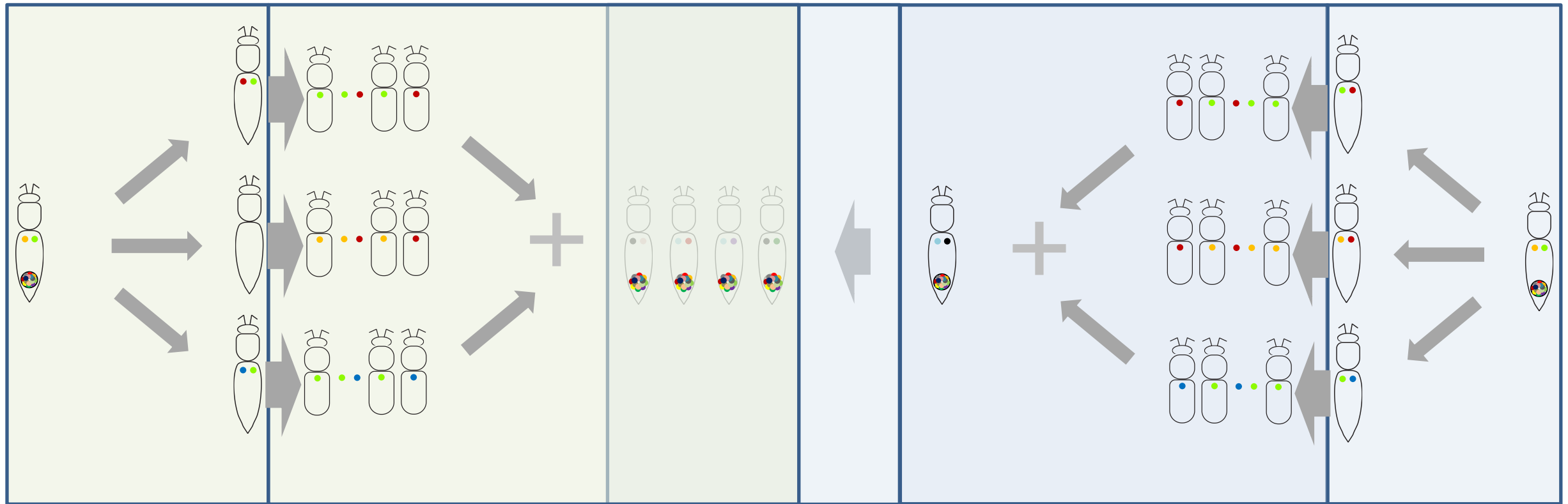


Mating control: mating station: *timeline*



Parents of workers

Parents of queens



Leto 1
Year 1

Leto 2
Year 2

Leto 3
Year 3

Leto 2
Year 2

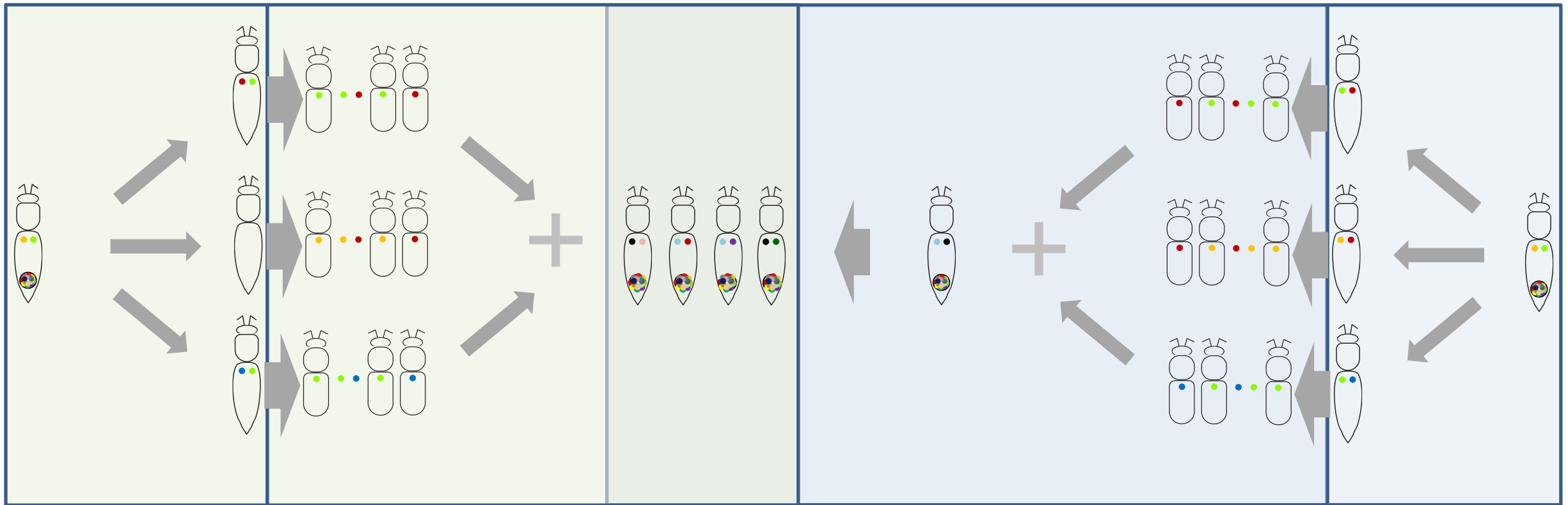
Leto 1
Year 1

Mating control: mating station: *accelerated timeline*



Starši delavk
Parents of workers

Starši matic
Parents of queens



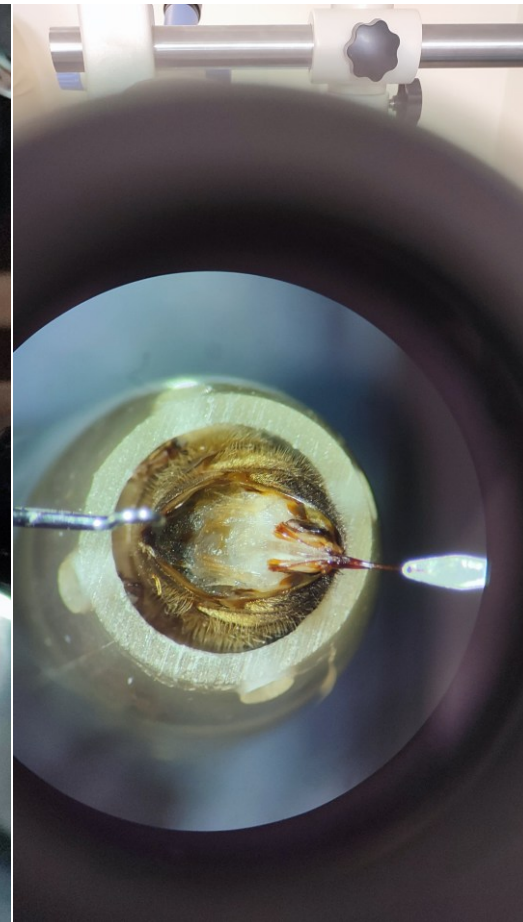
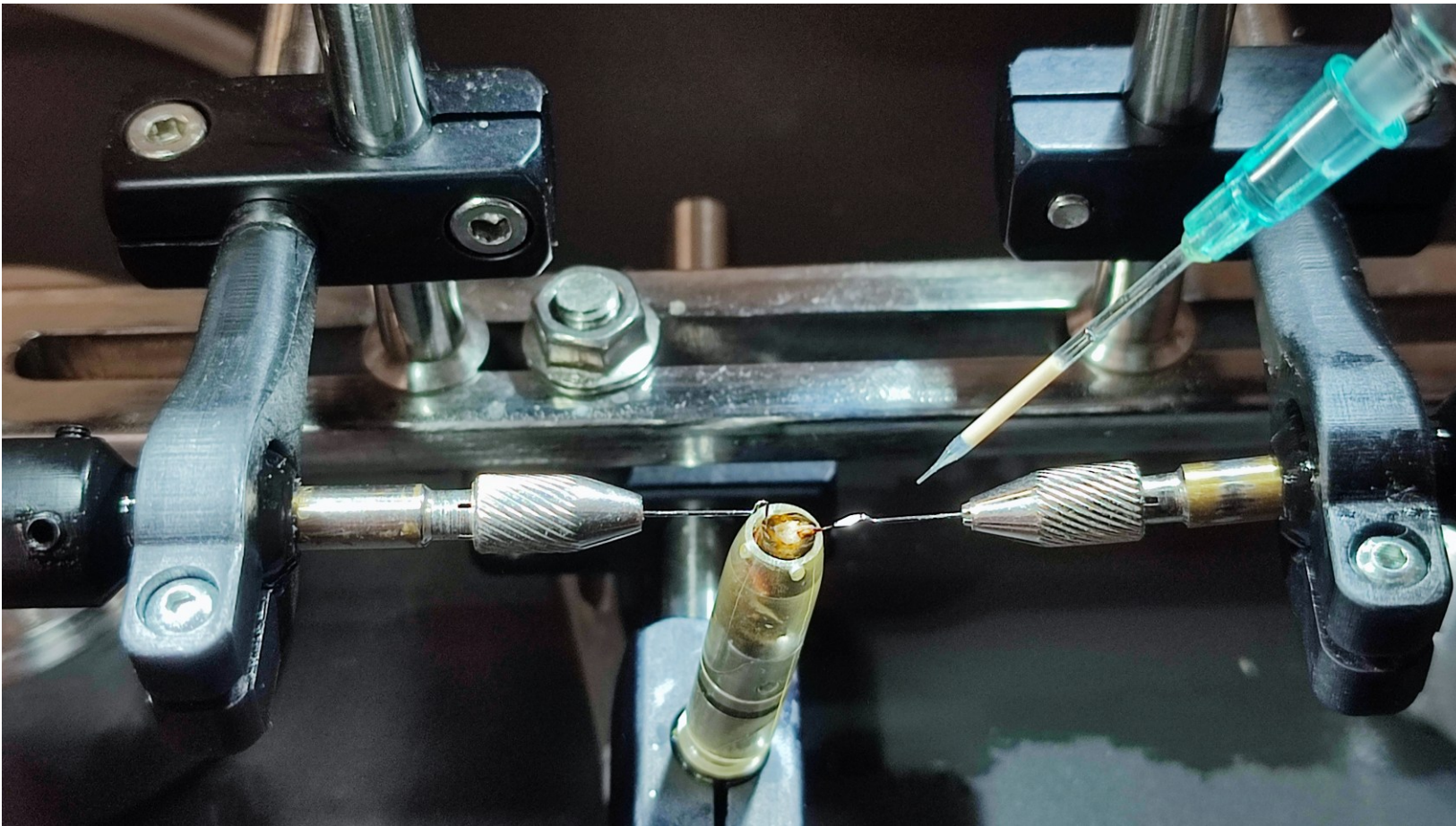
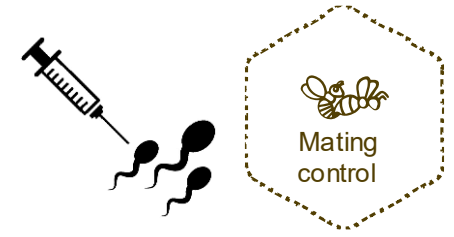
Leto 1
Year 1

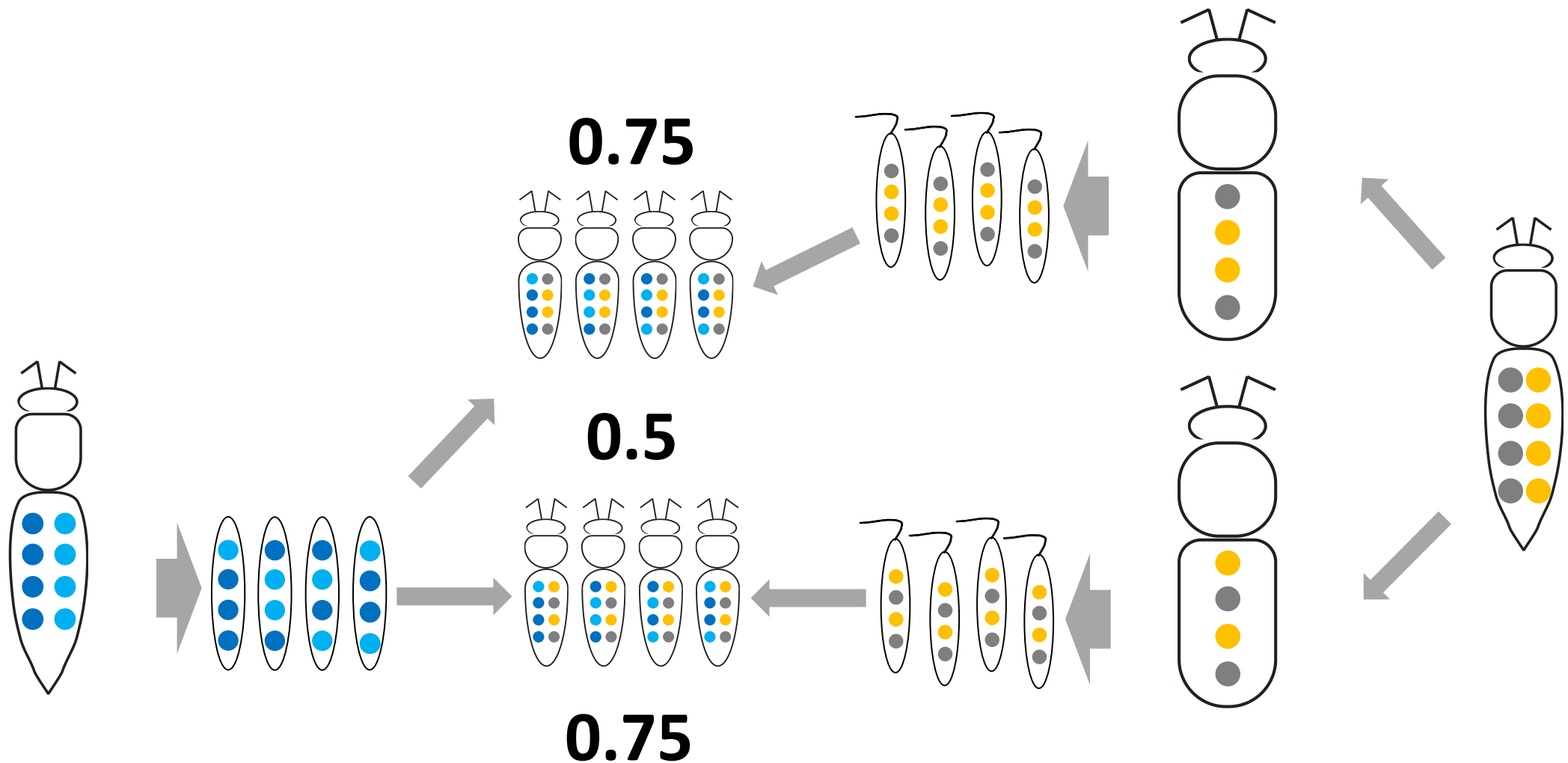
Leto 2
Year 2

Leto 2
Year 2

Leto 1
Year 1

Mating control: instrumental insemination





End comments & Discussion

- *Thanks for your attentions!*