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No pre-zygotic isolation mechanisms between *Schistosoma haematobium* and *Schistosoma bovis* parasites: From mating interactions to differential gene expression

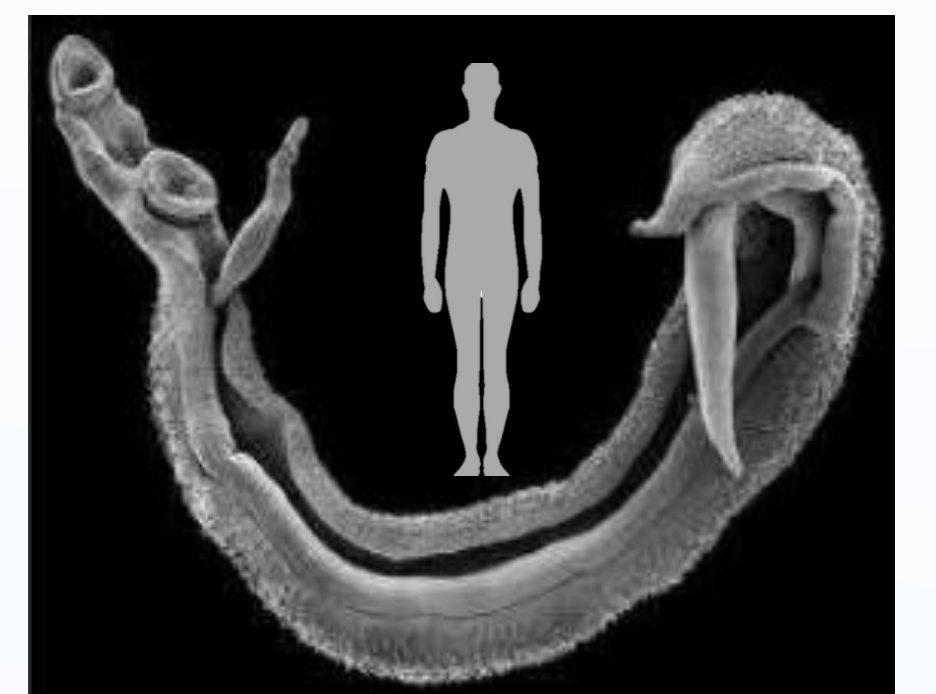
Context

Schistosomes are blood parasites infecting more than 240 million people worldwide, mostly in tropical areas. In 2013 the first European outbreak occurred in Corsica. The parasitic agents were hybrids between the human parasite *Schistosoma haematobium* and the cattle parasite *S. bovis*. Since hybrids display higher virulence, we questioned the type of barrier preventing these two species from hybridizing, once they are given the opportunity.

- We tested whether *S. haematobium* and *S. bovis* readily paired in a mate choice experiment.
- We tested for gene differential expression in hetero- Vs homo-specifically paired worms.

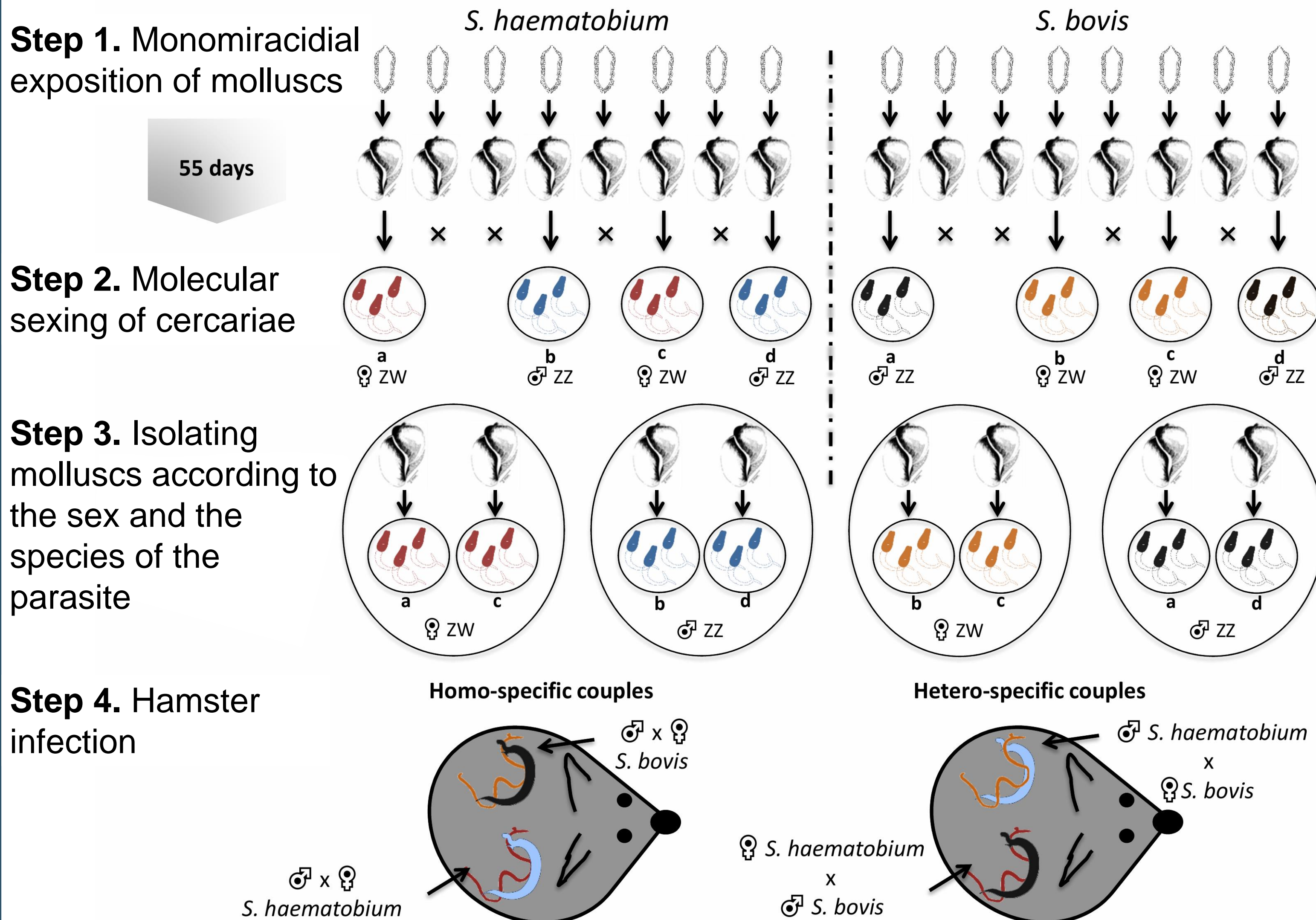


Schistosoma bovis



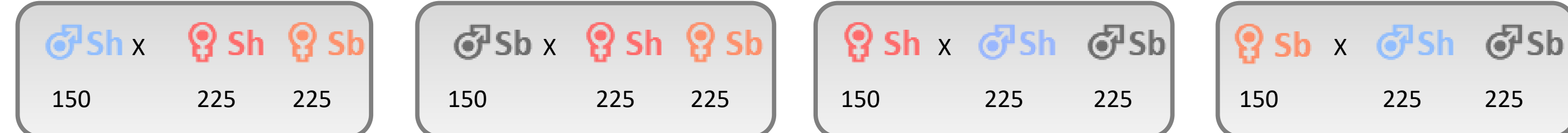
S. haematobium

Schistosoma cycle and experimental design

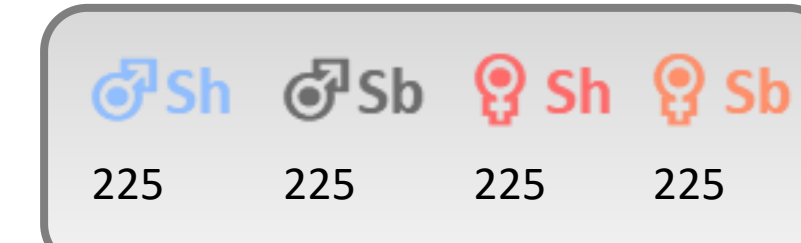


Objective 1: Quantification of homo- and hetero-specific pairs frequencies

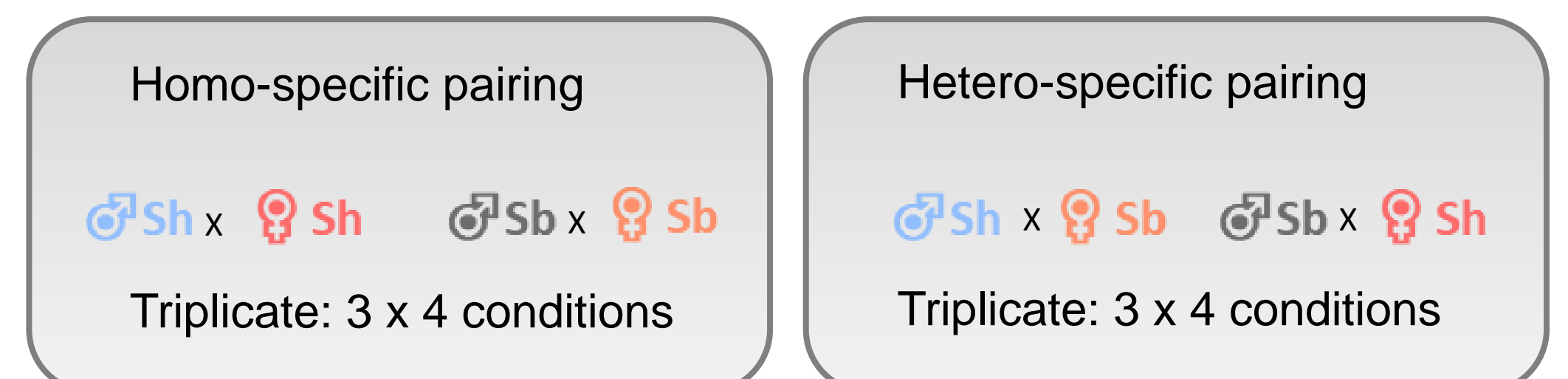
Limited Choice



Full Choice



Objective 2: Assess the transcriptomic profiles of homo- and hetero-specific paired worms



Results

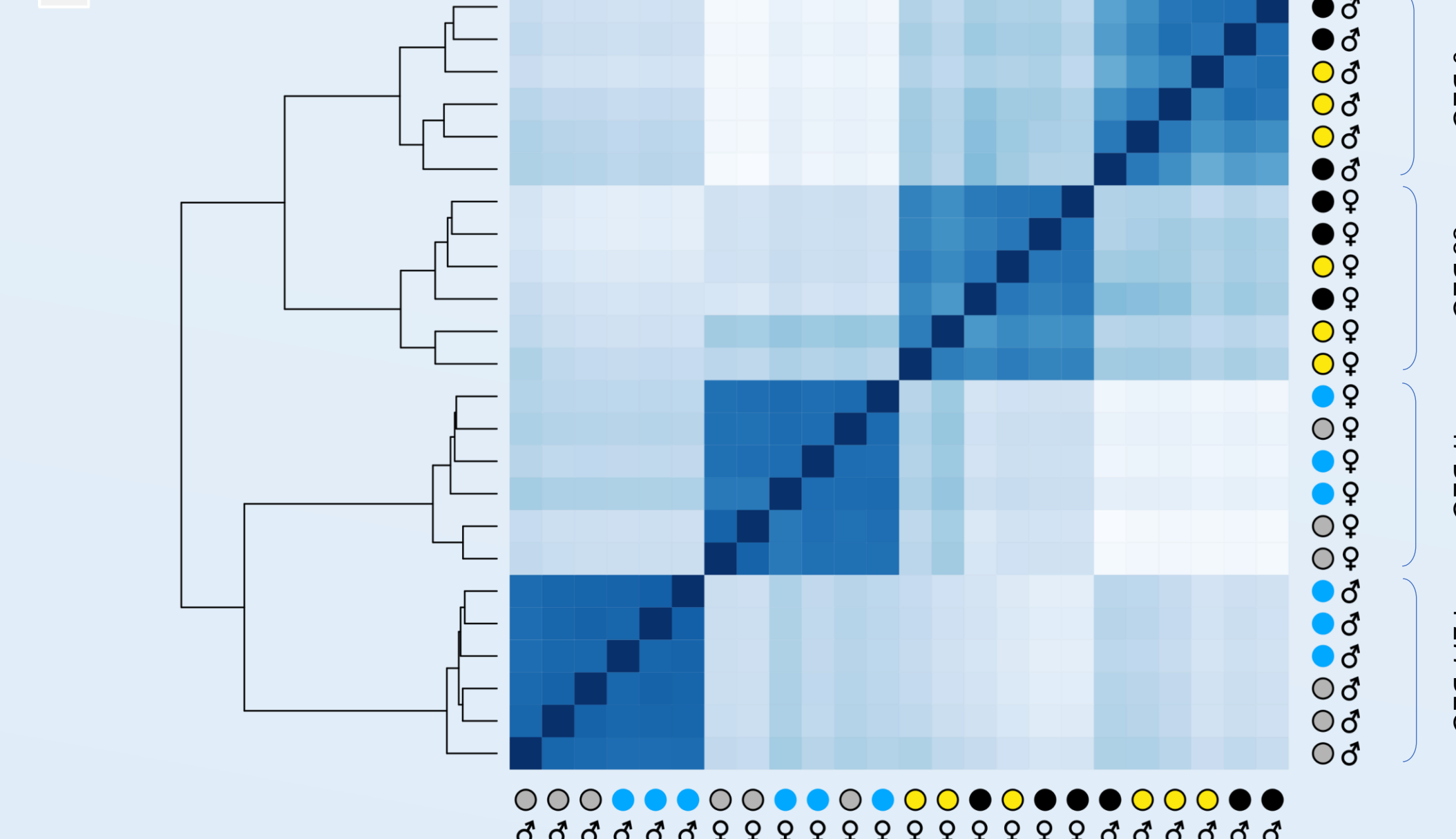
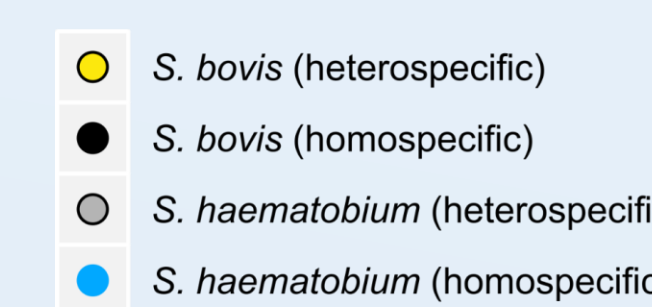
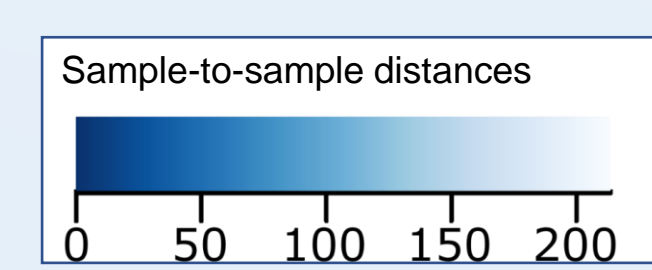
Mate choice experiment

Overall, *S. haematobium* and *S. bovis* readily paired.

Except for *S. haematobium* males, who paired more often with hetero-specific partners, the probability of hetero-specific and homo-specific pairs only depended on initial frequencies of partners.

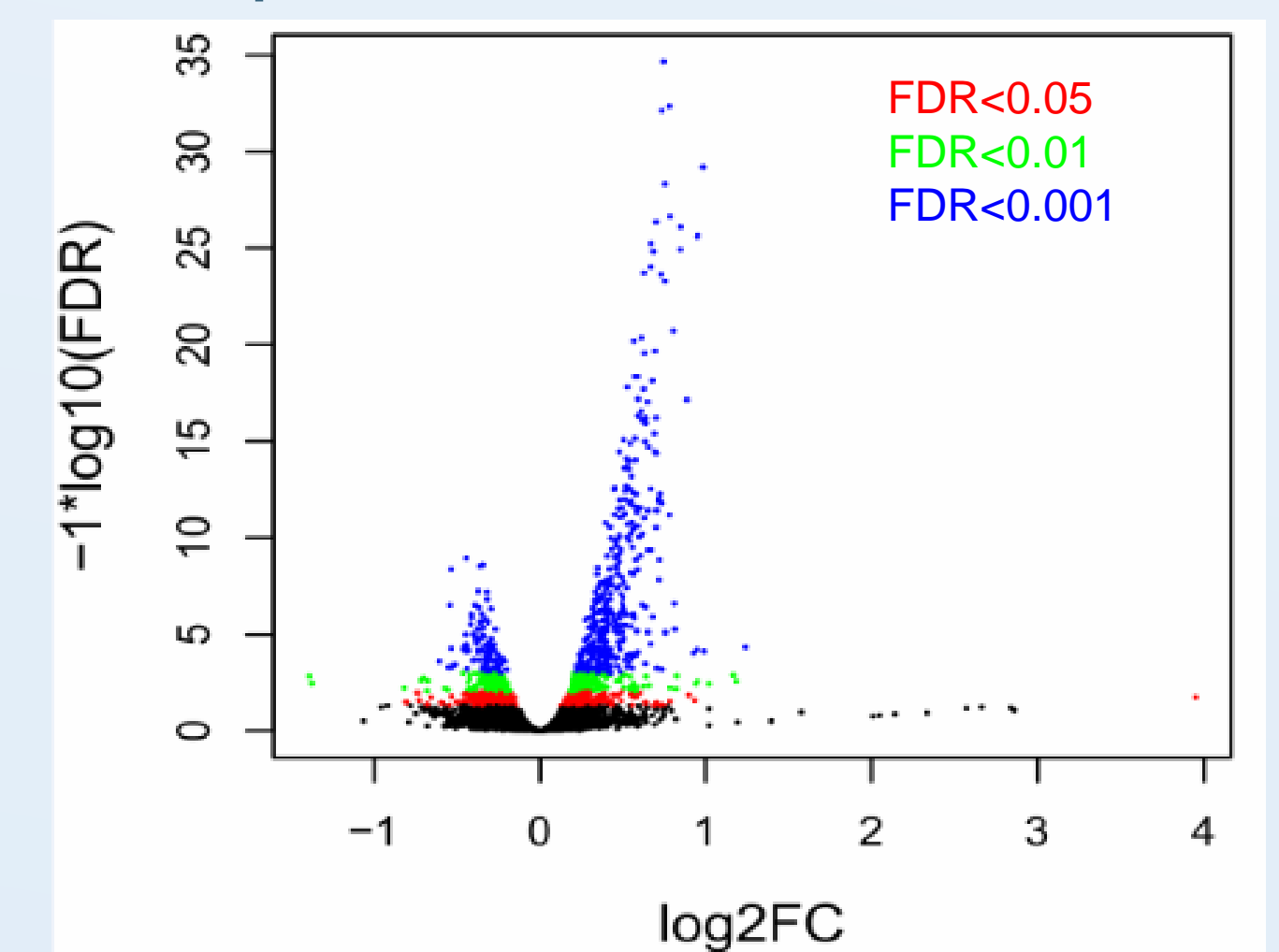
Homo-specific pairs	Hetero-specific pairs	Single worms		χ^2 -statistic	d.f.	P-value
♂ Sh x ♀ Sh	♂ Sh x ♀ Sb	♀ Sh	♀ Sb			
11 (14)	14 (11)	20	9	1.838	1	0.175
11 (15)	22 (18)	15	11	1.543	1	0.214
14 (20)	16 (10)	25	4	5.057	1	0.025*
9 (9)	6 (6)	36	26	0.015	1	0.903
10 (13)	10 (7)	41	15	2.651	1	0.103
				Total	11.104	4 0.049*

Observed number of homo- and hetero-specific couples with *S. haematobium* males and remaining partners. Expected number of couples under random mating hypothesis are into bracket.



Differential gene expression

Only a few Differentially Expressed Genes (DEG) were identified. When DEG were identified the log₂ fold change was quite low.



Significance level as a function of expression level for genes expressed between homo and hetero-specifically paired *S. haematobium* males.

Take home message

- No behavioral barrier preventing hetero-specific pairing
- Minimal transcriptomic changes are associated with hetero-specific pairing