

Adult Pacific Lamprey Use of Pheromones during Migration and its Relevance to Translocation

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Entosphenus tridentatus

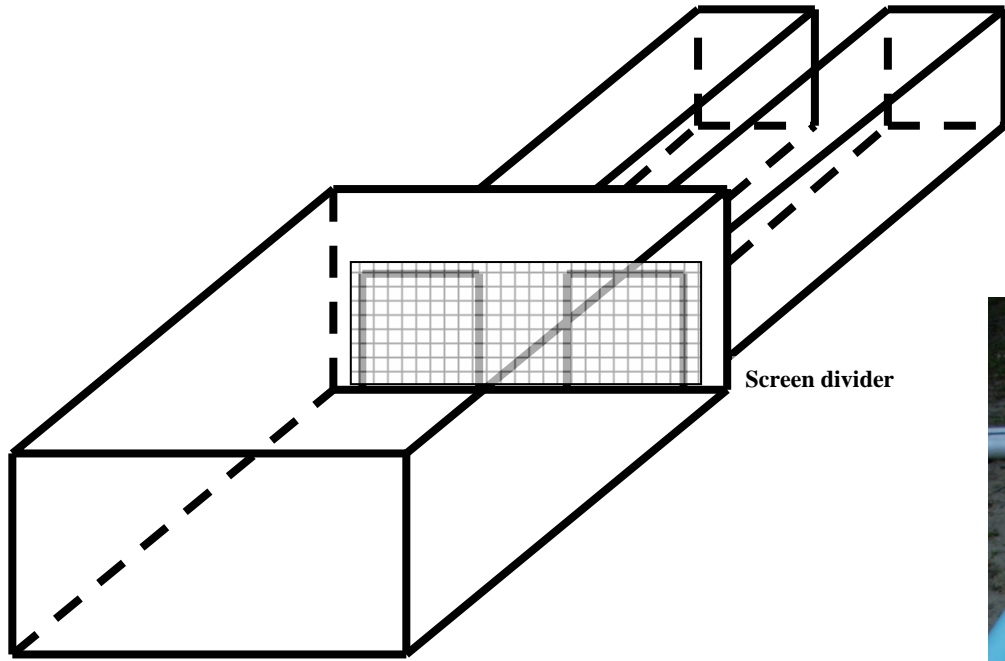
petromyzonal sulfate
petromyzonamine disulfate
petromyzolsterol disulfate
allocholic acid



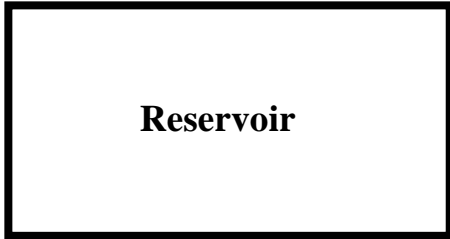
What are the relative roles of
current velocity and
pheromones in mediating
lamprey movements during
spawning migration?

Approach:

Conduct behavioral assays in a Y-maze to determine whether adult lamprey are attracted to larvae or current velocity.







Reservoir



South Arm



North Arm

Maze 3



A2 A1



A4 A3

Maze 2



Maze 1





General Results

Lamprey were active from 1900 to 0600 hr.

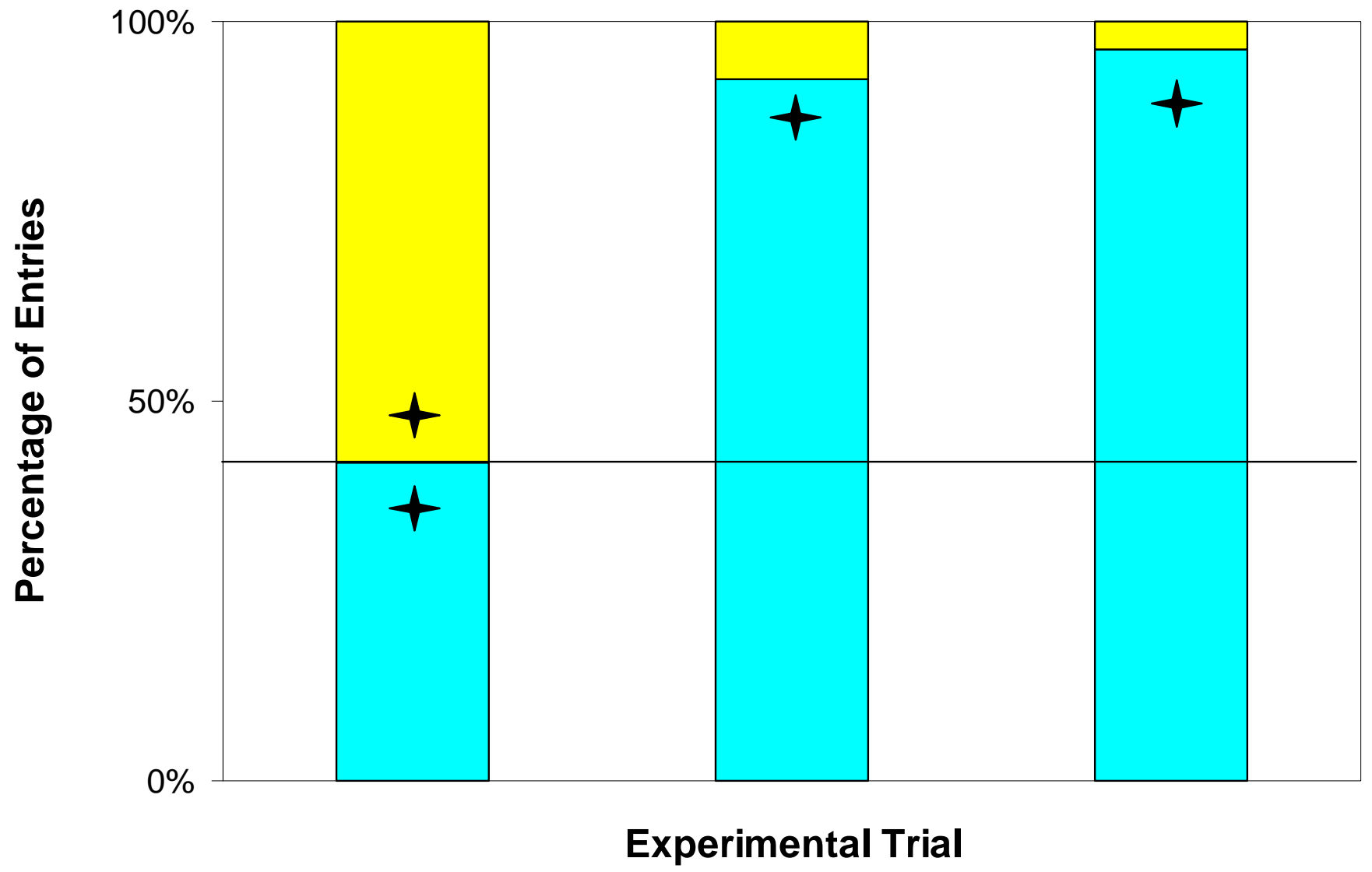
Each fish explored both arms, even when exhibiting extreme arm bias.

Number of entries into a given arm ranged from 1-277 each night (mean = 85).

Time spent in a given arm ranged from 11 s to 6.2 h (mean = 1.4 h)

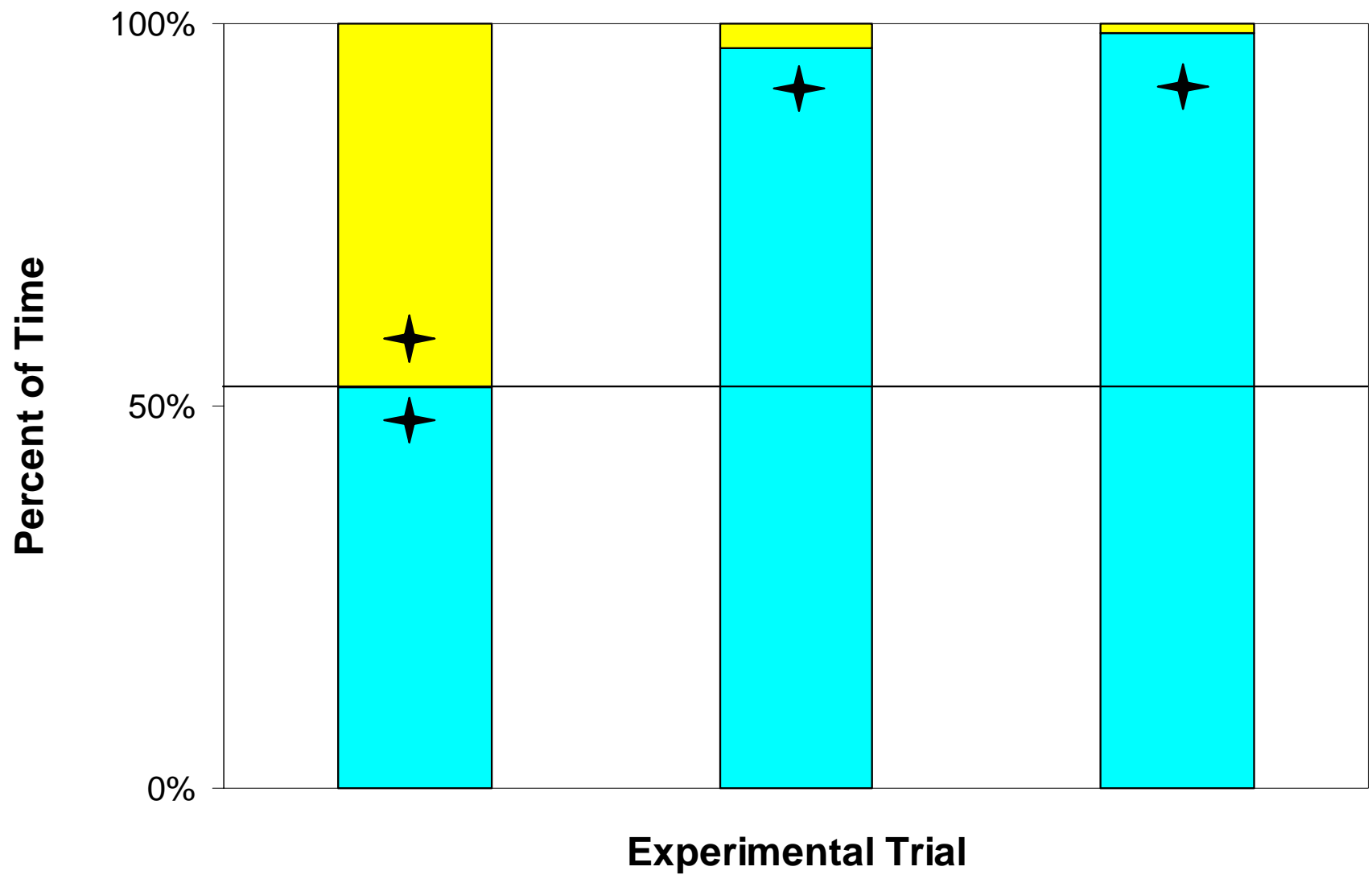
North Arm
South Arm

✦ = 12 L/min




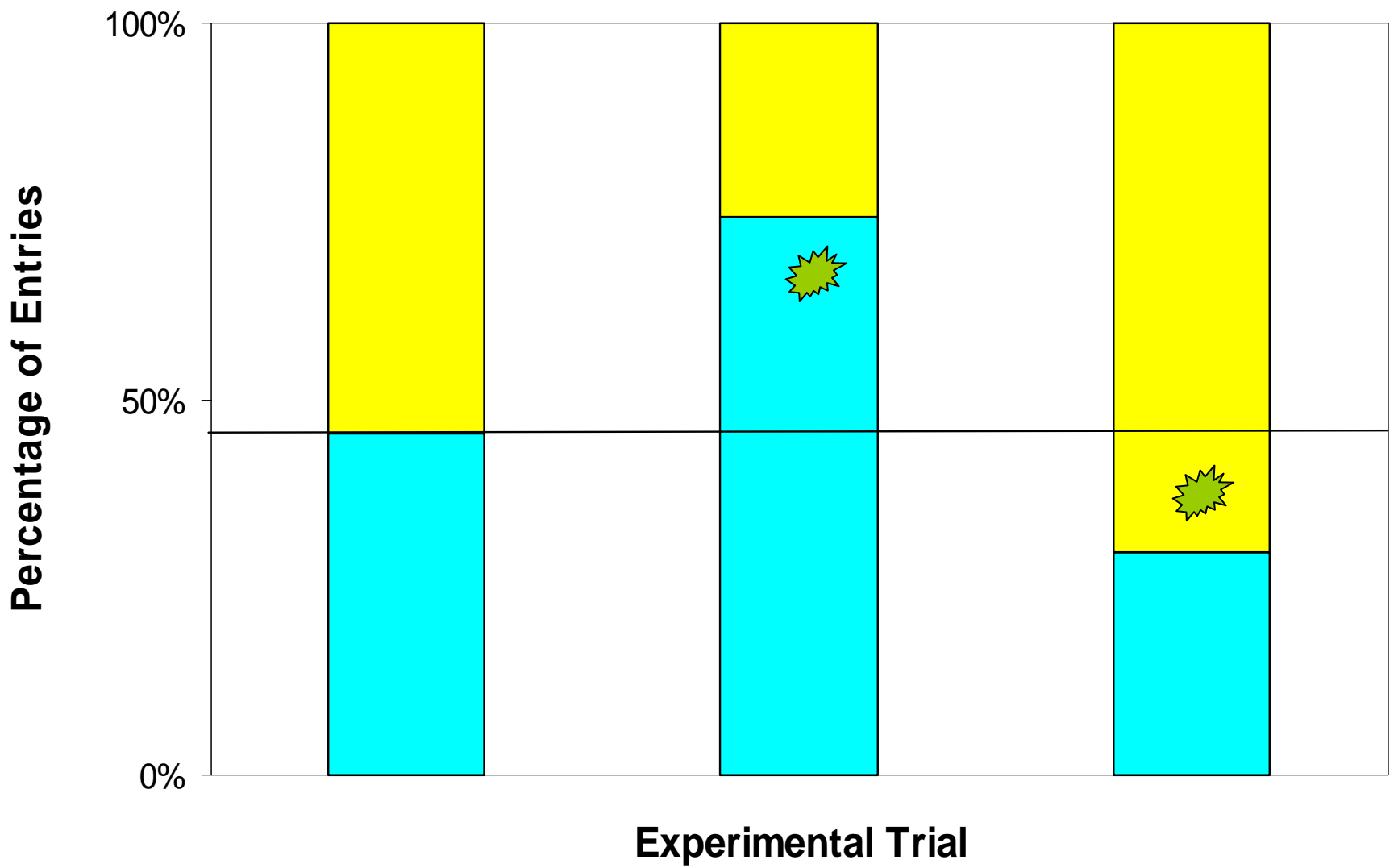
North Arm
South Arm

✦ = 12 L/min




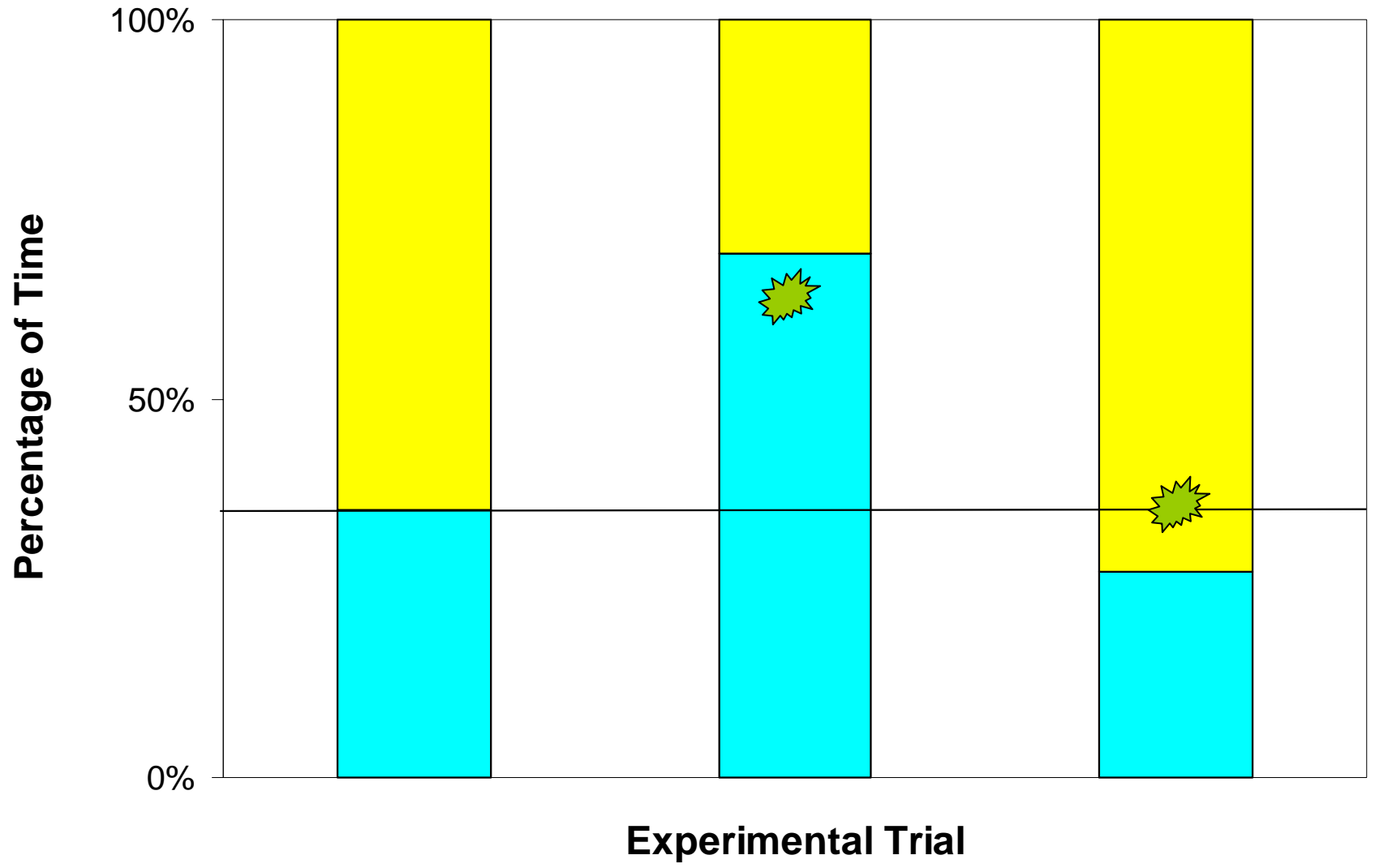
North Arm
South Arm

 = larval pheromone drip



North Arm
South Arm

 = larval pheromone drip



Results of Chi Square Comparisons-Entries

Spawning Phase Lamprey

(++ or -- for $p < 0.01$ + or - for $p < 0.05$)

Treatment Arm	Flow		Drip	
	N	S	N	S
Lamprey 1	--	++		--
Lamprey 2	++		++	--
Lamprey 3			++	++
Lamprey 4	++		++	+
Lamprey 5	+		++	++

Results of Chi Square Comparisons-Duration Spawning Phase Lamprey

Treatment Arm	Flow		Drip	
	N	S	N	S
Lamprey 1	++	++		--
Lamprey 2	++		++	--
Lamprey 3			++	++
Lamprey 4	++		++	ns
Lamprey 5	ns		++	++

Results of Chi Square Comparisons-Entries

Migration Phase Lamprey

Treatment Arm	Flow		Drip	
	N	S	N	S
Lamprey 6	ns			++
Lamprey 7	++			ns
Lamprey 8	++			
Lamprey 9	++		++	
Lamprey 10	--		ns	
Lamprey 11	++		++	

Results of Chi Square Comparisons-Entries

Migration Phase Lamprey

Treatment Arm	Flow		Drip	
	N	S	N	S
Lamprey 6	ns		(ns)	++
Lamprey 7	++		(++)	ns
Lamprey 8	++		(++)	
Lamprey 9	++		++	(ns)
Lamprey 10	--		ns	(ns)
Lamprey 11	++		++	(ns)

Results of Chi Square Comparisons-Duration Migration Phase Lamprey

Treatment Arm	Flow		Drip	
	N	S	N	S
Lamprey 6	++			++
Lamprey 7	++			ns
Lamprey 8	++			
Lamprey 9	++		++	
Lamprey 10	--		--	
Lamprey 11	++		++	

Results of Chi Square Comparisons-Duration Migration Phase Lamprey

Treatment Arm	Flow		Drip	
	N	S	N	S
Lamprey 6	++		(+)	++
Lamprey 7	++		(++)	ns
Lamprey 8	++		(++)	
Lamprey 9	++		++	(ns)
Lamprey 10	--		--	(++)
Lamprey 11	++		++	(ns)

Conclusions

Adult lamprey were attracted to both flow and water bearing larval pheromone at very low concentrations.

Migration-phase lamprey were attracted equally to creek water and larval washings.

Lamprey migration might be altered by increasing larvae and/or their bile acids.



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