

Scared Stiff by a Sniff: Behavioral response of *Bombina orientalis* tadpoles to a predator cue

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Many aquatic animals change their behavior in response to chemical cues in the water that indicate the presence of a predator.⁽¹⁾

In tadpoles, this generally means moving less and hiding more.

What are they responding to?

No universal agreement. It could be:

- Chemical released from the bodies of prey-upon conspecifics⁽²⁾
- Chemicals directly released by predators⁽³⁾
- A combination of the two⁽⁴⁾, possibly with learning involved⁽⁵⁾

Study System



<http://www.discoverwildlife.com/print?id=37696>

Predator: *Gasterosteus aculeatus*

- Three-spined stickleback
- widely distributed in aquatic ecosystems
- captured from Reed Lake

Prey: *Bombina orientalis*

- Oriental fire-bellied toad
- native to mountains of Korea
- not previously studied in a predator cue system



<http://fineartamerica.com/featured/a-fire-bellied-toad-bombina-orientalis-joel-sartore.html>

Methods

Obtain eggs from captive *B. orientalis*.



Raise tadpoles with repeated exposure to one of four treatments.



Measure tadpole activity levels.

Water exposed to crushed conspecifics

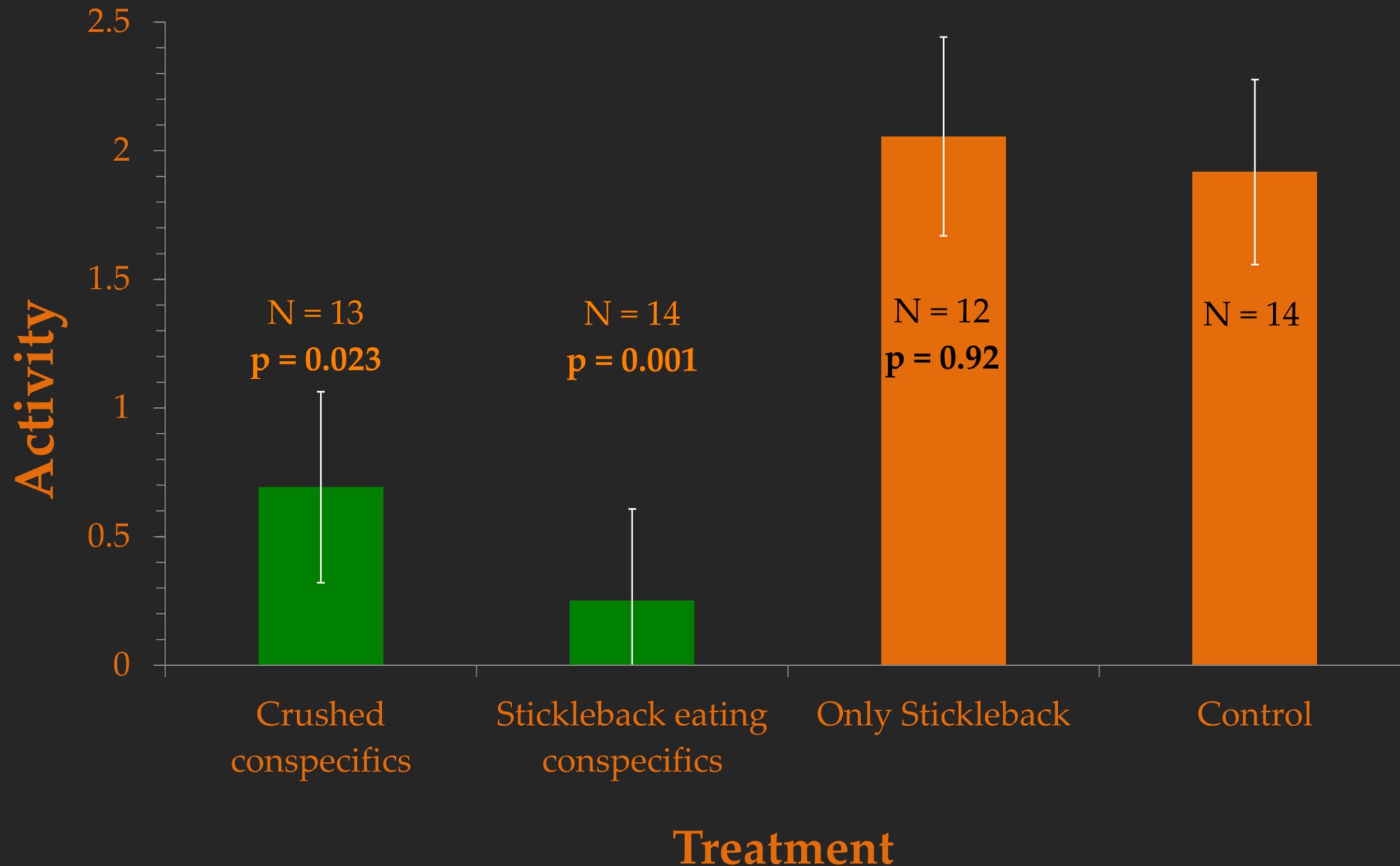
Water exposed to stickleback eating conspecifics

Water exposed to stickleback (eating nothing)

Control: water

Results

Treatment with water exposed to **crushed conspecifics** or **stickleback eating tadpoles** (but not only stickleback) significantly reduced tadpole activity.

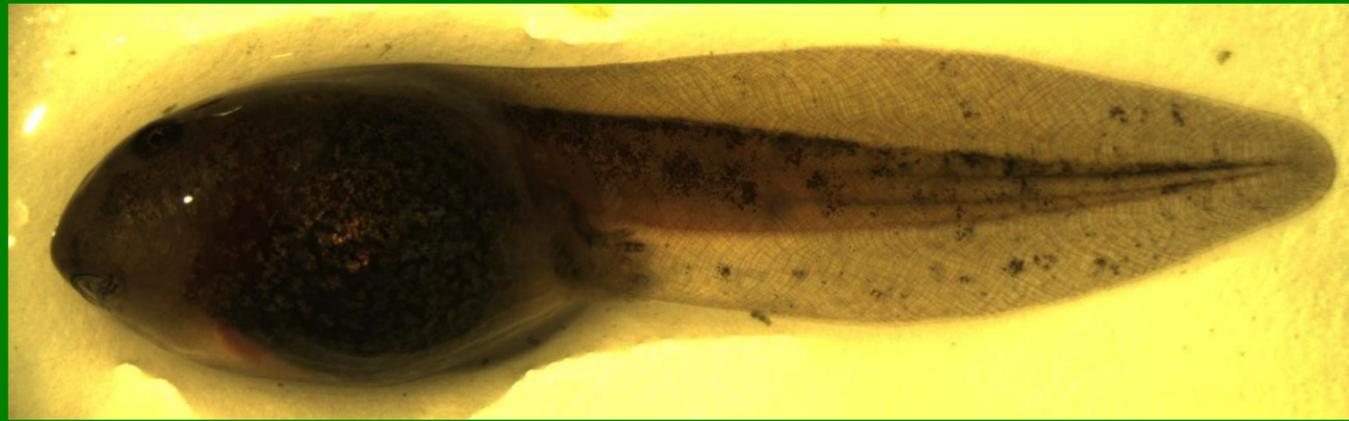


Activity defined as the average number of distinct episodes of movement by each tadpole over six ten-minute trial periods.

P-values from Wilcoxon signed-rank test, compared to control.

Groups with same color bar not significantly different.

One outlier from the crushed conspecifics group was removed for analysis.



Conclusion

B. orientalis tadpoles modify their behavior in response to chemical cues from conspecifics, but not necessarily from stickleback

More questions

- What is the fitness advantage of moving less in an environment with predators?
- Are tadpoles responding to metabolites released by disturbed conspecifics (“disturbance cues”) or to chemicals released from damaged conspecific tissue (“alarm cues”)? ⁽¹⁾
- Can tadpoles be trained to respond to a stickleback cue, by pairing it with a conspecific cue?

References

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