SPINY LOBSTER ENHANCEMENT: POST-RELEASE BEHAVIOR, MOVEMENT AND PREDATION OF JUVENILE LOBSTERS (*JASUS EDWARDSII*)

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A joint Australia/New Zealand research program is investigating the biological feasibility of releasing captive-reared juvenile lobsters into the wild to compensate for puerulus harvested for commercial aquaculture. Over 3 years, we ran experiments to investigate the behavior, activity patterns, area fidelity, foraging distance, and predation of juvenile lobsters reared in captivity and released back into the wild for enhancement purposes. We report on our findings from these experiments.

We conducted a series of tank-based experiments to observe changes in activity patterns. Lobsters reared in captivity in the absence of predators and fed during the day displayed marked changes in their activity patterns. These typically nocturnal animals emerged more frequently during the day to feed, a behavior that if displayed in the wild would make them extremely vulnerable to predation. We also investigated the response of lobsters reared in captivity for more than a year to the introduction of a predatory fish. Interestingly, the captive reared lobsters displayed the same suite of anti-predator behaviors when encountering a predator for the first time as like-sized wild lobsters. Furthermore, when released into the wild, the captive-reared lobsters reverted to strictly nocturnal activity patterns and showed all the appropriate anti-predator behaviors observed in the wild lobsters.

Having established from these earlier experiments that behavioural modifications observed in captivity did not continue after release, we undertook some field experiments to investigate the most suitable timing for release of juveniles relative to predation pressure.
We determined the timing of predation in two ways. Firstly, we released naïve lobsters into the wild under the surveillance of video cameras to record the presence and intensity of predators. Secondly, we tethered naïve lobsters in the field using chronographic tethering devices to record timing of predation events (Figure 1). Our results clearly indicated that predation was greatest immediately following release and consideration must be given to release protocols that mitigate this, such as cages with auto-release doors.

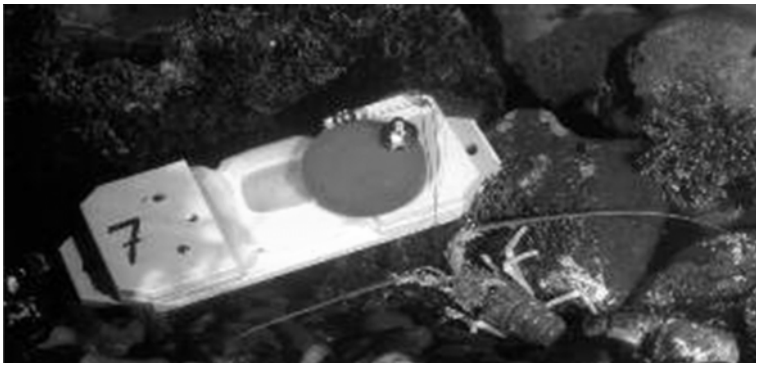

Figure 1: Juvenile lobster attached to a chronographic tethering device for recording time of predation events.

Finally, we carried out some foraging experiments whereby we released tagged captive-reared juvenile lobsters and tracked their movements at midnight on the day of release and the

following morning. These diver observations were intended to provide some measure of foraging distance as compared to like-size wild lobsters also tracked on the same reef. Generally we found that captive-reared lobsters remained in their release dens for the first 24 hours, but those released lobsters that did leave the den after nightfall foraged over the same area as wild lobsters.

Overall, we found that juvenile lobster behavior is altered substantially by lengthy periods in captivity. However, these behavioral alterations do not persist after release into the wild. This apparent plasticity in behavior may enable juveniles to maximize foraging range and duration in response to predation pressure and would suggest that behavior is not the biological factor influencing survival after release.