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Autotomy reduces feeding, energy storage and growth of the sea star *Stichaster striatus*

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Abstract

We evaluated the effect of autotomy on feeding, energy storage and growth of juvenile *Stichaster striatus* kept in the laboratory for five months with a limited supply of the mussel *Semimytilus algosus*. Autotomy strongly decreased feeding, energy storage and growth. Intact juveniles showed a ~3 fold higher feeding rate than autotomized individuals throughout the experiment. Intact juveniles also had a higher (~5 fold) energy content per pyloric caeca in each arm. This was mainly due to higher lipid content, the main proximate constituent of pyloric caeca. Intact juveniles showed a greater growth rate and reached a greater size than autotomized individuals, more evident for underwater mass than radius length. The reduced capacity to feed reduced energy intake in autotomized individuals. However, low energy reserves along with low growth in autotomized sea stars, support the hypothesis that juveniles of this species allocate energy to regeneration to the detriment of growth. This was also supported by the ~25% of arm length regeneration after 5 mo. Remaining small could increase risk of lethal predation, however, *S. striatus* may reduce predation risk by using crevices and kelp holdfasts as refuges from predators. Given the strong impact of autotomy on feeding, regeneration of arms to recover full capacity to forage and grow seems a better strategy for juvenile *S. striatus*, than merely growing.

Keywords: Autotomy; Energy storage; Feeding; Growth; Sea star; *Stichaster*