

Temperature effects on gait of the sea stars *Asterias rubens* and *Asterias forbesi*
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Off the coast of southern Maine, the sea star *Asterias forbesi* has recently surpassed in abundance the sea star *Asterias rubens*. Since *A. rubens* has a more northern distribution and a lower survival and growth rate at higher temperatures (Pratt 2006), the Johnson lab is searching for a link between locomotion speeds in these sea stars and temperature. In nature, speed is predation or capture food.

The Johnson lab discovered that sea stars can increase their speed by switching from a slower, crawling gait to a faster, oscillating gait (Ellers et al. 2014, Ellers et al. 2021). In general, many aspects of the physiology and locomotion of ectotherms (animals whose body temperature is the same as their environment, including sea stars) increase with temperature, often until they reach a plateau beyond which performance declines. These changes across temperatures are modeled through thermal performance curves (TPCs) (Schulte et al. 2011). In her Honors project in the Johnson Lab, Emma Bertke established a thermal performance curve for the maximum speed of *A. forbesi* that shows increasing maximum speed with increasing experimental temperature, with no difference between 13°C and 18°C (Bertke 2020). Thus, given the north/south distribution of *A. forbesi* and *A. rubens*, it was predicted that *forbesi*

