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ENERGETIC REQUIREMENTS DURING GONAD MATURATION AND SPAWNING IN SCALLOPS: SEX DIFFERENCES IN *CHLAMYS ISLANDICA* (MÜLLER 1776)

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ABSTRACT Reproduction in scallops, as in many broadcast-spawning invertebrates, involves the production of a gonad that can become the largest tissue in the body. Gonad maturation leads to mobilization of macromolecular reserves from somatic tissues in many scallops. Because ovaries typically contain higher energetic contents than testes, we examined whether the energetic investment in gonad production and spawning and the impact on somatic tissues was greater in female than male Iceland scallops, *Chlamys islandica*. In males and females, maturation led to accumulation of carbohydrate and protein in the gonads, whereas lipids only accumulated in the ovary. In both sexes, the increase in gonad mass was accompanied by decrease of carbohydrate in muscle and the remaining tissues, but testes maturation was also paralleled by loss of carbohydrates and lipids from the digestive gland. Although spawning led to a greater energy loss in the female than in the male gonads (73 vs. 49 kJ in gonad energy content), less mobilization of somatic energy was observed during gametogenesis and spawning in females than males (14.5 kJ vs. 36.7). Most of the energy requirements for maturation and spawning in females must have been covered by feeding, whereas somatic reserve mobilization could have covered most of these costs in males. As in most scallop species, lipids account for a major part of the ovarian energy content. Direct deposition of dietary lipids in the eggs could minimize the impact on somatic tissues of female scallops. The costs of protein synthesis during testes maturation could decrease the aerobic scope available for feeding by males. In light of our previous demonstration of the impact of gonad maturation in *C. islandica* on recuperation from exhaustive exercise, our results suggest that the survival of males may be decreased more by their reproductive investment than that of females. The bioenergetic strategies of female scallops seem to favor survival and hence future reproduction more than those of male scallops.

KEY WORDS: biochemical reserves, *Chlamys islandica*, reproduction, reproductive cost, scallops, sex differences