The NAO affects the reproductive potential of small tuna migrating from the Mediterranean Sea

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Several studies have confirmed that the North Atlantic Oscillation (NAO) has a direct effect on tuna across a range of biological aspects, such as abundance, catchability, recruitment, and physical condition (LC), especially during winter season (NAOw). However, its effect on reproductive biology has been barely investigated. Thus, the main aim of this study was to investigate the effect of the NAO on the physical condition index and gonadosomatic index (GSI) of the three most commercially exploited small species of migrating tuna (i.e. little tunny, bullet tuna, and Atlantic bonito) in the Mediterranean Sea. A positive direct correlation was found between little tunny and Atlantic bonito and the gonadosomatic and the physical condition indexes. In addition, a strong correlation was found between the NAOw and the gonadosomatic and LC indexes, which could lead to higher reproductive investment in gonad growth before the spawning season. In contrast, bullet tuna had a low LC index during peak gonad growth and were less affected by NAOw oscillations. In the case of bullet tuna, these results could be explained by a longer reproductive period that would lead to faster fat consumption before the reproductive period than in the other species considered and greater dependence on the surrounding environmental conditions for reproductive success.

Atlantic bonito

Atmospheric oscillations

Bullet tuna

Gonadosomatic index

Small tuna