2. Abstract

Escape variability has been claimed as an important constituent of predator avoidance, in which unpredictability of prey can result in successful escapes. Analysis of escape trajectories can give insights into anti-predator strategies of prey species and have environmentally relevant applications. The main goal of this study is to provide a kinematic description of the escape response of the white shrimp *Litopenaeus setiferus* when faced with artificial and natural (*Callinectes danae*) stimuli. We defined an escape trajectory as the route followed by the individual from the starting point to the point in space at the end of the first rotational motion displayed during the escape response. Beyond this stage, prey may continue escaping along a different path. We quantified the distance of first reaction, distance traveled during the propulsive phase of the escape, duration of prey response, and the angle between the stimulus and the escape path of shrimp. Data were gathered from images captured with a digital camera at a resolution of 30 frames s^{-2}. 120 sequences of individuals responding to artificial stimuli and 51 responding to predator attacks were filmed from dorsal view in trials carried out in a circular arena. Circular statistics analysis was used to describe the escape trajectories on pooled responses to stimuli every 45°. Differences were found amongst escape responses components of shrimp when exposed to danger (artificial) or attack (*C. danae*) stimuli. As in other species, responses to danger situations displayed a 'preferred' escape direction, whereas attack stimuli resulted in unpredictable directions. The greatest unpredictability resulted when shrimps were attacked from the front or rear suggesting that protean behavior of *L. setiferus* is mediated by the direction of attack. No differences, however, were found regarding reaction time neither in danger or attack situations, nor in the distance at which the first reaction to both stimuli occurred.