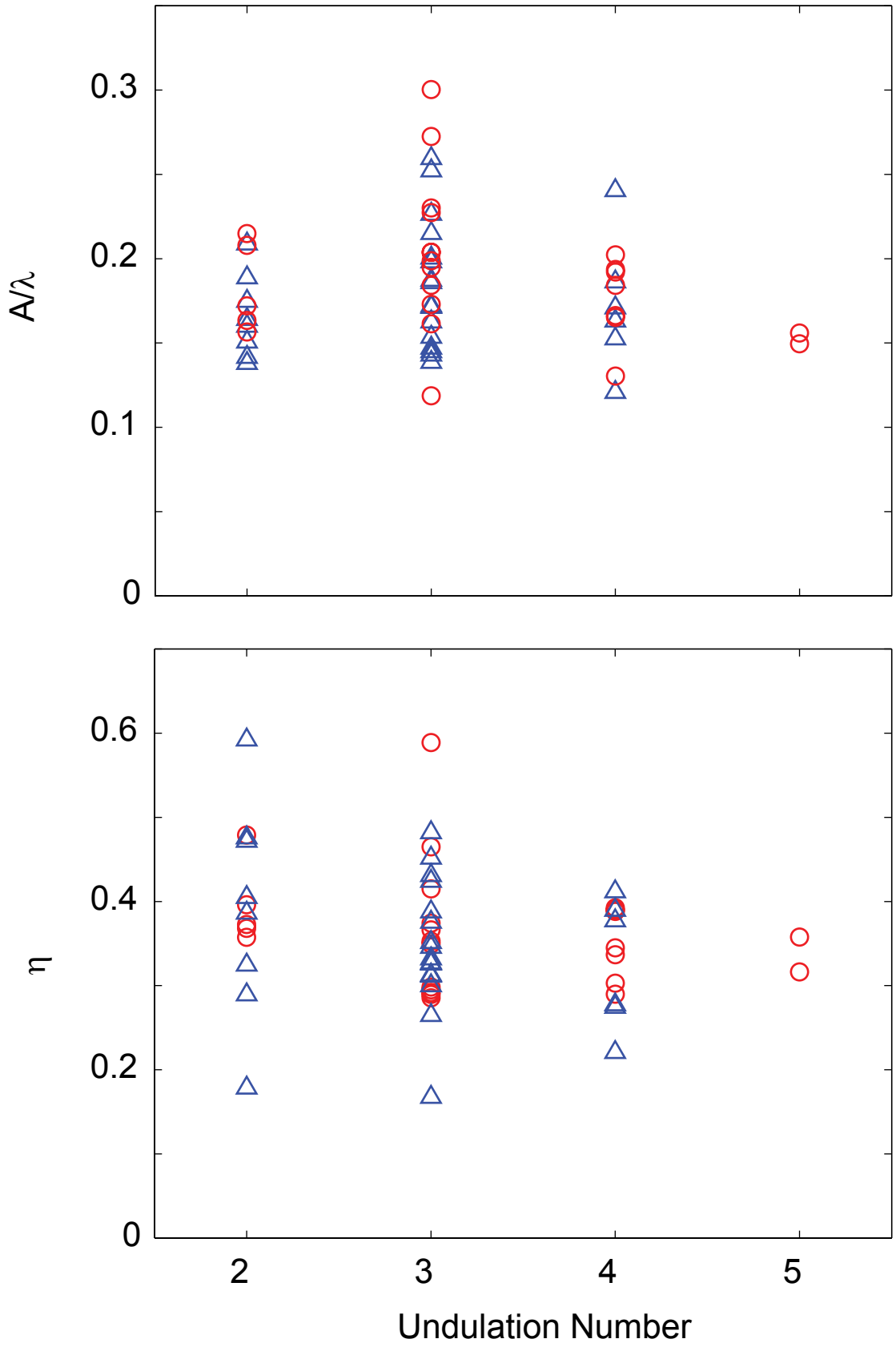

Fig. S1. Spatial form A/λ and wave efficiency η do not vary with compaction (red circles, closely packed; blue triangles, loosely packed) or undulation number (N=5 animals, n=51 trials).

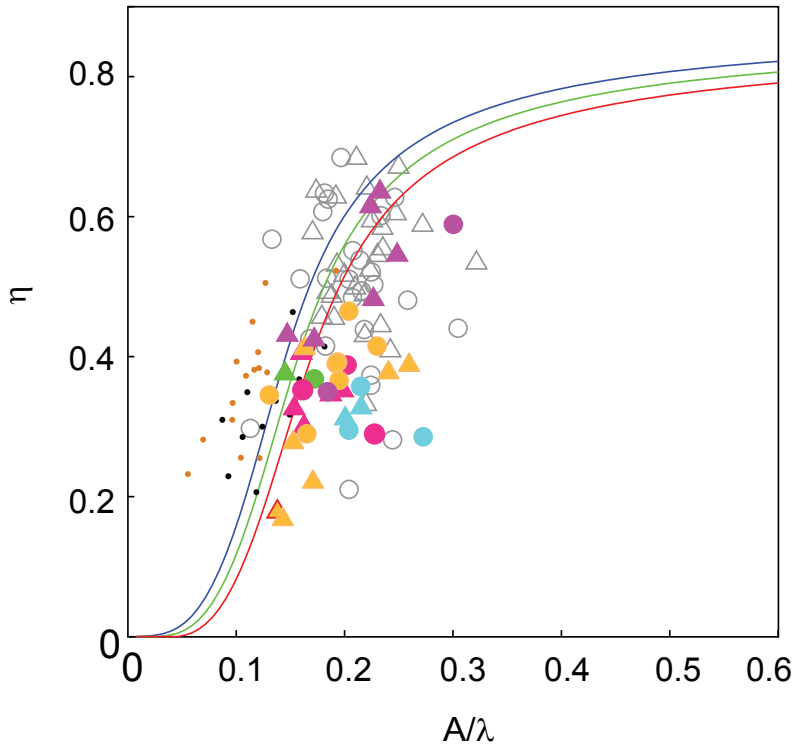

Fig. S2. Wave efficiency η increases with spatial form A/λ and is in accord with predictions from resistive force theory (RFT). Filled markers (triangles for loosely packed, circles for closely packed) are data taken in animals implanted with EMG wires (N=5 animals and n=37 runs) where different colors indicate different individuals. Open markers are data from Maladen et al., 2009. Brown points are data from animals tested without wires (N=15 runs, n=4 animals) and black points are data from the same animals tested with wires glued to their back (N=11, n=2 animals) in a loosely packed medium. The blue curve is a prediction of η *versus* A/λ from RFT with drag comparable to the sandfish without wires. The green and red curves are the RFT prediction with 20% and 40% increased drag on the head, respectively.

Table S1. Number of runs for each treatment for side view kinematics experiment

Individual	SVL (cm)	CP	LP
6	8.3	4	5
7	9.3	9	8
8	9.2	2	4