

Fig. S1. Overview of *Anquillicoloides crassus* life-cycle

Adult *A. crassus* males and females reproduce in the swimbladder lumen. Eggs are released passively, and leave the swimbladder via the pneumatic duct, reaching the surrounding water through the host digestive tract (De Charleroy, 1990; Kirk, 2003). Free-living larvae attach to the substratum, and are then ingested by predatory copepods, an intermediary host, and make their way through food-web interactions, until predated upon by the definitive host, the European eel. Larvae penetrate the intestinal wall to reach the swimbladder. Residence time in the swimbladder wall is dependent on both density and temperature. When the population of adults in the lumen is low enough, larvae enter the lumen where, after feeding, they moult into sexually active adults (Kirk, 2003). (a) Differing intermediate/ paratenic hosts of parasite infection across eel life-stages; (b) *A. crassus* life cycle within the swimbladder. L₁ – L₄ indicate parasite life stages. L₁: juveniles within the egg through to L₄: juveniles within the eel swimbladder (c.f. Kirk et al., 2003).

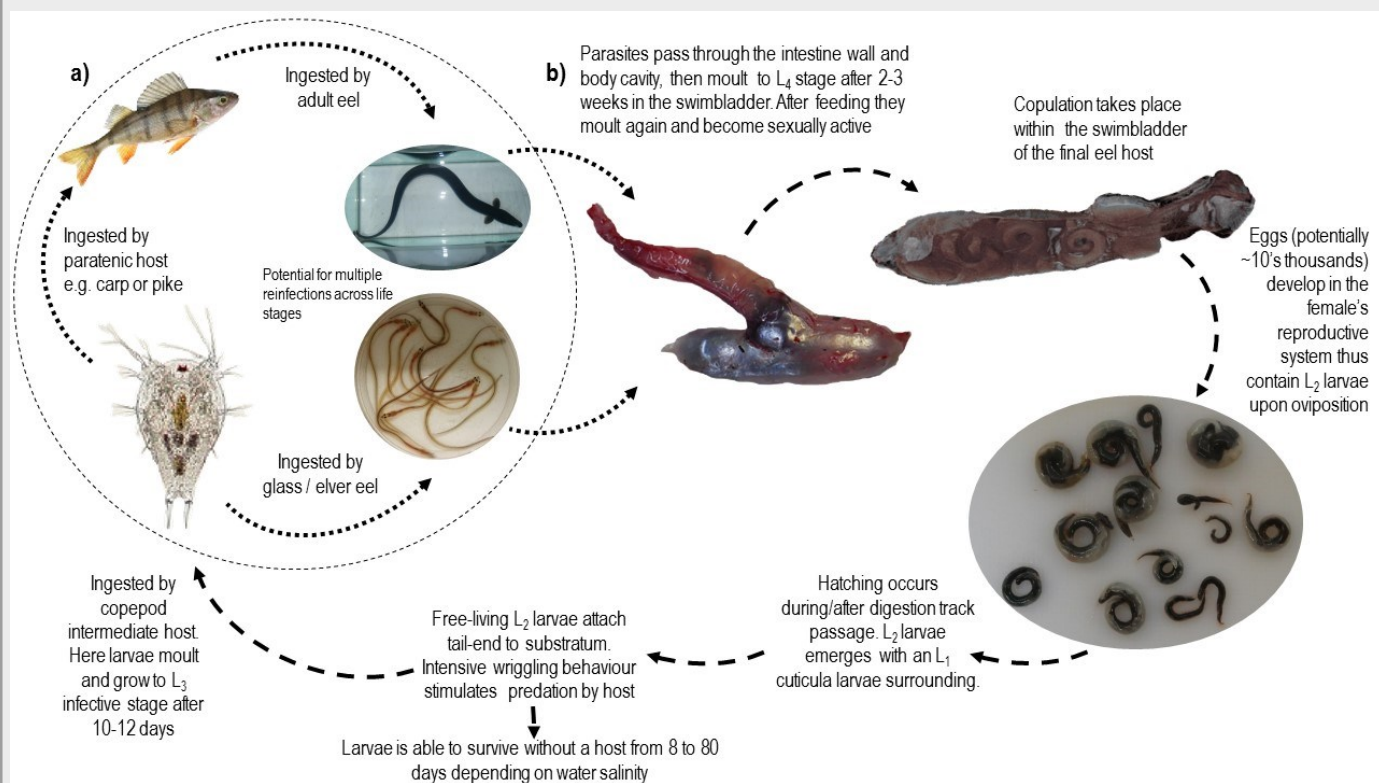


Table S1. Spearman's correlation coefficients calculated between the damage indicators and the mechanical properties of the eel swimbladder in the longitudinal ($n = 10$) and circumferential ($n = 10$) directions.

Note: Values with asterisks indicate significance ($p < 0.05$), σ_{\max} indicates maximum stress and E_l , the strain.

	Longitudinal		Circumferential	
	E_l	σ_{\max}	E_l	σ_{\max}
Thickness	-0.36	-0.65*	0.22	-0.37
LRI	-0.18	-0.15	-0.53	-0.33
Parasite load	-0.56	-0.70*	0.45	0.18

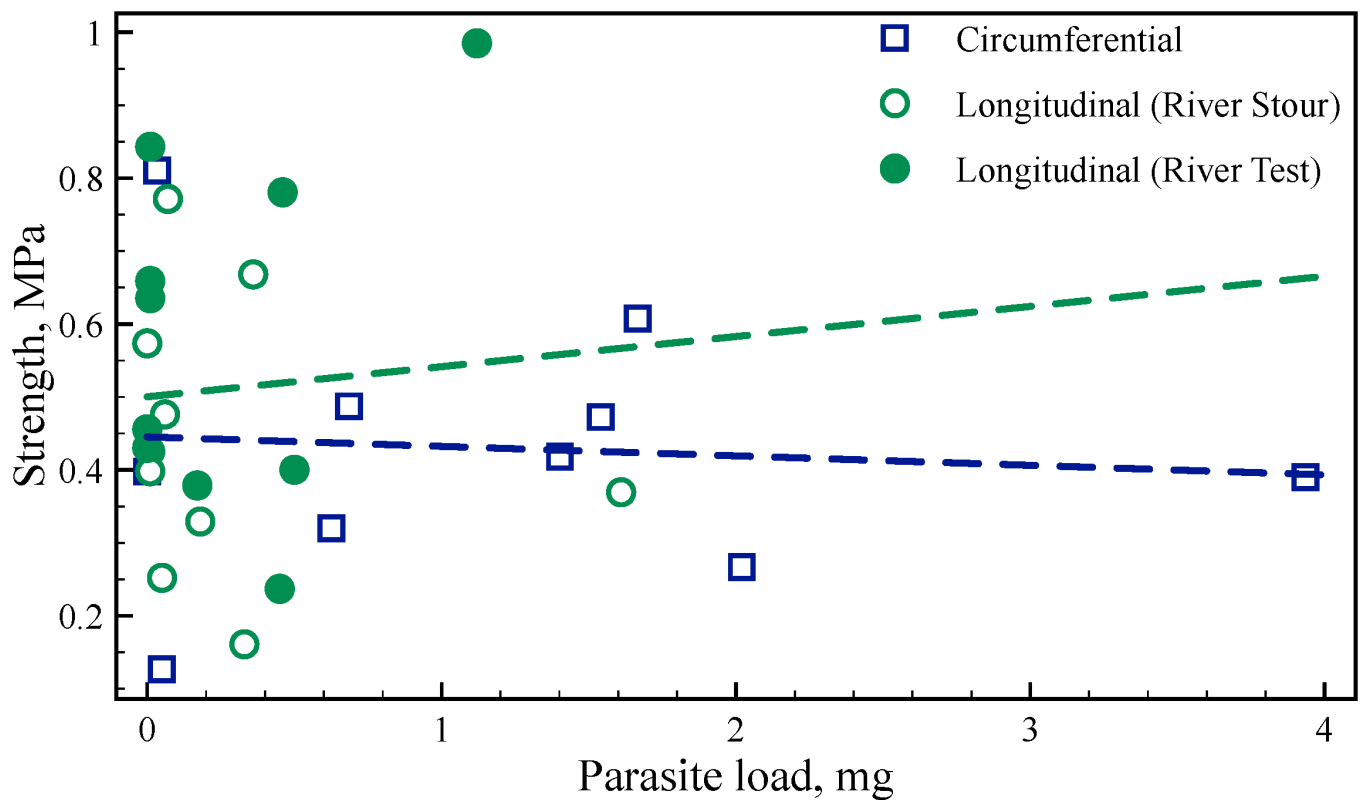


Fig. S2. Maximum stress in the longitudinal (circles: $n = 20$) and circumferential direction (squares: $n = 10$) versus the parasite load. While the correlation coefficient identified between parasite load and the longitudinal direction is very high (River Stour samples, $n=10$), there is considerable scatter which could be confirmed through consideration of the secondary longitudinal sample population (River Test samples, $n=10$).

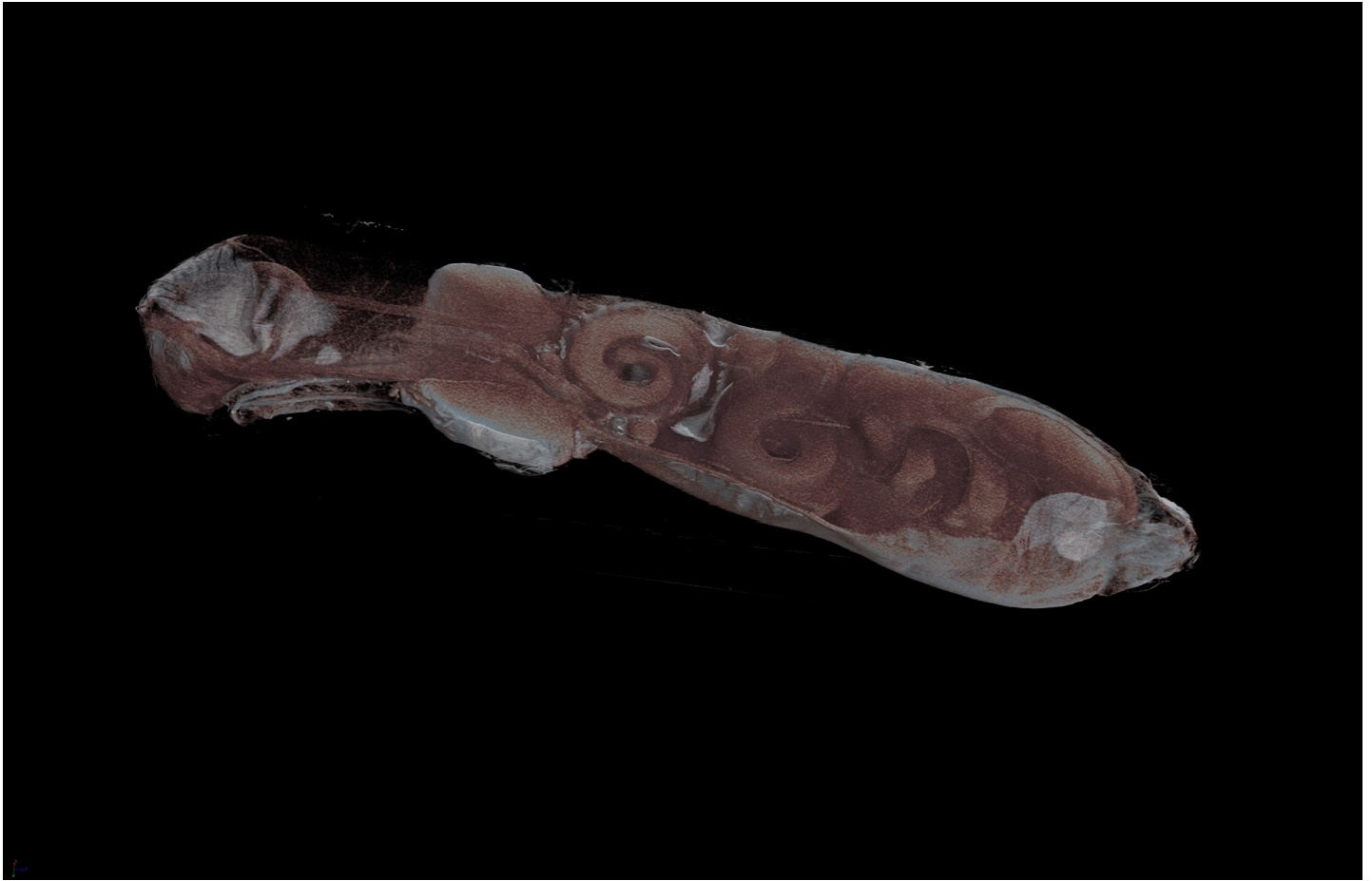
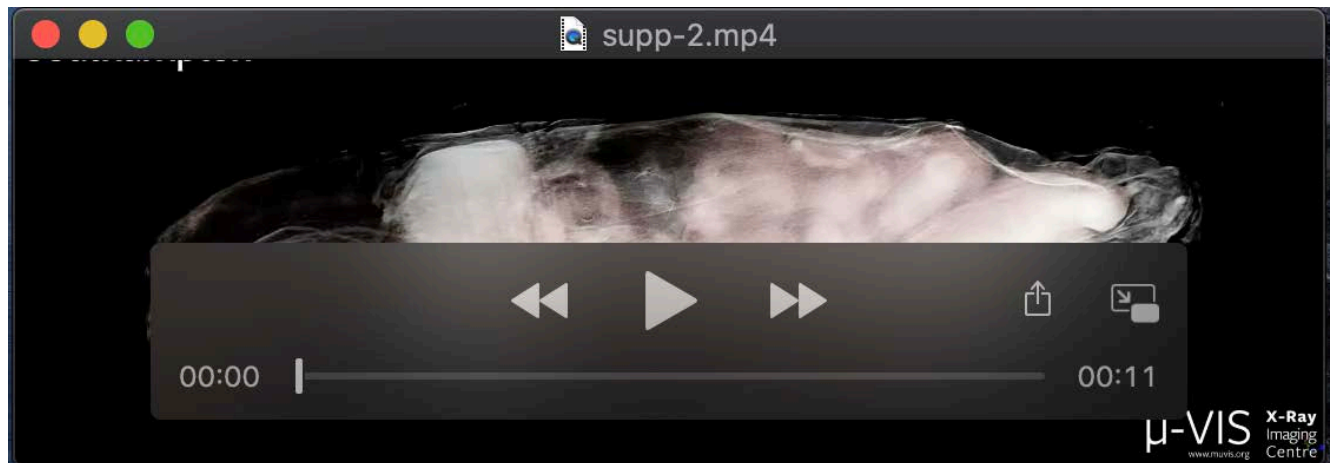


Fig. S3. Micro Computed Tomography (μ CT) imagery of the European eel (*Anguilla anguilla*) swimbladder, infected with parasitic *Anguillicoloides crassus* nematodes. Imagery may also be viewed as 3D pseudo-Xray rendered image in supplementary Movie 1.



Movie 1: 3D pseudo-Xray rendered image of the European eel (*Anguilla anguilla*) swimbladder, infected with parasitic *Anguillicoloides crassus* nematodes.