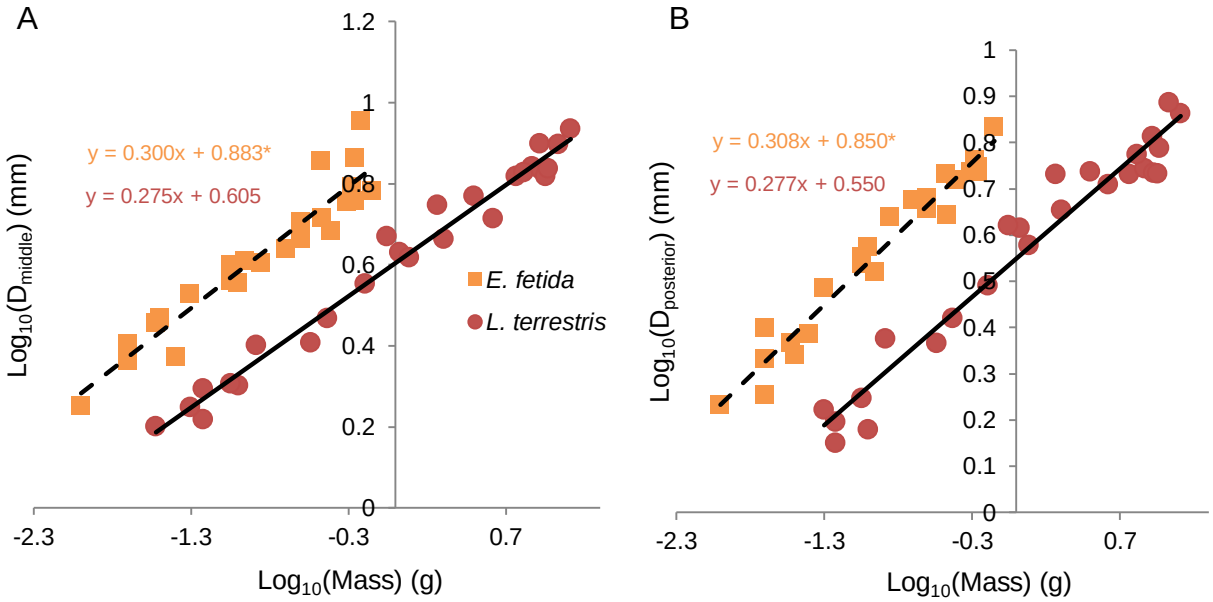

Fig. S1**.** A. Log transformed graph comparing middle diameter, D_{middle} to body mass for *L. terrestris* and *E. fetida*. B. Log transformed graph comparing posterior diameter, $D_{posterior}$, to body mass for *L. terrestris* and *E. fetida*. The regressions shown in 3A and 3B were fit to empirical data using OLS regression (solid line for *L. terrestris*, dashed line for *E. fetida*), and the regression equations for both species are shown. * Indicates a significant difference between species with the Bonferroni correction. N=25 per species.

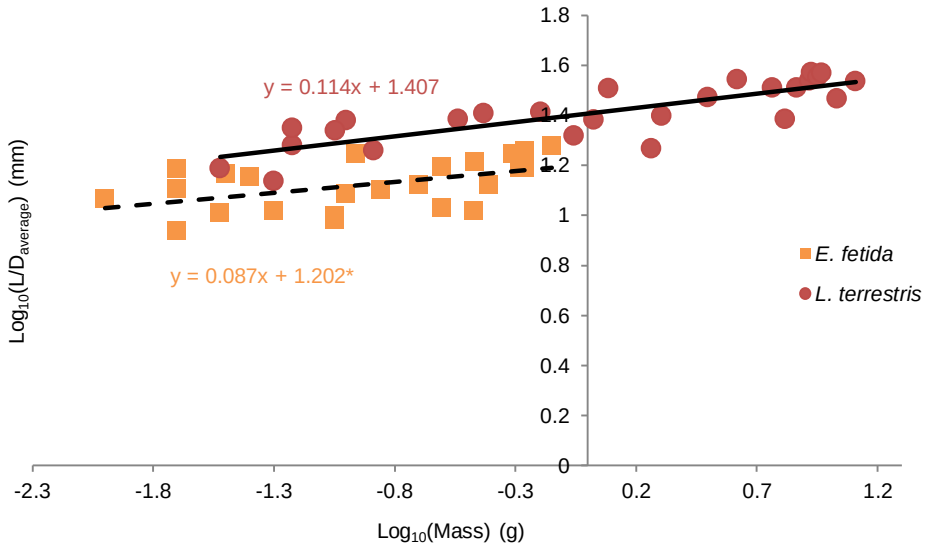

Fig. S2. Log transformed graph comparing the (length/ average diameter) ratio to body mass between *L. terrestris* and *E. fetida*. The regressions were fit to empirical data using OLS regression (solid line for *L. terrestris*, dashed line for *E. fetida*), and the regression equations for both species are shown. * Indicates a significant difference between species with the bonferroni correction. N=25 per species.

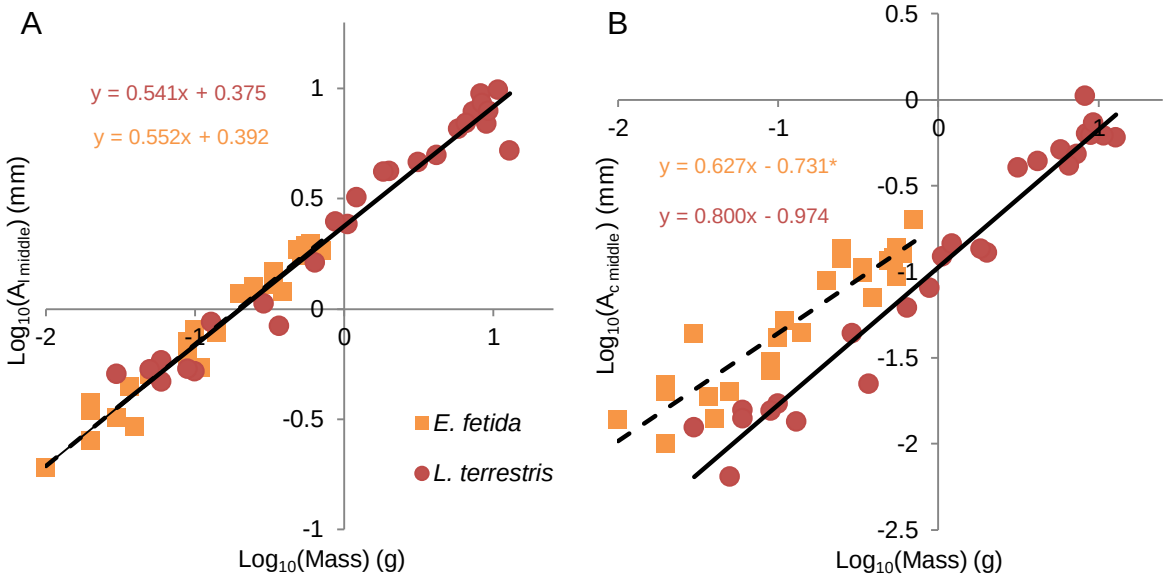

Fig. S3. Ontogenetic scaling of muscle cross-sectional areas in the middle segments**.** $A_{l\ middle}$ and $A_{c\ middle}$ refer to longitudinal muscle and circumferential muscle cross sectional areas in the middle segments, respectively. A. Log transformed graph comparing $A_{l\ middle}$ to body mass for *L. terrestris* and *E. fetida*. B. Log transformed graph comparing $A_{c\ middle}$ to body mass for *L. terrestris* and *E. fetida*. The regressions shown in 1A and 1B were fit to empirical data using OLS regression (solid line for *L. terrestris*, dashed line for *E. fetida*), and the regression equations for both species are shown. * Indicates a significant difference between species with the bonferroni correction. N=25 per species.

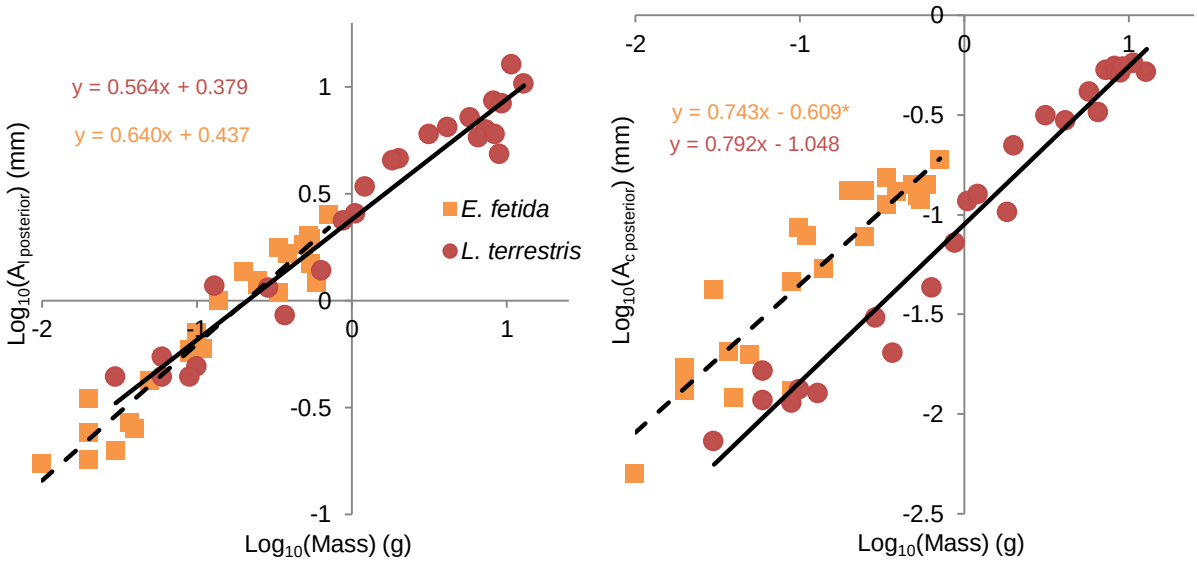

Fig. S4. Ontogenetic scaling of muscle cross-sectional areas in posterior segments**.** $A_{l\ posterior}$ and $A_{c\ posterior}$ refer to longitudinal muscle and circumferential muscle cross sectional areas in the posterior segments, respectively. A. Log transformed graph comparing $A_{l\ posterior}$ to body mass for *L. terrestris* and *E. fetida*. B. Log transformed graph comparing $A_{c\ posterior}$ to body mass for *L. terrestris* and *E. fetida* in the anterior segments. The regressions shown in 1A and 1B were fit to empirical data using OLS regression (solid line for *L. terrestris*, dashed line for *E. fetida*), and the regression equations for both species are shown. * Indicates a significant difference between species with the Bonferroni correction. N=25 per species.

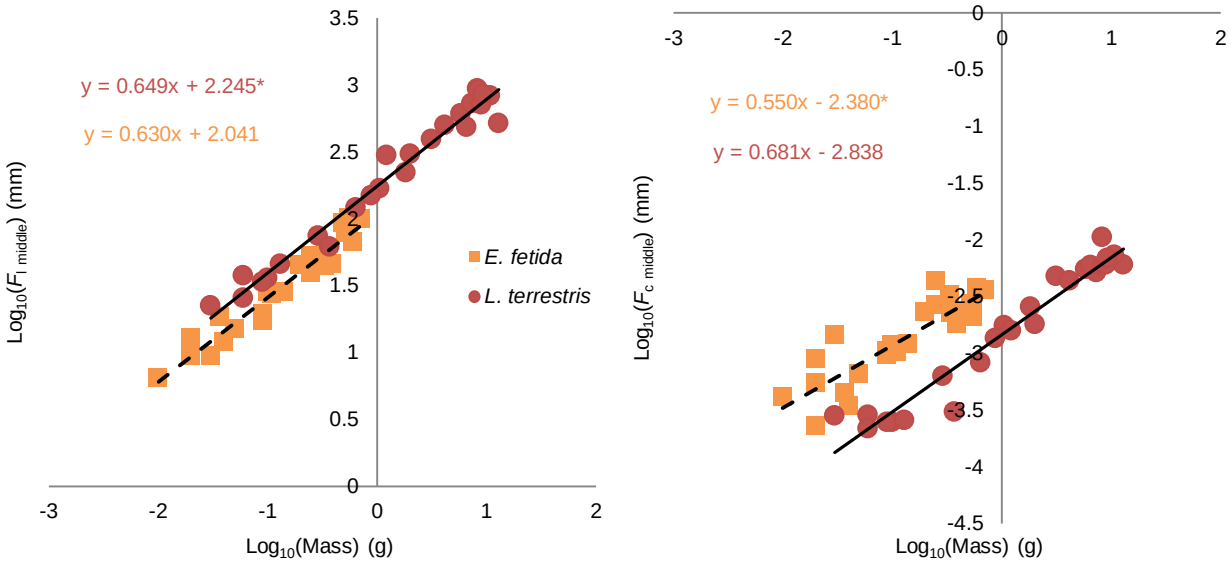

Fig. S5. Comparison of calculated force production with body mass in the middle segments. Force production was estimated for each worm using its mechanical advantage and muscle cross-sectional area. (A) Force production during longitudinal muscle contraction ($F_{l\ middle}$) and (B) force production during circumferential muscle contraction ($F_{c\ middle}$) as a function of earthworm body mass. * Indicates a significant difference between species with the Bonferroni correction. N=25 per species.

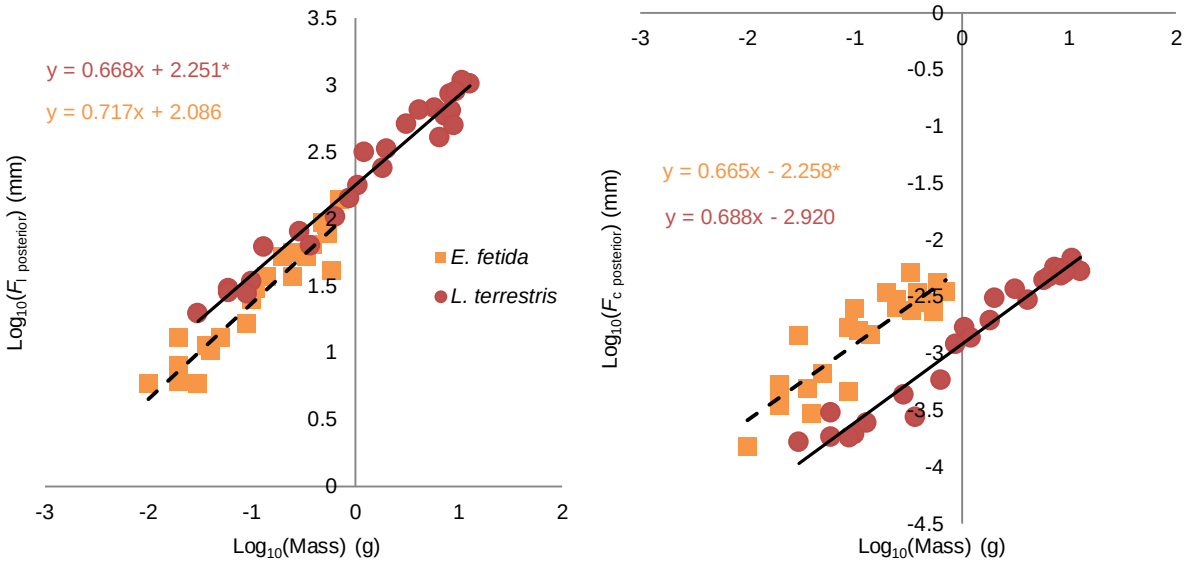

Fig. S6. Comparison of calculated force production with body mass in the posterior segments. Force production was estimated for each worm using its mechanical advantage and muscle cross-sectional area. (A) Force production during longitudinal muscle contraction ($F_{l\ posterior}$) and (B) force production during circumferential muscle contraction ($F_{c\ posterior}$) as a function of earthworm body mass. * Indicates a significant difference between species with the Bonferroni correction. N=25 per species.

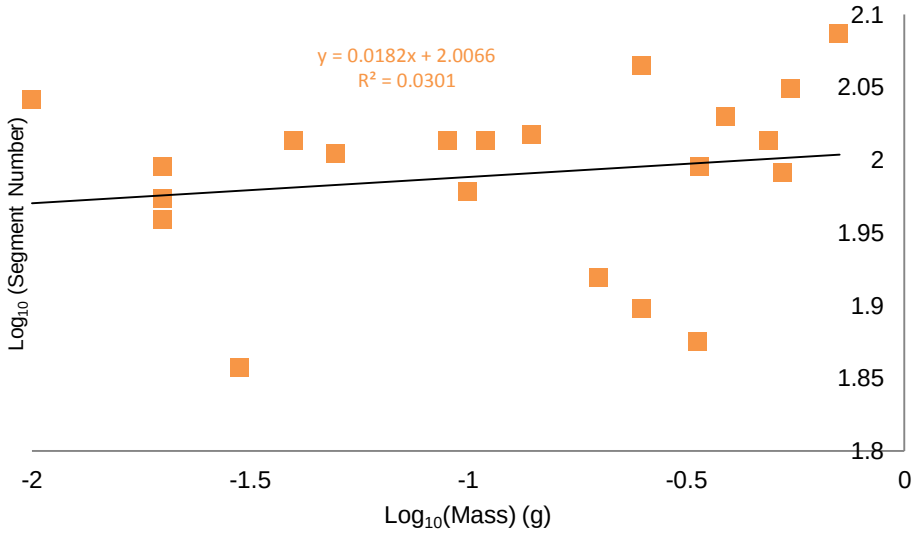

Fig. S7. Log transformed graph comparing segment number to body mass in *E. fetida*. The regression was fit to empirical data using OLS regression and compared with a null slope of zero. * Indicates a significant difference in slope from zero. N=21.