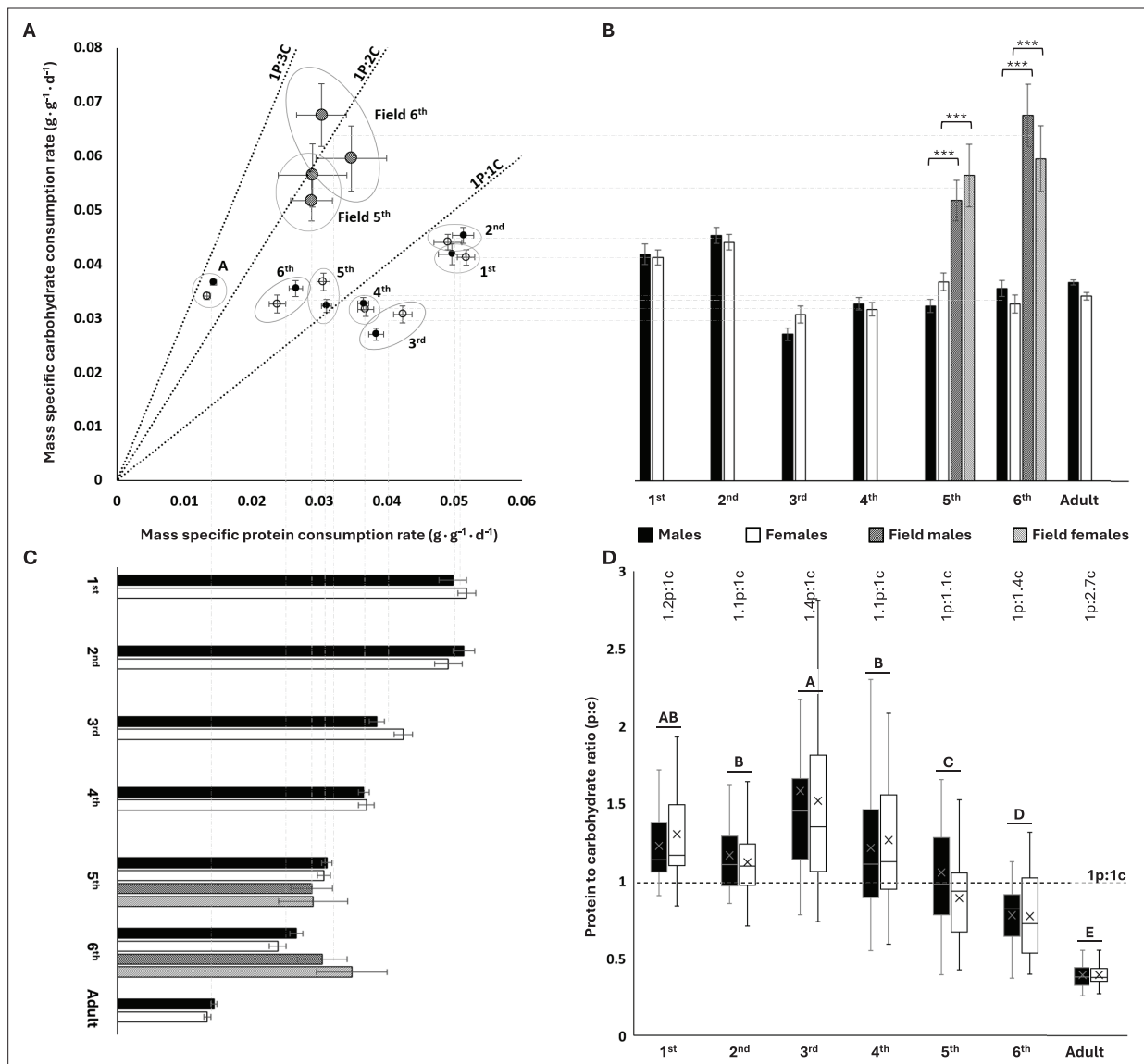


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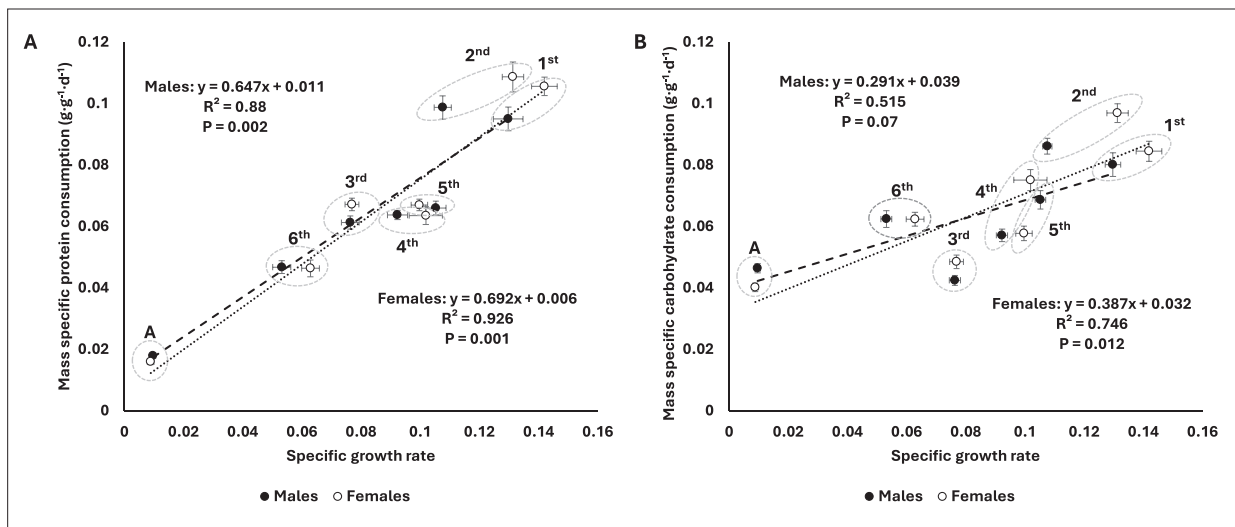
## Figures and figure supplements

Body mass and growth rates predict protein intake across animals

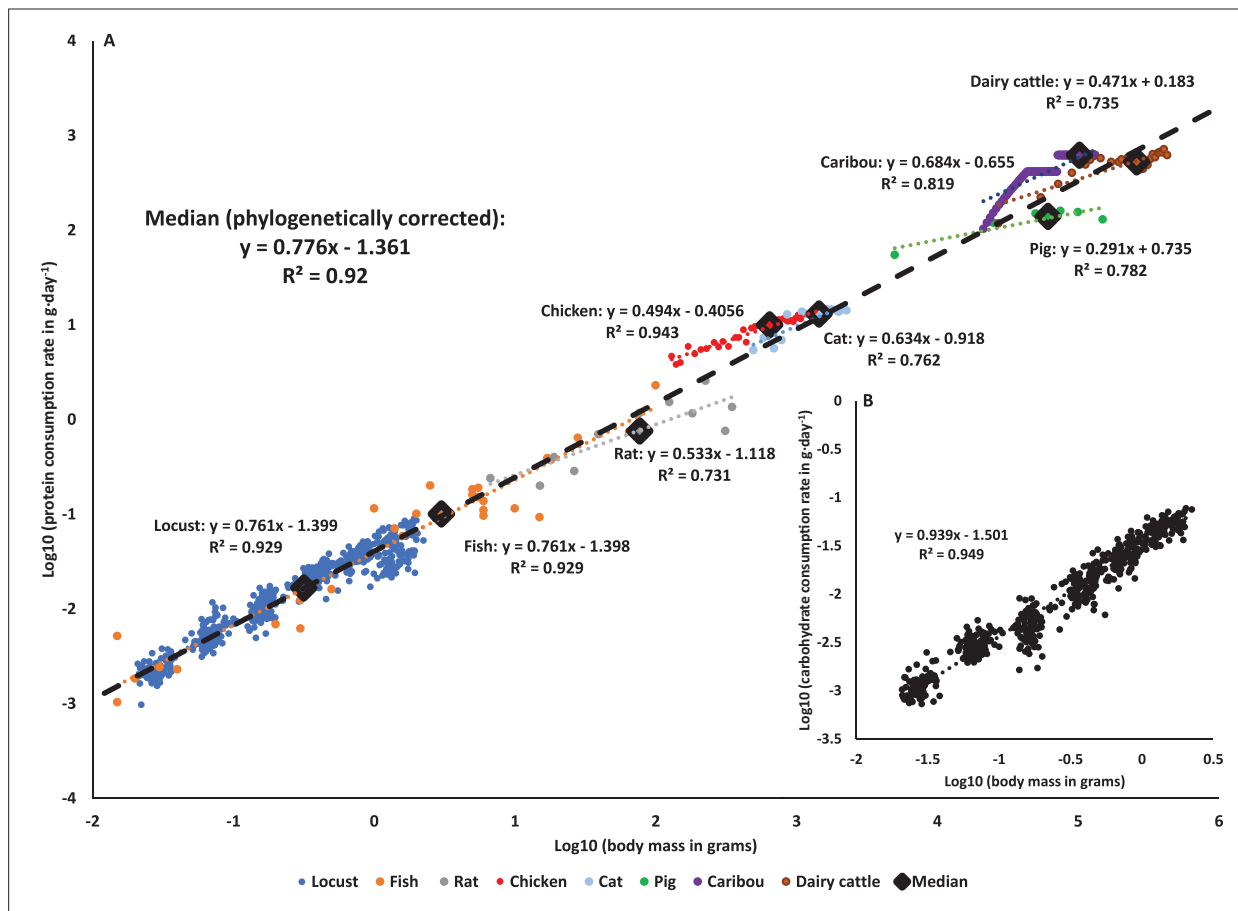
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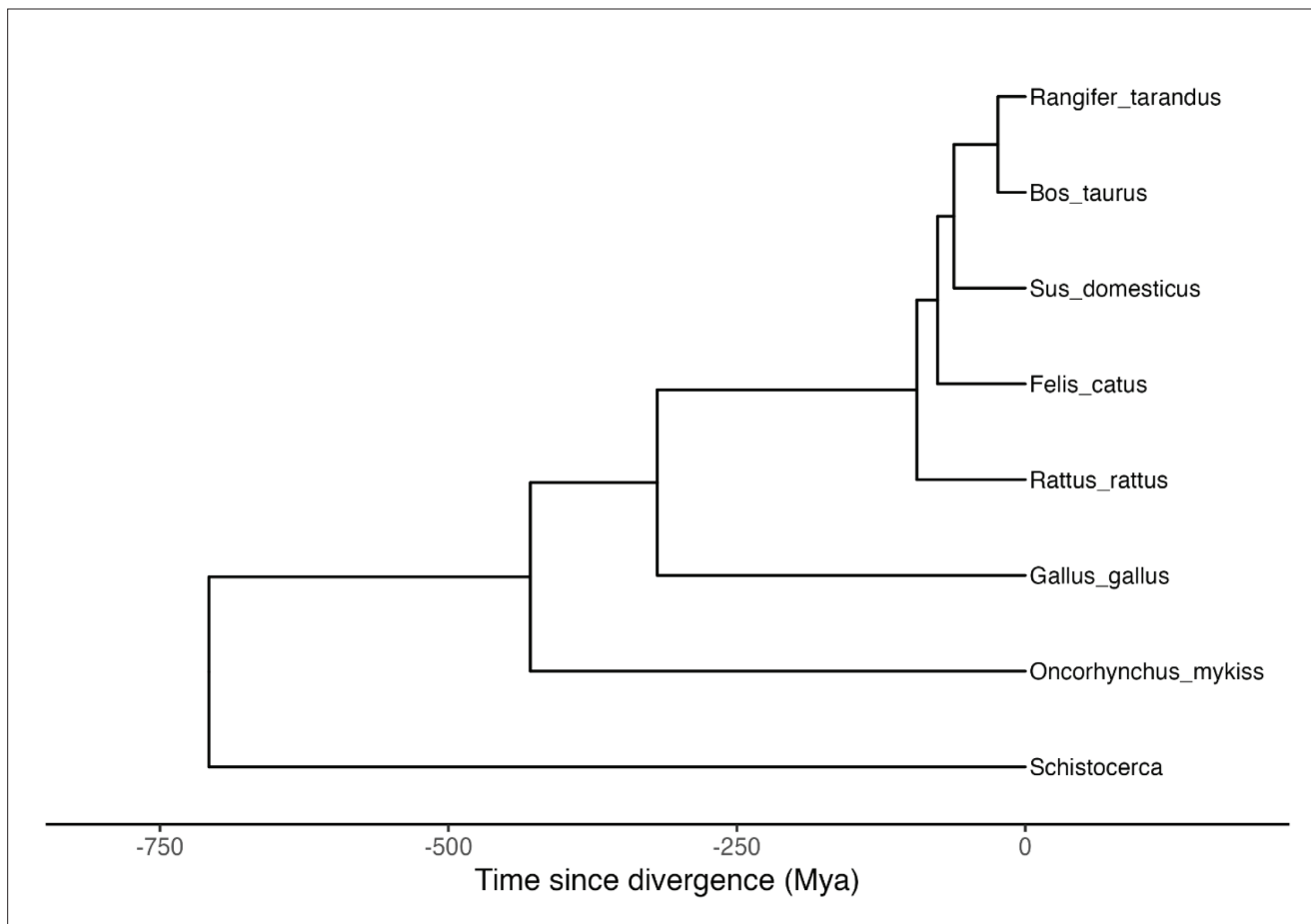
**Figure 1.** Protein and carbohydrate consumptions across different development stages in lab and field population of *Schistocerca gregaria*. (A) Self-selected protein to carbohydrate (p:c) consumption rates decreased systematically during ontogeny. (B) For lab-reared locusts, mass-specific carbohydrate consumption rates were highest in early instars relative to older instars and adults. Field-collected fifth and sixth instars consumed more carbohydrate than lab-reared nymphs. (C) For lab-reared locusts, mass-specific protein consumption declined systematically with age. Field-collected fifth- and sixth- instar nymphs consumed protein at similar rates to lab-reared animals. (D) Young, first to fourth nymph instars self-selected protein-biased intake target ratios, whereas later in development, locusts became carbohydrate-biased (medians and interquartile ranges are represented by the boxes and center line, with an X to indicate the mean). The numbers above the boxes represent life stage averaged (both sexes) p:c intake targets. The post hoc letters were given only when there was no significant interactive developmental stage \* sex effect. For panels (A–C), means and standard errors (SEM) are shown. All consumption rates are in grams per day, divided by the final body mass of the relevant instar. The three asterisks represent significant differences between lab and field populations when  $p < 0.001$ . Throughout, males are black circles/bars and females are white circles/bars; field locusts are represented by striped bars. For sample sizes, see Table 1.



**Figure 2.** Mass-specific protein consumption rate was well-predicted by specific growth rate across ontogeny in both sexes (**A**), whereas mass-specific carbohydrate consumption was only significantly related to specific growth rate in females (**B**). Filled circles and dashed line represent males, whereas opened circles and dotted line represent females. Here, consumption rates in grams per day were divided by initial mass at the relevant instar because the final mass at the instar was a strong determinant of the parameters on both axes. Means and standard errors (SEM) are shown.



**Figure 3.** Macronutrients scaling through ontogeny across animal kingdom. **(A)** Protein consumption rate scales hypometrically throughout development across the animal kingdom (PGLS, slope = 0.776, SE = 0.086,  $t = 9.036$ ,  $p < 0.001$ ). The blue circles: locusts (*Schistocerca cancellata*, this study); orange circles: fish (early development in multiple species [reviewed in [Dabrowski, 1986](#)]); gray circles: rats (*Rattus rattus* [[Ricci and Levin, 2003](#)]); red circles: chicken (*Gallus gallus domesticus* [[Kaufman et al., 1978](#)]); light blue circles: cats (*Felis catus* [[Dickinson and Scott, 1956](#); [Miller and Allison, 1958](#)]); green circles: pigs (*Sus domesticus* [[Black et al., 1986](#)]); purple circles: caribou (*Rangifer tarandus* [[McEwan, 1968](#)]); brown circles: dairy cattle (*Bos taurus* [[Crichton et al., 1959](#)]). Diamonds represent the median value of each taxonomic group (matched by color), and the black dashed line is the across-species phylogenetically corrected regression model (see [Figure 3—figure supplement 1](#) for phylogenetic tree). **(B)** Carbohydrate consumption rates scale hypometrically, a very close to isometrically in *Schistocerca cancellata*.



**Figure 3—figure supplement 1.** Phylogenetically correction and scaling of protein consumption rate across the animal kingdom. The pruned tree used in our analysis represents estimated divergence times among focal taxa. This tree was derived from a larger, time-calibrated tree from [TimeTree.org](https://www.timetree.org/) with 15,029 leaf nodes representing all currently available taxa contained in the clade represented by the focal taxa.