Biochemical food quality effects on a Daphnia hybrid complex

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ABSTRACT: Correlative field studies have shown that the food quality of natural seston for *Daphn* is highly correlated with the content of eicosapentaenoic acid (EPA), indicating that the growth of *Daphnia* in nature is at least seasonally limited by a low availability of this polyunsaturated fatt acid. Here we test the hypothesis that a putative limitation due to limited availability of EPA in natural seston should lead to genetic adaptation in physiological traits reflected in genotype-dependent differences in the ability of sympatric clones of *Daphnia* to cope with these shortag We further test if this adaptation to the low availability of EPA provides another explanation for the coexistence of hybrids with their parental taxa. Standardized growth experiments were performed with and without dietary EPA using clones of three taxa from the *Daphnia longispina* complex: *Daphnia galeata*, *Daphnia hyalina*, and their interspecific hybrids. Fitness was estimate from juvenile somatic growth rates, *g*, and from intrinsic population growth rates, *r*. There was marked interclonal variability in the susceptibilities of *g* and *r* to the absence of EPA from the food, with considerable intraspecific variability. At the taxon level, we noted differences in susceptibility to EPA limitation with regard to the intrinsic rate of population increase *r*, which demonstrates that the availability of EPA affects the relative fitness of hybrids, but not of the parental species. On average, hybrids seemed less susceptible to the absence of EPA than do parental species. Environmental heterogeneity driven by EPA-mediated changes in the quality of food may in consequence contribute to the maintenance of genetic diversity in *Daphnia* and ma be a reason for the temporal dominance of hybrids.