APPENDIX S1: SIGNATURE OF BODY SIZE IN FIELD DATA

In this appendix, we describe methods and results used to show putative size-dependence of transmission rate of the fungal parasite *Metschnikowia bicuspidata* in natural populations of the zooplankton host *Daphnia dentifera*. Sampling methods and locations are described in detail elsewhere (Hall et al. 2005b for Fig. S1 panel a; Cáceres et al. 2006 for panel b) so are only briefly summarized here. We have sampled small, deep, kettle lakes in southwest Michigan with and without epidemics on two spatial scales. In the intensive spatial survey within individual lakes (Hall et al. 2005b), we collected 34 whole water-column samples in the deep basin of Baker Lake using a 153 μm mesh, 13 cm diameter Wisconsin net. Collected animals were diagnosed live in the laboratory and separated into juvenile and adult stages based on size. We compared mean size of adults using a *t*-test assuming separate variances and found higher infection levels in adults than juveniles ($t = 18.8$, $df = 33.5$, $P < 0.0001$; Fig. S1.A)

At the among-lake scale, we pooled net tows of animals collected from three locations in the central, deep basin of 17 lakes (Cáceres et al. 2006). In 2004, several lakes experienced epidemics (with infection prevalence exceeding 1%; Duffy et al. 2005) while others did not. We compared mean size of adults of *Daphnia dentifera* from these two classes of lakes after having estimating mean adult size (top of carapace to base of tail spine) from each lake at 40X magnification using an ocular micrometer. Using a *t*-test based on unequal variances, we found that lakes with epidemics had larger adults than those without epidemics ($t = -3.71$, $df = 13.6$, $P = 0.0025$; Fig. S1.B).

Figure S1. Examples of the signature of a size effect on transmission rate in natural populations. (A). During extensive spatial sampling of Baker Lake in September 2003, adults exhibited much higher infection prevalence than juveniles. This difference could reflect an observation bias to some degree (since it takes several days for infections to become obvious during sampling). However, the experimental results indicated that juveniles should have lower infection prevalence than adults. Bars are means (± 1 SE) of average body size among sites. (B). Adult body size in 17 lakes surveyed during September of 2004. Lakes are grouped categorically as having an epidemic (defined as infection prevalence greater than one percent) or not. Bars are means (± 1 SE) of average body size among lakes.