Supplemental Figure. We use the model by Andersson and Eriksson (1982) to show how models of optimal host clutch size under within-species (conspecific) brood parasitism can be used to quantitatively explore the effectiveness of clutch size adjustment as a tolerance mechanism. The model was developed for precocial birds like goldeneye ducks (*Bucephala clangula*) and assumed that the proportion of offspring fledged P decreased in a negative linear relationship with the total number of eggs in a nest, b. Thus, the proportion of hatched offspring that survive to fledge is $P = 1 - ab$, where the constant a is the slope of the relationship between total clutch size (host plus parasite eggs) and offspring survival. The larger the value of a, the greater the strength of negative density-dependence within the brood, and the higher the cost of brood parasitism to hosts. With this assumed pattern of offspring survival, the optimal clutch response for a parasitized host is to reduce the number of eggs she lays by half an egg for each egg the parasite lays in her nest (see Andersson & Eriksson 1982). If we now evaluate a female's fitness under two other scenarios—in the absence of parasitism (solve for optimal host clutch size with zero parasite eggs) and with parasitism but without tolerance (the host lays the clutch size that would be optimal in the absence of parasitism but parasitic eggs are also added to the clutch)—we can determine the effectiveness of tolerance for recouping fitness lost due to parasitism. In all three scenarios, once the host's optimal clutch size is determined, her fitness is determined by multiplying her clutch size by the value of P determined for the total number of eggs in the nest, both host and parasite. Comparing these three fitness estimates indicates the degree to which tolerance recoups fitness lost to parasitism and hence the relative fitness benefit of tolerance. Following Andersson & Eriksson's (1982) original analysis, we assumed that parasites lay 6 eggs in the host nest and contrasted host fitness estimates for two different values of the slope parameter, $a = 0.03$ and $a = 0.05$ (in their Figure 2 Andersson and Eriksson explored optimal host clutch size when parasites lay 4 eggs or 8 eggs (we assumed 6 parasitic eggs, the mean of these two values) and they assumed $a = 0.05$ (we assumed this value and also the less costly value of 0.03)). Under these assumptions, tolerance recoups only a small amount of the fitness costs of brood parasitism (Figure).

References

Andersson M, Eriksson MOG. 1982. Nest parasitism in goldeneyes *Bucephala clangula*—some evolutionary aspects. *Am Nat.* 120:1–16