

# Strategies for introducing *Wolbachia* to reduce transmission of mosquito-borne diseases

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## Text S4: The effect of juvenile density-dependent mortality on the required number of released females.

From the results in Figure 2A, showing *Wolbachia* introduction into a seasonally fluctuating mosquito population, we concluded that male-biased releases require between  $\frac{1}{2}$ - $\frac{1}{3}$  the number of females to be introduced compared to equal sex-ratio releases, across a range of different release times. Here we explore how the form of juvenile density-dependent mortality affects this conclusion. For each release sex-ratio the required releases sizes were compared for two populations, one in which density-dependence is relatively strong ( $\beta=0.3$ ) and the other in which it is weaker ( $\beta=0.1$ ). For the population with strong density-dependence,  $\alpha$  was set to 0.019 during the six month high abundance period and 0.038 for the rest of the year. For the population with weaker density-dependence,  $\alpha$  was set to 0.13 during the six month high abundance period and 0.19 for the rest of the year. These values of  $\alpha$  were specified so that the total annual adult recruitment in the absence of *Wolbachia* was the same for both populations. However the pattern of seasonal variation in mosquito abundance differs between the different density-dependence forms (Figure S3).

Assuming a release strategy of 30 daily releases, Figure S3 compares the minimum required release size, and the corresponding number of introduced females, for equal sex-ratio and 95% male-biased releases for weak (Figure S3A) and strong (Figure S3B) density-dependence. For both forms of density-dependence  $\frac{1}{2}$ - $\frac{1}{3}$  the number of females was required for male-biased compared to equal sex-ratio releases, across all release times.

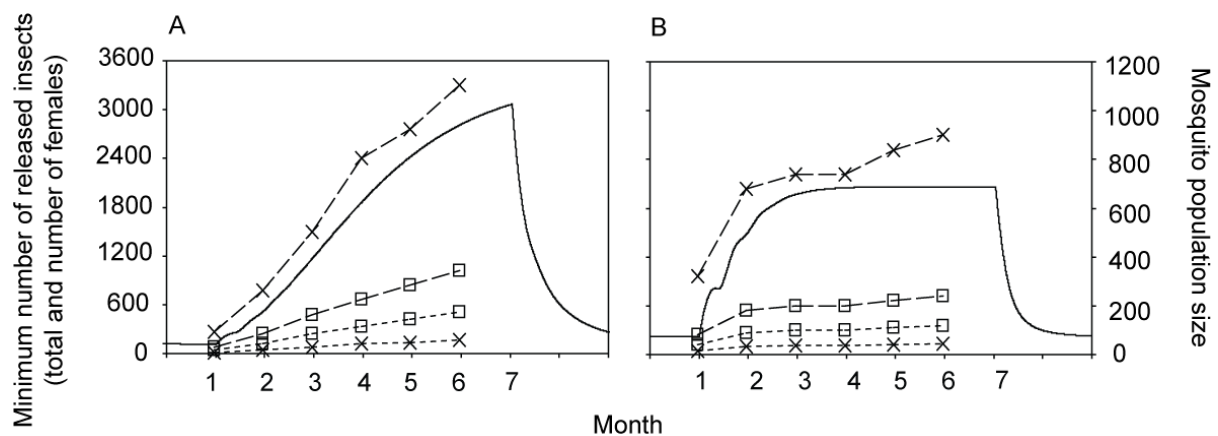


Figure S3. The mosquito abundance (solid line), the minimum total number of released mosquitoes required for *Wolbachia* spread (dashed lines), and the number of released females (dotted lines) for different release times. Open squares show equal sex ratio releases and

crosses show 95% male releases. Panels A and B show weak ( $\beta=0.1$ ) and strong ( $\beta=0.3$ ) density-dependence respectively. Values of the larval carrying capacity  $\alpha$  are specified as described in the text, and other parameters are as in Table 1.