**Supplementary Material**

**Supplementary Methods**

Colonies that were used from the University of Leeds apiary for production of experimental bees for experimental work.

Workers were taken from colonies Am1102, Am1103, Am1111, Am1113, Am1117, Am1123, Am1128, Am1137, Am1138 and Am1139.

Drones were taken from colonies Am1101, Am1102, Am1109, Am1110, Am1111, Am1115, Am1123, Am1130 and Am1138.

**Supplementary Results**

In addition to the main analyses presented, the four colonies (Am1102, Am1111, Am1123, Am1138) that provided individuals for both the worker and drone experiments were also analysed together. There was a significant interaction between the ratio of susceptible: infected individuals in a group and whether the experiment was carried out with the workers or drones, on the proportion of susceptible individuals that became infected by the end of the experiment (χ24,273 =10.76, *P* =0.029). The spore production of experimentally infected individuals was also found to be affected significantly by the interaction between the ratio of susceptible: infected individuals and whether the infected individuals were drones or workers (χ25,12 =17.18, *P* =0.004). The spore production for the susceptible individuals, however, did not show a significant interaction between the ratio of susceptible: infected and the whether the experiment was with workers or drones (χ25912 =10.99, *P* =0.276). Survival analysis of the colonies showed that there was a significant effect on the survival of the experimentally infected individuals and whether they were workers or drones (χ211 =53.88, *P* <0.001). The susceptible individuals also showed different survival depending on whether they were with infected individuals that were workers or drones (χ211 =24.35, *P* <0.001).

**Supplementary figure legends**

**Fig. S1:** Schematic outline of experiment testing the effect of the ratio of infected:susceptible individuals on transmission of the *Nosema ceranae* parasite in honeybees. Cohorts of uninfected honeybee workers (unshaded) were grouped with (a) workers or (b) drones that had been experimentally infected with the parasite (shaded), at infected:susceptible ratios of 5:5, 4:6, 3:7, 2:8, 1:9 or 0:10 (control). The number of replicate colonies tested at each ratio is given next to each box in parentheses.

**Fig. S1**

