revealed a significant difference between call stimuli ($F_{2,135} = 3.64$, $P = 0.027$) and a significant interaction between the two factors ($F_{2,270} = 6.58$, $P = 0.002$).

In mated females, the mate's call evoked greater auditory responses than the unfamiliar call (Fig. 5B; $F_{1,135} = 7.74$, $P = 0.01$). We then focused on the distribution of responses to these two call stimuli in a preliminary attempt to assess their representation in the NCM. A significant difference in the distribution of RS values was found between the mate's call and the unfamiliar call (interval size 0.2; 10 intervals from −1 to +1; $\chi^2 = 22.3$, d.f. = 9, $P = 0.007$). Importantly, the proportion of NCM single units exhibiting robust auditory responses to the two calls was similar: both call stimuli elicited a response with an RS value of > 0.6 from half of the NCM single units (Fig. 8A, left). The difference in distribution between the two stimuli lay in the proportion of neurons that showed very low $RS_{unfamiliar}$ values. As independent cumulative distributions do not indicate whether a neuron that responded strongly to the unfamiliar call also responded strongly to the mate's call and *vice versa*, we plotted RS values for the unfamiliar call against RS values for the mate's call for all single units (Fig. 8A, right). Most neurons with an $RS_{unfamiliar}$ of ≤ 0.6 are biased toward the mate's call (28/32 cells) while most neurons with an $RS_{unfamiliar}$ of > 0.6 responded robustly to both call stimuli. In the light of the results, one could assume that the subset of cells that responded weakly to the unfamiliar call ($RS_{unfamiliar} \leq 0.6$) supported the overall preference in terms of mean RS for the mate's call over the unfamiliar call. Further analysis of the degree of discriminability in the response to the call stimuli using a selectivity index (the d' index) served to address this issue (see below).

Playback of the familiar call also elicited stronger responses than the unfamiliar call ($F_{1,135} = 4.34$, $P = 0.04$). Again, the distribution of the number of neurons according to their RS values differed between the two call stimuli ($\chi^2 = 16.6$, d.f. = 9, $P = 0.05$). The main difference lay in the proportion of neurons that displayed very low response magnitudes (data not shown). Lastly, our results did not reveal any difference in neuronal responses between the mate's call and the familiar call ($F_{1,135} = 0.83$, $P = 0.37$; distribution of RS values, $\chi^2 = 14.3$, d.f. = 9, $P = 0.11$).

Previous statistical analyses used data from each single unit as a sample. The number of recorded single units however differed between mated females (range, 2–9). To minimize the possible effects of this difference, the number of data points was reduced to match the number of females. Using mean RS values per bird, we found a similar pattern of results (mate's call, 0.63 ± 0.04; familiar call, 0.60 ± 0.04; unfamiliar call, 0.52 ± 0.07; Friedman test, $P = 0.046$). The mate's call as well as the familiar call evoked stronger auditory responses than the unfamiliar call (Wilcoxon test, mate vs. unfamiliar, $P = 0.015$; familiar vs. unfamiliar, $P = 0.035$) with no difference between the mate's call and the familiar call ($P = 0.37$).

In control females, each of the three call stimuli, all of which were unfamiliar, could also elicit very strong responses (see mean RS value in Fig. 5C). Analysis of call-evoked responses did not reveal any difference in RS between the three call stimuli ($P > 0.41$ for all comparisons), nor did the distributions of RS values differ between call stimuli ($P > 0.35$ for all comparisons). Importantly, when $RS_{unfamiliar}$ was plotted against RS_{mate} within cells, cells that responded weakly to the unfamiliar call ($RS_{unfamiliar} \leq 0.6$) did not show a clear preference for the mate's call (Fig. 8B). Therefore, the calls used as auditory stimuli in the present study did not differ in their potential to drive auditory responses in the NCM of control females.

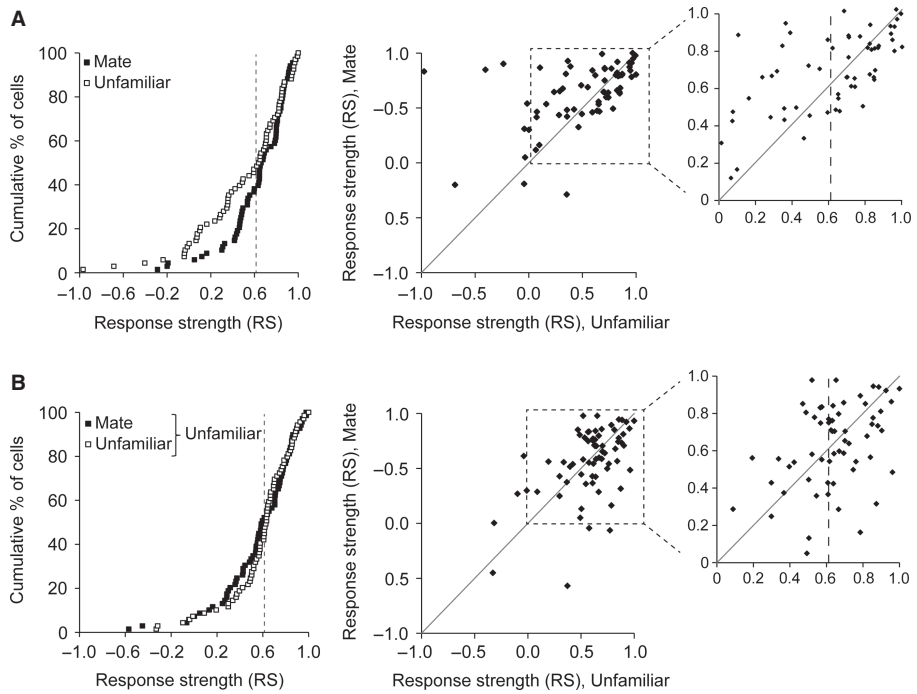

FIG. 8. (A) A subset of cells show a preference for the mate's call over the unfamiliar call in anesthetized mated females. (B) No such preference was seen in control females. Cumulative distributions (left panels) of the strength of responses evoked by the mate's call (filled squares) or the unfamiliar call (open squares). Each square represents a single unit. Single units were ordered according to their RS value. Note that cumulative distributions overlap in control females. Within-cell comparisons of RS values (middle panels). The RS for the mate's call (*y*-axis) is plotted against that for the unfamiliar call (*x*-axis). The figure on the right is an enlargement of the inset. Each dot represents a single cell. The diagonal line represents equal responsiveness to both stimuli. Points to the left of the diagonal line are biased toward the mate's call while points to the right are biased toward the unfamiliar call. In mated females, most of cells with an RS of ≤ 0.6 (dashed line) were to the left of the diagonal line.