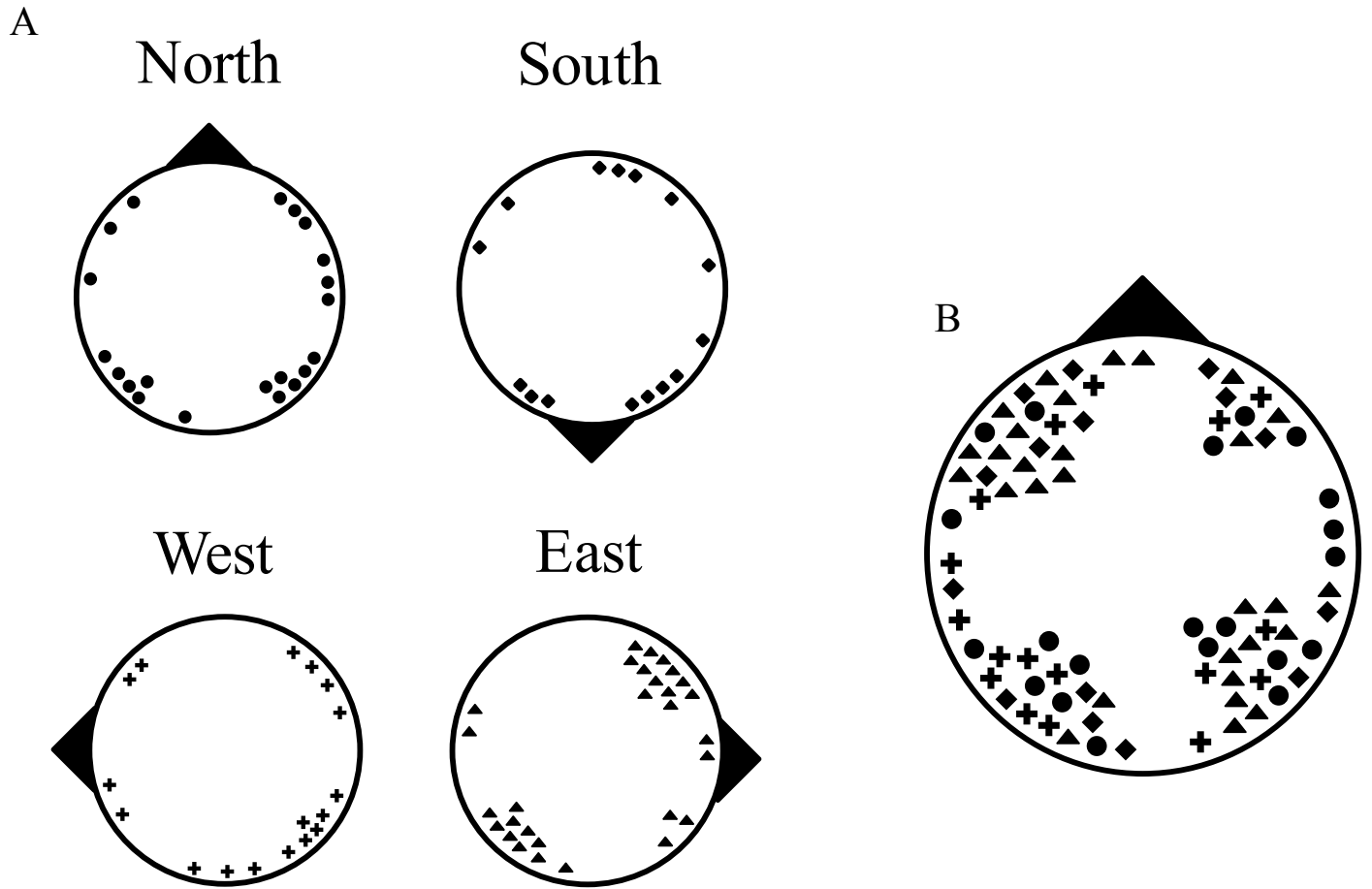


**Fig. S1.** Spontaneous orientation of second instar *Drosophila melanogaster* larvae relative to the alignment of magnetic north (black triangles). Distributions of topographic bearings for Berlin, Canton-S and Oregon-R  $\times$  Canton-S larvae showing bearings of each larva in the four testing fields. In only one condition was there a non-uniform distribution (Berlin strain, west magnetic field alignment; 231 deg,  $r=0.93$ ,  $P=0.005$ ) indicating that the overall quadramodal distributions were not dependent on the alignment of magnetic north. Furthermore, there is no consistent unimodal bias in the distributions of topographic bearings (Fig. 1, left) or magnetic bearings (Fig. 1, center) for any of the strains, or in the pooled distributions of topographic bearings (Fig. 2, left) or magnetic bearings (Fig. 2, center), that could account for the significant clustering of quadrupled bearings (Figs 1 and 2, right). Black dots indicate individual larval bearings. For non-random distributions ( $P<0.05$ , Rayleigh test), the black arrow represents the mean angle of the distribution with the length of the arrow indicating the mean vector length ' $r$ ' (radius of each circle corresponds to  $r=1$ ). Dashed line indicates the 95% confidence interval for the mean vector bearing.



**Fig. S2.** Pooled distributions of bearings from three stains of second instar *Drosophila melanogaster* larvae. (A) Distributions of topographic bearings obtained in each of the four alignments of magnetic north (magnetic north aligned to north, south, west or east). (B) Pooled distribution of bearings from all four alignments of the magnetic field plotted relative to magnetic north. Symbols indicate individual larval bearings and correspond to those shown in A. Black triangles at the edge of each circle indicate the direction of magnetic north. The unimodal distributions of bearings pooled from all three strains were indistinguishable from random in all four alignments of magnetic north, as well as when the data were pooled with respect to magnetic north ( $P > 0.10$ , Rayleigh test) indicating that there was no consistent unimodal orientation relative to the magnetic field.