Supplementary Information

Effect of Seafood (Gizzard Shad) Supplementation on the Chemical Composition and Microbial Dynamics of Radish Kimchi during Fermentation

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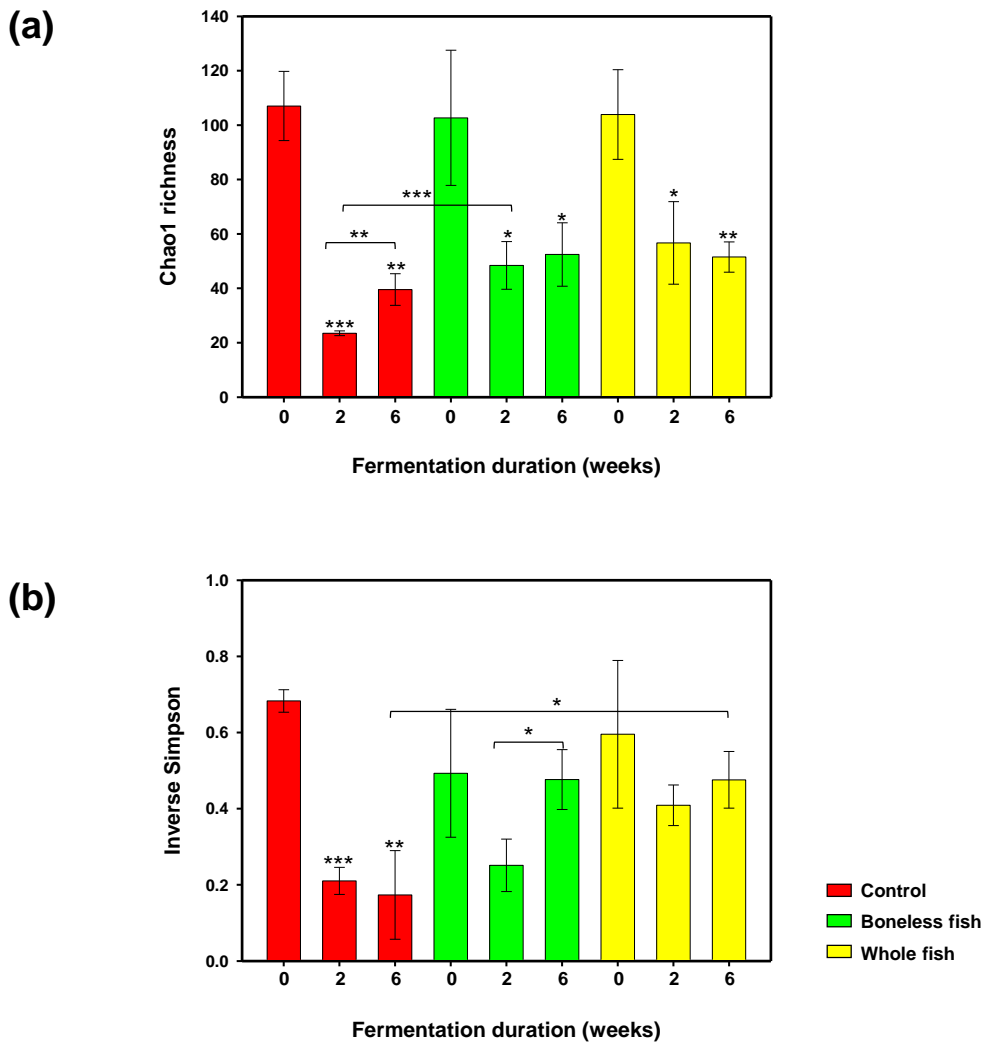
Figure S1 Alpha diversity of radish kimchi microbiota prepared by adding 10% boneless or whole gizzard shad fish slices over different fermentation durations. The control kimchi group was prepared without adding gizzard shad fish. (a) Chao1 diversity index and (b) Inverse Simpson's index. Data are represented as the mean ± standard deviation for each kimchi group. *** $P < 0.001$, ** $P < 0.01$, and * $P < 0.05$.
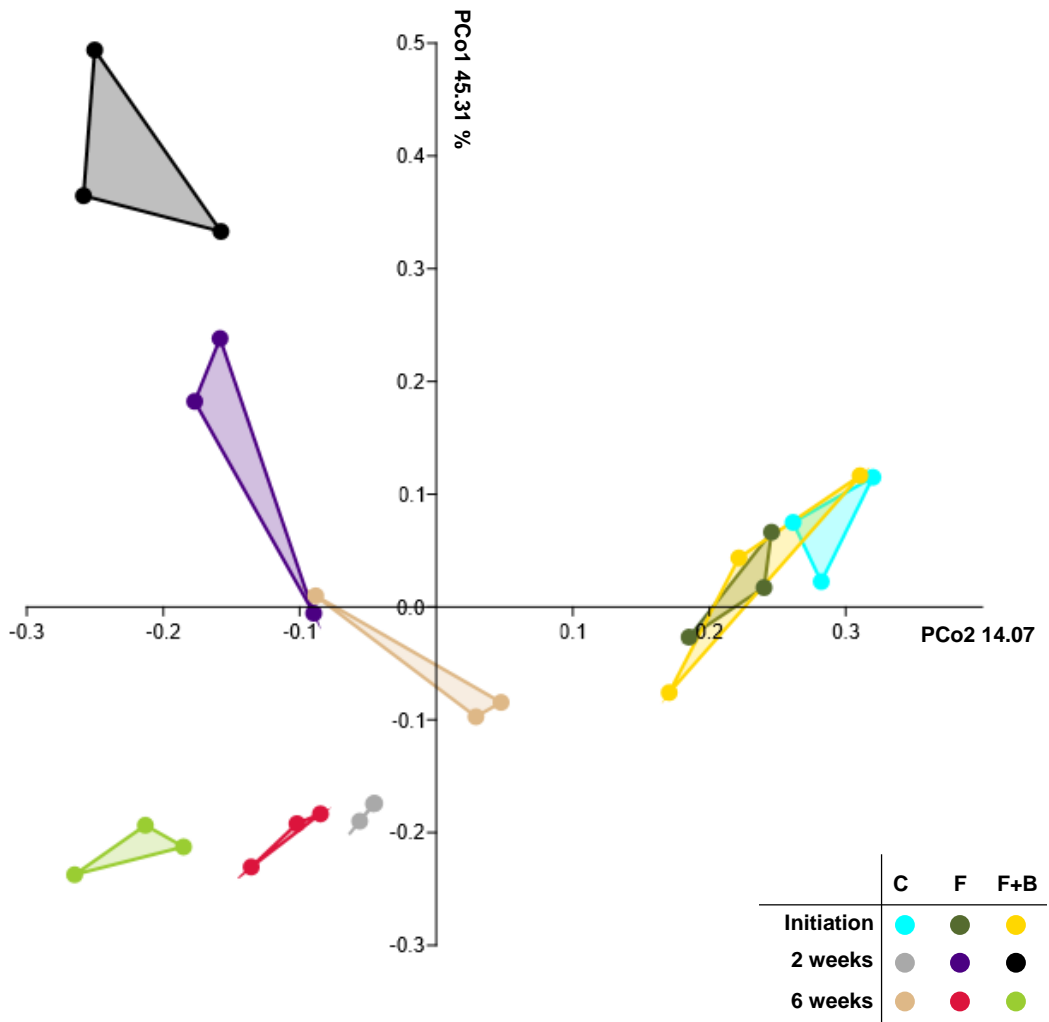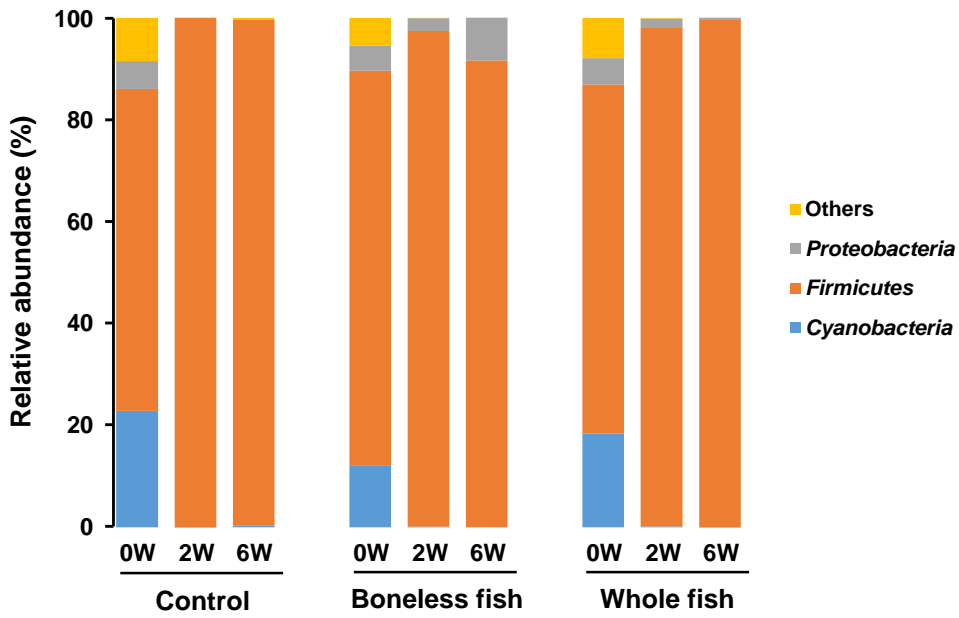
Figure S2 Principle coordinate analysis (PCoA) of the Euclidean distance representing the beta-diversity in the microbiota of radish kimchi prepared by adding 10 % boneless or whole gizzard shad fish slices over different fermentation time points. Each dot represents a replicate of the different groups of kimchi prepared by adding 10 % boneless or whole gizzard shad fish slices over different fermentation time points (initiation, 0 weeks; optimal ripening, 2 weeks; over ripening, 6 weeks). The control kimchi group was prepared without adding gizzard shad fish. Clustering was clear between the kimchi groups at the initiation of the fermentation and at the optimum-ripening and the over-ripening stages.
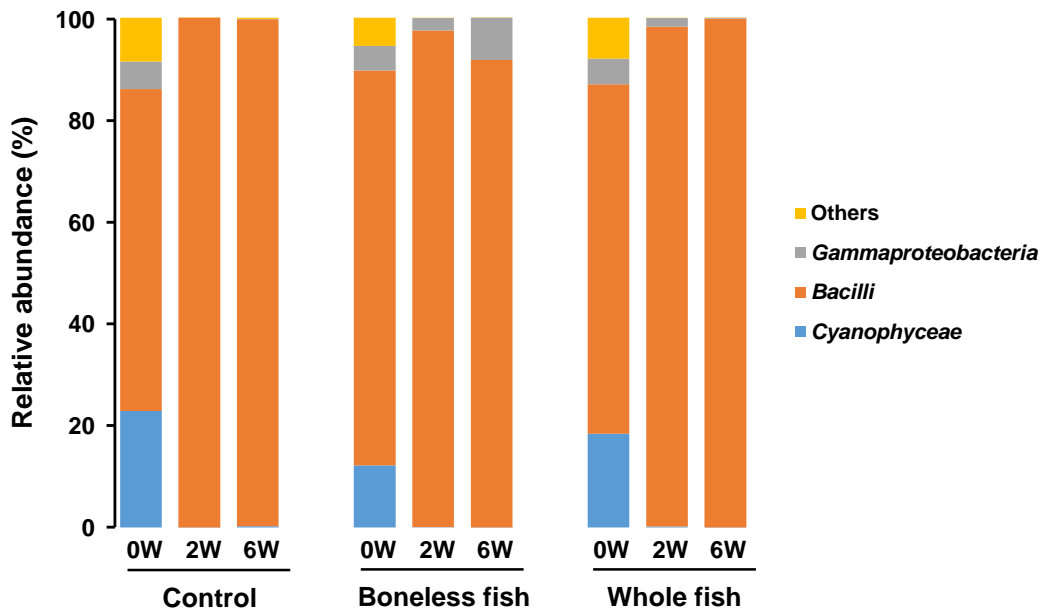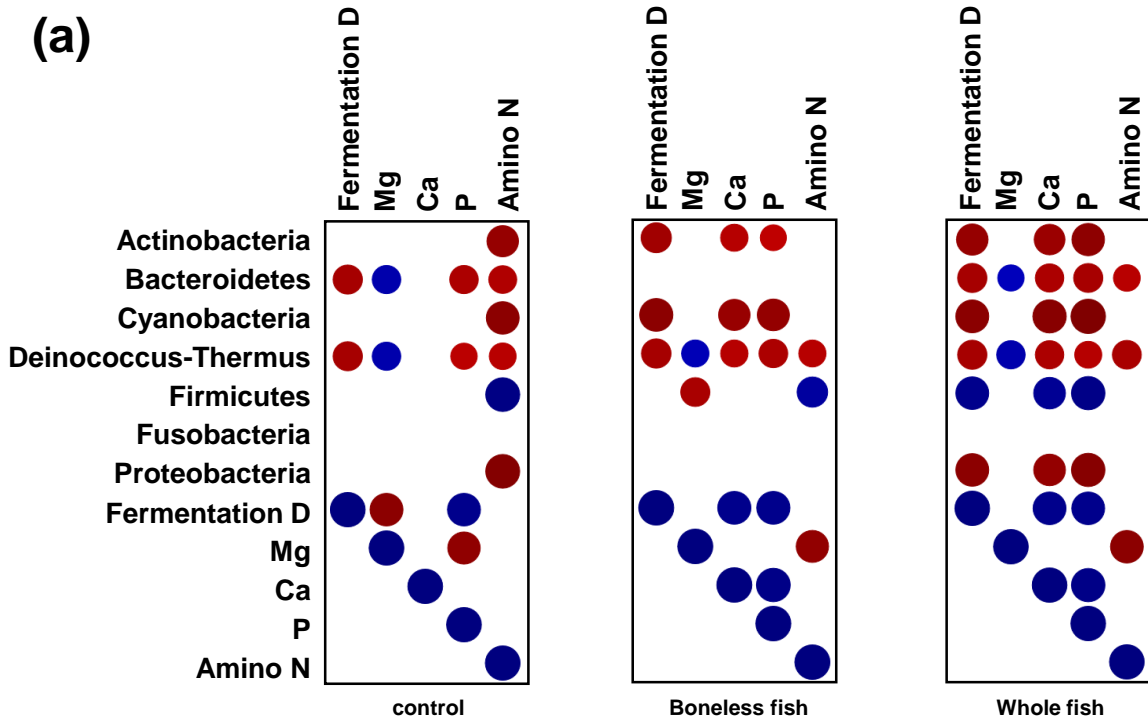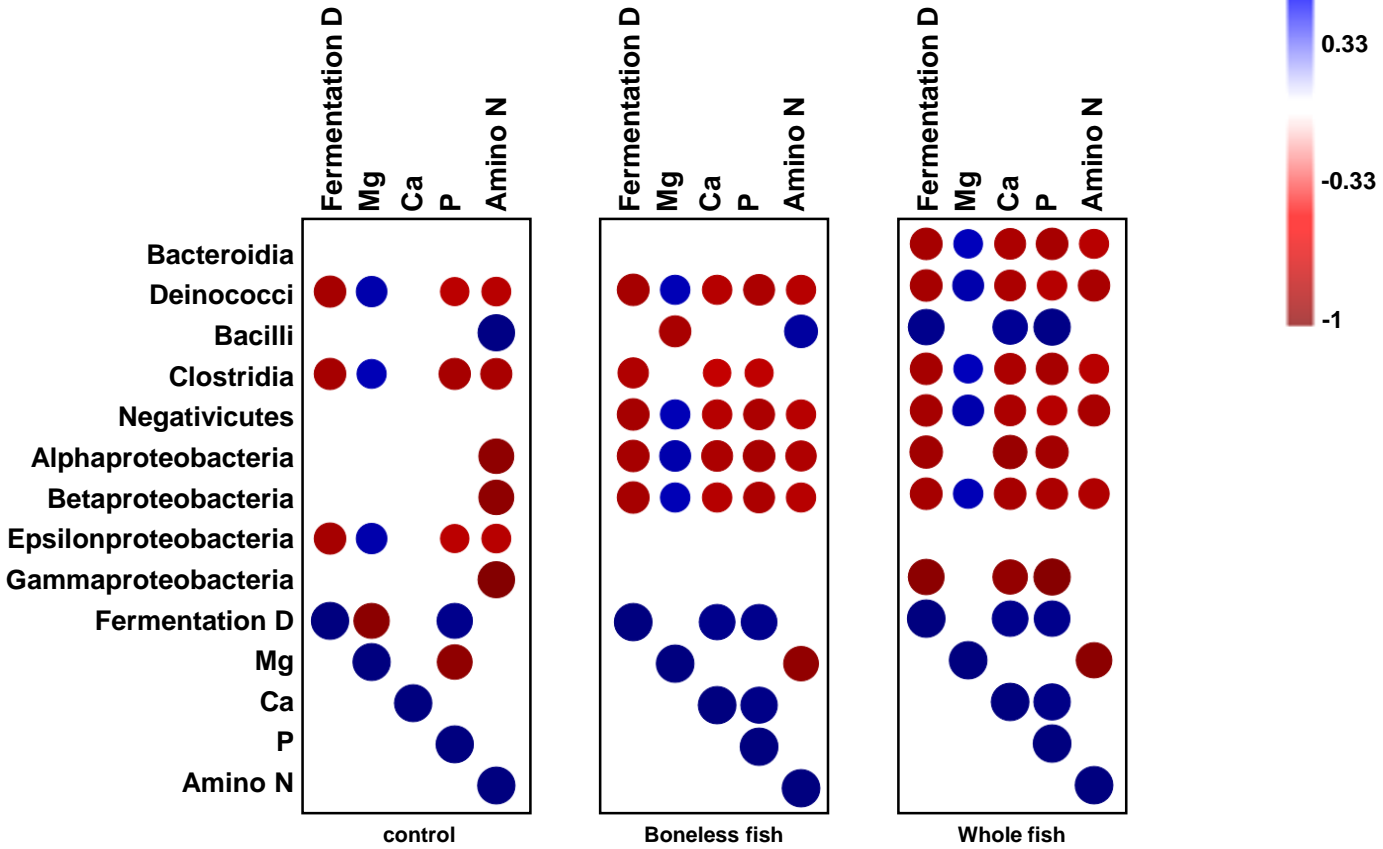
(a)

(b)

Figure S3 Stacked bar graphs representing the microbiome composition of radish kimchi prepared by adding 10% boneless or whole gizzard shad fish slices over different fermentation durations. The microbial composition at the (a) phylum level and (b) class level.
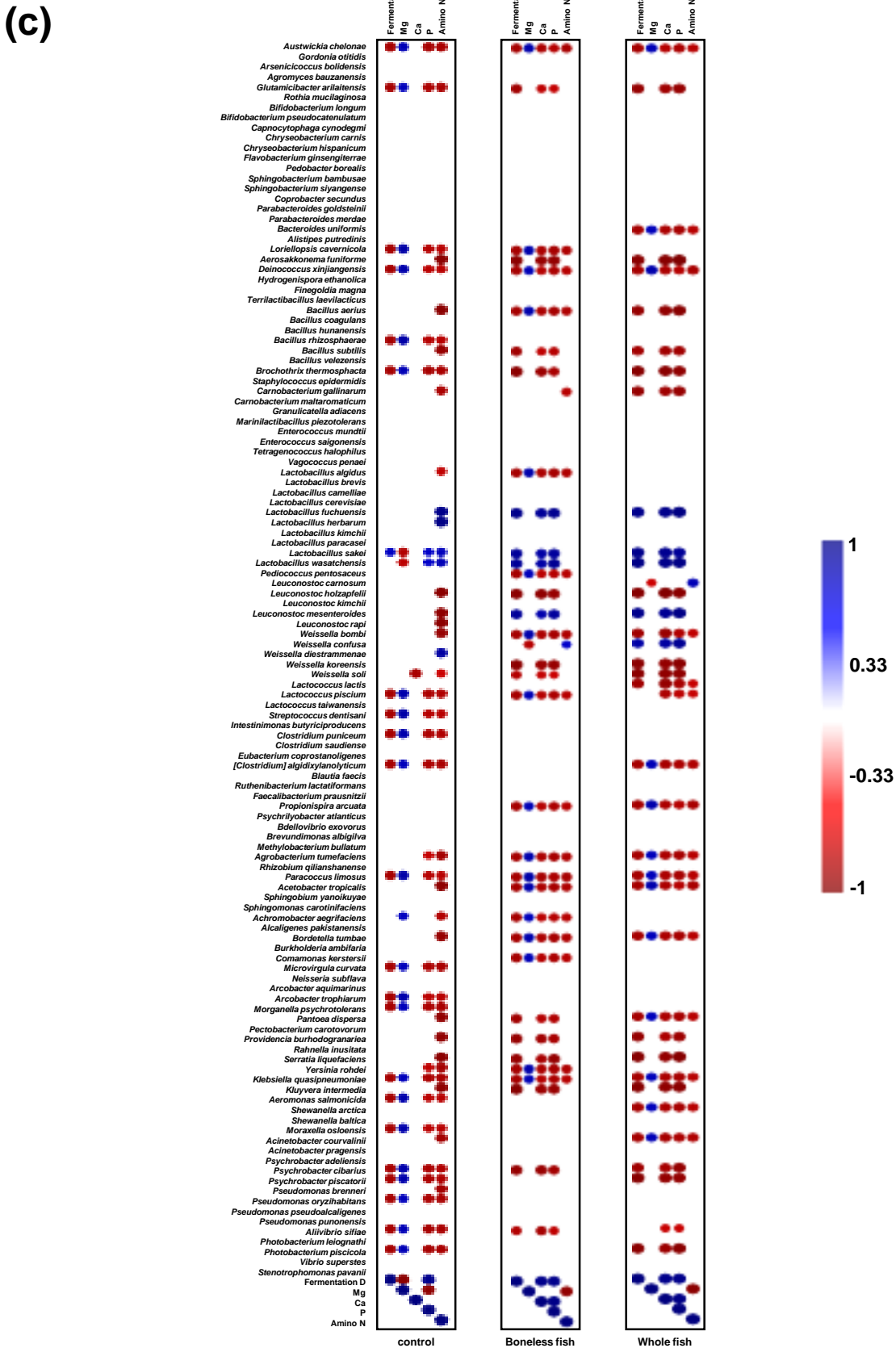
(a)

(b)

Figure S4 Correlograms representing the matrices of Spearman's rank order correlation coefficient (r) between different bacterial taxa at (a) phylum, (b) class and (c) species levels and different fermentation durations, the contents magnesium (Mg), calcium (Ca), phosphorus (P) and the content of amino nitrogen (N). Radish kimchi was prepared by adding 10 % boneless or whole gizzard shad fish slices. The control kimchi group was prepared without adding gizzard shad fish. Only significant (*P* < 0.05) positive (blue) and negative (red) correlations are shown in the graph.