

Supplementary material

Chili pepper extends lifespan in a concentration-dependent manner and confers cold resistance on *Drosophila melanogaster* cohorts by influencing specific metabolic pathways

Uliana V. Semaniuk^a, Dmytro V. Gospodaryov^a, Olha M. Strilbytska^a,
Alicja Z. Kucharska^b, Anna Sokół-Lętowska^b, Nadia I. Burdyliuk^a,
Kenneth B. Storey^c, Maria M. Bayliak^a, Oleh Lushchak^{*a,c}

^aDepartment of Biochemistry and Biotechnology, Vasyl Stefanyk Precarpathian National University, Shevchenka 57, 76018, Ivano-Frankivsk, Ukraine;

^bDepartment of Fruit, Vegetable and Plant Nutraceutical Technology, Wrocław University of Environmental and Life Sciences, Chelmońskiego 37, 51-630 Wrocław, Poland;

^cInstitute of Biochemistry, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario K1S 5B6, Canada;

^dResearch and Development University, 13a Shota Rustaveli str., Ivano-Frankivsk, 76000, Ukraine

Corresponding author:

*Oleh Lushchak, Department of Biochemistry and Biotechnology, Vasyl Stefanyk Precarpathian National University, Shevchenka 57, 76018, Ivano-Frankivsk, Ukraine; oleh.lushchak@pnu.edu.ua

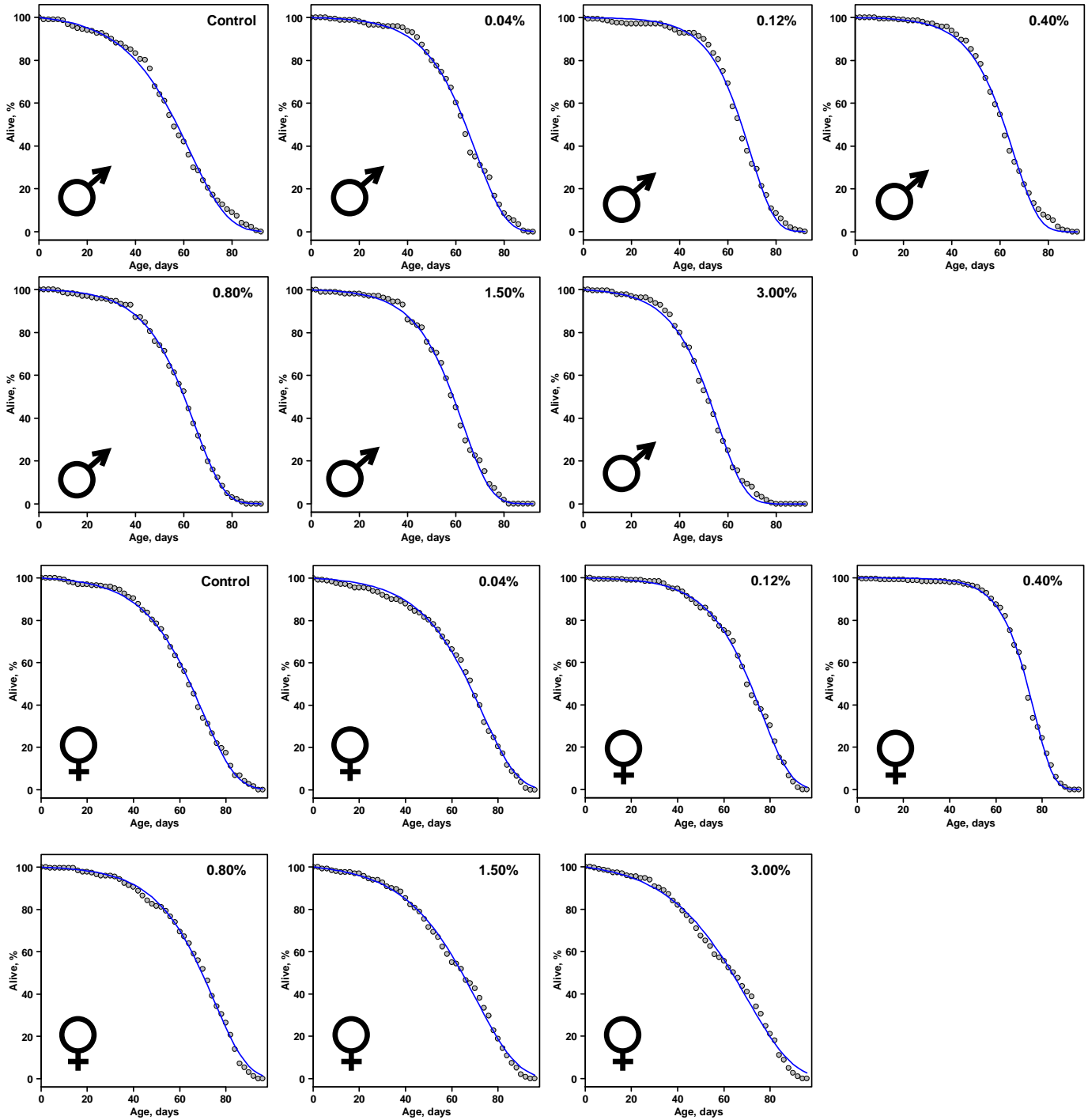


Fig. S1 Fitted line plots of lifespan curves for the control cohort and cohorts reared on the diets with indicated concentrations of chili powder. Standard symbols denote male and female flies, respectively. Approximation of the curves was performed using Levenberg-Marquardt algorithm implemented in R package *minpack.lm*. Modified Gompertz equation $N_t = N_0 \cdot e^{\frac{A \cdot (1 - \alpha \cdot t)}{\alpha}}$ where N_t is the number of alive individuals at any time moment, N_0 is an initial cohort size, and A and α are age-independent and age-dependent parameters of the Gompertz equation, respectively.

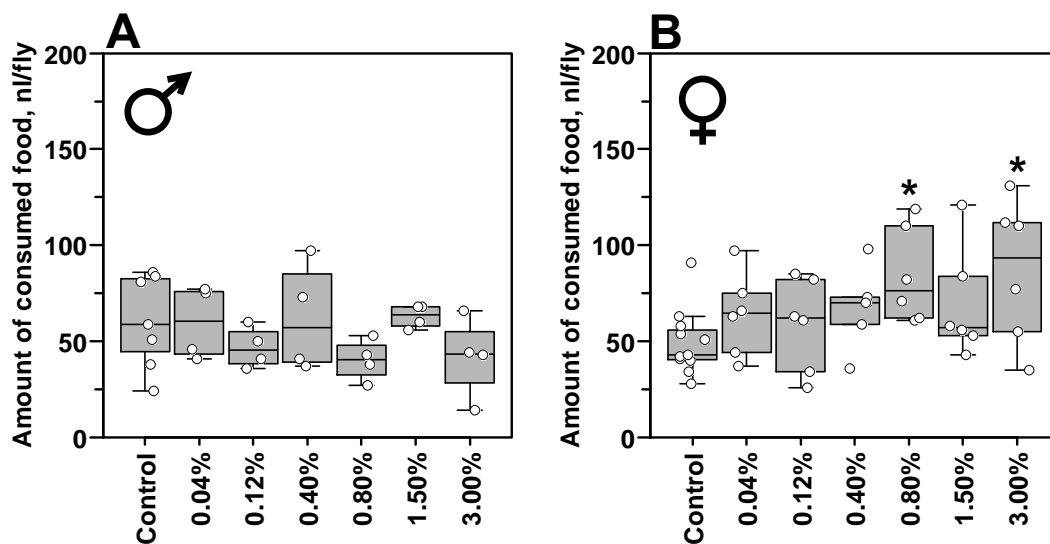


Fig. S2 Consumption of food by 20-day-old flies reared on either control diet (0% chili powder) or on diets supplemented with chili powder: A – males, B – females. Midlines of the boxplots are medians, floor and ceiling of the boxes are 1st and 3rd quartile, respectively, the lengths of the whiskers are 1st and 3rd quartile minus/plus 1.5 interquartile range. *Significantly different from the control group, $p < 0.05$ by Dunnett's test ($n = 4$ –10 independent repeats).

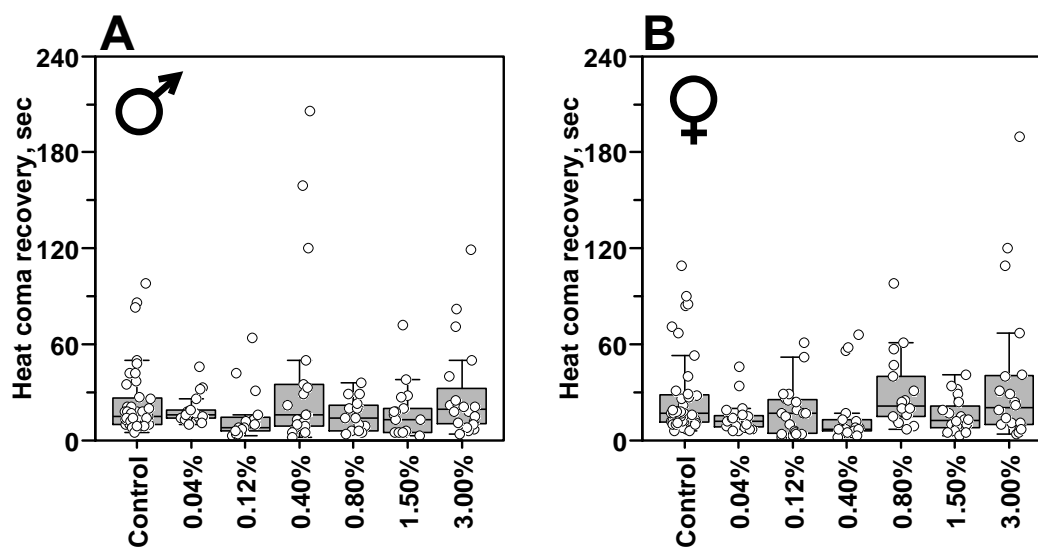


Fig. S3 Time of heat coma recovery (A – males, B – females) of 20-day-old flies fed on either control diet (0% chili powder) or on diets supplemented with chili powder. Midlines of the boxplots are medians, floor and ceiling of the boxes are 1st and 3rd quartile, respectively, the lengths of the whiskers are 1st and 3rd quartile minus/plus 1.5 interquartile range. *Significantly different from the control group, $p < 0.05$ by Dunnett's test ($n = 12-22$ individuals).

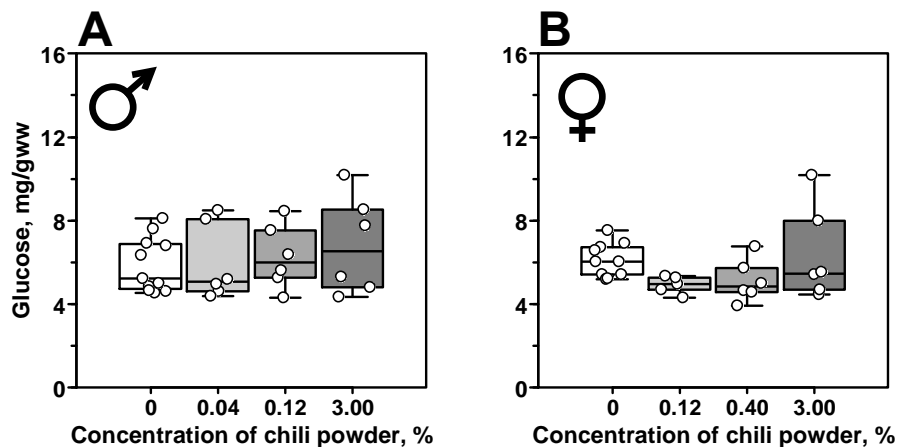


Fig. S4 Contents of body glucose in 20-day-old male (A) and female (B) flies reared on the diets with indicated concentrations of chili powder. Control group was reared on the medium with 0% chili powder. Midlines of the boxplots are medians, floor and ceiling of the boxes are 1st and 3rd quartile, respectively, the lengths of the whiskers are 1st and 3rd quartile minus/plus 1.5 interquartile range, $n = 5-10$.

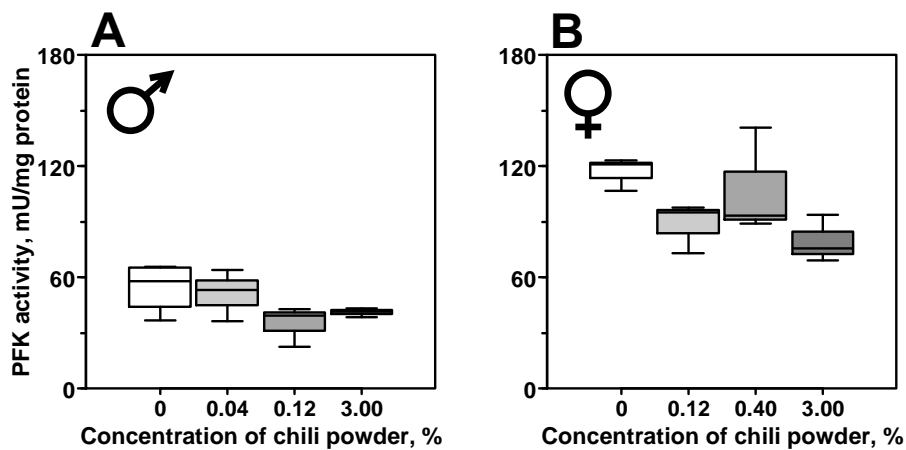


Fig. S5 Activity of phosphofructokinase (PFK) in 20-day-old male (A) and female (B) flies reared on the diets with indicated concentrations of chili powder. Control group was reared on the medium with 0% chili powder. Midlines of the boxplots are medians, floor and ceiling of the boxes are 1st and 3rd quartile, respectively, the lengths of the whiskers are 1st and 3rd quartile minus/plus 1.5 interquartile range. *Significantly different from the control group, $p < 0.05$ by Dunnett's test ($n = 3-4$).

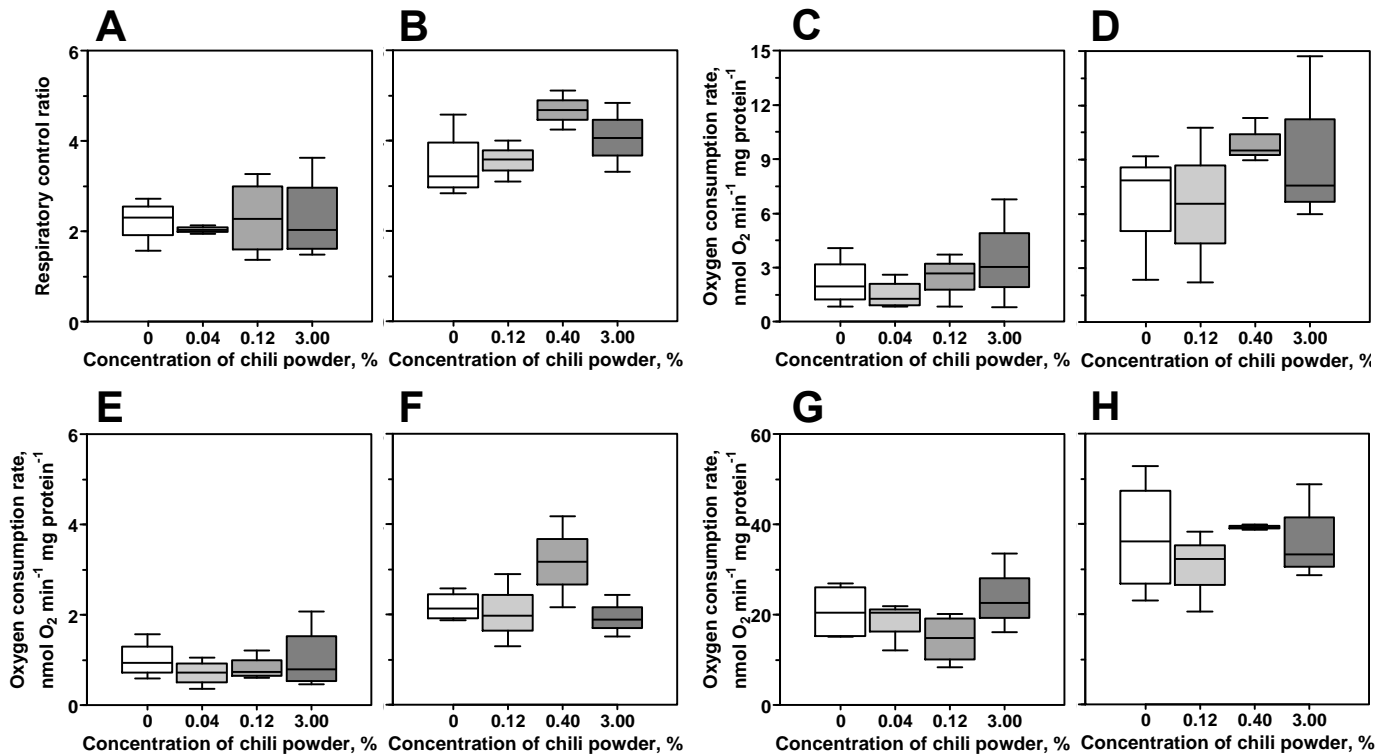


Fig. S6 Mitochondrial function of 20-day-old flies fed on either control diet or on diets supplemented with chili powder: respiratory control ratio; rate of NADH-linked oxygen consumption; rate of succinate-linked oxygen consumption; rates of tetramethyl-*p*-phenylenediamine-linked oxygen consumption. Control group was reared on the medium with 0% chili powder. Panels A, C, E, G show data for males and panels B, D, F, H show data for females. *Significantly different from the control group, $p < 0.05$ by Dunnett's test ($n = 3-4$ independent repeats).

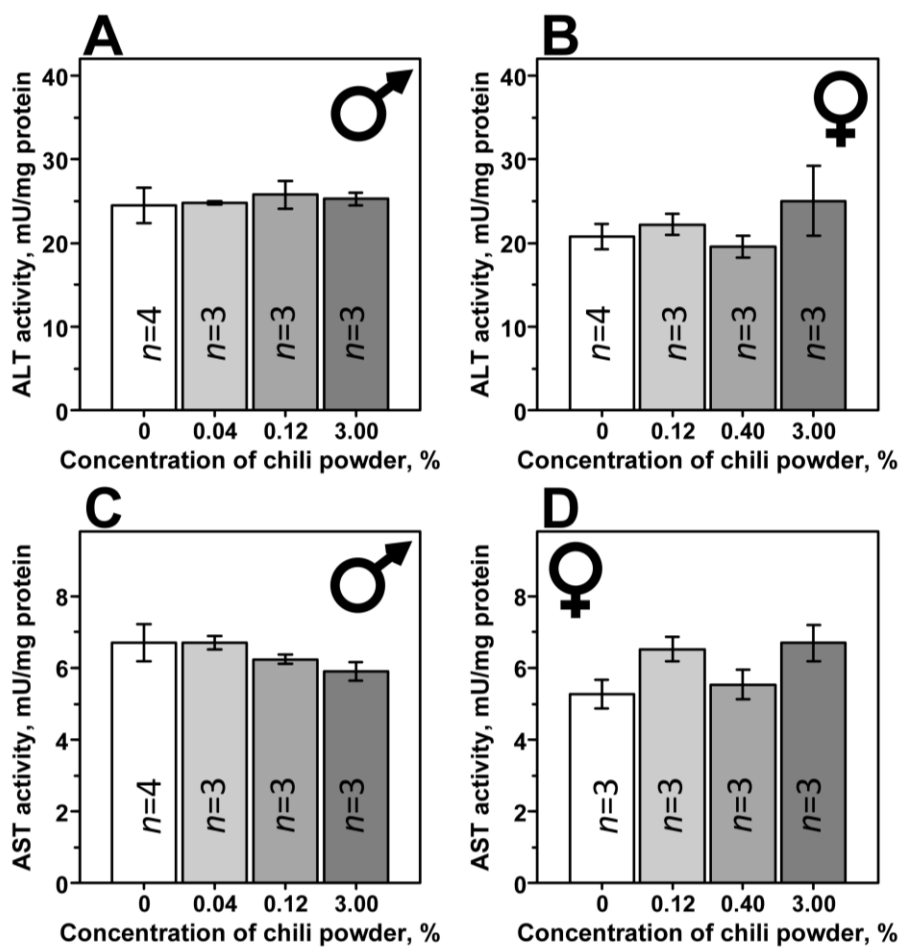


Fig. S7 Activities of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) in 20-day-old flies reared on the diets with indicated concentrations of chili powder. Control group was reared on the medium with 0% chili powder. Panels A and C show data for males and panels B and D show data for females. Data are means \pm SEM, $n = 3-4$.