

Metabolic and Developmental Changes in Insects as Stress-related Response to Electromagnetic Field Exposure

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Table S1. General Linear Mixed Models to test the effect of EMF exposure (treatment: control, 1 mT, 7 mT) on weight loss with time (time, days 1–14) in adult mealworms. The model included a random factor: experimental replicate, within which animals were measured on consecutive days. The dependent variable in the model was the relative weight of insects on consecutive days, expressed as the percentage of the initial weight (on day 0).

Effect	df	F	P
treatment	2, 37	0.12	0.885
time (covariate)	1, 388	6633.10	<0.001
interaction	2, 388	144.34	<0.001

Post-hoc comparisons	Treatments	t	df	P
Significance of slopes	control	46.54	130	<0.001
for particular	1mT	50.24	129	<0.001
treatments	7mT	47.70	129	<0.001
Comparisons of slopes	control vs 1mT	0.29	278	0.768
among the treatments	control vs 7mT	13.70	278	<0.001
	1mT vs 7mT	13.71	278	<0.001
Comparisons of	Control vs 1mT	0.12	18	0.904
intercepts among				
treatments with parallel				
slopes				

Table S2. General Linear Models to test the effect of EMF exposure (treatment: control, 1 mT, 7 mT) on adult mealworm mortality. The dependent variables in the models were days of the occurrence of particular levels of mortality in particular replicates.

Day of occurrence of:	df	F	P	Post-hoc comparisons		
				control vs 1mT	control vs 7mT	1mT vs 7mT
First dead individual	2, 27	0.21	0.811			
50% mortality	2, 27	1.03	0.369			
100% mortality	2, 27	6.51	0.005	0.690	0.003	0.007

Table S3. General Linear Mixed Model to test the effect of EMF exposure (treatment: control, 1 mT, 7 mT) on weight loss with time (time, days 1–7) in larval mealworms. The model included a random factor: experimental replicate, within which animals were measured on consecutive days. The dependent variable in the model was the relative weight of insects on consecutive days, expressed as the percentage of the initial weight (on day 0).

Effect	df	F	P
treatment	2, 33	2.04	0.146
time (covariate)	1, 106	424.28	<0.001
interaction	2, 106	17.27	<0.001

Post-hoc comparisons	Treatments	t	df	P
Significance of slopes	control	15.02	139	<0.001
for particular	1mT	19.60	139	<0.001
treatments	7mT	10.97	139	<0.001
Comparisons of slopes	control vs 1mT	3.41	278	0.001
among the treatments	control vs 7mT	4.96	278	<0.001
	1mT vs 7mT	3.31	278	0.001

Table S4. General Linear Mixed Model to test the effect of EMF exposure (treatment: control, 1 mT, 7 mT) on weight loss with time (time, days 1–7) in mealworm pupae. The model included a random factor: experimental replicate, within which animals were measured on consecutive days. The dependent variable in the model was the relative weight of insects on consecutive days, expressed as the percentage of the initial weight (on day 0).

Effect	df	F	P
treatment	2, 25	0.23	0.796
time (covariate)	1, 106	45.36	<0.001
interaction	2, 106	2.21	0.115

Table S5. General or Generalized Linear Models to test the effect of EMF exposure (treatment: control, 1 mT, 7 mT) on metamorphosis success measured as the day of the first emergence of a given subsequent stage (pupa from larva or adult from a pupa) or as a percentage of successfully emerging individuals (relative to the initial number of larvae).

			df	F/ χ^2	P
General Linear Model	Day of the first emergence of	pupae	2, 15	0.73	0.497
		adults	2, 15	2.61	0.106
Generalized Linear Model	% of successfully emerging	pupae	2	1.46	0.482
		adults	2	2.34	0.310

Table S6. General Linear Mixed Models to test the effect of EMF exposure (treatment: control, 7 mT) on adult and larval mealworm metabolic rate measured as CO₂ production. The model included a random factor: individual, measured 4 consecutive times during the exposure. Time was included as a within-subject factor and individual weight as a covariate to control for its effect on metabolism. The weight and the dependent variable (CO₂ production per individual per unit time) were log-transformed to linearize potentially allometric relationships between weight and metabolism.

	Effect	df	F	P
larvae	treatment	1, 9	<0.01	0.966
	time	3, 11	2.51	0.110
	interaction	3, 11	2.13	0.152
	weight	1, 9	5.39	0.046
adults	treatment	1, 8	13.90	0.005
	time	3, 13	0.79	0.518
	interaction	3, 13	0.30	0.825
	weight	1, 8	10.19	0.012

Table S7. General Linear Mixed Model to test the effect of EMF exposure (treatment: control, 7 mT) on sugar content in adult haemolymph. The model included a random factor: replicate (3 replicates with 6 individuals in each).

	df	F	P
treatment	1, 4	0.66	0.464