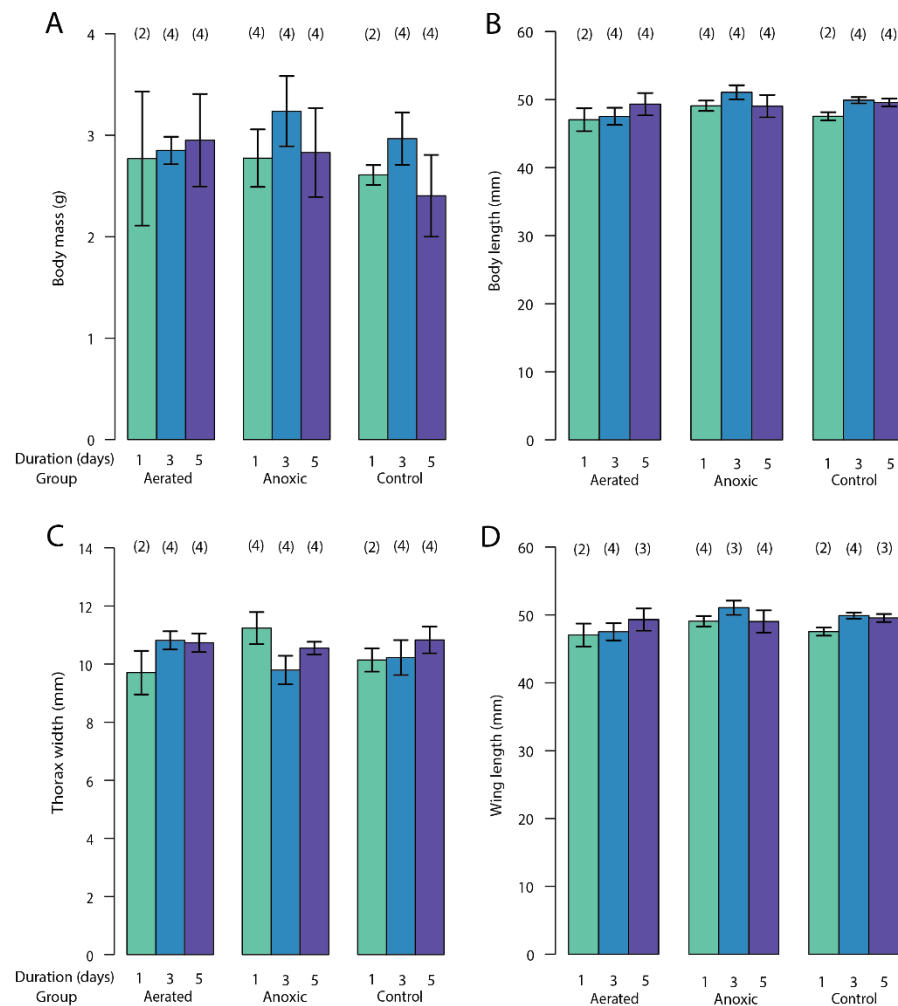


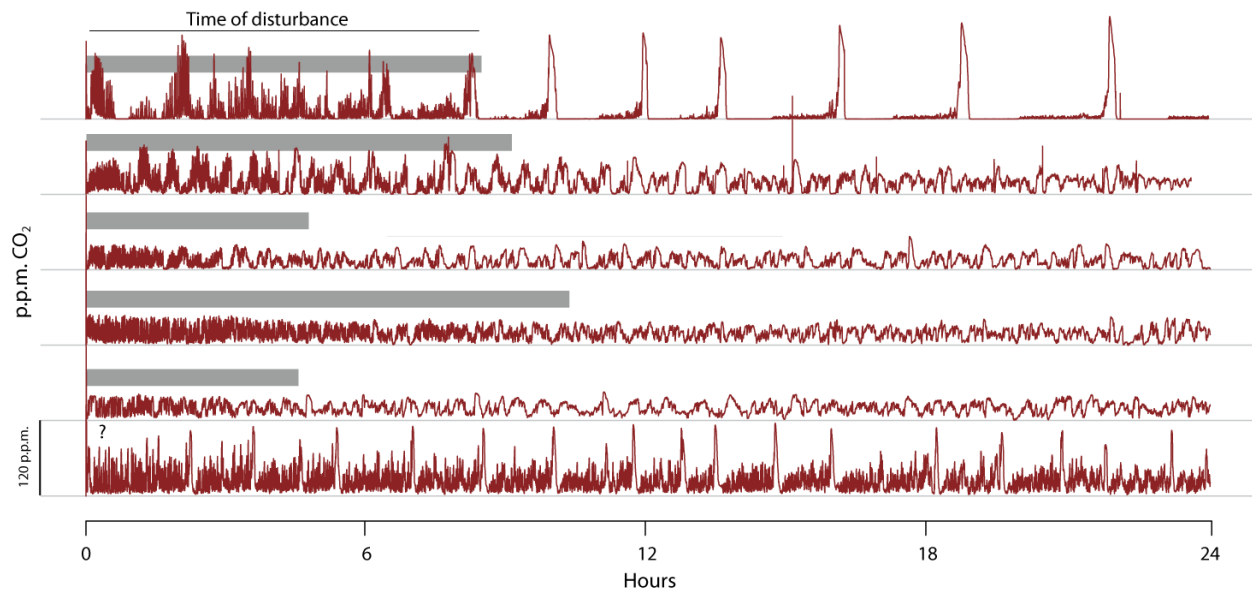
Supplementary Figure 1. Pupal period of *M. sexta* from control and immersion treatments.

Control pupae were held in cups without water for various durations. Here, pupal period is defined as the number of days from wandering to eclosion. Means that do not share a letter are significantly different. Numbers in parentheses above each bar indicate treatment sample size.

Error bars represent s.e.m. See table 2 for statistical information.

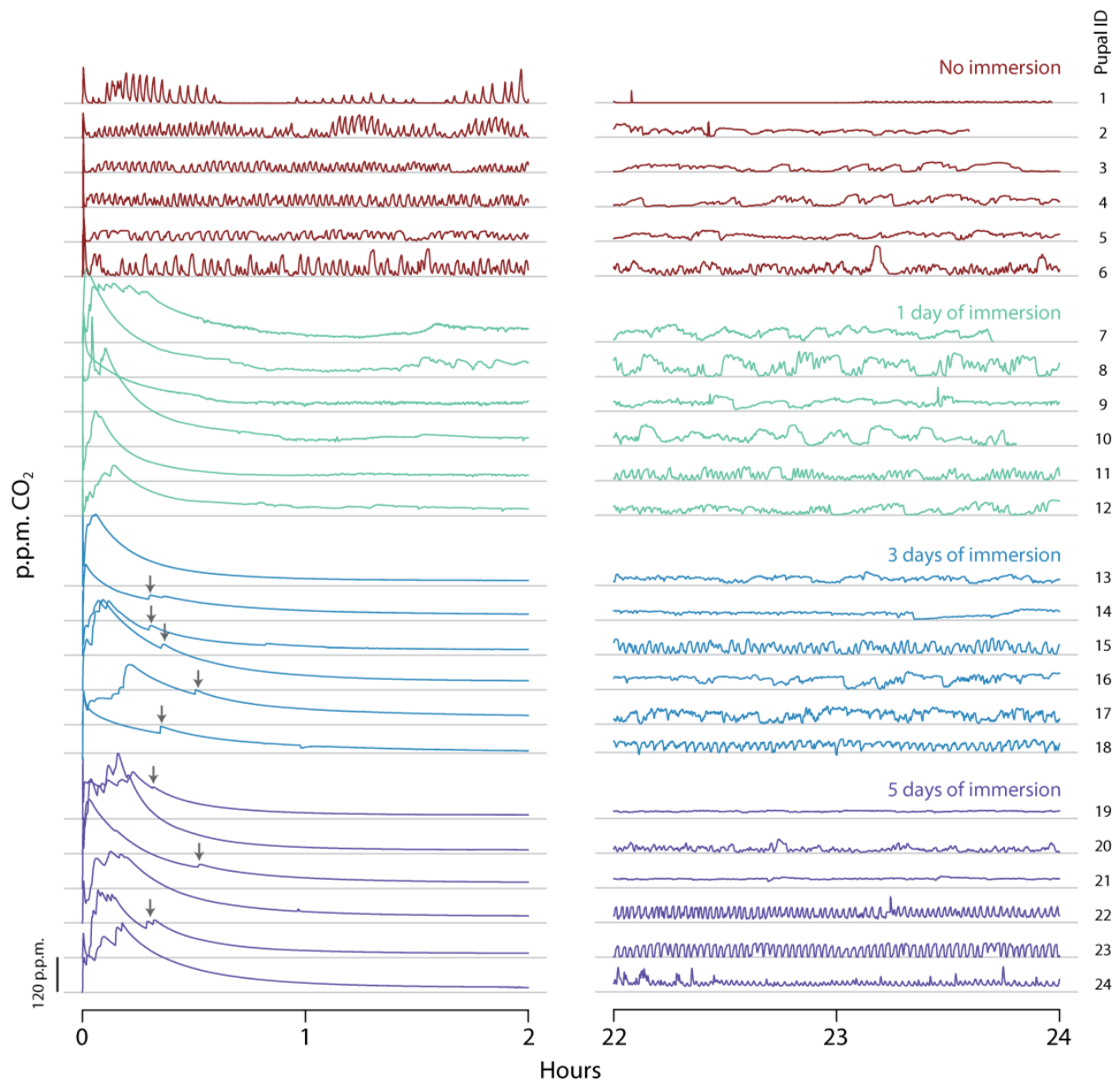


Supplementary Figure 2. Adult morphologies of moths that successfully eclosed. Aerated means the pupae were immersed in water with air-saturated levels of oxygen and anoxic means the pupae were immersed in water lacking oxygen. Numbers in parentheses above each bar indicate treatment sample size. A) Body mass as a function of immersion time and immersion group. B) Body length as a function of immersion time and immersion group. C) Thorax width as a function of immersion time and immersion group. D) Wing length as a function of immersion time and immersion group. Error bars represent s.e.m. See table 2 for statistical information.



Supplementary Figure 3. Disturbed patterns of respiration by control (non-immersed) pupae.

Control pupae were handled briefly when they were removed from their wooden blocks and put into the respirometry system. Despite this minimal handling, pupae appeared to have altered patterns of spiracular activity for between 5 and 10 hours (indicated by the grey bars below, which were estimated by eye; the last pupa showed no obvious change over the course of 24 h). During this period, pupae exhibited enhanced high-frequency activity, returning gradually to lower frequency activity. This observation suggests that researchers testing pupae in short-term respirometry experiments (i.e. lasting fewer than 10 hours) may observe unnatural patterns of CO₂ emission. This raises the question of whether the immersed pupae also showed unnatural patterns of emission, based on handling disturbance. We think not because the pupae appear to have been anaesthetized by the buildup of CO₂ (or other metabolic products arising from anoxia) in their bodies; thus, they would have been unaware of human handling *per se*.



Supplemental Figure 4. Expanded view of the first 2 hours and hours 22 – 24 for all pupae shown in Figure 1 (plotted in the same order). Arrows in the left column indicate a small peak of CO₂ emission superimposed on the larger decline, which occurred in 8 of 12 pupae immersed for more than one day.