

## Heat and Humidity Induced Plastic Changes in Body Lipids and Starvation Resistance in the Tropical *Zaprionus indianus* of Wet-Dry Seasons

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**Abstract :** Insects from tropical wet or dry seasons are likely to cope starvation stress through seasonal phenotypic plasticity in energy metabolites. Accordingly, we analyzed such plastic changes in *Zaprionus indianus* flies reared under wet or dry season-specific conditions; and also after adult acclimation at 32°C for 1 to 6 days; and to low (40% RH) or high (70% RH) humidity. Both thermal or humidity acclimation revealed significant accumulation of body lipids for wet season flies but low humidity acclimation did not change the level of body lipids in dry season flies. Developmental and adult acclimation showed sex specific differences i.e., starvation resistance and body lipids were higher in the males of dry season but in females of wet season. We found seasonal and sex specific differences in the relative level for body lipids at death; and in the rates of accumulation or utilization of energy metabolites (body lipids, carbohydrates and proteins). Body lipids constitute the preferred energy source under starvation for flies of both the seasons. However, utilization of carbohydrates (~20% to 30%) and proteins (~20% to 25%) was evident only in dry season flies. Higher starvation resistance after thermal or humidity acclimation is achieved by increased accumulation of lipids. Adult acclimation of wet or dry season flies revealed plastic changes in mean daily fecundity despite reduction in fecundity under starvation. Thus, thermal or humidity induced plastic responses in body lipids support starvation resistance under wet or dry seasons.

**Keywords :** heat or humidity acclimation, plastic changes in body lipids and starvation resistance, tropical drosophilid, Wet- or Dry seasons, *Zaprionus indianus*

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