

**P093***Evolution of sociality of ants under optimization-thermodynamic theories***Amlan Das**, Carlos A. Navas

In the evolution of sociality of ants we posed the questions: is the energetic cost obeys diel cycle and how and at what extent metabolic rhythm is performed in ants? Is there any correlation between diel energy budget and weight of ants under the working hypothesis of optimization-thermodynamic predictions? To test our questions oxygen consumption rate ( $sVO_2$ ) among workers of varied body mass of a south American leaf cutting ant, *Atta sexdens rubropilosa*, Forel (Hymenoptera: Formicidae) was monitored. As a whole 843 respiratory measurement data were recorded from 47 individual worker ants at different time-hours over 24 h diel periods. From our experiments we assorted three results and discussed as: 1) correlation of metabolism ( $sVO_2$ ) in ants with body mass in general 2) correlation of  $sVO_2$  with 24 hour diel repertoire, and 3) correlation of  $S_vO_2$  between three ant groups of different body masses with 24h diel repertoire. *Atta* shows a positive correlation between their respiratory rate and body mass under constant temperature ( $23 \pm 1$  °C) ( $r = 0.704$ ,  $r^2 = 0.485$ ,  $df = 45$ ,  $p < 0.0001$ ). Over a 24h diel period *Atta* exhibits a complex, irregular and multifarious energetic cost distribution ( $r^2 = 0.183$ ,  $p < 0.0001$ ), although there remains a clear propensity of higher  $sVO_2$  during night than day hours. Key words: *Atta sexdens rubropilosa*, metabolic cost, diel cycle, body mass