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Idiosyncrasy effects on collective behaviour in cockroach *Periplaneta americana* (L.)

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Recently, a large number of publications have been focusing on behavioural syndromes and personality, or in other words: idiosyncrasy. Unfortunately, only few studies are devoted to the existence of personality in arthropods, or more precisely, in insects. Moreover, the implications of idiosyncrasy for ecology and collective decision have been poorly explored. We have focused our study on the most widespread social behaviour: the aggregation. Collective decision that leads to aggregation emerges from the network of feedbacks within the group. The global understanding of these collective decisions requires integration of two levels of analysis: the individual and the collective one. In this respect, most of the studies on collective behaviour underestimate the role of individual idiosyncrasy. Through the use of RFID tagging method, we have highlighted that *P. americana* shows high rates of inter-variability and a high intra-individual stability of sheltering time along experiments. In addition, we have studied the implications of this variability in collective behaviour during aggregation process. Significant differences observed amongst groups in terms of collective decision-making and sheltering behaviour are due to inter-individual differences. Also, aggregation's dynamics depend on the distribution of personalities inside the group. Furthermore, individuals tested in groups tend to homogenize their differences but they still remain. Finally, we have demonstrated that key-individuals have an asymmetrical influence during collective decision-making and affect the exploitation and exploration of environmental resources by the entire group. For all these reasons, we propose that idiosyncrasy might be studied in a social context and that a global understanding of collective dynamics requires taking into account the idiosyncrasy of individuals.