

Using computer algorithms to elucidate zebra finch reproductive behaviour

Birds that experience variation in climatic conditions must maintain a stable nest temperature during incubation for successful hatching of offspring. Varying nest structure and incubation behaviour may be the methods birds use to regulate nest temperature. We used a modeling approach to investigate how birds adjust incubation behaviour to ambient temperature.

Hidden Markov Models (HMM) have been used previously to predict the spatial distribution of animals based on the models' ability to classify movement behaviour. We used a HMM to predict zebra finch (*Taeniopygia guttata*) incubation behaviour and nest structure from a nest temperature data set. The full data set consisted of data logger nest temperature records and video recordings of incubation behaviour in two different temperature conditions. Nest temperature from data loggers was used to obtain predictions about the timing, duration and frequency of incubation which could then be compared to video recordings of incubation behaviour and the structure of nests. Predicted results would be that zebra finches in a colder temperature would incubate for longer periods of time than warmer temperatures, and that experience at those temperatures would play a role in how successful their breeding attempt will be.

This research explores new uses of computational techniques in animal behaviour, animal cognition, and behavioural ecology, provides new information about behavioural regulation of nest temperature during incubation, and develops practical techniques for inferring behaviour from data loggers in the field and in the lab.