Avian brood parasites lay their eggs in nests of other species, their hosts, which are left to care for the foreign nestlings. This can induce an arms race in which hosts evolve defences against parasitism while brood parasites evolve strategies to evade host defences. Decades of research have shown that the arms race can also promote diversification in the biology of brood parasites and their hosts. Plumage polymorphism of brood parasitic females and the variation in colour, shape and markings of the eggs of brood parasites and hosts are common examples of the morphological diversification driven by the arms race. However, we still known very little about polymorphism and diversification in nestlings of brood parasites and hosts.

In the remote island of New Caledonia, the fan-tailed gerygone *Gerygone flavolateralis* is the host of the shining bronze-cuckoo *Chalcites lucidus.* Nestlings of the gerygone and cuckoo have two skin colours, either bright or dark. In addition, the nestlings of the gerygone can be either bright, dark or mixed in the same nest. The cuckoo nestlings mimic gerygone nestlings, however, despite the cuckoo mimicry and mixed broods, the gerygone can recognise and eject the parasite nestling from the nest, but never ejects own nestlings by mistake. The gerygone uses cues such as begging calls, natal down and hatching order, rather than colour, to discriminate the parasite nestling. Furthermore, the proportions of dark and bright chicks of the fan-tailed gerygone varies between different populations in New Caledonia. Therefore, the colour of gerygone nestlings might depend on other factors than brood parasitism.

Two important factors that could influence the colour of the gerygone nestlings are the exposure to harmful UV radiation and the temperature variation during embryonic development. These may depend on the mother's behaviour during incubation or the characteristics of the nests. The first objective of this research is to understand if brood parasitism causes changes in the incubation behaviour of the mother and consequently in the colour of the nestlings. The second objective is to understand if the nestling colour is linked to harmful UV radiation and variation in temperature inside the nest during the development of the embryo. Finally we will test if the two types of nestlings react differently to challenges caused by external pathogens and physiological stress.

The New Caledonian cuckoo-gerygone system is unique as no other known cuckoo-host system in the world has reached a similar complexity. One of the fundamental questions in evolutionary biology is: which factors determine the variation of shapes, forms and behaviours we observe in nature? The study of coevolutionary interactions is essential to our understanding of the mechanisms generating the great diversity of life on Earth.