

Kagu are flightless birds found only in tropical rainforests of New Caledonia, an island in the South Pacific. They are cooperative breeders and live in polyandrous family groups, consisting of related adult males (one to three), one female and their offspring. Non-breeding young help raising the chicks and defending the territory. The family occupies a territory that slightly overlaps with the territories of neighbouring families. Usually several brothers form a new family at the periphery of the parental territory with a female that originates from families that live up to a dozen kilometres away. Kagu can breed throughout the year. A breeding attempt consist of a single chick that can be repeated up to three times a year.

Since 2002, the Behavioural Ecology Unit of MIZ PAN conducts research on Kagu. We use a wide range of methods, including radio-telemetry, video-monitoring, molecular techniques and direct observation. So far, working in two national parks in different parts of the island, we have collected data from 25 families and 250 individuals. Currently, we monitor 10 families in the Parc des Grandes Fougères. These families consist of 33 individuals, of which 26 are radio-tagged. Therefore, we know the composition of families and their territories. Based on 12 microsatellite markers and molecular sex identification, we also know the structure of the monitored families.

The aim in the next phase of the research is to understand the mechanisms of mate choice in Kagu. Potentially both males and females have a choice when selecting partners. Males establish territories in the periphery of the parental family and have a limited choice of females because they do not actively look for a female partner but wait for females passing through their territory. In a few cases, we observed females that remained for some time with a group of males but later left them. These males started later breeding with other females. Females have a partner choice on several levels. They can select larger male groups, which may provide more help in chick feeding and defence. The female can also select territories that are richer in food, such as insects and earthworms. After selection of a territory and a group of males, the female has another choice, as she can select one of the brothers with whom she will have offspring. Our research indicates that in all families, females have clear preferences, as one of the males is the father of the majority (90%) of chicks.

In the proposed research, we aim at answering the question which criteria females use in selecting partners and whether males have a choice between females at the time of family formation. We take into consideration six criteria that may determine partner choice. The first criterion is the abundance of food and the number of males in a territory. These ecological factors may be crucial in the decision of females. The second criterion, behavioural, will be the level of individual investment in reproduction. Male Kagu that invest more time in incubation as well as feeding and protecting the chicks are potentially more attractive partners for breeding. The third measure of the quality of partners will be morphological features of individuals. The physiological status of an individual, based on measurements of sex and stress hormone levels will be another indicator of partner quality. The fifth criterion, which may be crucial in sexual selection, will be variation in functional genes of the Major Histocompatibility Complex (MHC). These genes are responsible for adaptive immune response and the maintenance of their high polymorphism is one of the factors affecting the choice of partner. The last criterion will be the composition of odours in Kagu from preen wax secretions.

The mechanisms of mate choice in birds have been the subject of many studies but they are still not well understood, particularly in cooperative species. Due to the long-term research by our team on Kagu biology and the specific biology of this species, we have the occasion to test advanced hypotheses regarding these mechanisms. The unique possibility to study mate choice criteria for both sexes is of particular importance.