PREFACE

This study is part of the project "Proximate Mechanisms and Genetic Consequences of the Mating System of Polyandrous Tamarins (*Saguinus mystax*; Callitrichidae; Primates)" aimed at elucidating factors shaping the evolution of primate mating systems and reproductive strategies in general, and enlightening the ultimate causes of the extremely rare polyandrous mating system in particular. Studying such questions in primates is generally difficult, and one main problem when choosing primates as model species is the limited sample size due to small groups (which is particularly true for callitrichid primates). Additionally, when intending to study reproductive strategies, groups have to be observed frequently on a (nearly) daily basis and over an extended period of time since crucial and rare events (e.g. migrations) may go unnoticed with a less intensive observation schedule. This makes it even more difficult to observe a large number of groups without sufficient (wo)men-power (see below).

Studying reproductive strategies also requires knowledge of physiological parameters (reproductive endocrinology) and genetic relationships (relatedness, maternities, paternities). Recent developments of non-invasive endocrine and genetic analyses have offered new and exciting opportunities to achieve reliable data on reproductive processes even under natural conditions. The development of genetic analyses based on the use of small amounts of hypervariable DNA (microsatellites) from faecal samples nowadays allows to reliably determine paternities and general relatedness in wild populations and has already been used successfully in a number of field studies across all primate taxa (reviewed in Woodruff 2004). Faecal samples also contain hormonal metabolites, and their measurement has been shown to accurately reflect both female and male reproductive status as well as levels of stress in wild mammals including primates (reviewed in Schwarzenberger et al. 1996; Touma & Palme in press). The use of faecal samples for genetic and endocrine analyses offers the additional advantage of frequent sampling without disturbing or stressing the animals. This is particularly important if behavioural observations shall be carried out since such observations require habituated and more or less tame animals that behave in a normal manner.

Our project combined detailed long-term behavioural observations in the natural ecological context with non-invasive monitoring of reproductive status and genetic analyses using faecal samples. In order to handle the amount of work and the different methods used, the study was a decidedly cooperative one that involved three departments of the German Primate Centre: Behavioural Ecology and Sociobiology (formerly Sociobiology), Reproductive Biology, and Primate Genetics. Data collection in the field comprised the work of two PhD-students from

the Department of Behavioural Ecology and Sociobiology, Maren Huck and me. In Peru we had the additional help of four Peruvian field assistants and two Peruvian students. Only through this relatively large number of observers was it possible to study two groups of moustached tamarins intensively on a nearly daily basis over a one-year period. The development of specific hormone assays and microsatellites for moustached tamarins was done by Michael Heistermann and Uta-Regina Böhle, respectively, from the departments of Reproductive Biology and Primate Genetics, respectively. The subsequent genetic analyses were then performed again cooperatively by Maren Huck and me. The hormone analyses were done separately: Maren Huck measured testosterone and cortisol levels in males (Huck et al. 2005b), while I measured oestrogens and gestagens in females. This followed the partitioning of the project into two different parts: the males' perspective was addressed in the doctoral thesis of Maren Huck (Huck 2004), and the females' perspective is addressed in the present thesis.

The chapters of this thesis are written in a manner that each can be read and understood separately, but they are closely connected by the underlying general question about female reproductive strategies in wild moustached tamarins. The chapters have been submitted beforehand to different refereed scientific journals. Two of them (chapters 3 and 4) have already been published, while chapter 5 is under revision. Being the first author and writer of all three manuscripts, I am fully responsible for their content (which does not deny helpful comments and criticism by the co-authors and others). My co-authors have participated insofar as Maren Huck and I collected data in the field and worked together in the lab (see above). Eckhard W. Heymann was responsible for the general project supervision; Michael Heistermann was advisor of the hormonal analyses, and Dietmar P. Zinner was advisor for statistical matters. They have been involved in the development of the separate manuscripts not more and not less than should be expected from attentive and responsible supervisors. I did not change the chapters compared to the published or submitted versions except for standardizing the layout, changing the spelling to British English throughout, correcting typing errors, and standardizing the taxonomy (see footnote 5, page 7).