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Conservation of the Callitrichidae

W. R. Kingston
Centro Nacional de Primatas, Belém, Brasil

There is world-wide concern over the imminent threat of extermination of many forest dwelling primates posed by the apparently unstoppable felling of tropical rain forests. Among such primates are the Callitrichidae and Callimiconidae families, which include the squirrel sized marmosets and tamarins. The five genera, fifteen or so full species and forty-five subspecies recognized by Hershkovitz (1977) in his recent monograph are confined to South and Central America and include some of the most highly endangered primates. Although very similar in size and form, they are remarkable for the very wide variations in coat color and adornments, such as ear tufts and moustaches, between obviously very closely related subspecies. They are true simian primates but unique in that they have claws rather than nails on the digits. They normally give birth to dizygotic twins which are known to share placental circulation without problems of freemartinism and frequently give birth to two such litters annually. Their normal social organization is a monogamous pair living in family groups with young of various ages, which are peculiar in that only the alpha female breeds although other post-pubertal individuals are often presente. It is obvious that they are of great interest to a number of different scientific disciplines.

In addition to their general interest they have been found to be of great value in biomedical research. Although relatively few species hava been available for this purpose, they have played a large part in the production of a vaccine for viral hepatitis, in the study of viral oncogenesis, immunological diseases such as asthma, and currently, colonic cancer. Although as yet little used, their twin births with shared placental circulation must surely be of great interest to immunologists and students of drug induced teratogenesis. An additional advantage is their small size with concomitant ease of handling and housing plus the relatively small amounts of test material required on a drug / body weight basis as compared with other primates. The relatively short life span deduced from captive records and the known relationship of life span to related disease in man with a reasonable time scale such that the experimental animal will body size in mammals, make these true primatas appropriate for the study of age related disease in man with a reasonable time scale such that the experimental animal will not outlive the working life of the researcher. They Ill accept a wide range of foodstuffs including many items of normal human diets, making them very suitable animals for diet related research. With proper precautions, young can be taken from the parents within a few hours of birth, examined, weighed and returned without risk of subsequent rejection; in fact they can be hand reared from birth with little difficulty. Add to this the ease with which a number of species can be bred under controlled conditions and it can be seen that thy are an extremely valuable research animal.

It is obvious from the above that the loss of any species of the families in question would be, from many points of view, highly undesirable over and above the general conservation ethic. Without a doubt the most satisfactory way of trying to prevent this is the creation of secure permanent reserves of adequate size in the natural habitat of each species. In spite of much publicity and dedicated effort, I am afraid that it is true that no such reserve yet exists and, given the political and human pressures foreseeable in the countries to which these animals are endemic, is ever really likely to exist. Failing this, the alternative is captive breeding and the creation of self-propogating colonies which will at least preserve the genome and, if really secure reserves become a reality, provide stock for release in them.

Although this idea is widely accepted, albeit with reservations about the viability of captive bred animals under natural conditions, the sheer size of most primates makes the cost of maintaining sufficient numbers to ensure adequate genetic diversity almost prohibitive, a position aggravated by the low productive rate of most species. Largely as a resut of biomedical

research demands, methods have been developed to breed several species of marmosets and tamarins quite successfully at relatively low cost. Several species have been bred to four or five generations without the need to introduce wild caught animals. Personal experience in both Peru and Brazil has demonstrated that these costs can be still further substantially reduced if breeding is done in the countries of origin where building, labor, and food costs are all considerably less than those prevailing in more highly developed countries where costs are still further increased by the need for artificial heating, at least in the winters of temperate zones. The Brazilian National Primate Centre is currently breendig *Callithrix humeralifer*, C. argentata, C. jacchus, C. j. penicillata and Saguinus midas niger quite successfully (Kingston & Muniz,1983), with total food costs of less than $3 U. S. per animal/month and labor costs about one-fifth of those of Europe and the U. S. A. Second generation Callithrix humeralifer are thriving and similar C. argentata are expected shortly.

Is there not then a case for the setting up of an internationally supported breeding facility, located in South America, to breed all species required both for conservation and scientific interests? The size of the colony of each species, subject to a viable minimum, could be adjusted to the number required. Funding is, of course, the major problem but I would suggest that capital costs should be met by donation from all interested parties, and running costs, dare I say it, by a charge for each animal supplied to research institutions based on the actual costs of production assessed by independent accountants. If this plan could be implemented, combined with an absolute ban on the export of any wild-caught animals by international agreement, it would at least ensure that biomedical research needs for these animals could be met with infinitely superior control-bred stock, at the same time keeping the drain on wild populations to an absolute minimum and maintaining a viable nucleus of even the most highly endangered species.

There would remain the necessity of maintaining a number of separate small colonies of each species both to ensure genetic diversity and to cover for the risk of decimation of the principal colony by disease. This would, of course, represent additional costs. I have always felt that insufficient attention has been paid to the public exhibition value of these animals as a source of funds for their maintenance. The potential of this is perhaps greater in the more developed countries of Europe, the U. S. A., Japan, and South Africa than in the countries of origin but even there, if the exhibit is situated close to large centers of population the potential still exists. What I have in mind is something on the lines of the following:

There should be an exhibit of reasonably tame specimens of each species housed in visually attractive cages permitting a clear opportunity for viewing and photography by the public. Full descriptive labelling and perhaps literature couched in non-technical language should be provided, in which full use is made of the publicity value of extreme rarity, the maternal and paternal care of the offspring which is a feature of these animals, and the sentimental appeal of the minute "babies". Besides the general exhibit, there would be either a functional breeding unit or, if conditions permit (suitable climate and terrain), a free-ranging reserve, provisioned if necessary. With proper planning, viewing of these could be permitted, with guides for which an extra charge could be made. Properly situated and designed, I would be surprised if this did not generate an income sufficient for the maintenance of the whole colony. With cooperation between these units each could display a wide range of species to interest the public but be responsible for the larger scale production of a limited number, care being taken that each unit had at least one "easy", species (e.g.; one of the *Callithrix)* and one of the more difficult *Saguinus* species. Equally, care should be taken that the more spectacular species, such as *Leontopithecus,* Saguinus imperator, S. bicolor, S. oedipus should be evenly distributed, but in return each unit should house a less "showy" species such as S. midas niger, S. *fuscicollis fuscicollis* or S. *bicolor martinisi.* I fully appreciate the magnitude of the organization of all this, but given the will I think it is possible. The excellent work of Dr. Devra Kleiman et al. with *Leontopithecus rosalia* has demonstrated very well what can be done in this way. I certainly feel that the public would respond more generously to appeals for conservation funds if they were given the opportunity to see what they were being asked to support, and, if a little restrained advertising was allowed, sponsorship by industry would probably be forthcoming.

With regard to the obviously more desirable creation of permanent reserves in the country of origin, it has always seemed to me that there is a lack of realism about these very worthy plans. At the Front Royal meeting in 1975 on the conservation of the Callitrichidae, there were long discussions about the size of the reserves required to maintain a viable population of several species. In all seriousness, areas were marked on maps of remote areas of Amazonian jungle in the localities in which these species are found. In hard practical terms surely these are nothing more than wishful thinking. While they remain remote no doubt the species is safe, but it only needs a road to be driven through the area or gold or oil suspected and such plans become worthless. Even for the decreed reserves, the funds are totally inadequate for effective policing or demarcation on the ground. No doubt, given the will, increased funds could be found but politicians, however dictatorial, ultimately depend on public support and, given the financial position of most developing countries, the survival of some obscure monkey of interest mainly to foreigners is likely to be considered of very low priority. Even the international prestige gained by loudly acclaimed protection of native fauna has a very low appeal to the general public understandably clamoring for an improvement in their own lot.

No, in my opinion the only way that secure reserves can be established is for them to offer a demonstrable material advantage to the people of the country in which they are created. The only practical way for this to occur is for them to produce an income either by being a tourist attraction and/or by producing something which can be profitably sold, preferably for badly needed foreign currency. Reserves should be situated near enough to large centers of population, even if this means translocating some species, to make them accessible to both national and foreign visitors who should be permitted to visit at least parts of the reserves. They should be large enough to permit the much publicized controlled harvesting of species which have some value beyond the conservation ethics be it biomedical research or frankly commercial. Then there is some hope that the funds generated by both entrance fees and the sale of the controlled harvests will both fund proper maintenance of the reserves and justify them to the general public of the country concerned.

I am fully aware that these suggestions will arouse considerable hostility from the conservation lobbies both international and national, particularly in countries which have passed completely inflexible export bans. I can fully appreciate their concern that the "pure'" conservation ideals should be tainted with any suggestion of commercialism. However, I would ask them to be realistic. It must be obvious that, while specific appeals way well produce substantial donations for the initial costs of reserves and conservation oriented breending facilities, these, if they are to be fo lasting value, require continuously increasing funds for their maintenance. If breending is sucessful, stocks increase and need more housing, food, and people to look after them. Reserves whether purchased outright, leased, or decreed, require continuous management as well as effective policing. Vehicles and other required equipment need maintenance and replacement when worn out. Where is this money to come from? The continuous creation of new reserves is a very satisfying achievement, but unless these can be successfully maintained the value of them is relatively transitory and the money would be better spent in making the existing ones more effective and permanent. The fauna of a country is a natural resource which with proper management is renewable indefinitely. If a legitimate demand exists for an element of it and this can be supplied without endangering the survival of the species concerned, the only objection that I can see is that it may involve the death of the animal concerned. Whether this situation is any worse than the almost universally accepted production and slaughter of equally sentient animals for human consumption is a matter of opinion.

References

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Author's address: Centro Nacional de Primatas, Caixa Postal 1641, Belém 66.000, Pará, Brazil.

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