THE FUTURE OF THE FERNANDINA RICE RATS: EXTINCTION OR CAPTIVE BREEDING?

by

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While studying fur seals on Fernandina (Narborough Island) and enjoying the company of the endemic rice rats (*Nesoryzomys narboroughi*) I became concerned about the future of the latter species. Actually, two species of the genus *Nesoryzomys* are known from Fernandina, the smaller one of which (*N. fernandinae*) has only recently been described from skulls found in owl pellets (Hutterer and Hirsch 1979). The two Fernandina species are the only surviving *Nesoryzomys* rats in the Galapagos Archipelago (if the smaller one still exists). A good survey of Fernandina is needed to determine the present status of *N. fernandinae*. Earlier, Santa Cruz, Baltra, Santiago and Isabela also had *Nesoryzomys* species (see Clark 1984 for a tabulation of all species of Galapagos rice rats).

At least on the first of these 3 islands the introduction of the black rat (*Rattus rattus*) led to the extinction of the endemic species. This happened on Santa Cruz in the incredibly short period of perhaps only 4 years while on Santiago black and endemic rats apparently co-existed for at least 70 years (Clark 1984). It seems likely that extinction of the endemic rats on Santa Cruz was hastened by a disease or parasite which the black rats had brought with them (Brosset 1963), while on Santiago the black rats may slowly have outcompeted the native rat species. Similarly the native *Oryzomys* rice rat species on San Cristóbal went extinct after the introduction of the black rat, leaving only the population on Santa Fe. The conclusion seems inescapable that wherever the black rats are introduced the native rats will succumb.

Given this sad conclusion, how likely is it that black rats will be introduced to Fernandina and replace the last two *Nesoryzomys* species? Or that the same would happen to *Oryzomys bauri* on Santa Fe? Unfortunately, I think such an introduction is bound to happen given enough time. Clark (1984) in her review of the native land mammals of the Galapagos therefore states: "It is imperative that the surviving species be protected from a similar fate" (of extinction). "Thus, all necessary safeguards should be maintained against the accidental introduction of ... black rats on Fernandina and Santa Fe." I fully agree with this; but it seems to me that given all possible safeguards against introduction the probability of accidents is still high. The stranding of a ship on Pinta in 1984 has demonstrated that unfortunate events of this sort can neither be predicted nor prevented short of banning all ship traffic from the area. Tourist boats as well as fishing or cargo ships frequently have rats on board and therefore, given enough time, the introduction of black rats to Fernandina seems a distinct possibility. If this happens the last two *Nesoryzomys* species will, within a relatively short period of time, go extinct. The same could, of course, happen to *Oryzomys* on Santa Fe.

With this somewhat depressing assessment of the future, what is the best strategy for the conservation of these species? Obviously all possible care should be taken to prevent accidents. One may even consider closing Punta Espinosa for tourism; but I think this is undesirable because Fernandina and its fate would then become of less concern to the general public. What can be done instead?

Let me first give the reason why I would like to limit the rest of this note to a consideration of the Fernandina rice rats excluding the Santa Fe *Oryzomys bauri*. The Santa Fe rice rat has proved to be hardly distinct from the mainland (Peruvian) species *O. xantheolus* (Gardner and Patton 1976, Patton and Hafner 1983). Its genetics, karyotype and skull morphology point to a very close relationship with that species so that Patton and Hafner (1983) even suggest that it may have been introduced during the last few hundred years, perhaps by aboriginal sailors. This means that a genetically very similar species exists on the mainland from where stocks for reintroductions could be obtained. In other words the *Oryzomys* species as such would not disappear entirely even if it went extinct on Santa Fe.

The *Nesoryzomys* species, however, are clearly distinct from all known mainland rice rats and presumably reached the archipelago 3.00 — 3.5 million years ago (Gardner and Patton 1976, Patton and Hafner 1983). As the morphological analysis of the now extinct *Nesoryzomys* species from the other islands has shown that these were probably all just little diverged populations of the one big and one small species (l.c.), it seems as though the conservation of the Fernandina species might actually conserve the full set of all *Nesoryzomys* species ever in existence.

I suggest therefore an experiment with captive breeding to insure the genetic future of this genus. Such a program could investigate the species' resistance to diseases and parasites and would make them manageable for eventual reintroduction to little islands cleared of black rats. Ideally such a program should establish several colonies in different locations at zoological gardens or similar institutions with the knowledge and the funds to maintain such a colony at sufficient size to prevent inbreeding depression. This could also be avoided through regular interchange between captive colonies. With those stocks safely maintained, the genetic future of the genus would seem assured even if an accidental introduction of black rats to Fernandina should occur.

I admit that it is generally undesirable to permit the export of endemic animals. However, I think that in this case there are valid reasons for granting such permission to a few qualified institutions. Abuse of such a permit, e.g. by trading with the animals, seems very unlikely, since there is no reason to assume that anyone not concerned in the management of genetic resources or in conservation in general would be interested in acquiring a rat which looks just like a black rat.

In summary, I surmise that a captive breeding program is the only way of really insuring the genetic future of the last two *Nesoryzomys* species in case of an accidental introduction of black rats to Fernandina. If this note could stimulate discussion and perhaps action for the future of the Fernandina rice rats it will have achieved its aim.

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