

In all the cases, the prolificacy of the species was of one single young per birth, except for two cases in London Zoo where twins were born (Wheeler, pers. obs.). Wild females from markets were autopsied on thirteen occasions randomly throughout the year, and only one foetus was found in the reproductive tract of pregnant females (54% of the cases). Those results confirm the observations of other authors (Rahm, 1962a; Weir, 1974). Nevertheless, they contradict the information found in reference zoology books (Nowak and Paradiso, 1983; Haltenorth and Diller, 1987) which states that brush-tailed porcupines produce one to four young per litter. The fact that this gregarious species lives often in groups of several individuals sharing the same pens and that females have two pairs of lateral thoracic mammae (Weir, 1974) could have contributed to this assumption. In fact, the number of mammae is not always indicative of litter size, particularly in hystricomorph rodents (Gilbert, 1986). Another possibility could be that this species has litters of two to four young in the wild, and that singleton births are a product of some maladaptation to captive life. This low prolificacy represents a disadvantage for the choice of this rodent as an animal for meat production in the tropics. On the other hand, preliminary observations on ovarian morphology and histology, suggest that *A. africanus* is polyovular (Jori and Lopez-Béjar, unpubl. obs.). However, further research is needed in the field of its reproductive biology to confirm this assumption.

Impact of hunting on brush-tailed porcupine populations

Should all these observations be true, this hystricomorph rodent species shows a low reproductive potential and, thus, should be unable to withstand heavy hunting pressure. However, *Atherurus* seems to respond rather well to its exploitation. Lahm (1993) did not find a difference between heavily hunted and less severely hunted areas for that species in north-eastern Gabon. Muchaal and Ndjangui (1995) seemed to obtain similar results in south-western Cameroon. These findings remain inconclusive since very little is known about the ecology, reproductive biology and population dynamics of this species. Besides, both studies relied on relative densities, which are only a token indication of abundance. In Equatorial Guinea, the harvest of *A. africanus* was found to be below the potential harvest despite heavy dependence on that species in the continental area (Fa *et al.*, 1995). In Gabon, the harvest of more than 150 000 animals per year does not seem to reduce porcupine carcasses in market stalls. *Atherurus* populations may have endured such high harvest rates simply because densities are high and large areas of rainforest habitat are still available. New areas may be simply hunted as populations decline in more severely hunted areas, or porcupine populations may just persist in spite of hunting pressures. In north-east Gabon's evergreen forest, the biomass of brush-tailed porcupine was estimated at 174 kg per km² and maximum sustainable yield was evaluated at 44 kg per km² per year (Feer, 1993). This figure, which is equivalent to an average of 14 animals per km² per year, can be easily achieved in frequently hunted areas. As urban centres develop and new roads are built, pressure on wildlife populations becomes increasingly higher. In that situation, those species with a low reproductive rate, are less tolerant to intense rates of hunting, which cause population decline (Amubode, 1995). Although large numbers of carcasses are being sold daily in urban markets of Central or West Africa, it is adventurous to assume that current harvest levels of *A. africanus* are sustainable. Development and wildlife exploitation are increasing with the rural exodus, and the area extension of new hunting grounds, although still important, is finite.

With current knowledge of this species, farming of brush-tailed porcupine is technically feasible but it is doubtful whether its exploitation will become economically profitable due to its current low reproductive rate in captivity. Reproductive rates could possibly be improved by trying polygamous breeding, selecting females that produce twins, and reducing the interval between births by mating females during post partum oestrus. Moreover, research on its reproductive biology is needed to verify if singleton births are a result of captive conditions or happen naturally in the wild. In the first case, the possibility of increasing litter size exists, and its potential as a minilivestock candidate could be improved. In the second case, the brush-tailed porcupine is of limited interest as a game farming species. However, the current level of exploitation can outstrip its reproductive rate and its ability to replace harvested populations. As human populations grow in African countries, wild populations of that rodent can become depleted in frequently hunted areas. Therefore, captive breeding actions could help to repopulate overhunted areas. Moreover, they can contribute to the knowledge of that species, which represents an important source of food, income, and socio-cultural values for many African populations.

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