

## Status of the hog deer in Sri Lanka

Andrew J. McCarthy and Sarath B. Dissanayake

*The hog deer *Axis porcinus* was believed to be extinct in Sri Lanka until a recent preliminary survey revealed a single remaining population in a 35-sq-km area of the south-western coastal belt. The authors describe the results of their 3-month study, outline potential threats to the survival of the population and discuss possible conservation measures.*

The hog deer, of which two subspecies are recognized, *Axis porcinus porcinus* and *A. porcinus annamiticus*, is widely distributed, the range stretching from Pakistan, across northern India, Nepal and Bhutan, through Bangladesh and Burma, as far east as southern Thailand and Vietnam (Dhungel and O'Gara, 1991). The species is also present in Victoria, Australia, where it has been introduced, and has been recorded from the coastal region of south-western Sri Lanka where its origins remain the subject of discussion.

The Sri Lankan population was classified in 1852 by Kelaart as a separate species *A. oryzus* and reduced to a subspecies of *A. porcinus* by subsequent authors, e.g. Phillips (1935). The population is currently classified as *A. porcinus* by Honacki *et al.* (1982).

### Origins and past status in Sri Lanka

The origins of hog deer in south-west Sri Lanka are unclear. Some observers have suggested that the species may be a relict of a past invasion during a period of lower sea levels when the land bridge between India and Sri Lanka was in existence (U. K. Padmalal and S. D. Saparamadu, pers. comm., 1992). The predominant contemporary view is that the species was introduced, either by the early Sinhalese or during the colonial period, when the south-western lowlands were being cleared of forest for the cultivation of spices. While no documentary evidence for introduction has yet been found in the archives from the colonial period (S. D. Saparamadu, pers.

comm., 1992), this view is supported by the probable historical absence of the nominate form from peninsular India (Schaller, 1967; Prater, 1980).

According to Phillips (1935), hog deer were originally present along the south-western coastal belt between Galle and Kalutara, in scrub, riverine grassland, cinnamon gardens and rice fields. There are no records of hog deer outside this range. Since the 1930s there have been few reports of hog deer from the south-west, and until new evidence emerged during the 1980s, some observers believed that the species was extinct in Sri Lanka (Saparamadu, 1972).

In order to resolve the issue, the Department of Wildlife Conservation (DWLC) initiated a limited investigation in the early 1970s (Saparamadu, 1972). Little information was forthcoming other than several unconfirmed reports of deer from the Bentota area, which were checked in the field by department staff without success (S. D. Saparamadu, pers. comm., 1992). Several more reports of deer were received during the 1980s, most of which proved impossible to check due to the unstable political situation in the region. In 1984, however, Colombo Zoological Gardens acquired a single male from the region and in 1988 a former Director of the DWLC acquired another from a hunter in the Nape area.

### The 1992 survey

Our survey was carried out between August and October 1992 at the request of the DWLC,

Battaramulla, Colombo. The search area comprised most of the south-west coastal lowland region and stretched from Galle in the south to Kalutara in the north, inland as far as the foothills of the central mountains (Figure 1). The area was delimited on the basis of past records of hog deer and from additional anecdotal information from individuals at the Departments of Wildlife Conservation and Forestry.

The region is one of the most densely populated in Sri Lanka outside Colombo; Galle District had a human population density of 542 per sq km in 1988 (a rise from 314 in 1953) and Kalutara District 570 per sq km in 1988 (a rise from 328 in 1953). Land use comprises a mosaic of settlements, roads and rice paddies together with coconut, oil palm and rubber plantations. Some pockets of less intensive settlement and land use remain in the area, particularly in the Elpitiya region, where the predominant agricultural regime is small-scale cinnamon and rice cultivation supplemented by vegetable plots and home gardens (Baldwin, 1991).

Field-work was carried out in two phases. The first was based on interviews with local residents and was intended to establish the approximate range of hog deer, and other deer species within the study area. The second phase was intended to confirm the findings from phase 1 and to estimate hog deer population densities in a number of habitat types.

### Hog deer distribution

A total of 232 people were interviewed at 97 separate locations using a standard interview format and photographic identification cards of the four Sri Lanka deer species.

Results of the interview survey indicated that hog deer were still present in a 35-sq-km area between Elpitiya, Induruwa and Ambalangoda (Figure 2). The area is sparsely populated compared with the surrounding region. There was no evidence that any other deer species or other large mammals were present, although a small population of spotted deer *Axis axis*, was reported to occur

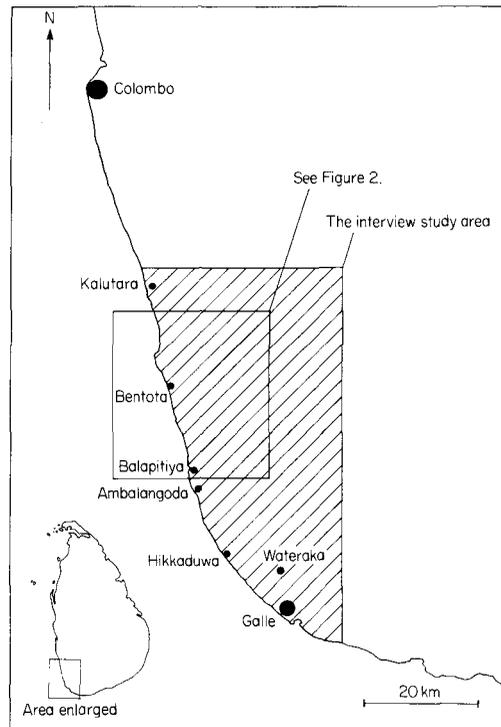


Figure 1. The interview study area in Sri Lanka.

about 10 km to the east of Elpitiya. Land use in the Elpitiya region was dominated by extensive and long established cinnamon gardens, home gardens, vegetable plots and small-scale rice cultivation. Access was difficult compared with the more densely populated surrounding areas, the majority of roads being unsurfaced and poorly maintained. Reports of hog deer from outside the Elpitiya region were confined to Ellewatta, approximately 2 km south-east of Elpitiya town, and Wateraka, about 20 km further south. These reports remained unconfirmed, however, and it is probable that they represented either remnant, or recently extinct, small populations. Reports of past hog deer presence were received from several older residents of the Hikkaduwa coastal region, to the south of the confirmed range, although the species probably became extinct in this area during the 1940s.

The presence of hog deer was established on the basis of direct and indirect anecdotal evidence, such as descriptions of sightings or

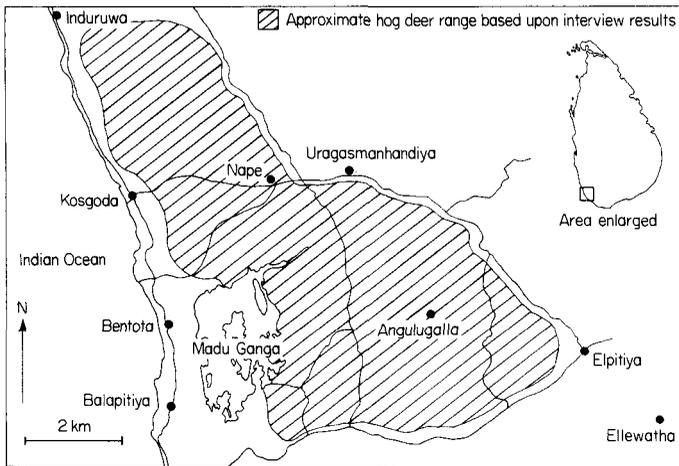


Figure 2. Probable hog deer range in Sri Lanka.

reports of crop damage. Interviewees were frequently able to give detailed descriptions of hog deer and it was apparent that the species was probably present in greatest numbers in the Angulugalla and Nape areas (Figure 2). Anecdotal evidence was supported in four cases by respondents showing the project team sets of skulls and antlers, and one local hunter showing us a hog deer skin. Two captive individuals were recorded; a male of 4 years and a female of 18 months. Both were kept as family pets and appeared in good physical condition.

Many local residents appeared to have an excellent knowledge of the range, favoured habitats and activity patterns of the species. More than half the interviewees described the hog deer as a shy, nocturnal species favouring dense cover such as scrub, cinnamon gardens and rice fields, and feeding on the young leaves and shoots of crops in home and cinnamon gardens and recently planted rice fields. Respondents indicated damage to one or more of the following cultivated species: cinnamon *Cinnamomum verum*, manioc *Manihot esculenta*, okra *Abelmoschus esculentus*, yam *Dioscorea* spp. and rice *Oryza* spp.

Reports of crop damage were confirmed by the authors' observations in the Angulugalla and Nape areas. Damage was often severe, an estimate in one instance revealing approximately 20 per cent of an okra crop affected, a number of plants being almost entirely defoliated. A mixed vegetable garden in the same

area revealed damage to okra, manioc and yam. Browsing was selective, the woody stems being avoided in favour of more palatable growth such as leaves and young shoots. Further damage was caused to commercially important species by rubbing of antlers on saplings of cinnamon, *Alstonia* sp. and rubber *Ficus* spp. As a result of the damage, home gardens and small plantations were often fenced to prevent deer access.

Attitudes of local residents to the presence of hog deer ranged from negative, with the interviewees asking the project team to capture and translocate the animals elsewhere, to positive, with interviewees expressing the wish to retain the species within the area. We regarded these attitudes as a probable reflection of the extent of crop damage in the locality and used them as an indication of the species's local density.

Hunting was apparently still widespread, despite the revoking of gun licences by the authorities during the 1980s due to political tension in the region. The principal technique reported during interviews, and later confirmed visually, was the use of wire snare traps, set along deer paths in cinnamon gardens and scrub. The method was described as less effective than shooting. Approximately 30 per cent of respondents in the Ellepitiya area reported the hog deer population to be increasing. These claims were supported by reports of increasing levels of crop damage and more frequent sightings during the past decade.

## Current status

Population studies were carried out in the areas of Angulugalla and Nape, where four vegetation types, differentiated on the basis of their dominant species, were selected to represent a range of habitats common to both regions: *Panicum* grassland, *Dillenia retusa* scrub, *Gleichenia linearis* fern scrub and cinnamon garden. Rice fields were not surveyed because this second phase of field-work was carried out immediately after the harvest, when rice fields offered little cover and were extensively disturbed by ploughing and sowing.

Silent drives (see Green, 1985) using locally recruited personnel were used to survey 19 study blocks totalling 7.85 ha in area. Study blocks were small of necessity due to the dense nature of the habitat and the number of personnel available (between 12 and 16). Drives were carried out during the day when hog deer were expected to be lying in cover. Evidence comprised direct (sightings) and indirect evidence (sleeping areas, antler fraying damage, tracks, droppings, presence of hairs and browse damage) and were recorded from, or adjacent to, study blocks. Three hog deer sightings were confirmed by the authors during the course of the drives in Angulugalla (a single adult female and an adult female and fawn). No sightings were made in Nape. Indirect evidence was found in 10 out of 11 blocks in Angulugalla (91 per cent of cases) and 5 out of 8 blocks in Nape (63 per cent of cases), indicating high levels of habitat use.

Population density calculations were based upon both direct and indirect evidence and were, due to the small area surveyed in each location, only approximations. Sightings were used to give a density of approximately 50 hog deer per sq km (in Angulugalla) and indirect evidence used to give a figure of approximately 40 per sq km (in Nape).

## Discussion

The survey confirmed the existence of hog deer in the agricultural landscape of south-west Sri Lanka. The present range, however, is



Captive hog deer stag (Andrew J. McCarthy).

extremely small and it seems unlikely that viable populations persist outside the Elpitiya, Angulugalla and Induruwa areas. While past evidence suggests that the species originally occurred over a wider area, our study was unable to determine the extent of the range prior to the 1940s. It is probable that hog deer have been restricted to their present range for at least 50 years.

The survey indicated higher hog deer population densities in Sri Lanka compared with prime grassland habitat in, for example, Nepal (Seidensticker, 1976; Dhungel and O'Gara, 1991). Densities were probably seasonally high in the surveyed habitats due to the lack of cover and disturbance in rice fields during the post-harvest period, and it was thought likely that densities varied substantially between habitats throughout the year, according to levels of disturbance and food and cover availability.

It was not known whether the population was contiguous or fragmented into smaller, isolated subpopulations. If fragmented, this may have serious implications for the long-term viability of the population, which, despite high densities in the surveyed habitats is probably rather low in terms of total numbers, due to the small range. Whilst the interview survey indicated that hog deer numbers were probably increasing due to the revocation of gun licences it is possible that prior to the

1980s the population was at a very low level and may have been close to extinction.

### Conservation

Probably the greatest long-term threat to hog deer in Sri Lanka is constituted by the continually expanding human population and the associated development of a previously rather isolated rural area. Developments such as road improvement and construction are already taking place on the fringes of the region and are likely to result in an influx of migrants as well as agricultural intensification and a possible subsequent increase in hunting pressure. While the latter apparently declined in the 1980s due to the revocation of firearms licences, the authors suggest that any increases in hunting-induced mortality may pose a serious threat to the survival of the hog deer population.

The implementation of a conservation programme will require additional data on hog deer habitat requirements, ranging patterns and population dynamics. A short-term measure, involving awareness-raising among the local population could be implemented immediately by the DWLC, perhaps as part of a wider research project. The understandable antipathy of local farmers toward the species can be expected to increase if the hog deer population expands and a solution may have to be found that involves either compensation for crop damage or funding for preventive measures such as deer fencing. Clearly, long-term conservation measures will need to be innovative if the continued existence of hog deer is to be secured in the face of continued development and human population growth. Conventional solutions such as the establishment of protected areas will probably not be possible in the region because of increasing human land-use pressure and any conservation programme will need to recognize the species's dependence upon maintenance of traditional agricultural land-use patterns.

### Acknowledgments

The authors are especially indebted to the former Director of the DWLC, Dr Sarath Kotagama, who, in addition to giving permission for the survey, provided us with staff and a vehicle for the duration of the field work. Thanks are also extended to the then acting Director of DWLC, Mr Medewewa, for his assistance, to Dr Michael Green and Mr G. P. Karunaratne of IUCN for showing such interest and for giving so much of their time, and to Mr S. Saparamadu of Colombo for his valuable information on the past status of hog deer. These acknowledgments would not be complete without mentioning the villagers of the Angulugalla and Nape regions, whose hospitality and co-operation made the field-work both possible and enjoyable.

### References

- Baldwin, M.F. (ed.). 1991. *Natural Resources of Sri Lanka: Conditions and Trends*. A report prepared for the Natural Resources, Energy and Science Authority of Sri Lanka. 280 pp.
- Dhungel, S.K. and O'Gara, B.W. 1991. Ecology of the hog deer in Royal Chitwan National Park, Nepal. *Wildlife Monograph*, **119**. 40 pp.
- Green, M.J. 1985. *Aspects of the Ecology of Himalayan Musk Deer*. PhD. thesis. University of Cambridge, Cambridge, UK. 280 pp. (unpubl.).
- Honacki, J.H., Kinman, K.E. and Koeppl, J.W. 1982. *Mammal Species of the World: a Taxonomic and Geographic Reference*. Allen Press and The Association of Systematics Collections, Lawrence Kansas, USA. 694 pp.
- Phillips, W.W.A. 1935. *Manual of the Mammals of Ceylon*, pp. 333–337. Dulau and Co. Ltd, London, UK and Colombo, Sri Lanka.
- Prater, S.H. 1980. *The Book of Indian Animals*. Bombay Natural History Society, Bombay, India. 324 pp.
- Saparamadu, S.D. 1972. The hog deer: is it really extinct in Ceylon? *Ceylon Wildlife Bulletin* **11**, 3.
- Schaller, G.B. 1967. *The Deer and the Tiger*. University of Chicago Press, Chicago, Illinois, USA. 370 pp.
- Seidensticker, J.C. 1976. Ungulate populations in Chitwan Valley, Nepal. *Biological Conservation*, **10**, 183–210.
- Andrew J. McCarthy, Division of Environmental Sciences, University of Hertfordshire, College Lane, Hatfield, Hertfordshire AL10 9AB, UK.
- Sarath B. Dissanayake, Assistant Director (Research), Department of Wildlife Conservation, Rajamalwatte Road, Battaramulla, Sri Lanka.