

ASIAN ELEPHANT THREATENED

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SIR — Pagel and Mace¹ present a strong argument in favour of the current ban on trade in elephant products. The halving of the African elephant population in the past eight years is justly a cause for concern. But we wish to draw attention to a generally overlooked aspect of elephant conservation — that there are two species of elephants, and that the CITES ban has minimal benefits in the conservation of the Asian species, *Elephas maximus* L.

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An elephant should be ready for removal to the purchaser's home from within 14 to 21 days after the commencement of training, according to its size, though they are still far from being trained.

A full grown female should begin bringing in a few stalks of fodder after a fortnight and after 4 or 5 weeks should be fit for loading with almost a full feed.

Elephants are easiest taught to kneel down by being stretched out fore and aft, and then prodded behind the withers with a sharp bamboo, while the word of command is shouted, and men haul on the front leg ropes till the elephant has to sink down to the ground.

Runaway elephants may forget everything else, but never seem to forget how to kneel down.

All the other accomplishments are gradually taught, and the elephant should be safe to shoot from at the end of 5 or 6 months, though still by no means absolutely trustworthy.

The Asian elephant is much rarer than its African cousin. Current estimates are imprecise, but put the number of wild Asian elephants at 34,000–56,000 with a further 16,000 in captivity². Even optimistic figures indicate that there are only one tenth as many Asian as African elephants^{2,3}. Asian elephant numbers may not have undergone a dramatic decline in recent years, but the species faces much more intractable conservation problems.

Elephant poaching may be a relatively minor problem in Asia today and, because some males and all females lack tusks⁵, poaching cannot be the terminal threat it is in Africa. Much more important for the Asian elephant are habitat loss and fragmentation as a result of escalating human population, which in turn leads to increasing conflict between man and elephant. In India, for example, which may contain half of all wild Asian elephants, the human population increased from 236 to 790 million in the period 1901–88⁴. This increase places intense pressure on undeveloped areas. Only one-third of Asian elephant habitat is in protected areas⁴.

Erosion of habitat forces elephants into agricultural areas, where they destroy crops and inevitably cause human fatalities: 150–200 a year in India⁴. Most remaining populations are already small. Fragmentation of habitat leads to fragmentation of elephant populations. In Thailand, 29 protected areas hold 1,300–1,700 elephants, but only 13 of these areas hold more than 25 individuals⁴. Many Asian elephant populations in the longer term may not be viable^{2,6}. It does not help that

many of the larger elephant populations are located in politically unstable areas — for example the 8,500–11,000 elephants in northeast India². The destruction wrought in Manas National Park, Assam, by Bodo secessionists shows how vulnerable even protected areas are to political unrest. In the Vietnam war, US forces bombed elephants because the Viet-Cong were using them as transport⁴.

None of the problems are faced by the Asian elephant can be alleviated overnight as poaching has been in Africa. Neither has much effort been expended by the international community in finding ways in which human and elephant populations can successfully co-exist (although the individual countries involved are trying to tackle these problems). This state of affairs must be rectified, because the continued success of the CITES

ban, coupled with human population growth, will result in the Asian situation being repeated in Africa in the near future. It will be in the long-term interests of both elephant species to find solutions to the Asian elephant's problems now. (Source: *Nature* 352, 1991).

1. Pagel, M. D. & Mace, R. *Nature* 351, 265–266 (1991).
2. Santiapillai, C. & Jackson, P. *The Asian Elephant: an Action Plan for its Conservation* (IUCN, Gland, 1990).
3. Cherry, M. I. *Nature* 351, 7 (1991).
4. Sukumar, R. *The Asian Elephant: Ecology and Management* (Cambridge University Press, 1989).
5. Shoshani, J. & Eisenberg, J. F. *Elephas maximus* (Mammalian Species 182, American Society of Mammalogists, 1982).
6. Soule, M. E. *Viable Populations for Conservation* (Cambridge University Press, 1987).

THE DILEMMA OF SUBSPECIES

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Oliver Ryder's article¹ on the subspecies problem, which reports on issues considered at a July 1985 conference at Philadelphia on the establishment of species survival programs by the American Association of Zoological Parks and Aquariums, is most welcome and timely.

Owing to the extremisms of 'lumpers' and 'splitters' among systematists and taxonomists, and the general neglect of systematics in the wake of modern disciplines such as molecular biology, the subspecies concept has come in for a considerable bashing. Darwin's vague definitions² of 'species' and 'variety' may also have contributed to this, even though there are some sound modern definitions^{3,4}.

It is therefore heartening that the Philadelphia conference has recognized the importance of a concept of 'evolutionarily significant units or populations', that is, of subspecies within species, despite the difficulties involved in recognizing them. As Ryder remarks, these difficulties could be overcome by adopting

the criterion of 'concordance between sets of data derived by different techniques'. One such modern technique is the estimation of genetic distance 'when geographical distribution data indicate the existence of discrete populations within the range of a species'.

An example from recent genetic distance studies on Sri Lankan species illustrates this well. A Japan–Sri Lanka programme has been concerned with native livestock and their wild forms, including jungle fowl, musk shrews, macaque monkeys and elephants⁵. Work on the two Asian elephant subspecies in Sri Lanka and India has given particularly promising results⁶.

Genotype and gene frequencies and heterozygosity at variable protein loci, determined by electrophoretic analyses of blood samples from 29 tamed *Elephas maximus maximus* (the *forma typica*) in Sri Lanka, and from 20 tamed *E. m. indicus* in India, indicate that the genetic variability within each of the subspecies is low, as in the case of other non-domesticated large