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Inheritance of tusks in Asian bull elephants

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original course. He lists how tusk shape and size vary from region to region, and stated that there are certain areas in Sri Lanka where tuskers are more prevalent. This leads one to believe that there are definite hereditary factors present. Williams (1950, p. 50), mentioned how baby bulls were anxiously watched to see whether they would grow two tusks, one tusk, or none. Eltringham (1982, p. 6) recapitulates some of Deraniyagala's findings when he mentions that 50% of male elephants in northeast India are tuskers and that the tuskless condition appears to be the norm in Sri Lanka. Mukna males are supposed to be built differently, possessing stronger necks and trunks. Kurt *et al.* (1995) noted that tusklessness in *Elephas maximus* bulls is artificial. Perhaps there is a sex-linkage involved (cf. Jachmann *et al.*, 1995). Following are some data I collected on tusk development of captive bull calves in North America: [1] "Thonglaw" (tusker, Washington Park Zoo [WPZ], Portland, Oregon) — all his offspring, except "Packy", were tusked; [2] "Packy" (mukna, WPZ) — all his offspring have been tuskless; [3] "Tunga", wild born (tusker, WPZ) — had one bull calf, tusked; [4] "Vance" (mukna, Busch Gardens, Tampa, Florida; owned by Roman Schmitt) — has sired six calves (per Sabu's [Raymond Moreau] notes via Sandra Shoshani), all of them are tusked bulls, "Sabu", "Smokey", "Beau", "Caesar", "Ned", and "Samuel R."; [5] "Sneezy" (mukna, Tulsa Zoo, Oklahoma) — had one bull calf ("Maverick"), mukna; [6] "Bandara", a Sri Lankan bull (mukna, Calgary Zoo, Calgary, Canada) — had one tuskless bull calf (now in African Lion Safari, Cambridge, Canada); [7] "Hugo" (mukna, WPZ) — had one bull calf ("Chang Dee"), tusker. One important factor in this investigation is the country of origin (or the origin of their parents or grandparents) of the seven bull elephants listed above; any information to help resolve this puzzle would be greatly appreciated. Thonglaw came from Cambodia and Tunga was from Thailand. The rest were wild caught and I have not been able to trace their origin. Many elephants that were shipped out of Thailand did not originate there. Should the genealogy of the tuskless elephants be traced to countries others than Sri Lanka, these data may shed some light on the subspecies of *Elephas maximus*. According to Shoshani and Eisenberg (1982, p. 1) there are three subspecies: *Elephas maximus indicus* [found in Indo-China], *E. m. maximus* [restricted to the island of Sri Lanka], and *E. m. sumatranus* [restricted to the island of Sumatra]. There have been so many calves born since I wrote this article that it is really difficult to draw conclusions from the tusked or tuskless state of the father elephants. Tuskers have sired muknas and muknas have sired tuskers (cf. Daniel, 1998, pp. 39-61, 145). The genetic state of the mother elephant possibly also plays an important role in determining what the calf will be. I would be most eager to hear from Elephant readers should they be able to add, correct, or update information and references provided, or comment on differences in Asian tusk shape and size by country or region.

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One of the purposes of breeding endangered species in captivity is to learn as much as possible about their natural history. Asian bull elephants in the wild, other than in Sri Lanka, are primarily tusked species. Yet with captive males performing most of the breeding in the United States, we find more calves resulted from tuskless, or "mukna" males. [A mukna does not preclude having "tushes". According to Deraniyagala (1955, p. 40) these are small straight tusks found in Asian females and tuskless Asian males, and rarely protrude beyond the lips. Editors' note: we avoid the term "tushes"; thus, an elephant is either with or without tusks, since many of the so called "tushes" are long enough to be tusks.] I have been trying to gather data on the genetics of tusk inheritance in male Asian elephants, and found that there is a dearth of literature on this subject. Deraniyagala (1955, p. 42) lists some information on the status of tuskers versus muknas in each Asian country in which elephants are indigenous. The range is from an 11% occurrence of tuskers in Sri Lanka to 96% in Peninsular India and even 99% in Malaysia. These statistics were gathered before the sky-rocketing price of ivory instigated so much poaching of tusked bulls that the natural ratio could now be far off its