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Age determination of Eurasian otter (*Lutra lutra* L.) cubs

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INTRODUCTION

Births of Eurasian otters (*Lutra lutra* L.) vary geographically from seasonal to non-seasonal (Chanin 1985, Mason and Macdonald 1986). Consequently, ontogenetic criteria for age determination of wild-living cubs of this species become particularly important, as their age in many cases can not be inferred relative to a known, restricted, birth season. Moreover, morphological age criteria for cubs facilitate determination of birth seasons. Such criteria for cubs up to about 6 months of age are established in the present communication, based on previously published information as well as own observations on captive cubs. Discontinuous characteristics were preferred when possible.

CRONOLOGY OF ONTOGENETIC STAGES

Cubs born in captivity have been described as blind and toothless, with sleek, silvery grey fur (Pechlaner 1980, Reuther 1986, Mason & Macdonald 1986). Based on data compiled by Rogoschik (1992, 1995, pers comm.) the mean age (\pm SD) when the first deciduous tooth erupted was 19 ± 6 days ($n=7$), with minimum and maximum age 13 and 29 days. From the same source the mean age at eye opening was 30 ± 6 days ($n=14$), with minimum and maximum age 21 and 41 days, while the permanent canines erupted at age 106 days in two litters.

In addition to the above information on cub development, I made the following ontogenetic observations on live cubs: 1) Two captive-born, 8-week-old, sibling cubs from Otter-Zentrum, Hankensbüttel, Germany, had shed their deciduous incisors, but the permanent ones had not yet emerged. 2) A wild-born cub from

Lurøy, Norway, was estimated to be about 3 months old at the time of capture, based on the date when the permanent canines erupted and comparison with photos of known-age, captive born cubs of different ages. The sequence and rate of substitution of deciduous with permanent teeth in this cub was investigated at 1 to 12 day intervals, during the ensuing 2.5 months. The permanent teeth were then about fully grown. The number of days from capture for main stages in the process of dental development for this cub are given in Table 1. 3) A wild-born cub from Agdenes, Norway, also was estimated to be about 3 months old at the time of capture. Its dentition was inspected twice, at capture and after an interval of just over two months (Table 1).

AGE CRITERIA.

The following criteria for assigning approximate age in months of cub carcasses were derived: Eyes not opened, teeth deciduous if present: age 0 months. Open eyes, deciduous teeth: age 1 month. Deciduous teeth, incisors shed: age 2 months. Permanent incisors, in some cases canines just protruding: age 3 months. Well developed permanent incisors, canines and molars, but retaining at least one deciduous carnassial: age 4 months. No deciduous teeth, at least one of the permanent teeth still in progress: age 5 months.

COMPARISON OF SIBLINGS.

The age criteria were applied to carcasses of 96 small wild cubs, which included five pairs of siblings. Cubs that were killed together were assumed to be siblings. Two of the sibling pairs consisted of a male and a female. Dental development in the siblings was highly synchronous. Consequently, the estimated ages in months were consistent within all pairs. The sibling identities were not known until after ages were assigned.

SOURCES OF ERROR AND THE USEFULNESS OF THE AGE CRITERIA

Several of the age criteria were derived from observations on one or two cubs whose age was not accurately known. Individual development and growth rates may differ considerably among otter cubs (Stephens 1957, Harris 1968, Pechlaner 1980, Rogoschik 1992) and could be faster in well nourished captive than in wild cubs. It is thus obvious that the above criteria for age determination can be improved by adding observations on ontogenetic chronology from more cubs.

Table 1. Progress in substitution of deciduous with permanent teeth in two wild born, captive otter cubs.

Days from capture	Estimated age in months	Dental development
Cub 1:		
0	3	Emerging permanent incisors. Otherwise deciduous teeth.
12	3.5	Emerging permanent canines plus deciduous canines.
34	4	Permanent plus deciduous canines. Deciduous carnassials. Otherwise permanent teeth.
48	4.5	The last deciduous tooth shed during inspection. (Upper carnassial).
64	5	Permanent teeth not quite fully grown.
81	5.5	All permanent teeth fully grown.
Cub 2:		
0	3	Permanent incisors. One deciduous canine shed during inspection. Otherwise deciduous teeth.
63	5	No deciduous teeth left. Permanent teeth not quite fully grown.

The established rate of dental change of the Eurasian otter cubs corresponded reasonably well with that of two African clawless otter (*Aonyx* sp.) cubs. The permanent dentition in *Aonyx* sp. started to appear at an estimated age of 9-10 weeks, and they had shed all deciduous teeth by the end of their 18th week (Harris 1968). The ages when different developmental stages were reached differed by less than three weeks in Eurasian otter cubs of known age (Rogoschik 1992), and the application of the derived age criteria resulted in consistent age estimates of siblings of both sexes. This indicates that most age estimates by the above method can be expected to be within ± 1 month of the real age of cubs.

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SAMMENDRAG

Aldersbestemming av oter-unger (*Lutra lutra* L.)

Kriterier for å estimere alder i måneder for oterunger utvikles på grunnlag av tidligere publisert informasjon om utviklingshastighet hos unger født i fangenskap og tannutvikling hos innfangede viltfødte unger. Øyne ikke åpne, ingen tenner eller bare melketenner: alder=0 mnd. Åpne øyne, melketenner: alder=1 mnd. Melketenner, men fortennene felt, alder=2 mnd. Varige fortenner frambrudt, i noen tilfeller er varige hjørnetenner i ferd med å bryte fram: alder=3 mnd. Godt utviklede varige fortenner, hjørnetenner og bakre kinntenner, men fortsatt minst en melke-kinntann i behold: alder=4 mnd. Ingen melketenner, varige tenner nesten utviklet: alder=5 mnd. Anvendelse av alderskriteriene på fem søskenpar innsamlet som fallvilt ga samme alder til hver av søsknene.

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