

## PRELIMINARY DATA ON THE ONTOGENY OF SOME BEHAVIOURAL ACTIVITIES OF CAPTIVE OTTER CUBS

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**ABSTRACT** – Two captive otter cubs (*Lutra lutra*), born in October 1992, were followed throughout 9 months, from January to September 1993, in order to study the ontogeny of swimming, hunting and sprainting activities. Cubs were able to swim as adults do at 9 months old. First observed attempts at independent hunting and sprainting occurred when they were 3 and 6 months old respectively, but cubs were not completely proficient at these activities until they were 8 months old.

**Key words:** *Lutra lutra*, Ontogeny, Cubs, Captivity.

**RIASSUNTO** – *Dati preliminari sull'ontogenesi di alcune attività comportamentali di cuccioli di lontra in cattività* – Due cuccioli di lontra (*Lutra lutra*), nati in cattività nell'ottobre 1992, sono stati seguiti per 9 mesi, da gennaio a settembre 1993, con lo scopo di studiare l'ontogenesi di nuoto, caccia e marcamento. I cuccioli erano in grado di nuotare come gli adulti a 9 mesi d'età. I primi tentativi di caccia e marcamento indipendenti sono comparsi rispettivamente a 3 e 6 mesi e sono stati definitivamente acquisiti a 8 mesi di età.

**Parole chiave:** *Lutra lutra*, Ontogenesi, Cuccioli, Cattività.

### INTRODUCTION

While studies on captive otters (*Lutra lutra*) have investigated the adaptive significance of behavioural activities such as hunting and food preferences (Erlinge, 1968), mating (Harper & Jenkins, 1981) and sprainting behaviour (Hillegart et al., 1981), there are none to date which provide information on the behavioural ontogeny in cubs. Only one field study, concerning the development of hunting behaviour of European otters in a marine environment has been undertaken (Watt, 1993).

Parental care in the European otter is quite prolonged (see Carss, in this volume) with females breeding at 2-3 years old (Jensen, 1964), suggesting that cubs receive useful information for their adult life. Thus learning may play an important role in the behavioural development of otter cubs.

In the present work, two captive otter cubs were studied in the Otter Breeding Centre of Ticino Natural Park (Northern Italy). Records were kept of i) their general pattern of activity, ii) the gradual acquisition of three particular activities: swimming hunting and sprainting behaviour and iii) the attainment of independence.

### METHODS

#### PROCEDURE

The study was conducted on two captive otter cubs in the enclosure at the Ticino Natural Park (see details in Fumagalli and Prigioni, in this volume). As well as the female and her two cubs there was also a 6 years old male and two 15 months old animals.

Data were collected weekly from January to September 1993, starting when cubs were 3 months old: one of them suddenly disappeared in June, so for the last 3 months of the study period data refer to one cub only. Observations were made using a videocamera (Sony 8 mm). Filming was useful in order to record images for a detailed evaluation, to know individuals identity when uncertain and to allow precise computation of partial activity times. Any activity where cubs were present either with their mother or alone or with other individuals was recorded. A total of 104 hours of observations were recorded. Each recording session lasted 5 hours on average and it was diurnal in order to guarantee sufficient light for filming. Thirty hours of activity of otters were filmed. Each behaviour was timed in minutes and expressed as percentage of the total time of activity per month.

#### BEHAVIOURAL ACTIVITY

The activity of cubs was divided in 5 behavioural categories: a) *playing* performed in water with other individuals or objects, b) *rolling-grooming* which referred to ground activities, including resting in a group (e.g. mother and cubs together), c) *swimming*, d) *hunting* and e) *sprainting*.

For the last three activities the following sub-categories, which express gradual development by cubs, were defined.

#### SWIMMING

*Surface swimming-uncoordinated*: the back was often above the water surface and the cub rarely swam in a straight line. Generally this indicated poor co-ordination of movements.

*Surface swimming-co-ordinated*: the back was under water and the cub swam in a straight line. This indicated that cubs were able to swim as adults do.

*Plunged-head swimming*: the body was on the surface but the head was submerged as if looking for something under the water.

*Dolphin-swimming*: alternation of brief emersions and immersions on the surface.

*Plunged-swimming*: underwater swimming.

Swimming in adults consisted almost entirely of surface and under water swimming: consequently we could talk about definitive acquisition of the activity when cubs swim as adults do.

#### HUNTING AND SPRAINTING

a) Activities performed by the female with cubs present but inactive (the cubs are nearby and can see their mother hunting or sprainting).

b) Hunting performed by cubs and female at the same time, sprainting by female followed by cubs.

c) Independent activities by cubs.

These sub-categories underline the maternal role in the transmission of information: a) and b) show how the close association of cubs and their mother could facilitate imitative learning, c) represents the final step of independent behaviour.

## RESULTS

#### GENERAL PATTERN OF ACTIVITY

The distribution of single activities varied considerably throughout the study period (Fig. 1). In August only swimming activity was recorded. Playing occurred between the cubs, cubs and female, cubs and the other individuals; in particular

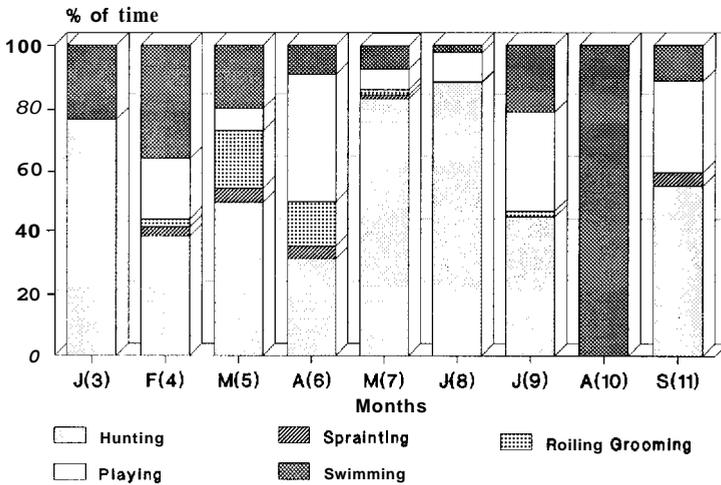


Fig. 1 – Percentage of time spent by cubs in various activities each month (in parenthesis age of cubs in months).

after the attainment of independence (July), the cub was seen playing quite often with the male. Rolling-grooming activity occurred from February to May, when family cohesion was still apparently strong. Time spent by cubs together and with their mother decreased from January to July when family break up took place: the cub was 10 months old (Fig. 2).

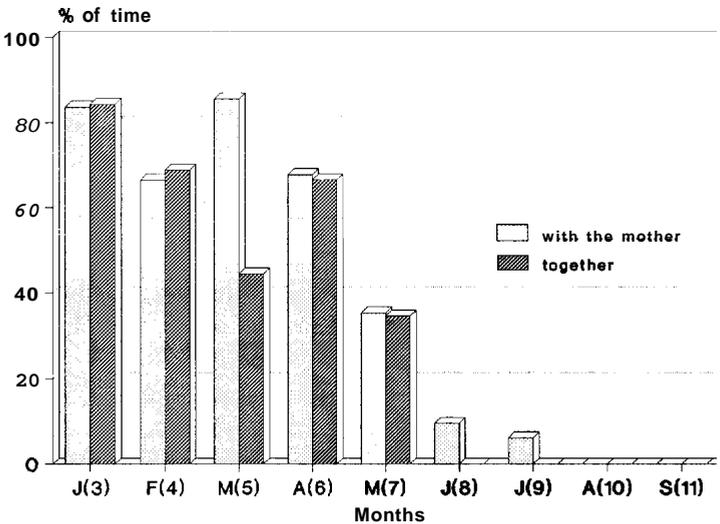


Fig. 2 – Percentage of time spent by cubs together and with their mother (in parenthesis age of cubs in months).

DEVELOPMENT OF SWIMMING ACTIVITY

Plunged swimming was observed from January (3 months old). Surface swimming developed from being uncoordinated to being co-ordinate quite suddenly in late July (9 months old) (Fig. 3) Plunged-head was performed by cubs when sear

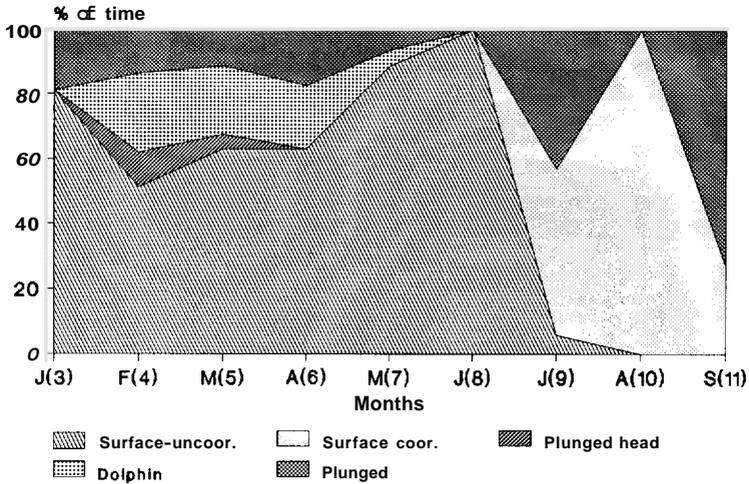


Fig. 3 – Development of swimming activity expressed as percentage of time spent by cubs (in parenthesis age of cubs in months; coor. = coordinated; uncoor. = uncoordinated)

ching for their mother underwater without diving themselves. Dolphin-swimming was performed by the female followed by cubs, never by the female (or other individuals) alone. It decreased in May and ceased just before mother-cub separation. Thus dolphin and plunged-head swimming lasted only for a few months, the former from February to May, the latter from February to March. These were gradually replaced by more adults behaviours (surface and plunged swimming). Cub appeared to swim as well as adults between July and August, when 9-10 months old.

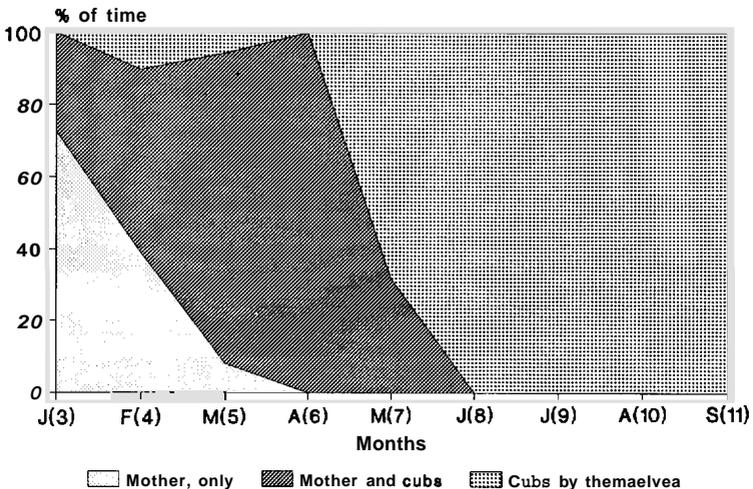


Fig. 4 – Development of hunting behaviour (in parenthesis age of cubs in months)

## DEVELOPMENT OF HUNTING AND SPRAYING BEHAVIOUR

In January at the age of 3 months the cubs were already able to follow their mother during hunting activity (Fig. 4). There were no data for the first 2 months of life, so we cannot say anything about the initiation of searching and prey catching behaviour. Nevertheless by February (4 months old) there were attempts at independent hunting, the definitive acquisition of which occurred in June when cubs were 8 months old.

In March the cubs (5 months old) started to spraint following their mother, in April (6 months old) first attempts at independent activity were observed (Fig. 5). The definitive acquisition occurred in June when cubs were 8 months old.

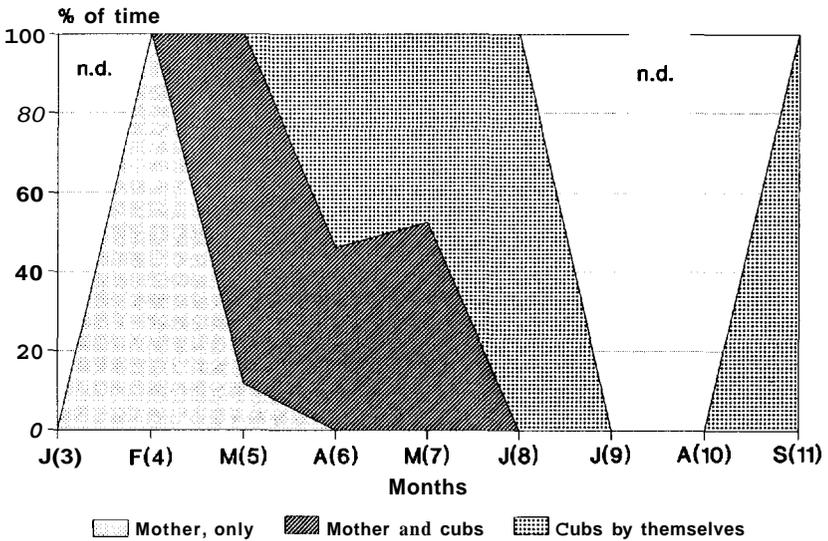


Fig. 5 – Development of sprainting behaviour (in parenthesis age of cubs in months; n.d. = no data)

## DISCUSSION

A prolonged association between female and cubs is likely to favour observational learning, suggesting the importance of parental care for the behavioural development of young. Data collected in the wild show that the family break up usually occurs when the cubs are 12-14 months old (Erlinge, 1967; Watt, 1993; Watson, 1978). In the present study the time spent by cubs with their mother was shorter, suggesting a certain individual variability in the attainment of independence.

As in the wild (Watt, 1993) parental care was completely dependent on the female. Nevertheless the male (who was the father) was seen playing with the cubs and no aggressive behaviour was observed. In our case it was not necessary to separate the male to prevent possible infanticide which can often occur in captivity (Vogt pers. comm.)

In this study captivity per se did not appear to influence the general activity and behaviour of cubs. In particular they spent a lot of time hunting even when provided

with surplus food almost every day (see Fumagalli and Prigioni, in this volume). The acquisition of hunting and swimming activities appeared to run in parallel. Cubs were able to plunge quite early (3 months old and even before) and this rapid swimming development probably allowed them develop at the same time hunting techniques, which required the ability to dive. Dolphin-swimming could represent some sort of training for propulsion in underwater swimming.

In this study the semi-captive condition seemed to be important for a natural development of vital behavioural activities in otter cubs and to allow the animal's fitness for reintroduction into the wild to be judged. Animals held in more unnatural conditions may be less able to survive when released.

#### REFERENCES

- CARSS, D.N. Foraging behaviour and feeding ecology of the otter *Lutra lutra*: a selective review. (in this volume)
- ERLINGE, S. 1967. Home range of the otter *Lutra lutra* L. in southern Sweden. *Oikos*, 18: 186-209.
- ERLINGE, S. 1968. Food studies on captive otters (*Lutra lutra*). *Oikos*, 19: 259-70.
- FUMAGALLI, R. & C. PRIGIONI. Behavioural ecology of captive otters *Lutra lutra* in the Breeding Centre of the Natural Park of Ticino Valley (Piemonte Region, Northern Italy). (in this volume).
- HARPER, R.J. & D. JENKINS. 1981. Mating behaviour in the European otter (*Lutra lutra*). *J. Zool. Lond.*, 195: 556-558.
- HILLEGART, V., OSTMAN, J. & F. SANDEGREN. 1981. Area utilization and marking behaviour among two captive otter (*Lutra lutra*) pairs. Abstract, Second International Otter Colloquium, Norwich, September, 1981.
- JENSEN, A. 1964. Odderen in Danmark. *Danske Vildtundersogelser*, 11: 1-18.
- WATSON, H. 1978. Coastal otters (*Lutra lutra* L.) in Shetland. Vincent Wildlife Trust, London.
- WATT, J. 1993. Ontogeny of hunting behaviour of otters (*Lutra lutra* L.) in a marine environment. *Symp. Zool. Soc. Lond.*, 65: X7-104.