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### Field observations of Spanish lynxes (*Felis pardina*) playing with prey in Doñana, south-west Spain

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Play behaviour is well documented in felids (Leyhausen, 1979; Fagen, 1981), but the functional significance of this activity remains unclear (Caro & Alawi, 1985; Caro, 1987; Bekoff, 1989*a*). Moreover, most of the information concerning play in felids has been provided by observations of domestic and/or captive individuals (see revision in Bekoff, 1989*b*) as free-living wild felids are usually rare, solitary and frequently nocturnal (Gittleman, 1989). In this note we report some observations of two free-living Spanish lynxes (*Felis pardina*), a juvenile and an adult, playing with wild rabbits (*Oryctolagus cuniculus*) in Doñana, south-west Spain. Play patterns of captive young northern lynxes have been described by Lindemann (1955), while Leyhausen (1979) has observed captive adult wild felids playing with prey.

The lynxes, an 18-month-old male, nutritionally independent but still living in its natal range, and a 30-month-old female established in a well-defined home range, have been radiotracked since they were approximately six months old, allowing us to estimate precisely their age and spatial behaviour. Observations were recorded in early summer 1986, at short range (less than 50 m), early in the morning, using binoculars. The Doñana area is a flat zone covered with Mediterranean maquis adjacent to the border of the marismas of the Guadalquivir River (Valverde, 1958). It is intersected by a number of paths and fire-breaks with no vegetation, where occasionally lynxes can be seen.

The juvenile male was observed several times with a rabbit in its mouth, but on two occasions (12 and 16 June) it left the prey, still alive, on a car track by the middle of the fire-break and walked away a few metres. When the rabbits tried to escape, the lynx leaped and gripped them with its jaws several times within 15 minutes. In one case, it ate the prey and in the other it was left alive.

The adult female was observed on 1 July walking along a fire-break. Suddenly, she crawled close to a bush, leaped and caught a rabbit. It was left on a car track at a distance of 2 m; she waited until the rabbit moved some metres away, and then chased the prey, pouncing on it from more than 3 m. It was then carried back to the track. When the prey stayed still, the female tapped and pushed it with her forepaws, to make it move, and continued playing again. After 31 minutes she left the rabbit alive and rested for 10 minutes. Then she got up and after two attempts she hunted another rabbit, seized the prey and played with it for five minutes. Finally, the lynx carried this second rabbit under a heather (*Erica* sp.) and presumably ate it.

Both lynxes displayed the same play patterns that have been categorized by Leyhausen (1979) and Biben (1979) as 'overflow-play'.

Our observations show that play behaviour persists in free-living adult wild felids, at least under particular circumstances. Rabbits are the staple prey in the area (Delibes, 1980) and their numbers peak in early summer (Kufner, 1986). The incidence of myxomatosis was high at this time, making the rabbit an easily found and captured prey. The surplus of easily captured prey could have resulted in the lynxes showing incomplete predatory sequences, in which they play with rabbits and

in some cases leave them alive. Similar behaviour has been demonstrated by Biben (1979) with domestic cats and Schaller (1972) with lions (*Panthera leo*).

The costs of play in terms of amount of time devoted to this activity (one hour; 4% of daily activity time) seem considerable. Moreover, the energy costs of play, which were estimated by Martin (1984) as being 1.6 times the resting metabolic rate, seem to be significant in relation to the total daily energy budget. These costs, however, could become irrelevant when prey is plentiful and easy to obtain, as was the case in this study.

Even anecdotal, adult play observation could give some circumstantial evidence against the hypothesis that play serves exclusively as a mechanism to develop adult predatory skills as well as physical strength and endurance (Martin & Caro, 1985; Caro, 1988).

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#### REFERENCES

- Bekoff, M. (1989a). Social play and physical training: when "not enough" may be plenty. *Ethology* **80**: 330–333.
- Bekoff, M. (1989b). Behavioral development of terrestrial carnivores. In *Carnivore behavior, ecology and evolution*: 89–124. Gittleman, J. L. (Ed.). Ithaca, New York: Cornell University Press.
- Biben, M. (1979). Predation and predatory play behaviour of the domestic cats. *Anim. Behav.* **27**: 81–94.
- Caro, T. M. (1987). Indirect costs of play: cheetah cubs reduce maternal hunting success. *Anim. Behav.* **35**: 295–297.
- Caro, T. M. (1988). Adaptative significance of play: are we getting closer? *Tree* **3**: 50–54.
- Caro, T. M. & Alawi, R. M. (1985). Comparative aspects of behavioural development in two species of free-living hyrax. *Behaviour* **95**: 87–109.
- Delibes, M. (1980). Feeding ecology of the Spanish lynx in the Coto Doñana. *Acta theriol.* **25**: 309–324.
- Fagen, R. (1981). *Animal play behavior*. New York: Oxford University Press.
- Gittleman, J. L. (1989). Carnivore group living: comparative trends. In *Carnivore behavior, ecology and evolution*: 183–207. Gittleman, J. L. (Ed.). Ithaca, New York: Cornell University Press.
- Kufner, M. B. (1986). *Tamaño, actividad, densidad relativa y preferencia de hábitat de los pequeños y medianos mamíferos de Doñana, como factores condicionantes de su tasa de predación*. PhD thesis, University Autonoma, Madrid.
- Leyhausen, P. (1979). *Cat behavior. The predatory and social behavior of domestic and wild cats*. (Translated from the 4th edn, 1975: *Verhaltensstudien an Katzen*). New York: Garland STPM Press.
- Lindemann, W. (1955). Über die Jugendentwicklung beim Luchs (*Lynx l. lynx* Kerr) und bei der Wildkatze (*Felis s. silvestris* Scherb.). *Behaviour* **8**: 1–45.
- Martin, P. (1984). The time and energy costs of play behaviour in the Cat. *Z. Tierpsychol.* **64**: 298–312.
- Martin, P. & Caro, T. M. (1985). On the functions of play and its role in behavioral development. *Adv. Stud. Behav.* **15**: 59–103.
- Schaller, G. B. (1972). *The Serengeti lion*. Chicago: University Chicago Press.
- Valverde, J. A. (1958). An ecological sketch of the Coto Doñana. *Br. Birds* **51**: 1–23.