



## Original investigation

# Activity of badgers (*Meles meles*) in Central Poland

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## Abstract

A four-year study of badger activity was carried out in central Poland (54°48' N, 19°53' E) with the aid of radio tracking, winter tracking, sett inspections and direct observation of the animals. The daily activity of badgers varied considerably in the course of a year. In winter, the time spent away from the sett and the daily distance covered were both the shortest. In spring, the daily distances increased and the badgers were active on the ground for 3.5–4.5 hours. In summer and autumn, the animals were active for more than 6 hours. The longest spell away from the sett was 9 hours, while the farthest distance moved in a day was 8.1 km. Activity generally peaked once, this maximum occurring between 22:00 and 02:00 h. No cases of surface activity between 05:00 and 17:00 were recorded. Winter tracking indicated that during the first half of this season the animals restricted their activity to the immediate vicinity of their setts. Later in the season, the badgers began to undertake longer journeys, scent-mark their home ranges and inspect the setts in them with greater frequency. In winter the time spent by badgers in their setts was closely dependent on the outside temperature. The animals came up to the surface with varying frequency in the different seasons. In winter the badgers left their setts on average once in 48 hours, while the longest period of uninterrupted inactivity recorded during our study was 2 weeks. Badger activity was governed by weather factors, their life cycle and the availability of food during the year.

**Key words:** *Meles meles*, seasonality, daily activity, distance

## Introduction

The activity of badgers *Meles meles* (Linnaeus, 1758) has been the subject of numerous studies, particularly in western and northern Europe (NEAL 1977; HARRIS 1982; CRESSWELL and HARRIS 1988 a; BEVANGER et al. 1996; DO LINH SAN 2002 and others). Diverse aspects of this activity have been exam-

ined, including the time of departure from the sett, the duration of activity and its distribution over 24 hours, as well as the distances covered by the animals during their nocturnal movements. Many studies have assessed the significance of factors modifying activity, such as hormonal regulation (MAUREL and

BOISSIN 1983), length of daylight (BOUCHARDY and MOUCHES 1986), weather conditions (CRESSWELL and HARRIS 1988 a) and the accessibility and distribution of food resources (HENRY 1984; KRUK 1986; SHEPHERDSON et al. 1990; ZABALA et al. 2002).

In western and northern Europe there is a good understanding of these matters, but in the central and eastern parts of the continent, data on the activity of badgers are sparse and random (SUMIŃSKI 1989; GOSZCZYŃSKI and WÓJTOWICZ 2001; KOWALCZYK 2001; KOWALCZYK et al. 2001). It is to be expected that, because of the climatic characteristics of central Poland, the badger's annual, seasonal and daily activity rhythms will be different from those in western Europe. The low temperatures in winter and the fact that the ground is covered with snow for quite a long time may affect the duration of sleep in winter, the amount of time the animals spend outside the sett and their movements. Furthermore, the local environmental conditions, such as habitat fragmentation and human pressure, can affect the badgers' behaviour and the way in which they make use of the available space. For these reasons we decided to investigate a variety of badger activities in central Poland.

## Material and methods

### Study area

The study was carried out near Rogów in central Poland (51°48' N, 10°53' E) in a mosaic of woodlands and fields covering an area of about 89 km<sup>2</sup>. The woods and copses (17% of the study area) of diverse size and shape (from 60 to almost 500 ha) are used by the badgers during their foraging activity, and also for reproduction, for rearing their young, and as a wintering area. Meadows and pastures, which the animals raid for fruit (GOSZCZYŃSKI et al. 2000) provide the badgers with food, in the form of earthworms, and orchards, cover slightly over 10% of the area. By far the greatest part of the study area (62%) consists of arable land. The remainder is comprised of small towns, villages and roads.

Apart from foxes, badgers are the most numerous predators in the study area. Their density is

slightly over 2 animals per 1 km<sup>2</sup> of woodland. The average family group is small in size (3.5 adults and young together) (GOSZCZYŃSKI and SKOCZYŃSKA 1996). Nearly all the setts actually used by badgers are in woodland (GOSZCZYŃSKI and WÓJTOWICZ 2001).

### Daily and seasonal distribution of activity

Daily activity was assessed by radio-tracking eight badgers (2 adult males, 4 adult females and 2 young females) recruited from three families. The individual animals were tracked for periods from 1.5 to 36 months, on average for 10 months. Three radio collars were equipped with activity sensors, which enabled the animals' times of departure from and return to the sett to be determined. In the other cases, the strength of the signal and the location of the animal gave an indication of whether it was active or not. Radio transmitters manufactured by AVM, Televild and Wagener were used during the study. The animals were located during the daytime and at night. During the day the sett where the badger was sleeping was found, and the time of the location was noted. During night-time tracking the animal was located in two ways. If the animal was in one place, e.g. it was foraging in woodland or an orchard, it was located by triangulation, but when moving around, its position was determined from the strength and direction of the transmitter signal. Outside the sett area the badgers were not very shy during nights, and we were often able to locate them very precisely from the noises they made while foraging. We attempted to determine an animal's position as often as possible, usually every 5–15 minutes.

For assessing daily activity, the following method was used. On days when the badgers were tracked, the time each tracking session began and ended was noted. This period was then divided into one when the badgers were active and one when the animals did not show any signs of surface activity. From the total tracking time in a month we were able to determine during which hours the badgers were active, in which month and for how many minutes per hour the badgers were active during each day. For each hour the amount of time the animals were active on the ground was expressed as percentage. The total tracking time was about 7200 hours; the badgers were tracked on the ground for 727 hours. This study analyses the records kept from spring 1995 to spring 1998. Additional data from three summer months (June–August 1993) are also included.

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