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Diet, food availability and foraging behaviour of badgers (*Meles meles* L.) in southern England

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Abstract

During a four-year study in the south of England the diet of badgers was investigated by analysis of faeces contents; availability of earthworms was assessed by formalin-sampling and by calculation of number of "worm nights" using meteorological data; and the foraging behaviour and habitat use of badgers was recorded from direct observation of radio-collared animals. The main foods of badgers were earthworms, insects, fruit and wheat, and grass was also ingested in substantial quantities. Earthworms appeared in the diet most frequently but wheat was almost as important a food overall in terms of percentage volume. Earthworm intake was correlated with worm biomass as measured by formalin-sampling, but not with number of "worm nights". There was a significant correlation between the amount of time radio-collared badgers spent foraging in a particular part of their territory and earthworm biomass at that location. Percentage time spent in different habitat types (pasture, scrub and arable fields) showed marked seasonal variation but absolute amount of time spent in pasture and scrub was constant over much of the year. We suggest that earthworm consumption, like that of other foods, is dictated primarily by availability.

Introduction

Badgers *(Meles meles)* are often described as omnivores (e. g. Neal 1977, 1986; Long and Killingley 1983). While the latter term may be questioned on the grounds that no animal eats everything, badgers do consume a remarkably wide range of animal and plant material. Their diet includes small mammals (e. g. mice, voles, shrews, lagomorphs and hedgehogs); various birds and their eggs; carrion; reptiles and amphibians; soft-bodied invertebrates such as slugs, snails and worms; insects including adults and larvae of beetles, flies, wasps and bees; honey; wild roots, tubers, fruits, berries and nuts; garden fruits and vegetables (e. g. apples, pears, plums, cherries, strawberries, raspberries, carrots, potatoes, peas and beans); and commercial crops such as cereals (oats, barley, wheat and maize), pulses and grapes (for references see Neal 1977, 1986; Stocker and Lüps 1984; Lüps and Wandeler in press). To give an example of the variety of more specific food types that can be consumed within just one general category, Andersen (1954) lists no fewer than 121 genera of insects eaten by badgers in Denmark, and in a single badger stomach he found insects from 35 genera as well as worms, toads and frogs. Thus badgers not only consume a wide variety of foods over a range of different geographical regions; they also eat many different food species within a single area and even in a single night (Lüps et al. 1987).

The simplest and most obvious hypothesis concerning food choice in badgers is that an individual eats whatever it happens to come across (e. g. Andersen 1954, p. 19). According to this view different foods are consumed independently of one another and would be expected to feature in the diet in proportion to their availability. However more recently Kruuk and his collaborators (e. g. Kruuk 1978, 1986; Kruuk and Parish 1981) have argued that badgers are "earthworm specialists", on the grounds that a. earthworms account for the bulk of the diet and are eaten year-round, whereas other foods are only eaten in relatively small amounts and at particular times of the year; b. badgers prefer

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earthworms, such that other foods are only eaten when earthworms are not available; and c. when earthworms are scarce badgers intensify their worm-hunting effort, whereas all other foods are eaten in direct proportion to availability.

There are, however, at least two problems with a universal description of badgers as "earthworm specialists". Firstly, it is now clear that in some parts of the badger's range earthworms form only a very minor part of its diet (e. g. Ibañez and Ibañez 1980; Kruuk and De Kock 1981; Ciampalini and Lovari 1985; Martín-Franquelo and Delibes 1985; Pigozzi 1988). Secondly, even in Kruuk's own study area in Scotland the importance of earthworms in the diet has diminished somewhat during the last few years, with cereals becoming increasingly important as an alternative food (Kruuk and Parish 1987). Thus the extreme preponderance of earthworms in the diet of badgers, which obtained in Kruuk's original study, may not be a general phenomenon.

In this paper we present data on diet, food availability and foraging behaviour of badgers in the south of England, from an area subjected to fairly intensive cereal farming. Our results differ in various respects from those of Kruuk and his collaborators, and we discuss these differences (and some similarities) in the context of the "worm specialisation" hypothesis.

Material and methods

Study area

The study, which lasted from September 1983 to October 1986, was conducted on private farmland in the South Downs near Lewes, East Sussex (for further details see Roper et al. 1986; Shepherdson 1986). The landscape consisted of chalk hills separated by steep valleys, the hilltops and valley bottoms being mostly arable and the hillsides left as permanent pasture grazed periodically by sheep and cattle. These areas of permanent pasture consisted of long tussocky grass (up to 25 cm in height) and a variety of herbs. Arable fields consisted of winter wheat *(Triticum aestivum)* except that in 1984 one field was planted with rape *(Brassica rapifera)*, in 1985 one contained peas *(Pisum sativum)* and in 1986 two contained barley *(Hordeum vulgare)*. On the south edge of the study area were two small vineyards. Scattered throughout the area, within pasture fields and on the edges of arable fields, were small irregular patches of scrub up to 1 ha in area, dominated by hawthorn *(Crataegus monogyna)*. Overall the area consisted of 65 % arable land, 28 % pasture and 7 % scrub.

Observations (see below) were conducted in the territories of four neighbouring badger groups which were surrounded by other occupied territories. The mean nearest-neighbour distance for 20 setts in the area was 520 m (sd 140 m) giving a density of about 2 setts/km^2.

Determination of diet

Diet was determined from faecal remains in two different ways. First, we conducted a monthly survey of the study area from September 1983 to August 1984, visually examining all faeces found. Second, we carried out a more detailed laboratory analysis on a smaller number of faecal samples collected over a two-year period in order to determine diet more precisely.

The monthly survey was conducted by walking around the study area on a prescribed route looking for defecation sites (Roper et al. 1986). Whenever a dungpit containing fresh faeces was found the contents were spread out on the ground with a trowel and their main constituents (i. e. any prey type judged to contribute more than 20 % to the total volume of faeces) noted after inspection with the naked eye. Wheat, insects, fruit and grass were readily identifiable from obvious remains, while faeces containing earthworm remains was identifiable from its earthy homogenous appearance and its characteristic smell (Skoog 1970). Since deposition of faeces by badgers at latrines is subject to seasonal variation (Roper et al. 1986) there was some variation in the number of faeces available for inspection each month (mean 35, range 21 to 48).

During 1984 and 1985 eight faecal deposits per month were collected from within the territory of a single social group and were frozen in plastic bags for subsequent detailed laboratory analysis. The method of analysis was based on those described by Kruuk and Parish (1981), Ashby and Elliot (1983) and Wroot (1985). Each sample was first defrosted, oven dried at 55 °C and weighed. Analysis for earthworm remains was conducted by taking 0.5-g subsamples of faeces, to each of which 5 drops of picric acid solution were added. Each sample was then "washed" by twice diluting it in 500 ml of water, allowing it to settle for 10 min and then withdrawing the sediment with a pipette. The final sediment was examined under a 35× binocular microscope and the number of earthworm chaetae (stained yellow) was counted. Number of worms per unit weight of dry faeces was calculated on the assumption that one worm yields 1200 chaetae (Wroot 1985).

Analysis for contents other than earthworms involved weighing the remainder of each faecal sample, rehydrating it and washing it in a 1 mm sieve. The remaining solid material was then examined under the microscope in a shallow white dish. Number of insects was estimated from remains such as beetle elytra and skins of leatherjackets, and was converted to volume by multiplying up by the approximate bulk of the prey item in question (Kruuk and Parish 1981). Total volume of cereals was estimated from the number of husks and partly digested grains in the faeces, and volume of grass was measured directly on the assumption that none of the ingested grass had been digested. Volume of fruits (blackberries and grapes) was estimated from the number of seeds. All volumes were then expressed as a percentage of the total.

Earthworm availability

Earthworm availability was assessed in two ways: by formalin-sampling to determine earthworm biomass and by calculating the frequency of occurrence of "worm nights" (Kruuk and Parish 1981; MacDonald 1983) using meteorological data.

Formalin-sampling was carried out systematically at five sites each month during 1985, three sites being pasture fields and two arable fields planted with winter wheat. The method was based on that described by Raw (1959) and Satchell (1967). At each site four 50 cm × 50 cm quadrats were placed on the ground at random locations and each quadrat was treated with two applications consisting of 3 l of 0.6 % formalin, separated by an interval of 15 min. Any earthworms coming to the surface within 30 min of the first application of formalin were collected and returned to the laboratory for counting and weighing. At sites consisting of ungrazed pasture worms were difficult to see on the surface and so the top 5 cm of turf was removed in each quadrat prior to treatment with formalin. This layer of turf was hand-sorted and any earthworms within it were collected.

Formalin-sampling was also carried out periodically at places where radio-collared animals (see below) had been observed to forage during the month in question. A map of the study area was divided into 50 m × 50 m grid squares and during 1984 and 1985 formalin-sampling was carried out in a total of 27 squares where badgers had been observed to forage, some squares being sampled in both years so as to yield 42 sampling occasions in all. On each occasion six quadrats were sampled using the method already described, the purpose being to correlate earthworm biomass within a particular grid square with the amount of time that radio-collared badgers spent foraging in that square in the year in question.

Following Kruuk and Parish (1981) "worm nights" were defined as nights when the temperature remained above 0 °C and when at least 2 mm of rain had fallen within the last 72 h. Under these conditions earthworms (especially *Lumbricus terrestris*) appear on the surface of the ground, thus making them readily available to badgers. Number of "worm nights" was calculated for each month during 1984 and 1985, using meteorological data supplied by the Southern Water Authority and collected at a weather station 16 km west of the study area.

Radio tracking

Between January 1984 and October 1986 observations were made on 25 badgers (16 male and 9 female) from four adjacent social groups. The animals were trapped at their home setts, anaesthetised with ketamine hydrochloride and fitted with radio-collars and luminous green "betalights" (for details of trapping procedure and equipment see Cheeseman and Mallinson 1979; Shepherdson 1986). The maximum number of animals with functioning transmitters at any one time was 8 and the minimum 3.

On any one night a particular animal, designated in advance as the "focal animal", was followed on foot by an observer and watched through 7 × 50 binoculars fitted with a red-filtered 15-W tungsten-halogen spotlight. The animals rapidly habituated to the presence of observers and it was possible to stay within close range of a focal animal for several hours at a time. Observations (locating of the animal, its behaviour and the presence and behaviour of any other visible animals) were spoken into a pocket dictaphone, transcribed into note and map form the following day, and transferred onto computer for subsequent analysis. In addition, every 15 min "fixes" were taken on any other animals that were within radio range and if possible their precise locations were determined by triangulation. Observation sessions were scheduled to cover, as equally as possible, all the available animal for their whole nocturnal activity period. The total number of observation hours during the whole period (including only time when useful data were being collected) was 1205 h, with a minimum of 15 h and a maximum of 182 h in any one month. Usually an observer worked alone, but sometimes two observers worked simultaneously, either watching different animals within the same group or concentrating on different groups.

Results

Diet

The major constituents of the diet, as determined from visual inspection of all fresh faeces found during monthly surveys of the study area, were earthworms, insects, wheat, fruit and grass (see Fig. 1). All these items were subject to marked seasonal variation in their frequency of occurrence, with earthworms being the most frequently eaten food overall. Earthworms were an important constituent of virtually all samples from September to April; wheat occurred in a majority of samples from June to September; insects appeared to a substantial extent only in June; while fruit (blackberries or, in a few instances, grapes) occurred with fairly high frequency in August and September. Grass appeared with roughly the same seasonal pattern as earthworms, but with a lower frequency. The results suggest a diet dominated by earthworms in winter and spring and by vegetable matter (cereals and fruits) in summer and autumn.

Detailed laboratory analysis of faecal samples collected during 1984 and 1985 again revealed the presence of substantial amounts of earthworms, insects, wheat, fruit and grass (see Fig. 2). Insects were mainly dipteran larvae (e. g. one sample contained remains of 14 nematoceran larvae) and dung beetles (e. g. *Geotrupes* spp.), while fruits were mainly blackberries or, in a few samples, grapes. In addition a variety of other foods occurred occasionally in the diet including snails, rabbits (both young and adults, the latter probably eaten as carrion), partridge eggs, sugar beet, peas and cattle cake.

As judged from the frequency of occurrence of different prey classes (Fig. 2a), earthworms and grass were eaten most often from November to April, wheat during

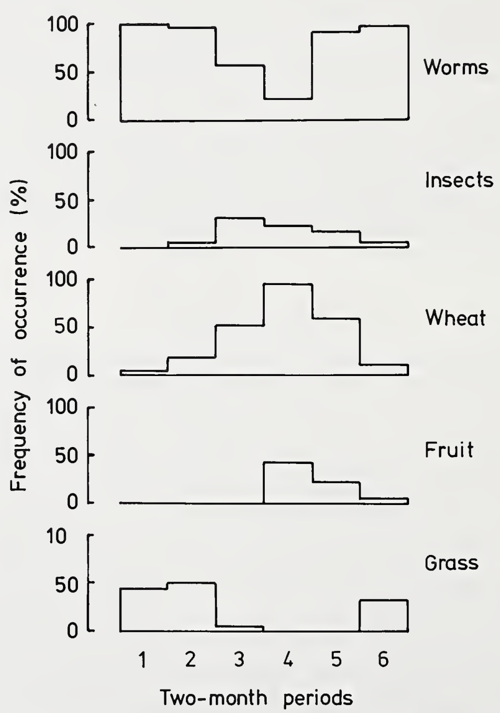

Fig. 1. Frequency of occurrence of different foods in badger faeces during two-month periods in a single year, as determined from gross inspection of faeces in the field

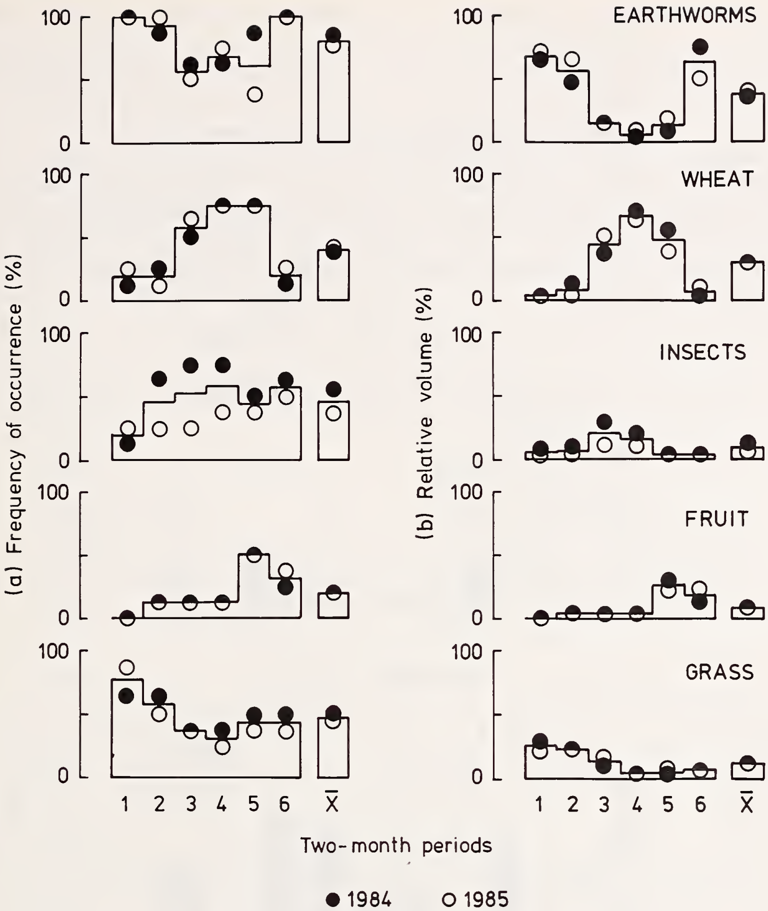

Fig. 2. a: Frequency of occurrence of different foods in badger faeces; b: estimated relative volume of different foods, during two-month periods in each of two years. Data were derived from laboratory analysis of faecal samples. Filled circles: 1984. Open circles: 1985

summer, fruit during late summer and autumn; and insects at any time of year. There was reasonable agreement between 1984 and 1985 except in the case of insects, which were eaten with high frequency during the hot, dry summer of 1984 but were less conspicuous in the diet during the cold, wet summer of 1985. Overall, earthworms were by far the most frequent category of prey. In terms of percent volume (Fig. 2b) the same general pattern emerged, except that averaged over the whole two-year period earthworms and wheat were of roughly equal importance (35 % and 30 % by volume respectively).

Earthworm availability

Formalin-sampling data from pasture and wheat fields in 1985 showed worm biomass to be on average higher in pasture (see Fig. 3a). However two-way analysis of variance showed that this difference was not statistically significant (main effect due to habitat type, $F_{1,3}$ = 3.99). In both pasture and arable fields there was marked and significant seasonal variation in worm biomass, with minimum biomass in mid-summer (main effect due to season, $F_{5,11} = 8.95$, $p < 0.001$).

Calculation of percentage of "worm nights" in each two-month period throughout the two years of the study (Fig. 3b) showed a markedly different pattern between the two years: in 1984 "worm nights" were most frequent in the winter whereas in 1985 they were most frequent in the summer. This difference between 1984 and 1985 was caused primarily by differences in rainfall, the summer being hot and dry in 1984 and cool and wet in 1985. Statistical comparison of the two years showed a significant difference ($X^2 = 55.1$, $p < 0.001$). Despite this difference in the seasonal pattern of "worm nights" between the two years there was no major corresponding difference in worm intake (compare Fig. 2. with Fig. 3b).

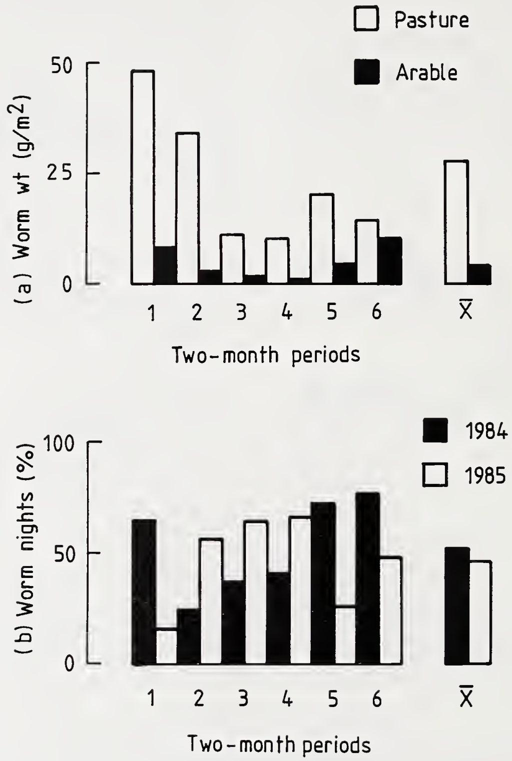

Fig. 3. a: Weight of worms extracted by formalin-sampling in pasture and arable fields, for successive two-month periods during 1985; b: Number of "worm nights" as calculated from meteorological data, for two-month periods in each of two years

In order to compare different measures of worm availability with worm consumption in a more systematic manner, the relevant data on availability were correlated with the percentage of worms by volume in the diet across two-month periods within each year for which data were available. Spearman tests on the ranked data showed no significant correlation between percentage of worms in the diet and percentage of worm nights, either in 1984 ($r = 0.31$, $N = 6$) or in 1985 ($r = -0.7$); nor was there a significant correlation between worm consumption and worm biomass in arable fields in 1985 ($r = 0.70$). However, a significant correlation did emerge between worm consumption and worm biomass in pasture in 1985 ($r = 0.94$, $p < 0.01$). (No data on worm biomass were available for 1984). Thus of the various measures of worm availability taken in the study, the only significant predictor of worm consumption was the biomass of worms in pasture, as revealed by formalin-sampling.

Habitat use and foraging behaviour

Fig. 4 shows seasonal changes in the use of four main habitat types by radio-collared animals. (These habitats together accounted for 97 % of the total observation time; during the remaining 3 % of observation time animals foraged mainly around farm buildings.) Percentage of observation time spent in each habitat type (Fig. 4a) was calculated by summing data over all the animals that had been watched in a given two-month period, dividing by total observation time for those animals, and expressing the results as a percentage. Data were analysed separately for each of the three years of the study. Absolute time (Fig. 4b) was estimated by multiplying percentage time by the average number of hours per night for which animals were active during each two-month period.

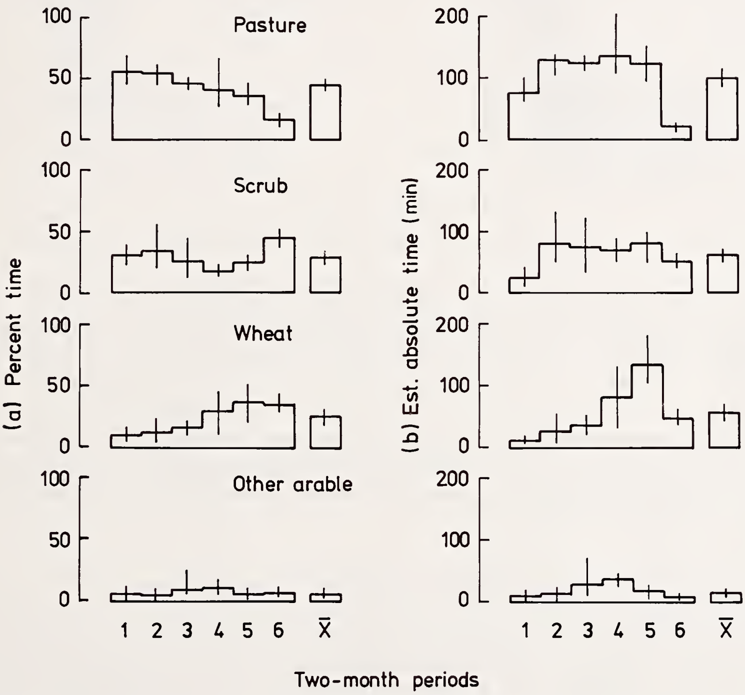

Fig. 4. a: Percent observation time spent by radio-collared badgers in four different habitat types, for two-month periods (mean and range over three successive years, 1984–1986); b: Estimated absolute time spent in each of four main habitat types

All four main habitat types were used throughout the year but there were seasonal differences in the proportion of time allocated to different habitats. Thus, a large proportion of time was spent in pasture and scrub in the winter and spring, with a shift to wheat and other arable crops in the summer and autumn. Absolute time spent in each habitat varied in a rather different manner, with more time being spent in all habitats from spring to autumn (March to October) than in winter (November to February). This was simply a consequence of the activity period being relatively short in winter, when the animals only emerged for a few hours per night. A more interesting finding ist that the absolute time spent in pasture and scrub was relatively constant from March to October, by comparison with strong seasonal variation in time spent in wheat and other arable crops.

No correlation was found between percentage of time spent in any one habitat type and percentage by volume of any one food category in the diet ($r < 0.65$ in all cases). However such correlations would only be expected if there were a one-to-one relationship between habitat and prey, and observations showed that this was not the case. From July to August radio-collared badgers visited wheat fields primarily to feed on the growing crop, but they also occasionally foraged for worms in wheat fields throughout the year. The same was true of other arable crops. Pasture and scrub were visited primarily to obtain worms, but also yielded insects and (in the case of scrub) blackberries.

Two distinct methods of capturing worms were observed. On most occasions a badger would meander slowly around in a circumscribed area, nose to the ground, snuffling in the grass or earth. Every few minutes the animal would halt and thrust its nose into the surface, grubbing vigorously for prey. Usually grubbing with the snout was accompanied by digging with one or both forepaws, which often persisted for a minute or more and could result in a hole up to 12 cm deep being made in the earth. In the case of pasture, large lumps of turf (up to 20 cm × 20 cm) were often torn up in such digging operations. On several occasions we chased a badger off while it was digging a large hole and found one or more earthworms lying in the bottom of the hole. In the second method of worm-hunting the animal moved slowly and more or less linearly over the substrate with its nose close to the ground, picking earthworms straight off the surface and swallowing them with a backwards jerk of the head. We observed this behaviour only 12 times during the whole three-year period of the study, always in stubble fields from which wheat had been harvested.

Between mid-June and early September wheat was eaten by knocking down the growing crop. An animal would either jump up, seize an ear of wheat and bring it down to the ground in its jaws or, more usually, it would knock down a number of stalks with one fore-leg and then stand on the stalks while eating the ears. Much more wheat was trampled down than was actually eaten. Each year consumption of standing wheat began within a day or two of the ears emerging from their surrounding sheath of leaves. After the harvest, leftover grains of wheat were scavenged directly off the surface of the ground, and throughout the winter badgers continued to find small amounts of wheat around the edges of fields and in barns where straw was stored.

Foraging behaviour and earthworm biomass

Fig. 5 illustrates typical foraging patterns, showing the use of space by four radio-collared males (M1 to M4) during a single representative month. All four males belonged to the same social group, centred on sett 1. The maps were constructed by dividing the study area into 0.25-ha grid squares and logging the total amount of foraging time spent by each animal in each square during any one month. Grid squares were then ranked in order of importance, enabling heavily used squares to be distinguished from those that were used less frequently or not at all. In Fig. 5 the most heavily used squares, which together account for 70 % of an animal's foraging time in that month, are denoted by large filled circles; less heavily used squares that together account for a further 20 % of foraging time are denoted by intermediate-sized circles; and the least heavily used squares, accounting for the remaining 10 % of foraging time, are denoted by small circles. Thus the squares containing large circles together constitute a "core foraging range" for a particular animal, where it spent most (i.e. 70 %) of its foraging time during that month.

It is clear from Fig. 5 that use of space by each animal was "patchy" in the sense that

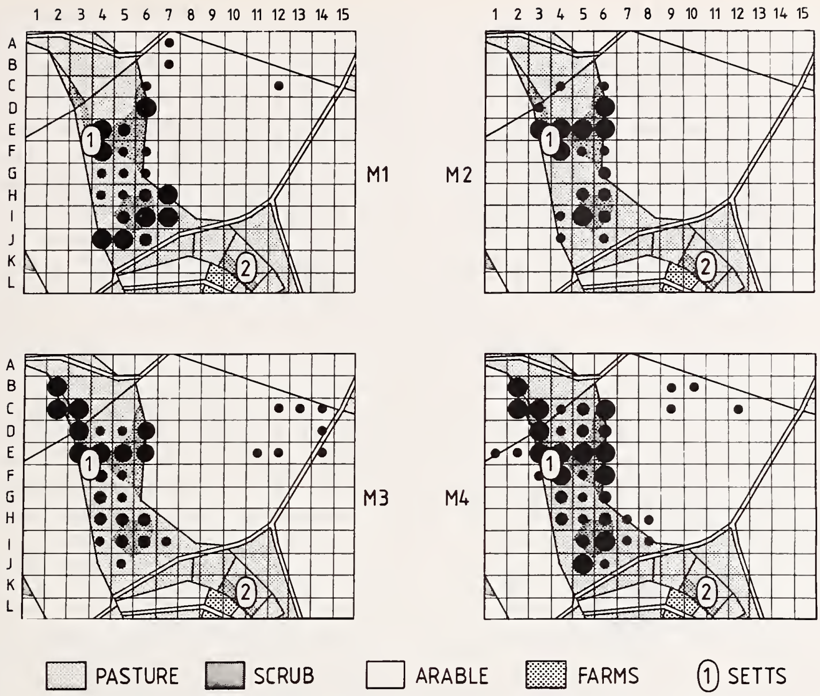

Fig. 5. Maps of part of the study area showing locations used for foraging by four males from sett 1, in May 1986. Each grid square is 0.25 ha. Single lines represent fences and double lines show roads. Filled circles show which grid squares were used for foraging by each animal (for further explanation see text). The territory of group 1 covered the whole area to the NW of the road running diagonally from square L4 to square B15

some locations were used more heavily for foraging purposes than others, while much of the home range was not used at all. Furthermore, different individuals had different favourite foraging locations. Similar individual differences in use of space were evident in other months, and other social groups.

In order to determine whether this "patchy" use of space was related to earthworm biomass we plotted earthworm biomass (as determined by formalin-sampling) against foraging time (i.e. total foraging time for all radio-collared animals in a given social group during the year in question) for 42 individual grid squares. Because not all grid squares were formalin-sampled at the same time of year it was necessary to correct for seasonal changes in worm biomass, and this was done using mean values for worm biomass in successive two-month periods (as shown in Fig. 3a). Thus, the data from each sampling occasion were expressed as the weight of worms that would be expected had sampling been carried out in the Jan-Feb period. The results (see Fig. 6) show a significant positive correlation between the two variables ($r = 0.64$, $N = 42$, $p < 0.001$). Thus badgers were sensitive to local differences in worm biomass (which could be considerable even in adjacent grid squares covering the same habitat type), and they spent more time foraging where worm biomass was greater.

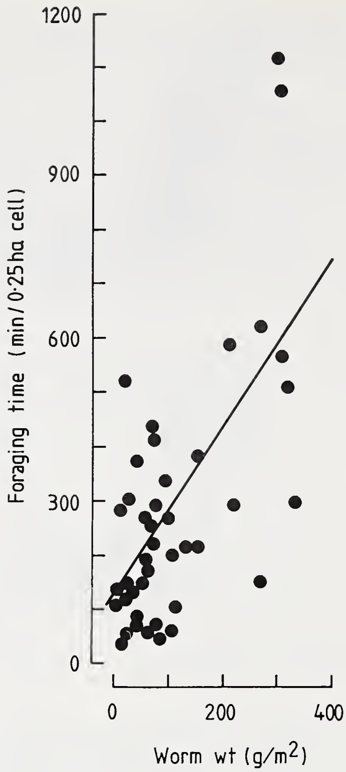

Fig. 6. Correlation between the amount of time that radio-collared badgers spent foraging in a particular 0.25 ha grid square in a given year, and the weight of worms extracted by formalin-sampling

Discussion

The results show that earthworms are an important year-round food for badgers in the south of England, and in this respect they are consistent with the majority of previous studies of badger diet in the British Isles (Fairley 1967; Paget and Middleton 1974; Kruuk 1978; Kruuk and Parish 1981; Ashby and Elliot 1983; Neal 1986) and elsewhere in N. Europe (Andersen 1954; Skoog 1970; Stocker and Lüps 1984). On the other hand there are a number of differences between our results and those of at least some previous studies. First, in our study wheat was a major food, eaten year-round, accounting for almost as large a proportion of the overall diet by volume as did earthworms. Previous studies have reported consumption of cereals (e.g. Andersen 1954; Skoog 1970; Lüps et al. 1987: Kruuk and Parish 1985) but not on such a large scale. Second, in our results both the frequency of occurrence of earthworms in the diet and the percentage volume were subject to marked seasonal variation, whereas the same measures of worm intake in a Scottish population of badgers remained comparatively constant throughout the year (Kruuk and Parish 1981, Fig. 5). Third, in our study area worm biomass as revealed by formalin-sampling was the best predictor of worm intake, whereas Kruuk and Macdonald have suggested that worm availability for predators like the badger depends more on local climatic conditions (number of "worm nights") than on biomass (e.g. Kruuk et al. 1979; Kruuk and Parish 1981; Macdonald 1980, 1983). Fourth, and probably related to the previous point, in our study badgers obtained worms mainly by actively grubbing and digging in long-grass pasture and arable fields whereas others have described them picking worms straight off the surface of short-grass pasture (e.g. KRUUK et al. 1979; MACDONALD 1980).

What are the implications of these results for the concept of badgers as worm specialists (KRUUK 1978, 1986; KRUUK and PARISH 1981)? Two reasons for employing the latter term are that badgers do eat a lot of earthworms in some parts of their geographical range, and that they adopt special methods of hunting for worms. But by these criteria one could with equal justification say that badgers are olive specialists or beetle specialists in Italy (KRUUK and DE KOCK 1981; CIAMPALINI and LOVARI 1985); fruit, insect or rabbit specialists in Spain (IBAÑEZ and IBAÑEZ 1980; MARTÍN-FRANQUELO and DELIBES 1985); toad specialists in France (HENRY 1984); wasp specialists in Switzerland (SCHMID and LÜPS 1988) or wheat specialists in the south of England (the present study). An attempt to rescue the idea of badgers as food specialists could be made by saying that they specialise on different things in different places (KRUUK and DE KOCK 1981), but there are other environments in which the diet is not dominated by any single food category (e.g. HARRIS 1984; PIGOZZI 1988).

An additional reason for referring to badgers as "worm specialists" is the suggestion that badgers change their foraging effort to compensate for fluctuations in earthworm availability (KRUUK and PARISH 1981). This suggestion derives from the fact that in Scotland the percentage by volume of worms in the diet was found to remain fairly constant throughout the year (KRUUK and PARISH 1981, Fig. 5). This finding, however, was not replicated in the present study; and other studies have also reported substantial seasonal variation in worm intake (ANDERSEN 1954; MOUCHÈS 1981; HARRIS 1982; ASHBY and ELLIOT 1983; HENRY 1984). Our results suggest that during most of the year badgers spend about the same absolute amount of time foraging for earthworms regardless of changes in earthworm availability, with the result that earthworm intake is correlated with availability. Perhaps then the lack of marked seasonal variation in relative worm intake in KRUUK's study reflects a relative lack of seasonal variation in the availability of worms and other foods in that particular study area, and is not a general phenomenon.

In conclusion, we suggest that badgers may be better described as opportunistic than as specialist feeders: that is, badgers eat whatever is most readily available in a particular place at a particular time of year. When the availability of earthworms outstrips that of any other suitable food (as it will do in moist northern European habitats dominated by well-fertilised short-grass pasture) then earthworms will be the dominant food; but in our view there is little evidence that the principles governing earthworm intake are qualitatively different from those governing intake of other foods.

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Zusammenfassung

Nahrungsangebot, Nahrungssuche und Nahrungsaufnahme von Dachsen (Meles meles L.) in Südengland

Zur Ermittlung der Nahrungsstrategie des Dachses in einem landwirtschaftlich genutzten Hügelgebiet (South Downs) im Süden Englands (East Sussex) wurden von 1983–1985 verschiedene Methoden kombiniert angewandt: 1. Kotanalyse (Vorkommenshäufigkeit und Volumenanteile pro Monat), 2. Analyse von Klimadaten zum Erkennen von „Wurm-Nächten" Temp. > 0 °C, ≥ 2 mm Regen innerhalb 72 h), 3. Bodenproben zur Erfassung der vorhandenen Regenwurm-Biomasse und 4. Radiotelemetrie (total 14 Tiere) um die Habitatnutzung festzustellen und die Technik des Nahrungserwerbs zu beobachten.

Über das ganze Jahr betrachtet am häufigsten erbeutet und mit dem höchsten Volumenanteil verzehrt werden Regenwürmer (Lumbricidae) mit 35 %, gefolgt von Weizen (*Triticum* sp.) mit 30 %.

Regenwürmer bildeten von November bis April, Weizen von Juni bis September die Hauptnahrung. Häufig, aber mit geringen Volumenanteilen, wurden Insekten (v. a. im trockenen Sommer 1984) und Gras gefressen. Auf Früchte (Brombeeren und Weintrauben) konzentrierten sich die Dachse vor allem im August und September. Für die Aufnahme von Regenwürmern ist weniger die Häufigkeit von „Wurm-Nächten“ als ihr Vorhandensein in den obersten Bodenschichten (v. a. im Weideland) im Jahresverlauf maßgebend. Die verschiedenen Habitat-Typen werden im Verlauf des Jahres unterschiedlich stark genutzt. Die im Gebüsch und Weideland verbrachte Zeit blieb über weite Teile des Jahres annähernd konstant. Die in den Sommermonaten durch längere Aktivitätsphasen resultierende zusätzliche Zeit für die Nahrungssuche verbrachten die Dachse häufig in Weizenfeldern.

Es hat sich gezeigt, daß Dachse Regenwürmer in erster Linie entsprechend ihrer Verfügbarkeit im Boden als Nahrung nutzen. Von einer echten Spezialisierung auf dieses Beutetier kann daher kaum gesprochen werden.

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