SEASONAL FOOD AND PREY RELATIONSHIPS OF BADGERS IN EAST-CENTRAL ALBERTA

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A general mammal inventory and preliminary studies was undertaken 45 km (28 mi.) SE of Wainwright by the author in the summer of 1975 for the Provincial Parks Planning and Design Branch. This project was part of an ecological assessment of a relatively undisturbed region (110° 45′ and 110° 35′, 52° 37′ and 52° 33′). The major topographic features are the Ribstone Creek and marsh system, flowing along the west side of the area, then east and northward again through the southeast sector; an extensive tract of sand-ridges, elevated as much as 150 m (490 ft. north boundary) above the Ribstone system; three major lakes, Wallaby and Border in the northwest and David Lake in the southeast; and a considerable mixture of sand-ridge/marsh where the two ecosystems meet one another in the south-central area.

A complete mammal and bird checklist of this unique area is currently in preparation. The present note relates to the badger (*Taxidea taxus*) and related species, with particular reference to seasonal changes in food-supplies and feeding habits. The population of badger in the study-area was widespread, and signs of activity as well as the animals themselves, were encountered in all the sand-ridge systems, pastures and isolated extensions into the marshes and willow (*Salix*) bogs. Movement of the species across the Ribstone Creek system was facilitated by several weirs for flood control. Feces, tracks and the badgers were seen on the dykes leading to these weirs. But access to the insular sand-ridges in the marshes and bogs (west of David Lake, etc.) required that the animals traverse both extensive (0.5 to 1.5 km, 0.3-0.9 mi.) poplar tracts and wet bog-marsh habitat for total distances of from 1 to 2.5 km (0.6-1.6 mi.). In spite of this, all evidence suggested that the species had traversed this terrain at least twice in the spring-summer and early autumn of 1975. The first visit to the region, June 19, revealed a small degree of very recent badger activity in the isolated sand-ridge systems. The age of these feeding-dens was estimated at not more than 2 weeks, from condition of soil-mounds, the number of feces found in them (usually buried), and their small numbers (1 or 2 dens average at each feeding site). All older badger digs at these sites were clearly of at least 10-12 months' old. On the main sand-ridge system north and east of Ribstone Creek, badger feeding dens were noted dating almost continuously from early spring (April?) to recent. The inference was that the animals on the insular sand intrusions among the marshes had only very recently occupied these territories.

Investigations in June, including analysis of the stomach-contents of 2 badgers killed by automobiles and of ca. 40 feces groups, proved that the major food at time of the visit was pocket gopher (*Thomomys talpoides*). These were easily identifiable in the field by the presence of largely undigested forefeet of the animals, of which at least one, and usually 2 individuals were found in each fecal group (i.e., 2 in each stomach). The June investigation showed that Richardson's ground squirrel (*Spermophilus richardsoni)* formed a minor part (10 to 40% by number) of the badgers' diet.

During the June and subsequent studies, populations of pocket gopher,

Badger. L. A. Morgotch

Richardson's ground squirrel and the voles and mice (*Microtus*, *Peromyscus* and *Clethrionomys*) were surveyed by live and snap-trap methods, as well as by fecal and pellet analyses, nest counts, etc. Of these species, only *Microtus* was noted in the diet of the badgers. Some brief comments on the primary food-items of the badgers are presented below to the subject-species.

Richardson ground squirrel: A number of small colonies, some among the roots of willow clumps with Saskatoon berry (*Amelanchier alnifolia*) and some in extensive tracts of buckbrush (*Symphoricarpos* (*pauciflorus* Robbins?)), were noted on sand-ridges and insular ridge-systems. All colonies of 20 or more adults, however, were in pastures or grazed meadows. No young were in evidence June 19, but one family of 5 very small young appeared briefly June 20 in a pasture near David Lake. From July 21 - 31, 20% or fewer of the ground squirrels examined were adult, and of these, from 4% to 6% were males. By October 3, possibly due in part to some inclement weather, only 5 ground squirrels of this species were observed.

Thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*): Found in casual association with the badger, but there was no evidence that badgers used them for food.

Pocket gopher: More numerous and more generally distributed than Richardson's ground squirrel. It was found on all insular ridge-systems and uplands in the marsh-bog matrix, as well as on the sand-ridges and in damp meadows and pastures near the lakes. Series of mounds extending from the upper ridges down into recently dried marsh and pond-edges were fresh in mid-June, suggesting that the animals had recently moved downward with the retreating water table. Great activity was recorded for the species in June, when specimens and live-trapped individuals were 80% immatures (June 19-21). At this time, new mounds were noted at the rate of 2 to 3 per individual per 24-hour period in all colonies studied. By opening the most recent mounds and leaving them exposed, I was able to obtain an estimate of reaction-time, the time elapsed before the opened den was plugged by the inhabitant. In mid-June average reaction time was 40 minutes, the longest being 70 minutes. Similar experiments and mound counts in late July indicated a great reduction in ac-

White-footed Mouse (*Peromyscus*).

ivity; new mounds were produced at a rate of less than 1 per 72 hours per animal, and reaction time in plugging he opened dens often exceeded 4 hours. Investigations in early October showed that there had been considerable activity, probably in late August and September, but by October 3 to 5, new mounds were noted at a rate of less than one per 72 hours, and in many communities no new digging was seen. The reaction time was as much as 20 hours at opened dens.

The June acitivity corresponds to he breeding of the species, the young of which begin feeding and digging in he last half of June. The only sight-records of pocket gopher were from his period, when young animals were ittle more than half grown and browsed on grasses and forbs.

Analysis of badger feces and the stomach contents indicated that he species depended heavily upon pocket gophers in the period from late March or early April to early July. By ate July, however, the fecal analyses of recent samples showed a considerable increase in use of Richardson's ground squirrels. The location of resh feeding dens — most of which were old dens revisited and renovated — for the period July 18 to 29, favored he colonies of Richardson's ground squirrel; only 25% to 30% of active feeding dens at this time were associated with pocket gopher communities. Fecal analyses showed that badgers, from about mid-July, had resorted to Richardson's ground squirrel for about 66% of their food, with 5 to 10% plant material included in the diet.

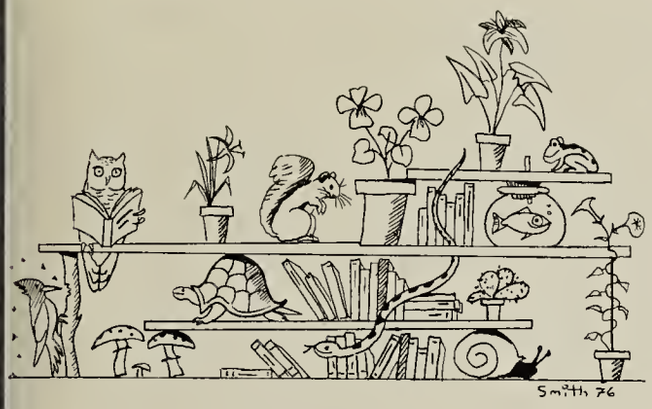
In early October, the number of feeding dens of the badgers had decreased significantly at all sites; the number of active dens recorded was at most 25% that of the July count. About 3/4 of these were in association with pocket gopher communities. Fecal analysis showed that in recent feces, pocket gopher accounted for 10 to 30% of food by weight; Richardson's ground squirrel was only 5-10%, and the meadow vole (*Microtus pennsylvanicus*) was found in 68% of fecal groups. The vole represented a small proportion by weight, however, for no more than 2 individuals were found in any fecal group. The bulk (by quantity and by weight) of foods in the early October survey was insects, principally unidentified grasshopper and beetles. The latter accounted for 50 to 90% of the food in fecal groups from the sand-ridge system. The proportion was somewhat lower for insular areas of the marsh matrix. But most badger ac-

Franklin's Ground Squirrel. Gary Seib

tivity recorded in early October was of a type unfamiliar to me, characterised by a profusion of small, shallow semicircular gouges, resembling the hoof-prints of cattle, and measuring 5 to 8 cm (2-3in.) in diameter and 3 to 7 cm (1-3 in.) deep. I examined dozens of such sites, at which the number of individual "digs" varied from 6 to 40 or 50. Feces of badger were almost always found at these sites, and the animals' tracks were often clear in the freshly-exposed sand. The feces here were not buried, as was usually the case at feeding dens. During the June reconnaissance, these peculiar marks had been noted on only one occasion. It is clear that these were sites at which badgers dug for beetles and other insects beneath the sparse grass and lichen.

After analysis of fecal and other data, if was found that feces from September-October collected at higher elevations (sand-ridge system) contained a very high proportion of insect in particular, beetle remains, while those from low elevations in and beside the marsh matrix contained about 30% pocket gopher, 30% microtine, and 40% insect foods. Three major beetles were: a june beetle (*Phyllophaga anxia*), the gold scarab (*Cotalpa lanigera*) and, less frequently a darkling beetle (*Embaphion (muricatum*?)). As aspen longhorn beetle (*Saperda calcerata*) was found in one fecal group from the marsh-edge.

All evidence suggests that the badgers of this region, in order to compensate for considerable fluctuations in preferred food sources alter both feeding habits and feeding localities. The centres of feeding-sites are in many cases relocated, apparently twice annually, to distances of as much as 4 km.



MEADOW LAKE GEOLOG
The Land — Past and Present

by E. A. Christiansen, Saskatchewan Research Council, G. A. Padbury, Saskatchewan Institute of Pedology, R. J. Long, Saskatchewan Museum of Natural History
Published by Museum's Branch, Department of Tourism and Renewable Resources in co-operation with the Saskatchewan Research Council.
50 p., 1975, $2.00

Meadow Lake Provincial Park and surrounding area is the subject matter of this geolog. It is intended to interpret the earth's history of the past two or three million years. An auto-tour of 106 miles starting from the Provincial Park Nature Center at First Mustus Lake works around 10 stops, ending near the starting point. To read the geolog first, then drive the route set out for us would be a perfect set-up, but much can be learned just from the reading alone.

The rock and soil formations tell many a story to the geologist. In this booklet, he tells us how the valleys and lakes were formed and how and why certain soils were deposited in their present sites. Much of this knowledge is gained by the use of boreholes. How so much information could be compacted into so few pages and still be readable is incredible.

The geolog does a good job of explaining what each continental glacier contributed to the earth's surface in the area under study. The booklet is written simply, and is colorfully illustrated with photos and drawings. It is difficult for scientists to write of their work on a level that is understandable to a layman but I believe this end has been achieved. The reading is helped greatly by a good glossary at the back of the booklet.

The MEADOW LAKE GEOLOG may be obtained from: Park Office, Meadow Lake Provincial Park, Box 70, Dorintosh, Sask.; Meadow Lake Regional Office, Box 580, Meadow Lake, Sask.; or Saskatchewan Museum of Natural History, Wascana Park, Regina, Sask. — *Pat O'Neil*, 1125 Elliott Street, Saskatoon, Sask. S7N 0V4

WILDLIFE OF OTHER LANDS

RON JAREMKO, Saskatoon Public Library, Saskatoon, Sask.

These are some recent titles dealing with wildlife in areas other than North America. Call letters are for the Saskatoon Public Library but will be similar to those in many other libraries.

BARRUEL, PAUL. *Birds of the world*. 1973. 222 p. Revised edition of a classic on bird behaviour treated on a world-wide scale. Illustrated with excellent photographs, many in colour.
Y598.2 B278

BELCHER, W. J. *Birds of Fiji in colour*. 1972. n.p. A collection of paintings by a pioneer in Fiji bird studies.
598.2996 B427

BERGER, A. J. *Hawaiian birdlife*. 1972. 270 p. A sourcebook on the birds of the Hawaiian Islands, past and present. Historical as well as biological information is given.
598.29969 B496

BREEDEN, STANLEY. *Wildlife of eastern Australia*. 1973. 224 p. The colourful first volume in a series covering the major bioclimatic areas of Australia.
574.994 B832