

Regurgitated Pellets and Late Winter Diet of Black-billed Magpies, *Pica pica*, in Central Alberta

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Analysis of pellets regurgitated by Black-billed Magpies (*Pica pica*) and collected beneath a communal roost near Edmonton, Alberta, revealed that these birds fed mostly on grain, berries, and garbage in late winter. Two-thirds of the pellets also contained bones of Meadow Voles (*Microtus pennsylvanicus*), suggesting predation on these small rodents to an extent greater than previously thought. Pellets were found in urban roosts as well as in an outdoor aviary housing captive magpies, indicating that pellet regurgitation is general in this species.

Key Words: Black-billed Magpie, *Pica pica*, regurgitated pellets, winter diet, Meadow Vole, *Microtus Pennsylvanicus*, Alberta.

On 20 and 26 February 1985, we found regurgitated pellets at a Black-billed Magpie, *Pica pica*, roost located in a rural area (53°28'N, 113°33'W) about 7 km south of Edmonton, Alberta. The roost, occupied by about 175 magpies at that time, was in a dense, natural stand of White Spruce, *Picea glauca*, on the slopes of a small creek. The frozen pellets were found either on the snow below trees that bore many droppings, or in a few cases, in the forks of branches within these trees. We believe they had been cast by magpies because no other bird that might have produced such pellets were ever recorded in the roost which had been under observation for more than five months as part of a study of the roosting behaviour of magpies (Reebs 1985).

We collected 121 pellets from below 36 trees. Sixty-four of the pellets appeared intact. These 64 pellets were dried, weighed, measured, and dissected. Average dry weight was 0.56 g (range: 0.27-0.96). Most pellets were oblong, measuring on average 25.4 mm long (range: 17.7-35.9) by 14.3 mm at largest diameter (range: 10.4-17.0) and 11.4 mm at smallest diameter (range: 8.2-13.8). For the most part, the pellets were composed of vegetable matter (Table 1). The fragmentary nature of this material made it impossible to determine quantitatively its precise origin, but it was apparent that grain hulls and chaff were abundant, along with some pieces of straw and bark. We think that oats (*Avena* spp.) and Common Wheat (*Triticum aestivum*) were the main grains consumed, based on the identification of some grains that were found whole in a few pellets. Such grains, commercially grown in Alberta, may have been obtained from spillage sites near silos and grain elevators. Pits and seeds were also present in many pellets. Prominent among them were pits of wild

cherries, *Prunus pensylvanica*, and *P. virginiana*, along with seeds from the berries of *Cotoneaster acutifolia* and *Shepherdia argentea*. Overall, the vegetable matter represented 92.3% of the total volume of material collected from the 64 pellets. The remainder consisted of matter of animal and inorganic origin (Table 1).

Notable by their high frequency of occurrence were small bones and teeth, apparently from microtine rodents. Such bones were found in 43 of the 64 pellets (usually 2-6 bones per pellet). Still intact among these bones were one skull and 12 jawbones still bearing teeth. Examination of their dental pattern revealed that they were all from Meadow Voles (*Microtus pennsylvanicus*). It is therefore reasonable to assume that most of the other bones also belonged to that species. Also present in a few pellets were fragments of eggshell, probably obtained from garbage, and egg rings of Forest Tent Caterpillar, *Malacosoma disstria*, which the magpies probably removed from the distal twigs of deciduous trees where the eggs had been laid the previous summer. Finally, a number of pellets contained small stones or pieces of concrete 2-5 mm in diameter, probably consumed by the birds as grit, and a few pieces of tinfoil, rubber, plastic wrapper, twine, and silicone sealant, probably obtained from garbage.

We subsequently found more pellets at two other magpie roosts located within the city of Edmonton. Mild weather at the time of collection caused the pellets to be wet and crumbly, thus preventing reliable measurement of their dimensions. They appeared, however, to be of the same size as the ones previously collected. Their composition also appeared to be similar, except that the presence of grain hulls and chaff could not be distinguished as easily as in the

TABLE 1. Contents of 64 regurgitated pellets of Black-billed Magpies collected under a communal roost in late February 1985, near Edmonton, Alberta.

Food item	Frequency of occurrence (%)	Total volume (%)
Vegetable matter		
Grain hulls and chaff	100.0	92.3
Pits and seeds	39.0	1.0
Animal matter		
Bones and teeth of		
<i>Microtus pennsylvanicus</i>	67.0	1.6
Egg shell	3.0	trace
Egg mass of		
<i>Malacosoma dissiria</i>	3.0	trace
Inorganic matter		
Grit	27.0	4.0
Human refuse	18.0	1.0

other pellets. Of 12 pellets that were preserved as units, eight (67%) contained small mammalian bones, a level similar to that in the sample collected outside the city.

We also found pellets at the outdoor aviary of the University of Alberta, where 21 magpies were kept in captivity. The pellets were beneath the perches where the birds usually spent the night. These captive magpies had access only to dry dog food (bit-size pieces, Wayne Pet Food) and grit. The pellets from these birds were smaller than those found in the wild, averaging 17.1 (12.8-23.9) mm long by 11.4 (9.3-14.3) mm at greatest diameter and 9.3 (7.0-11.7) mm at smallest diameter. They were composed of a mixture of small stones and friable material similar to that of the dog food.

Pellet regurgitation has been reported for many corvids, especially crows, jays, and ravens (Terres 1980: 683). The habit has also been noted and used by Tatner (1983) during a study of the diet of an urban population of magpies in Britain. The fact that we found pellets under both rural and urban roosts, as well as in captivity where the only available food did not contain any sizeable non-digestible parts indicates that pellet-forming is a widespread, if not an obligatory (Terres 1980) activity in magpies. The rate at which magpies produce pellets in winter, however, is still unknown. We found no more than three pellets below any single tree, despite the fact that magpies often use the same perch night after night (Rees 1985). This may point either to a low rate of pellet production, or to their rapid disintegration and burial under successive snowfalls, or to their removal by rodents during the night. Tracks of small rodents and

Snowshoe Hares, *Lepus americanus*, were abundant throughout the roosting site.

Throughout their range, Black-billed Magpies are persecuted on account of their alleged propensity to attack small birds and their eggs in summer and farm animals in winter (Linsdale 1937). Yet very few studies have examined their food habits in North America (Kalmbach (1927) was the only major exception we found). The composition of the pellets we collected suggests that, in central Alberta, the Black-billed Magpie relies heavily on grain, berries, and garbage for survival in late winter. Studies of the Magpie's feeding habits in Britain have also identified grain as the staple of winter diet (Holyoak 1968; Tatner 1983). The British studies also showed that many insects and a few small mammals were consumed in addition to grain and seeds. In contrast, magpies wintering in Canada probably have limited access to insect material with which to supplement their diet. Egg rings of such plaque lepidopterans as the tent caterpillars, and overwintering adults of other insects (e.g. dipterans) and arachnids which find shelter in crevices in the bark of trees are possible exceptions. Both items, however, were either rare or absent in our sample, possibly because it was late in the winter and all readily available arthropods had already been gleaned, or because such adult arthropods are relatively soft-bodied and would be unlikely to leave evidence in a pellet.

Excluding road kills and garbage, small rodents may be, in most years, the only other natural source of animal food. The frequent occurrence of Meadow Vole bones in the pellets we found suggests that these small, winter-active rodents may indeed represent an important part of the magpie's winter diet, especially at the end of the season when mild weather may entice the voles to venture more often on the snow. In a study pertaining to the year-round diet of magpies in North America, Kalmbach (1927) noted high numbers of small mammal remains in February samples of stomach contents. He dismissed the importance of this observation on the grounds of small sample size. Yet, in the light of what was found in this study, and because magpies have, on several occasions, been observed killing and eating small rodents in winter (Boxall 1982; Reese 1985), the extent to which they use Meadow Voles as a food item by either scavenging or actively preying on them may be more important than previously thought, especially in northern populations.

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