

## FOOD INTAKE AND PELLET FORMATION OF A HORNED OWL

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**A**N adult Horned Owl (*Bubo virginianus*) was captured at the San Joaquin Experimental Range, O'Neals, Madera County, California, on April 28, 1948. The owl was kept in a small cage and fed weighed amounts of food from April 28 until August 26, 1948, when it was released. The owl weighed 1,207 grams on the date of capture, and when released it weighed 1,220 grams. The number and frequency of pellets regurgitated by the owl were recorded for the four-month period. Food consisted of a variety of animals, but ground squirrels (*Citellus beecheyi*) and pocket gophers (*Thomomys bottae*) were the main items. The owl appeared to prefer small forms of prey to squirrels or cottontails (*Sylvilagus auduboni*). Unless indicated that it was alive, all prey items fed the owl were dead at the time they were put in the cage.

Feeding experiments (Table 1) revealed that when a Horned Owl is feeding on small prey, such as birds, mice or pocket gophers, the pellets are usually large (often three to four inches long) and frequent in appearance. However, when an owl is feeding on large species of prey, such as ground squirrels and cottontails, the pellets are generally much smaller (often an inch or less) and are formed less frequently. Apparently this is because with larger prey, where much of the meat is torn free of bones, a greater percentage of the material actually swallowed by the owl is digestible than is the case when they are swallowing rodents or birds intact. This is an important matter to take into consideration when evaluating food habits of owls from pellets collected in the field.

During 75 days of the study, when all food items were weighed, approximately 8,706 grams were consumed by the owl, for an average daily ration of 116 grams. This daily ration is equal to about 10 per cent of the owl's body weight. Fifty-five pellets were formed during this period, for an average interval of 1.36 days per pellet. This means that an average of about 158 grams was consumed for the formation of each pellet. The pellets were not weighed until eight years after their collection, when they were thoroughly air dry. The pellets then weighed from 0.4 to 18.0 grams, averaging 5.36 grams per pellet.

Another bit of information obtained by this study was that the Horned Owl was not susceptible to secondary poisoning when it fed upon rodents poisoned with Compound 1080. This is in agreement with findings of the U. S. Fish and Wildlife Service, which has shown that birds are far more tolerant to 1080 than most mammals. In an interval of 51 days the owl was

fed 14 ground squirrels and one pocket gopher that had first been poisoned in cages with 1080 rodent bait. Seven of the poisoned squirrels were fed during a period of 19 days. The owl seldom ate intestines of ground squirrels.

TABLE 1  
ITEMS FED A CAPTIVE HORNED OWL AND FREQUENCY OF PELLET FORMATION

1948 Date	Hour	Items Fed <sup>1</sup>	Weight in Grams	Amount Eaten Since Prev. Examination	Wt. in Gms.	No. of Pell.	Wt. in Gms. <sup>2</sup>
Apr. 28	4:30 p.m.	Mourning Dove <sup>3</sup>	107	—	—	—	—
Apr. 29	8:45 a.m.	Pocket Gopher	107	Dove, except feet and tail	95	0	0
	4:30 p.m.	Ground Squirrel and Pocket Gopher (1)	320	0	0	0	0
Apr. 30	8:30 a.m.	0	0	Heart and lung of squirrel and all of gopher (1)	123	2	11.8
	5:10 p.m.	5 Pocket Gophers (2)	387	0	0	0	0
May 1	10:00 a.m.	0	0	All but head and tail of squirrel (1). One gopher (2)	202	1	4.6
	6:00 p.m.	Live Brewer Blackbird <sup>4</sup> (3)	56	0	0	1	10.0
May 2	7:10 p.m.	0	0	4 gophers (2)	310	1	15.0
May 3	7:30 a.m.	0	0	Rest of squirrel (1)	72	0	0
	5:00 p.m.	Live Mourning Dove	139	0	0	1	12.4
	8:00 p.m.	Pocket Gopher and Gopher Snake <sup>5</sup>	481	0	0	0	0
	12:00 p.m.	0	0	Dove	139	0	0
May 4	8:00 a.m.	0	0	Blackbird (3) and gopher; snake removed	134	0	0
	12:05 p.m.	2 Pocket Gophers	198	0	0	0	0
	4:35 p.m.	0	0	Head of 1 gopher	25	1	13.7
	5:15 p.m.	Pocket Gopher and *Ground Squirrel (4) <sup>6</sup>	585	0	0	0	0
May 5-6	Not attended						
May 7	9:00 a.m.	0	0	3 gophers and all but head, tail and feet of squirrel (4)	683	2	25.0
	4:30 p.m.	Pocket Gopher	88	0	0	1	2.5

<sup>1</sup>Numbers in parentheses are to provide identity between food items offered and amount subsequently known or estimated to have been eaten.

<sup>2</sup>Pellets were air-dried for eight years before being weighed.

<sup>3</sup>*Zenaidura macroura*

<sup>4</sup>*Euphagus cyanocephalus*

<sup>5</sup>*Pituophis catenifer*

<sup>6</sup>Food items preceded by an asterisk were poisoned with Compound 1080 before being fed to the owl.

## OWL PELLET FORMATION

1948 Date	Hour	Items Fed <sup>1</sup>	Weight In Grams	Amount Eaten Since Prev. Examination	Wt. in Gms.	No. of Pell.	Wt. in Gms. <sup>2</sup>
May 8	9:55 a.m.	0	0	Gopher	88	0	0
	11:30 a.m.	Pocket Gopher	72	0	0	0	0
	4:45 p.m.	0	0	0	0	0	0
	5:15 p.m.	Pocket Gopher	70	0	0	1	10.7
	6:05 p.m.	0	0	Gopher	70	0	0
May 9	8:45 a.m.	Pocket Gopher (5)	77	Gopher	72	0	0
	12:45 p.m.	Brown Towhee <sup>7</sup> (6)	61	Gopher head (5)	20	1	9.9
	6:20 p.m.	Pocket Gopher	68	Part of gopher (5)	20	0	0
May 10	9:00 a.m.	0	0	Gopher and rest of gopher (5)	101	0	0
	1:45 p.m.	2 Pocket Gophers	143	0	0	0	0
	5:20 p.m.	Pocket Gopher	68	Towhee (6) and 2 gophers	204	1	8.9
May 11-12	Not attended						
May 13	2:00 p.m.	0	0	Gopher; remains of squirrel (4) removed	68	3	12.5
	5:20 p.m.	Ground Squirrel (7)	792	0	0	0	0
May 14	11:00 a.m.	0	0	Part of squirrel (7)	100	0	0
May 15	10:10 a.m.	Rattlesnake <sup>8</sup> (8)	888	More of squirrel (7)	100	0	0
May 16	12:35 p.m.	0	0	More of squirrel (7)	100	1	2.6
	5:45 p.m.	Refrigerated Pocket Gopher (9)	92	0	0	0	0
May 17	4:30 p.m.	0	0	0	0	0	0
May 18	8:30 a.m.	0	0	Remainder of squirrel (7), snake (8), and gopher (9) removed	0	0	0
	2:15 p.m.	*Ground Squirrel (10)	590	0	0	0	0
May 19	5:55 p.m.	0	0	Much of squirrel (10)	300	1	3.1
May 20	9:00 a.m.	0	0	More of squirrel (10)	100	0	0
May 21	8:30 a.m.	0	0	All but head, tail and some skin of squirrel (10)	100	0	0
	5:25 p.m.	*Ground Squirrel (11)	486	0	0	1	1.5
May 22	8:30 a.m.	0	0	Part of squirrel (11)	100	1	3.8
May 23	7:15 p.m.	0	0	Rest of squirrel (10) and most of squirrel (11)	340	2	4.5
May 24	4:00 p.m.	0	0	?	?	0	0

<sup>7</sup>*Pipilo fuscus*<sup>8</sup>*Crotalus viridis*

1948 Date	Hour	Items Fed <sup>1</sup>	Weight in Grams	Amount Eaten Since Prev. Examination	Wt. in Gms.	No. of Pell.	Wt. in Gms. <sup>2</sup>
May 25	8:20 a.m.	*Ground Squirrel (12)	312	Head and tail of squirrel (11) removed	100	0	0
May 26	9:30 a.m.	0	0	All but hind quarters and part of head of squirrel (12)	200	0	0
May 27	4:00 p.m.	0	0	All but part of head of squirrel (12)	75	3	8.9
May 28	9:45 a.m.	0	0	0	0	1	0.8
May 29	8:35 a.m.	*Ground Squirrel (13)	693	Part of head of squirrel (12) removed	0	0	0
	10:05 a.m.	*Pocket Gopher	53	0	0	0	0
	4:25 p.m.	0	0	Gopher	53	0	0
May 31	9:55 a.m.	0	0	Half of squirrel (13)	350	0	0
	11:00 a.m.	2 live Scrub Jays <sup>9</sup> (14)	170				
June 1	5:45 p.m.	Live Scrub Jay (15)	71	Head of 1 jay (14) and more of squirrel (13)	110	1	5.3
June 2	10:00 a.m.	0	0	Most of 2 jays (14)	150	1	2.7
	7:30 p.m.	0	0	?	?	1	2.2
June 3	11:15 a.m.	0	0	Part of all 3 jays (14, 15)	50	1	1.7
	8:45 p.m.	4 Pocket Gophers (16)	238	0	0	0	0
June 4	8:45 a.m.	0	0	3 gophers (16); remainder of squirrel (13) and jays (14, 15) removed	180	0	0
June 5	8:00 a.m.	*Ground Squirrel (17)	303	Gopher (16)	58	1	8.9
June 6	12:30 p.m.	0	0	0	0	0	0
	5:30 p.m.	0	0	All but head and rear end of squirrel (17)	200	1	1.1
June 7	Not attended						
June 8	8:20 a.m.	0	0	Most of squirrel (17)	50	0	0
	5:05 p.m.	Live Ground Squirrel (18)	220	0	0	0	0
June 9	1:35 p.m.	0	0	All but rear end of squirrel (18); remains of squirrel (17) removed	175	0	0
	4:20 p.m.	Live Ground Squirrel (19)	750?	0	0	0	0

<sup>9</sup>*Aphelocoma coerulescens*

1948 Date	Hour	Items Fed <sup>1</sup>	Weight in Grams	Amount Eaten Since Prev. Examination	Wt. in Gms.	No. of Pell.	Wt. in Gms. <sup>2</sup>
June 10	11:00 a.m.	0	0	Squirrel (19) alive	0	2	7.4
	5:05 p.m.	*Ground Squirrel (20)	714	Ditto	0	0	0
June 11	3:30 p.m.	*Ground Squirrel (21)	?	?	?	1	3.2
June 12-28		Fed 4 (all*) Ground Squirrels in author's absence	?	?	?	4?	?
June 28	3:45 p.m.	*Ground Squirrel (22)	292	Cleaned cage	?	—	—
June 29	9:00 a.m.	0	0	Part of squirrel (22)	100	1	0.9
	5:10 p.m.	0	0	0	0	1	2.3
June 30-July 1	Not attended						
July 2	10:35 a.m.	Hamster <sup>10</sup> and Live Scrub Jay	130	Removed rest of squirrel (22)	100	0	0
	5:30 p.m.	0	0	Jay escaped?	0	0	0
July 3	9:15 a.m.	0	0	Hamster	44	0	0
July 4	10:30 a.m.	Pocket Gopher	70	0	0	0	0
	11:10 a.m.	0	0	Head of gopher	10	0	0
July 5	9:15 a.m.	0	0	Rest of gopher	60	1	5.4
	9:30 a.m.	*Ground Squirrel	754	0	0	0	0
July 6	9:00 a.m.	0	0	Part of squirrel	200	0	0
July 7	8:00 a.m.	0	0	?	?	0	0
July 8-30		Fed Ground Squirrels and Cottontails in author's absence	?	?	?	?	?
July 31	12:15 p.m.	Hamster	50	Cleaned cage	—	—	—
	8:00 p.m.	0	0	Hamster	50	1	3.8
Aug. 1	9:55 a.m.	Ground Squirrel (23)	541	0	0	1	9.5
Aug. 2	10:00 a.m.	Mourning Dove	98	Much of squirrel (23)	300	1	5.8
Aug. 3	Not attended						
Aug. 4	2:45 p.m.	Pocket Mouse <sup>11</sup>	10	Dove; squirrel (23)?	98	1	1.9
Aug. 5	5:00 p.m.	3 Kangaroo Rats <sup>12</sup>	110	Pocket Mouse	10	0	0
Aug. 6	Not attended						
Aug. 7	7:45 a.m.	Ground Squirrel (24)	406	3 Kangaroo Rats	110	1	6.5
	5:30 p.m.	0	0	Part of squirrel (24)	100	1	3.3
Aug. 8	8:45 a.m.	0	0	Most of squirrel (24)	250	0	0
	11:40 a.m.	Brown Towhee (25)	49	0	0	0	0
	2:45 p.m.	0	0	0	0	1	6.0
Aug. 9	8:00 a.m.	Brown Towhee (26) and Ground Squirrel (27)	352	Brown Towhee (25); remains of squirrel (24) removed	49	1	3.4
	4:45 p.m.	Brown Towhee (28)	45	Brown Towhee (26)	37	0	0
	8:00 p.m.	Brown Towhee (29)	36	0	0	0	0

<sup>10</sup>Mesocricetus auratus<sup>11</sup>Perognathus inornatus<sup>12</sup>Dipodomys heermanni

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Aug. 10	7:30 a.m.	0	0	Both towhees (28, 29) and part of squirrel (27)	156	1	3.4
Aug. 11	8:00 a.m.	0	0	Some of squirrel (24)	100	1	2.6
Aug. 12	9:15 a.m.	0	0	Removed rest of squirrel (27)	0	0	0
	5:20 p.m.	Ground Squirrel (30)	437	0	0	0	0
Aug. 13	7:50 a.m.	0	0	Part of squirrel (30)	150	1	0.7
	4:00 p.m.	Ground Squirrel (31)	336	Most of squirrel (30)	200	1	7.2
Aug. 14	Not attended						
Aug. 15	7:45 p.m.	0	0	All but heads of squirrels (30, 31)	350	2	8.1
Aug. 16	11:15 a.m.	Kangaroo Rat	53	0	0	2	11.2
Aug. 17	8:00 a.m.	Ground Squirrel (32)	400?	Kangaroo Rat	53	1	4.3
	5:00 p.m.	0	0	Back of neck of squirrel (32)	20	0	0
Aug. 18	8:30 a.m.	0	0	Much of squirrel (32)	175	0	0
	5:10 p.m.	0	0	0	0	1	3.7
Aug. 19	9:15 a.m.	0	0	More of squirrel (32)	100	1	0.4
Aug. 20	8:30 a.m.	0	0	More of squirrel (32)	75	0	0
Aug. 21	8:15 a.m.	0	0	0	0	0	0
	7:55 p.m.	Brown Towhee	51	0	0	0	0
Aug. 22	11:00 a.m.	Brown Towhee (33) and Ground Squirrel (34)	633	Brown Towhee; rest of squirrel (32) removed	51	0	0
Aug. 23	8:15 a.m.	0	0	Brown Towhee (33) and part of squirrel (34)	153	0	0
	1:15 p.m.	0	0	0	0	1	10.4
Aug. 24	8:30 a.m.	0	0	More of squirrel (34)	200	0	0
	5:10 p.m.	0	0	0	0	1	2.5
Aug. 25	10:30 a.m.	Pallid Bat <sup>13</sup> and Rattlesnake	179	0	0	0	0
Aug. 26	8:15 a.m.	0	0	0	0	0	0
	10:30 a.m.	Photographed and released	0	0	0	0	0

<sup>13</sup>Antrozous pallidus