

Owl Pellets, Food Webs, and Biomass Pyramids

The barred owl inhabits woodlands and swamps in the Eastern part of the United States. This owl is approximately 43-50 cm (17-20 in) long with a wingspan of 99-110 cm (39-43 in) and has a mass of about **0.8** kg. Owls are nocturnal raptors that feed on small mammals, birds and reptiles. Owls swallow their food whole or if too big, may tear it into chunks. Owls are not able to digest hair, bones or feathers. The owl digestive system has a specialized section that presses the undigested portions together forming a pellet. Since the owls can not pass the pellet through their digestive system, they must spit out the pellet.



Materials: owl pellets, dissecting tools, identification keys, skeleton diagram, sorting sheet

Procedure

1. One owl pellet per table.
2. The 'surgeon' puts on a set of gloves. Remember to wash hands at the end of the procedure. These pellets have been sterilized, but...
3. Use dissecting tools and fingers to gently pry apart the pellet. NOTE: The bones you are looking for are small and easily broken.
4. Set aside any bones found.
5. The 'detective' will analyze the bones with the identification key and identify prey.
 - a. Shape and size of the skull
 - b. Shape of eye sockets
 - c. Length of the snout compared to the rest of the skull
 - d. [Bird skeleton chart](#)
 - e. [Mole skeleton chart](#)
 - f. [Rat skeleton chart](#)
 - g. [Bone identification chart](#)
 - h. [Skull identification chart](#)
6. Repeat until you have completely dismantled the pellet.
7. Try to assemble an animal skeleton using glue and a clean sheet of paper.

Results:

A. Create and fill in a chart on your paper – Please note that a vole is 'equivalent' to a mouse

Prey	Length (cm)	Number Found	Number eaten per day	Number eaten per week	Number eaten per year
Mouse	6.5 – 9.5				
Mole	12 – 14				
Shrew	8				
Rat	40				
Bird	15				
				Total	

B. Create a Numbers Pyramid for the owl based on the **number eaten per year** with one owl on the top with total annual number of all prey below. Use the assumption that an owl produces an average of 2.5 pellets per day.

C. Use the following facts about the prey to draw a food web that is representative of your pellet

Prey	Diet
Mouse	It eats a wide variety of plant and animal matter depending on what is available, including insects and other invertebrates, seeds, fruits, flowers, nuts, and other plant products. Deer mice sometimes eat their own feces (coprophagy).
Mole	A mole's diet is mostly insects and other invertebrates, including earthworms, centipedes, millipedes, snails, slugs, grubs, ants, sowbugs, termites, beetles, and crickets
Shrew	Food habit studies have revealed that shrews eat beetles, grasshoppers, butterfly and moth larvae, ichneumonid wasps, crickets, spiders, snails, earthworms, slugs, centipedes, and millipedes. Shrews also eat small birds, mice, small snakes, and even other shrews when the opportunity presents itself. Seeds, roots, and other

	vegetable matter are also eaten by some species of shrews.
Rat	The rat's diet typically includes seeds, nuts, grains, vegetables, fruits, meats and invertebrates. They consume about one-third of their weight in food every 24 hours. Because of their inability to vomit, rats are very hesitant to try new foods that may be poisonous. They will take a small nibble and wait to see if they feel sick and, if so, will avoid that food in the future.
Bird	insects; terrestrial non-insect arthropods, seeds, grains, and nuts; fruit

D. Create and fill in the following chart on your paper.

Prey	Number per year	Mass (g)	Mass of Prey (g)	Mass of Prey (kg)	Annual Food (kg) Eaten/ kg of prey	Biomass eaten
Mouse		20			45.6 kg	
Mole		55			365 kg	
Shrew		5			1168 kg	
Rat		240			12.8 kg	
Bird		20			127 kg	
		Total per pellet (H =			Total per pellet (P =	
		2.5 x H			2.5 x P	

E. Use your data to create a Biomass Pyramid. For the **top carnivore level** you need to see the opening paragraph to find the mass of Barred Owl. For the **herbivore level** use the assumption that an owl produces an average of 2.5 pellets per day and the total Mass of prey (kg). For the **producer level**, make the same assumption and then use the total of the Biomass eaten.

CONCLUSION:

Suggestions to improve lab”

Bibliography

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