Passage II

As fish mature, their diet often changes. Researchers investigated this phenomenon in 2 groups of winter flounder at a location in the Hudson River estuary where there is significant mixing of river water with ocean water. All the flounder were between 2 mo and 5 mo old and at least 20 mm long.

Study 1

Each June of 1996, 1997, and 1998, 100 flounder were captured and placed in cages that were sitting on the bottom of the estuary. Each cage was lined with a mesh bag that had square openings 3 mm in diameter. At the end of 10 days, the fish were removed from the cages and sorted into 4 classes based on length. The stomach contents of the fish in each class were analyzed to determine the percent by mass of each type of prey. The results, averaged over the 3 years, are shown in Figure 1. The percent of fish in each class with empty stomachs is shown in Table 1.

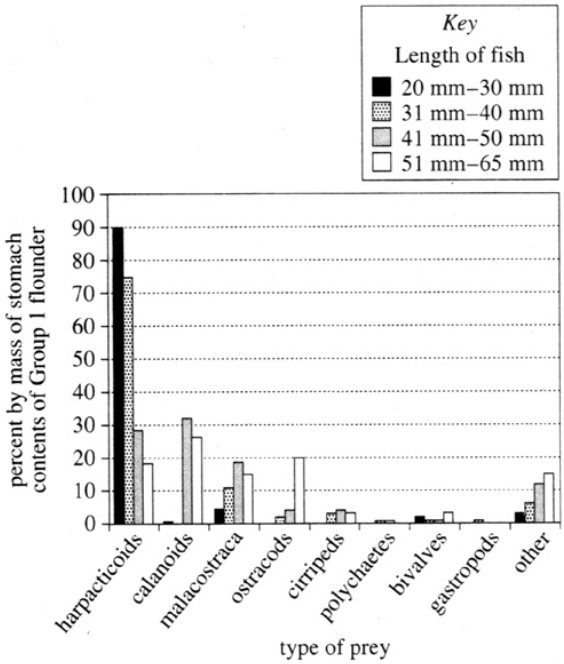

Figure 1

Table 1		
Group 1 flounder		
Length (mm)	Number of flounder	Percent with empty stomachs
20–30	45	15.5
31–40	87	32.2
41–50	100	35.0
51–65	68	23.5

Study 2

In June of 1998, 30 more flounder were captured, removed from the river, and sorted into 4 classes based on length. Immediately after the fish were sorted, their stomach contents were analyzed to determine the percent by mass of the same types of prey identified in Study 1. The results are shown in Figure 2. The percent of fish in each class with empty stomachs is shown in Table 2.

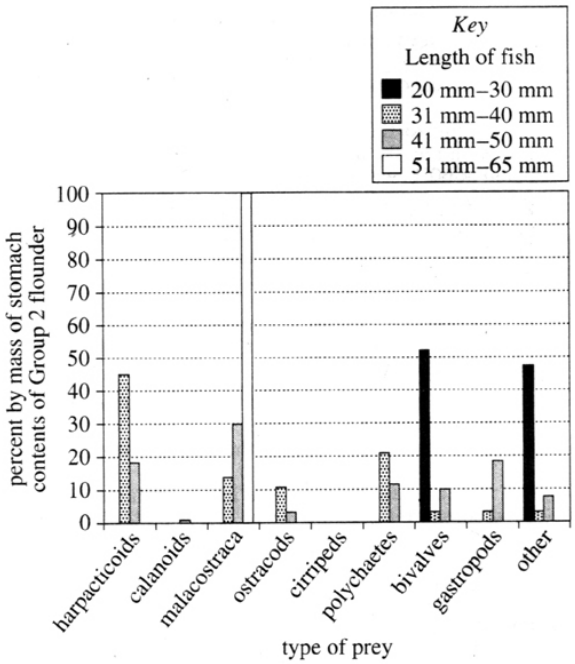

Figure 2

Table 2		
Group 2 flounder		
Length (mm)	Number of flounder	Percent with empty stomachs
20–30	1	0.0
31–40	8	12.5
41–50	15	26.7
51–65	6	50.0

7. For the class 51 mm–65 mm in length, were the stomach contents of Group 1 flounder and of Group 2 flounder the same?

   A. Yes; both Group 1 flounder and Group 2 flounder in this class ate calanoids only.
   B. Yes; both Group 1 flounder and Group 2 flounder in this class ate ostracods only.
   C. No; the Group 1 flounder in this class ate many types of prey, whereas the Group 2 flounder in this class ate malacostraca only.
   D. No; the Group 1 flounder in this class ate malacostraca only, whereas the Group 2 flounder in this class ate many types of prey.

8. In Study 2, which type(s) of prey was(were) NOT found in the stomachs of any of the 31 mm–40 mm long Group 2 flounder?

   F. Calanoids only
   G. Ostracods only
   H. Calanoids and cirripeds only
   J. Cirripeds and polychaetes only

9. For how many of the 4 classes was the percent of Group 1 flounder with empty stomachs higher than the percent of Group 2 flounder with empty stomachs?

   A. 1
   B. 2
   C. 3
   D. 4

10. In Study 1, what must the researchers have assumed about winter flounder feeding habits when they placed the cages in the estuary? Winter flounder feed in:

    F. fresh water near the surface of an estuary.
    G. fresh water near the bottom of an estuary.
    H. somewhat salty water near the surface of an estuary.
    J. somewhat salty water near the bottom of an estuary.

11. The total mass of the stomach contents of Group 2 flounder 20 mm–30 mm long was 50 mg. Based on Figure 2, the mass of bivalves in those stomach contents was closest to which of the following?

    A. 5 mg
    B. 10 mg
    C. 25 mg
    D. 50 mg

12. A researcher predicted that the diet of Group 1 flounder would change when flounder length exceeded 40 mm. Are the data in Figure 1 consistent with this prediction?

    F. Yes, because the diet of flounder 40 mm or less in length was at least 75% harpacticoids, whereas the diet of flounder greater than 40 mm in length was more varied.
    G. Yes, because the diet of flounder 40 mm or less in length was 100% harpacticoids, whereas the diet of flounder greater than 40 mm in length was more varied.
    H. No, because the diet of flounder 40 mm or less in length was at least 75% harpacticoids, whereas the diet of flounder more than 40 mm in length was more varied.
    J. No, because the diet of flounder 40 mm or less in length was 100% harpacticoids, whereas the diet of flounder more than 40 mm in length was more varied.