

**Lecture 5: Eating, and avoiding being eaten**

## I. Introduction

## A. Objectives

1. Recognize food-getting as a primary selective pressure in determining
  - fitness (survival and reproduction)
  - adaptation (physiological, morphological, behavioral)
  - diversification (via specialization)
  
2. Understand evolutionary conflicts between
  - eating and being eaten
  - choices of foods
  - choices of eating places, times, methods

## II. Eating

## A. Evolutionary pressures

1. Obtain energy and nutrition
  
  
2. Avoid/minimize costs

## B. Dimensions of food-getting

1. What, where, how, when; dimensions interact
  
  
2. Specialists vs generalists

## C. What to eat

1. mud, detritus
2. algae
3. vascular plants
4. corals
5. other invertebrates
6. vertebrates

## D. Where to eat

1. vertical position: surface, pelagic, benthic
  
2. horizontal position: near-shore, off-shore
  
3. standing vs flowing water

## E. Major feeding guilds of fishes (how to eat)

1. Predation cycle (behavioral)
  - search → pursue (or lure) → capture → handle
  
2. Macro predators

## 3. Grazers

4. Filterer/strainers

5. Suckers

6. Parasites

F. Temporal variation (when to eat)

1. Daily

2. Seasonal

3. Ontogenetic

G. Optimal foraging theory

H. Feeding-related species radiations

III. Avoiding being eaten

A. Goals

Avoid detection, evade pursuit, prevent capture, impair handling, escape

B. Strategies and tactics

1. Hide

a. School

b. Camouflage

c. Use shade

d. Use cover

2. Look dangerous

3. Be difficult to eat

4. Avoid predators

a. The quiet period

b. Release young in safe place

c. Tradeoff: optimal foraging under predation threat

IV. Human influences on trophic ecology