***Handout* Kuliah Minggu 7-8 : INTERAKSI ANTAR SPESIES – PREDASI & HERBIVORI**

Pokok Bahasan Kuliah:

I. PREDASI

PREDASI SEBAGAI BENTUK INTERAKSI

PERTAHANAN DIRI MANGSA

- Pertahanan kimiawi
- Pewarnaan kriptik dan kamuflase
- Mimikri: Batesian, Mullerian
- Intimidasi dan perlindungan tubuh
- Bentuk pertahanan yang lain

DINAMIKA POPULASI MANGSA-PEMANGSA

- Osilasi populasi mangsa-pemangsa: contoh *lynx* dan *hare*

MODEL PREDASI LOTKA-VOLTERRA

- Rumus matematis model predasi Lotka-Volterra
- Penggambaran model secara grafis

REFUGIA

- Pengertian refugia
- Refugia dalam bentuk ruang, jumlah, ukuran

II. HERBIVORI

HERBIVORI SEBAGAI BENTUK INTERAKSI

STRATEGI/MEKANISME PERTAHANAN TUMBUHAN

- Pertahanan mekanis/fisik
- Pertahanan kimiawi:
  - senyawa alkaloid, fenolik, terpenoid
  - perbedaan pertahanan kuantitatif dan kualitatif
  - perbedaan tumbuhan *apparent* dan *unapparent*
- Pertahanan dengan interaksi mutualisme

STRATEGI/MEKANISME PERTAHANAN HERBIVORA

- Adaptasi mekanis
- Adaptasi perilaku
- Enzim pencernaan
- Simbion mikrobial
- Manipulasi inang

EVOLUSI: SALING ADAPTASI ANTARA TUMBUHAN DAN HERBIVORA

Sumber ilustrasi:

- Molles, M.C.Jr. Ecology: concepts and applications. McGraw-Hill, New York. Dari 4th edition (2008): **Gambar 14.17; 14.19**
- Stiling, P. 2012. Ecology: global insights and investigations. McGraw-Hill, New York: **Gambar 13.6; 13.8; 14.10; Tabel 13.2; 14.1**

Table 13.2 Additional prey defenses used against predators.

Prey	Defense
1. Chameleons, octopuses	Change color for camouflage
2. Decorator crabs, caterpillars	Cover body with debris for camouflage
3. Sea cucumbers	Evisceration. Excrete portions of digestive tract, which contain toxic chemicals
4. *Camponotus saundersi* ants	Malayian ants which can self-destruct by squeezing abdominal muscles, causing glands to explode and spraying poison in all directions
5. Gulls	Mob predators that approach colonial nest sites
6. Honey bees	Mob Asian hornet scouts, vibrate their flight muscles to raise the temperature to lethal levels; obviates the need to use stingers
7. Swallowtail butterfly caterpillars	Resemble bird droppings on leaf
8. Ants, termites	Secrete alarm pheromone when threatened, causing neighbors to help attack the predator
9. Some moths	Perform elaborate evasive maneuvers in response to bat sonar signals
10. Porcupines	Quills can be ejected into predator

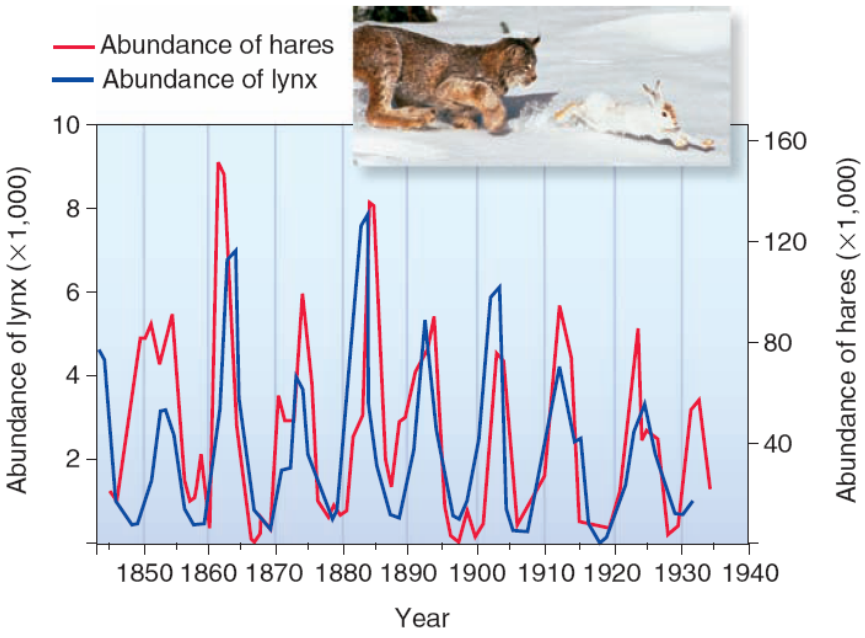

Figure 13.8 **Coupled predator-prey oscillations.** The 9- to 11-year coupled oscillations of the abundance of the snowshoe hare, *Lepus americanus*, and the Canada lynx, *Lynx canadensis*, were revealed from pelt trading records of the Hudson's Bay Company.

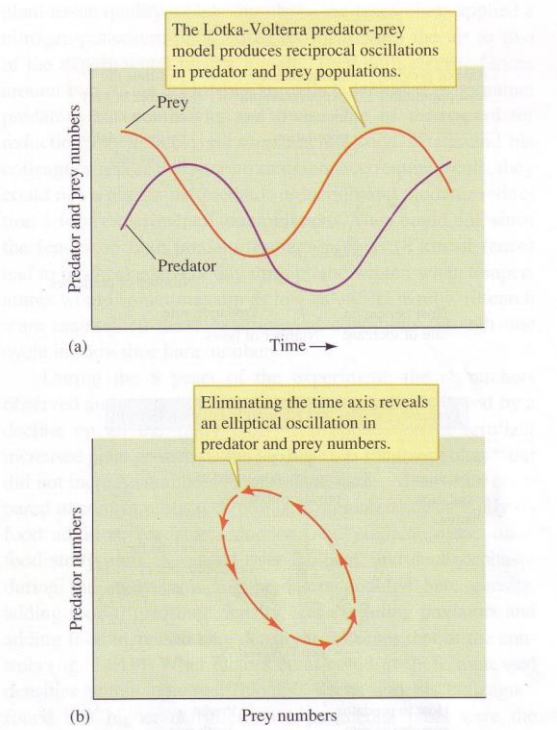

Figure 14.17 A graphical view of the Lotka-Volterra predator-prey model (data from Gause 1934).

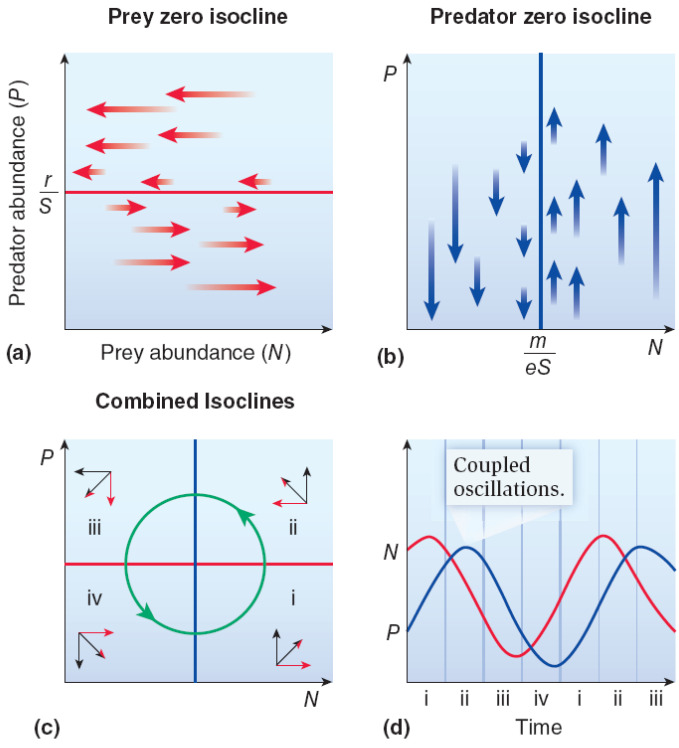

Figure 13.6 The basic Lotka-Volterra predator-prey model. **(a)** The prey zero isocline: The number of prey, *N*, increase at low predator densities, *P*, and decrease at high predator densities. **(b)** The predator zero isocline: The number of predators, *P*, increase when prey numbers are high and decrease when prey numbers, *N*, are low. **(c)** When prey and predator isoclines are combined, coupled oscillations result, which are expressed in **(d)** as numbers of prey and predators through time. (Modified from Begon, et al., 1996.)

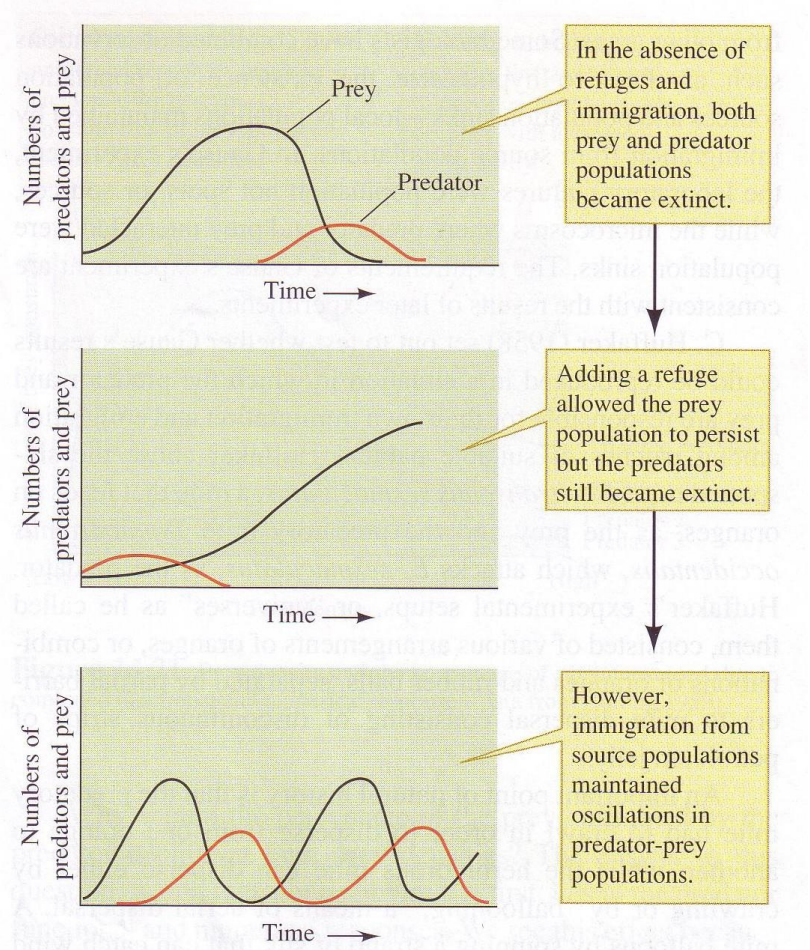

Figure 14.19 Refuges and the persistence of predator-prey oscillation in laboratory populations of prey (*Paramecium aurelia*) and predators (*Didinium nasutum*) (data from Gause 1934).

Strategy	Example
1. Mechanical defenses	Thorns, sticky hairs, silica
2. Chemical defenses	Alkaloids, phenolics, terpenoids
3. Mutualisms with defensive agents	Bull's horn acacia and ants
4. Associational resistance	Purple loosestrife growing next to *Myrica*
5. Mimic semiochemicals	Ecdysteroids mimic insect-molting hormone

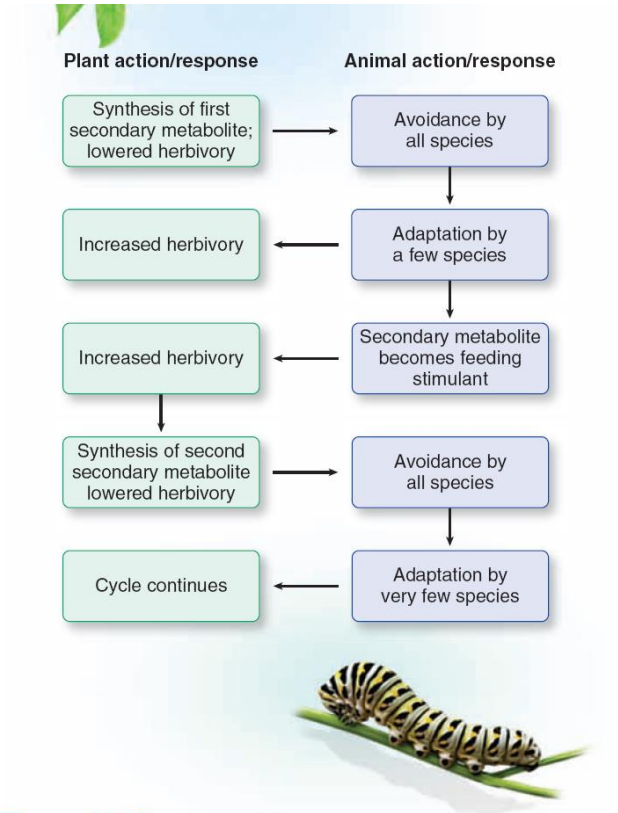

Figure 14.10 The evolutionary arms race between plants and herbivores.