Chapter 02
Animal Ecology

True / False Questions

1. The term "ecology" was first introduced by E. O. Wilson.
FALSE

2. A population is a group of individuals belonging to a single species, though not necessarily as a reproductive unit.
FALSE

3. A community is made up of living organisms and their nonliving environment.
FALSE

4. A study of both the living community and all of the physical factors such as sunlight, soil types, etc. would focus on a more complex level, the ecosystem.
TRUE

5. A frog is found along the edge of a pond. This location where it lives would be the frog's niche.
FALSE

6. The bat is found in 1) groves and grasslands, and 2) has a 4-degree temperature limit, and is at the end of its food chain. This defines its habitat and niche.
TRUE

7. While an animal can survive (determined by lab tests) between the temperatures of 10°C and 30°C, we find in nature that it only occurs between 16°C and 28°C. This is the difference between the fundamental niche and the realized niche of the animal.
TRUE

8. When dropping sterilized screwworm flies in a (mostly successful) attempt to eradicate them from the United States, scientists found that not all of the adult screwworm flies, often from different areas, were mating with each other. Each of the internally mating populations constituted a deme.
TRUE

9. The sponge constitutes an animal that is "modular" due to cloning.
TRUE

10. The study of whether most young of an animal die soon after they are hatched or whether most young grow up and the population dies in old age is called neoteny.
FALSE

11. Farmers sprayed rice paddies in Taiwan to suppress populations of a small rice mite. This also killed the populations of a predatory mite that controlled the numbers of rice mites. Soon the spraying did no good, and the damage to the rice from the rice mite was greater than before spraying had occurred. Few predatory mites existed in the paddies now. This happened because both mites were K-selected and resistance was a matter of chance.
FALSE

12. With over one billion people, but less land to farm than is in the United States, the People's Republic of China instituted a one child per family policy. This immediately changed the numerical value of "r" in the logistic growth equation.
TRUE

13. When severe floods reduce the production of the land in China, "N" in the logistic growth formula will change.
FALSE

14. A female trout, where the sex ratio is about equal, can lay approximately 10,000 fertilized eggs. If the trout population is at its carrying capacity, only 2 eggs, on average, will survive to adulthood.
TRUE

15. When N is very large and approaching the value of K, the term (K-N)/N is nearly equal to 0. This should result in a population that is leveling off and nearing the carrying capacity of the environment.
TRUE

Multiple Choice Questions

16. The maximum number of individuals of a species that an area can support is the
A. rate of increase.
B. growth rate.
C. carrying capacity.
D. net productivity.
E. gross productivity.

17. Natural populations are controlled by density-dependent and density-independent forces. What is an example of a density independent factor?
A. adverse weather
B. food supply
C. overcrowding
D. supply of nest sites
E. supply of mates

18. Commensalism differs from mutualism by the fact that in commensalism
A. one organism is not affected.
B. one organism is always harmed.
C. both organisms benefit.
D. neither organism benefits.

19. The carrying capacity of the environment is determined by
A. the limiting productivity of the environment.
B. the reproductive rate of the animal.
C. the occurrence of disease.
D. a complex "balance of nature" that remains to be explained in terms that scientists can calculate.

20. Two species of caterpillar feed on the same species of corn. Upon close inspection, the two insects are found to be feeding on different parts of the corn, the root and the stem. Such observations led us to believe that no two species can occupy the same niche at the same time, a principle called
A. keystone species.
B. succession.
C. competitive exclusion.
D. ecological dominance.
E. commensalism.

21. MacArthur observed that five species of closely related warblers coexisted on spruce trees, in feeding guilds, because they
A. ate different kinds of insects.
B. were kept below their carrying capacities by predators.
C. foraged in different places on the tree.
D. cooperated in their foraging habits.

22. A keystone species is
A. a predator that destroys many different species in a community.
B. a species whose removal causes major shifts in other species in a community.
C. a mimic that has the same appearance as another, poisonous species.
D. an organism that acts as a commensal in a host.
E. a prey species that must be present or the predator species will die off.

23. Energy enters the ecosystem as
A. cell respiration.
B. plant growth.
C. chemical bond energy.
D. oxygen.
E. light energy.

24. The energy storage in an animal's tissues is called
A. primary productivity.
B. gross productivity.
C. standing crop.
D. biomass.

25. At each level of the food chain
A. there is approximately a tenfold gain of energy.
B. there is approximately a tenfold loss of energy.
C. there is approximately a twofold gain of energy.
D. there is approximately a twofold loss of energy.

26. In tidal pools, the food pyramid is "inverted." There is a small base of phytoplankton and a larger top of zooplankton.
A. This proves that sometimes it is possible for a small amount of plant tissue to produce a large amount of herbivores.
B. This is based on numbers, and there are a few large algae plants feeding many very small animals.
C. These plants are actually deriving their food from dying animals, thus the pyramid is inverted.
D. The pyramid appears inverted because it is based on a very short time sample, over a year the algae production would likely be ten times the zooplankton in biomass or energy.

27. We could state a biological "law" that all food chains begin with photosynthetic producers if it wasn't for the exception of
A. lichens that make their own food energy.
B. fungi that are neither photosynthetic producers, nor herbivores or carnivores.
C. anaerobic bacteria such as the tetanus agent.
D. chemoautotrophic bacteria found around deep ocean thermal vents.
E. humans making synthetic food.

28. Producers in deep sea thermal vent communities are
A. fish.
B. giant pogonophoran worms.
C. deep sea kelp.
D. chemoautotrophic bacteria.

29. Ecologists have found that
A. life as we know it does not match the energy laws of physics.
B. ecology cannot be explained using principles from chemistry and physics.
C. it is possible to capture all the photosynthetic energy absorbed as molecules of glucose.
D. energy flows one way through ecosystems and requires external input.
E. inorganic elements flow through ecosystems.

30. Which of the following is not true of synthetic compounds in ecosystems?
A. Nontarget effects can persist for long periods of time.
B. Nutrient pools are not affected by manmade synthetic compounds.
C. Many other nonintended species can be affected as well.
D. Some chemicals become concentrated as they move up trophic levels in food webs.

Fill in the Blank Questions

31. An assemblage of living organisms sharing the same environment and having a distinctive unity is referred to as a _____.
community

32. Almost all life depends on the energy of the _____.
sun

33. Character displacement that promotes coexistence among several species by partitioning the same general resource results in the formation of a _____.
guild

34. The energy accumulated by plants less that used in respiration is the _____.
net productivity

35. A series of steps in which plants are eaten by consumers, which are themselves eaten by other consumers, is called a _____.
food chain

36. There can usually be no more that 4 or 5 trophic levels in a food chain because there is such a great loss of _____ between trophic levels.
energy

37. A species that when removed from a community changes the structure of the community is called a _____ species.
keystone

38. An animal's relationship to all the biotic and abiotic factors in its environment is called its _____.
niche

39. An interaction in which one species derives benefit from its host, but neither benefits nor harms the host is _____.
commensalism

40. In the logistic equation to describe the growth of populations, "r" is the intrinsic rate of increase of the population, and _____ is the carrying capacity of the environment.
(K)

41. Some conditions that can limit population size are severe cold, drought, fire, etc.; such conditions are regarded as density-_____ mortality.
independent

42. The only organisms that can do anything about increasing the carrying capacity of their environment are _____.
humans

43. The organisms responsible for nutrient flow through an ecosystem are _____.
decomposers

44. A species with a large geographic range would have a _____ average extinction rate than a species with a small geographic range.
lower or smaller