Mid-term Exam
Bio 150 – Prairie Restoration
Friday October 15, 2004

Use only the space provided -- non-relevant information will be penalized.

1. Define each term in a single sentence or phrase (words only, please) (3 pts. each).

pistil

Rubisco

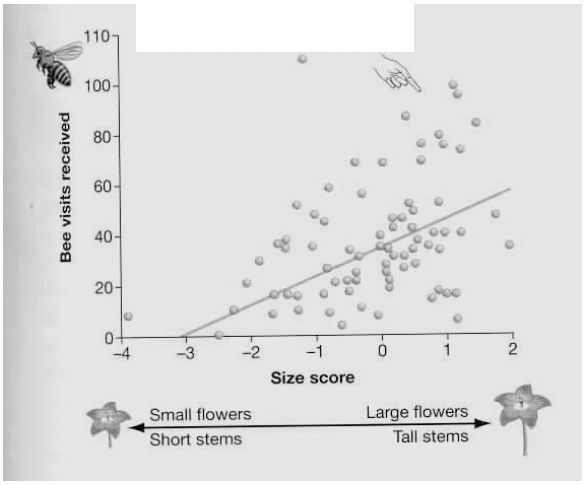
stipule

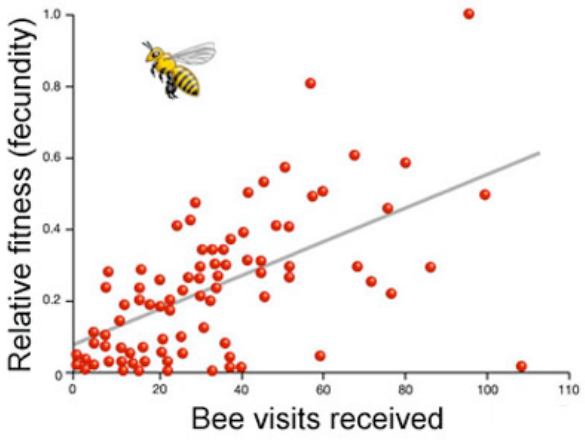
loess

forb

endemic

2. The following figure: shows the results of Galen's investigations of sky pilots and their bee pollinators:





a. What components of the process of *natural selection* do these data confirm? (6 pts)

b. What *additional* component does Galen need to investigate in order to prove that bees can cause evolution by natural selection on flower size? Suggest a way she could do this. (10 pts.)

3. Imagine that you measure the height of 25 randomly chosen *Andropogon gerardii* stems within one of the CERA prairies. Describe (in words) the difference between the *standard deviation (*s or SD) and the *standard error* (SE) you would calculate from these data. If you increased your sample size to 100, how would the magnitude of these two statistics change? (8 points)

4. The data below illustrate the effects of early spring fire frequency on the abundance of various classes of plants at Konza Prairie. Interpret these results, providing a biological explanation for any patterns in the data. (16 points)

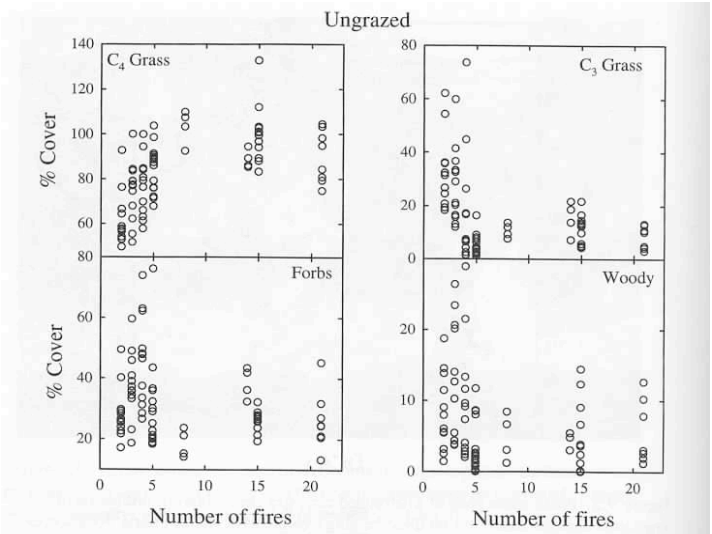


Figure 9.3. The relationship between percent cover of C_4 grasses, forbs, C_3 grasses, and woody species and the number of times a site has been burned during the interval from 1972 to 1993 in ungrazed prairie. Data are summarized by transect rather than the entire site as in Figure 9.2. From Steinauer and Collins (unpublished data).

(b) What effects might fire frequency have on insect species? Describe and justify your hypotheses. (8 points)

5. Describe your interpretations of the following data from Konza's long-term spring burn experiments. How do these results support or conflict with *general* theories of species diversity in communities? (16 pts.)

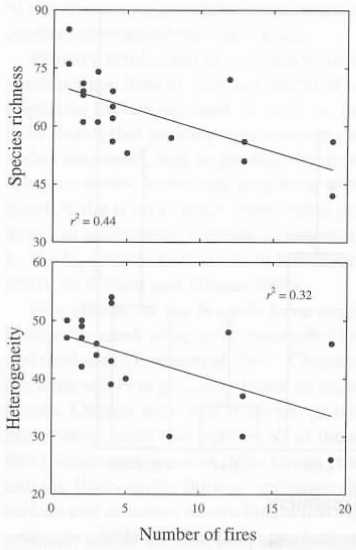


Figure 9.4. Relationship between number of times a site has been burned during the interval from 1972 to 1990 and plant species richness and community heterogeneity. Species richness is measured as the total number of species, and heterogeneity is the percent dissimilarity in species abundance from one point to another within a site. Redrawn from Collins et al. (1995) and Collins (1992), with permission of the Ecological Society of America.

6. Plant ecologists have noted that different populations of the same plant species differ in their reproductive effort (i.e., the proportion of a plant's total energy spent in reproduction vs. growth). Design an experiment to test whether water availability influences the reproductive effort of individuals, using a prairie species. Describe your design in enough detail that the reader could understand your goals and methods. You may use diagrams as well as words, if you wish. (18 pts.)

NAME ____________________

Box # _____________________