
Tijuana
Tucson
El Paso
Dallas
Texas
Austin
San Antonio
Hermosillo
Chihuahua
Torreón
Monterrey
Culiacan
MÉXICO
Gulf of Mexico
San Luis Potosí
León
Guadalajara
Querétaro
Ecatepec de Morelos
Mexico City
Puebla
Mérida
NORTH AMERICA
SOUTH AMERICA
Pacific Ocean
Agave angustifolia
Agave tequilana
Carnegiea gigantea
Choeronycteris mexicana
Leptonycteris curasoae
Desmodus rotundus
Diphylla ecaudata
0
200
400km

Questions

1. Briefly describe the ranges of each of the groups of organisms, agave (*Agave angustifolia* and *Agave tequilana*, green stars), *Carnegiea gigantea* (Saguaro cactus, yellow stars), nectivorous bats (*Choeronycteris mexicana* and *Leptonycteris curasoae*, purple dots), and vampire bats (*Desmodus rotundus* and *Diphylla ecaudata*, red dots).

2. What environmental factors influence a species' range?

3. Each symbol on the map represents a collection location of one individual organism. What can influence exactly where an organism is collected?

4. Both species of nectivorous bats migrate each year from southern Central America in the winter to the southwestern United States in the summer, following available food sources. If you were a researcher interested in collecting *Agave sp*. and *Carnegiea gigantea* from previously unknown locations, where would you search?

5. On occasion, ranchers attempt to eradicate vampire bats, due to a fear that they are harming livestock. However, in their efforts to kill vampire bats, nectivorous bats also get killed. And, due to the high-density cave roosting behaviors of nectivorous bats, ranchers can poison thousands of bats in a single cave once one has been exposed. If you were a conservation biologist, where would you target your efforts to educate ranchers about the benefits of bats?

6. Many species of plants and animals will be negatively impacted by changes in their habitat. Research one of these impacts, including finding a map projecting future conditions. Compare it to this map. How, specifically, would you predict the populations of these bat, agave, and cactus species to change under these future conditions? [thinking of climate change, urbanization and population growth]