

CASE OF THE FLYBLOWN ARCHIPELAGO

ç and Harry are avid and competitive Dipterists (a.k.a. midge mavens, fly fanatics, moscateers or gnat guys). They each boast an enormous collection of dead flies gathered from all over the world. They're always looking for new ones, either new to them (85,000 species have already been discovered) or new to science (maybe another 115,000 out there waiting to be found, described and named). This summer they plan an exotic adventure trip to an oceanic island somewhere for the purpose of enlarging their fly collections. They are considering the islands listed in the following table as possible destinations. They need your help to estimate the likelihood of finding a large number of species of flies.

Island	Latitude/ Longitude*	Size (sq km)	Distance to mainland	Nearest mainland
Easter Island	27°S / 109°W	164 km ²	3,600 km ²	Chile, S. A.
<i>Île de la Passion</i>	10°N / 109°W	7 km ²	965 km ²	Mexico
Isabela (Galapagos)	0°N / 91°W	4,640 km ²	965 km ²	Ecuador, S.A.
Pitcairn Island	24°S / 128°W	5 km ²	5,675 km	Chile, S.A.
Mayotte	12°S / 43°E	374 km ²	300 km	Malawi, Africa
Mauritius	20°S / 58°E	2040 km ²	900 km	Madagascar
Santa Catalina	33°N / 118°W	194 km ²	35 km	San Pedro, CA
*Latitude and longitude have been rounded to the nearest degree.				

Consider the role of each of the following factors on the potential for species diversity on an island: distance to the nearest source of plant and animal life; size of the island land mass; adequacy of available sunlight. How is each of those factors likely to affect

- the rate at which new colonists would have arrived and become established on the island;
- the ability of the island to have supported a rich flora and fauna;
- the rate at which established populations would be displaced by later arrivals;
- the rate at which established populations would be made extinct by other factors;
- the ability of plants and animals to find a wide variety of possible habitats.

It might be helpful to imagine a brand new island, maybe one formed by volcanic eruption, uplifting of the sea floor, coral reef formation, or a combination of events, and consider

how that island would become populated over time by organisms flying, swimming, drifting, rafting, blowing in on the tail of a hurricane, or carried upon or inside another organism.

Remember that early arrivals will find neither predators nor competition; the direction of their evolution in such a place might make them particularly vulnerable to the later arrival of such threats.

What other information about geology, geography, climatology, history or politics would be useful to have before making a decision about where to find the most different kinds of insects of the order Diptera?

After (and only after) you have written out your thoughts about what might happen on an isolated oceanic island (as opposed to a nearby offshore continental island), including any hypotheses that occur to you and any predictions that they suggest open the Esteem module called Island Biogeography and select one of the island group tabs at the bottom of the screen. The islands in the cited island groups (or archipelagos) lie close enough to each other to share similar temperature, rainfall and proximity to large land masses; thus many of the variable factors you considered above would not be expected to play a significant role and confound the results. You will notice that not all of them are oceanic islands. In what way do the islands listed vary from one another within their group? What appears to be the dependent variable common to all of them?

Looking at several of the data sets and consider what the data and the graphs generated from them seem to show about diversity or species richness? How do you think that works? (Hint: Try imagining the situation if the animals in question were large herbivores or carnivores instead of beetles and birds.)

Return to the deliberations of the maggotophiles, Al, Chuck and Harry. Based on the results of your interpretation of the species richness data sets, advise the “fly guys” regarding what they are likely to encounter with regard to diversity on each island under consideration. Which are likely to have the most species of flies? Which are likely to have the most species of flies not found anywhere else? Support your assertions with logical arguments.

The fictional Al, Chuck and Harry were named in honor of Alfred Russell Wallace, Charles Darwin and Henry Bates. According to Wikipedia, “Bates is most famous for his expedition to the Amazon with Alfred Russell Wallace in 1848. Wallace returned in 1852, but lost his collection in a shipwreck. When Bates arrived home seven years later (in 1859) he had sent back over 14,000 specimens (mostly insects) of which 8,000 were new to science.”

