Environmental Biology Fire Effects Internship Opportunity

We are seeking motivated, enthusiastic, physically fit individuals to assist with research on the impacts of an invasive scaly sword fern (*Nephrolepis multiflora*) and lava-ignited wild fires on native Hawaiian rainforest in Hawaii Volcanoes National Park. Work will involve backcountry hiking and possibly camping in various terrain and weather conditions. Field sites are located in Hawaiian rainforest communities with lava substrate and native matt ferns reaching 30' in height. Vegetation will be identified, measured and biomass sampled. Interns will occasionally assist the park’s vegetation management program. Three internship positions will begin April 1st and end either June 1st (2 positions) or July 1st (1 position). Roundtrip airfare between Portland and Hilo, dorm style housing within Hawaii Volcanoes National Park, and a daily meal reimbursement ($25/day) will be provided. Preference will be given to individuals with coursework in botany/forestry or related fields. If interested send a cover letter, resume, and names of three references to alison.ainsworth@oregonstate.edu and mychal.tetteh@oregonstate.edu.

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206 Course Web Link:

- Postponed a few things on website
- Thank T. Edwards and M. Herron
- Exam Wed 16 Feb
- Miller Chapter 3
  (check out the CD/website for Miller text)
**'Reptilia' (= 4 orders, without birds)**

1. **Testudines** (Chelonia, Turtles)
   - shell shape ~ ecology
   - no arboreal or gliding forms

2. **Squamata** ('Lizards' and Snakes)
   - lizards not monophyletic
   - repeated loss of limbs
   - very diverse

3. **Crocodylia** (Crocodiles, Alligators, Caiman)
   - threatened (21 spp. remain)
   - snout shape ~ diet
   - related to archosaurs
     (birds and dinosaurs)

4. **Rhynchocephalia** (Sphenodontida, Tuatara)
   - 2 extant species
   - islands of New Zealand
   - operate at ~cold temperatures

**Ranking Biodiversity?**

\[ R_i = (D_i + U_i)(\Delta P_i/C_i) \]

- \(D_i\) = distinctiveness
- \(U_i\) = utility
- \(\Delta P_i\) = enhanced probability of survival
- \(C_i\) = cost of strategy

**Direct limited funds...**

**Ecological Contribution?**

**Genetic Code**

- A (adenine)
- T (thymine)
- U (uracil)
- C (cytosine)
- G (guanine)

1. **Transcription**
2. **Translation**

**Proteins of amino acids**

**DNA sequence Codes for Proteins etc.**
**Natural Selection:**

- **Stabilizing Selection:** Favors average traits.
- **Directional Selection:** Favors one extreme.
- **Disruptive Selection:** Favors both extremes.

**Figure 16.14:** Bill adapted for soft seeds vs. hard seeds.

**Ricklefs 2001, Figure 16.14**

**Result of Disruptive Selection (Favors Both extremes)**

**Figure 16.15:**
- **Disruptive Selection (Favors Both extremes)**
- **Stalk Eyed Flies**
- **Sexual Selection**

**Figure 16.16:**
- **Disruptive**
- **Directional**
- **Stabilizing**
Speciation often result of:
1. Geographic Isolation
2. Reproductive Isolation

Evolution by Natural Selection vs. Lamarck

Darwin to the Galapagos

Galapagos Marine Iguana (Iguanidae)

- Only lizard to feed at sea
- Up to 10 or 12 m deep
- Up to a hour-long dives for large males (Darwin shipmate)
- Highly social: 8,000 indivs/ km of coast
- 16 islands
- Cold upwelling water nourishes algae
- Fernandina/Isabela: males to 10+ kg, females to almost 3 kg
- Genovesa: males only to 1 kg, females to < 1 kg

Why?
Water temperature and current strength
Galapagos Marine Iguana (Iguanidae)

El Niño → lack of food (Why?)

Starvation b/c high cost of salt excretion

Animals may lose 15% body length
- bone absorption

Only adult vertebrate known to regularly shrink (astronauts)

Largest animals die
- sexual selection
- natural selection
Primary Succession.
Similarities to Hawaii?
- total # species, # endemics?

- Why feed in the sea?
- Why salt glands?
- Why no fear of humans?

**Amblyrhynchus cristatus**
Galapagos Marine Iguana

Charles Darwin visited 1830s.

Theory of Evolution by Natural Selection

Speciation?
(Adaptive Radiation to fill available niches)

Ground Finches