Abstract: About half of all moss taxa exhibit female-biased sex ratios, and bryophyte male rarity largely unexplained. One possible explanation is differential stress tolerance of spores due to maternal sporophyte manipulation during stress. To test this hypothesis, sporophytes of the species *Bryum argenteum* were subjected to thermal stress and observed for growth abnormalities and sporophyte abortions. Data display a correlation between increased temperature and increased sporophyte abortions as well as increased time to complete meiosis, possibly indicating decreased fitness. Continued global warming may create more stressful environments for sporophytes which could result in the elimination of males from local populations.

**Introduction:** *Bryum argenteum* is a cosmopolitan moss that can be found in a wide variety of habitats. *B. argenteum* is a dioecious plant, and in the lab it exhibits a primary sex ratio of 1:1. However, it is strongly female-biased in field patches, with males absent entirely from both extremely hot and cold environments (Stark et al. 2010).

Our hypothesis is that spores of the species *Bryum argenteum* have differential stress tolerances that will lead to reduced fitness in highly stressed sporophytes and higher mortality of male versus female spores, which will translate into skewed sex ratios after germination.

**Methods:**

- The sporophytes used were from cultures that have been grown in the lab for several generations, from California, Kentucky, and Massachusetts male-female crosses.
- Sporophytes from each population cross were extricated from the maternal gametophyte then placed in sterile eppendorf tubes and subjected to three different temperatures, 22°C, 32°C, and 42°C for one hour.
- A Barnstead high-temperature incubator was used, and the temperature was increased 2°C every ten minutes until the target temperature was reached.
- The sporophytes were placed on the lab bench to cool for twenty minutes, and then transplanted into Petri dishes containing moist sand and returned to the growth chamber.
- Sporophytes were then observed and fitness was assessed based on the following parameters: (1) Days until hook of apex, (2) Days until capsule formation, (3) Days until meiosis begins, (4) Days until meiosis ends.

**Results:** The results show a correlation between increased thermal stress and increased sporophyte abortions. However, the other parameters that were measured do not seem to be influenced by thermal stress. This could possibly indicate that sporophytes that can tolerate the stress recover quickly and therefore their long term fitness is not altered; it could also indicate that thermal stress does not affect the development of the sporophyte.

**Conclusion:** If female-biased sex ratios are a result of differential stress tolerance, as global warming continues it may create a more stressful environment for developing sporophytes and could result in the elimination of males from many local populations. This could possibly reduce the resiliency of the population to disturbance and perhaps increase the chance of local extinction. Bryophytes have important ecological roles in many environments, such as primary productivity, nitrogen fixation, nutrient cycling, biological indicators of pollution, as well as many other services (Slack N., 2011). The viability of bryophyte populations in the face of global warming is something that needs to be addressed with further research.

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**References:**

