

Antarctica King Penguin Smell Test With Dimethyl Sulfide

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Abstract

To protect penguins from global warming-related risks, it is necessary to understand how their lifestyles would change as temperature rises. To study penguin feeding habits, I investigate whether they use smell to find krills. I observed reactions of sleeping penguins to a smelly chemical produced by krills, compared to the smell of sea water. There were significantly more reactions to the krill smell than sea water, supporting my hypothesis that penguins can smell krills. Future studies on penguin feeding habits should pay attention to their sense of smell.

Introduction

With this experiment, I want to test my hypothesis that penguins can smell krills. This hypothesis is part of my research into penguin feeding habits, which would facilitate efforts to predict their fate in climate change. I came up with this hypothesis because previous researches have shown that (1) birds can smell, (2) krills emit a smell different from sea water smell, and (3) other seabirds like petrels smell krills [1]. Krill smell comes from the DMS krills emit [2].

Methods

Materials:

1. Sea water off the coast of Antarctica.
2. DMS purchased from company X, product model Y number Z.
3. Cotton balls from company A, product model B number C.
4. 2-meter stick.
5. Glue from company N, product model M number L.
6. Excel 2016.

Set-up: The experiment takes place in a King Penguin colony in Antarctica.

Procedure:

1. Soak a cotton ball in sea water or DMS for 30 seconds.
2. Glue the cotton ball onto the 2 meter stick.
3. Find a sleeping penguin.
4. Hold the cotton ball right on top of the beak, not touching the penguin.

5. If the penguin wakes up within 3 minutes, mark it as “reacted to smell”. Otherwise mark as “did not react to smell”.
6. Repeat from step 1 with DMS if you used sea water last time, or with sea water if you used DMS last time.
7. Analyze data with t-test analysis function in Excel.

Results

Out of the 100 penguins sampled, only 10% penguins woke up from the sea water cotton balls, while 90% penguins woke up from the DMS cotton balls (Figure 1). This result supports my hypothesis that penguins can smell DMS, and potentially krills.

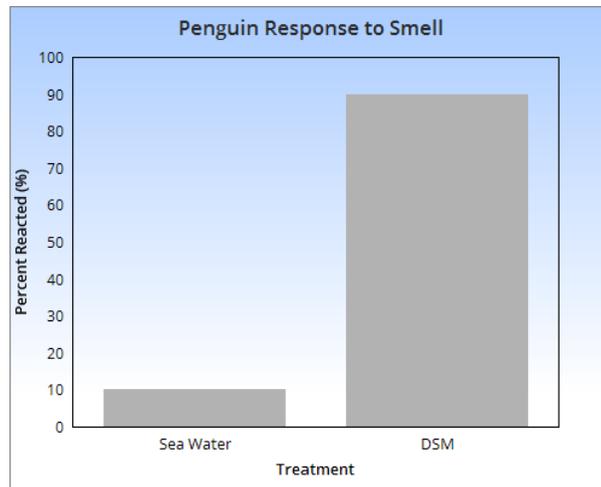


Figure 1: Percent of penguins waking

Discussion

I should have used a dry cotton ball or a cotton ball soaked in drinking water as another control. I cannot conclude from this finding whether penguins can detect DMS from krills when diluted in sea water. I should use krill DMS concentration in the sea as my next treatment.

Conclusion

Supporting my hypothesis that penguins can smell krills, significantly more penguins woke up from the smell of DMS than sea water. Note that this finding only pertains to King Penguins in Antarctica and cannot be extrapolated to other seabird species. However, sense of smell is a probable feeding strategy of King Penguins for future studies.

Works Cited

1. Cunningham, G. B., Van Buskirk, R. W., Hodges, M. J., Weimerskirch, H., & Nevitt, G. A. (2006). Behavioural responses of blue petrel chicks (*halobaena caerulea*) to food-related and novel odours in a simple wind tunnel. *Antarctic Science*, *18*(3), 345-352. doi:10.1017/S0954102006000393
2. Cunningham, G. B., Strauss, V., & Ryan, P. G. (2008). African penguins (*spheniscus demersus*) can detect dimethyl sulphide, a prey-related odour. *The Journal of Experimental Biology*, *211*(Pt 19), 3123-3127. doi:10.1242/jeb.018325