ENTOMOLOGICAL ACCURACY IN THE POPULAR PRESS:

Scientific Review of a BBC News Story: “New Hope for Pest Control”
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Introduction:

On July 15th, 2005 BBC News published a story on the ability of insects, particularly locusts, to detect polarized light, such as the reflective surface of water. This article, titled “New Hope for Pest Control” states that locusts use this ability to remain safe, by avoiding a flight path over areas of polarized light, like large bodies of water. In its title, the news story alludes to a possible method of pest control. BBC News based its article on a paper written by Nadav Shashar and his colleagues in the journal *Biology Letters* published July 11th, 2005. In this paper, an experiment was conducted on locust (Orthoptera: *Schistocerca gregaria*) behaviour towards polarized and non-polarized light. Experimental results showed a preferred flight path towards the non-polarized surface than towards a mirrored surface (reflecting polarized light). While the information given in the popular press article was to some extent accurate, it left out critical information. The article forces the uninformed reader to make a biased conclusion on the little information that was provided.

Comparison of the Popular Press Article to Scientific Information:

Although the information in the BBC article was generally correct, it barely scraped the surface of scientific information available on pest control of the migratory locust, and polarity perception.

On pest control of the migratory locust: The most misleading part of the BBC article is the title, “New hope for pest control” and the statement that “The research could lead to novel deterrents for locusts…” (BBC, 2005) giving the reader the idea that the newest biological control for locusts could be the use of some kind of light-polarized deterrent. This statement is an
interesting conclusion by the author, but not supported by enough facts. The scientific paper by Shashar et al. (2005) only concluded that the mirror is a deterrent, and that polarized reflections may help migrating locusts avoid flying over water. The result of these findings leading to pest control is unlikely.

The experiment by Shashar et al. was conducted as a result of observations that in a migration of November 2004, locusts avoided directly crossing the 3-5km Gulf of Aqaba. Instead the locusts turned north, away from the water (Shashar et al. 2005). It was not mentioned however, that during the same season, later in November, swarms of locusts made it to the Canary Islands (FAO, 2006a) off the western coast of Africa, a distance of 100 km. This indicates a contradiction in Dr. Shashar’s interpretation of locust migration behaviour.

Pest control for the migrating desert locust is being researched by many large organizations such as the FAO (Food and Agriculture Organization of the United Nations). The FAO keeps records of locust swarms and their behaviour and migratory patterns, and have recorded that they regularly cross the Red Sea, a distance of 300km (FAO, 2006b). In fact, the longest ever recorded migration was made by the desert locust in 1988, from West Africa to the West Indies of the Caribbean; a distance of 4500 km. This feat was accomplished by the locusts, flying with a wave of low pressure winds that would eventually become a hurricane (Tipping, 1995). Therefore, weather (as well as the polarized light deterrent) has an effect on migrations of these incredibly destructive pests. In order for the BBC article’s theory that this is a “new hope for pest control” to be effective, weather must not be taken into account. Since the weather cannot be controlled, light-polarized deterrents would not be very effective, if at all.

Another major point of interest that was left out of the BBC story was that: “...in nature, locusts often fly towards the wind, if it is not too strong.” (Shashar et al. 2005). They neglected
to mention that in the test where the wind was blowing from the direction of the mirror, locusts lacked a preferred direction of flight (Shashar et al. 2005) and didn’t necessarily avoid the mirror. Shashar et al. claimed that there is a conflict between choosing to fly into the wind and avoiding the mirror. The article instead focused on the findings that the locusts most often flew away from the mirror. This demonstrates another reason the light-polarized deterrent would be a weak candidate for a pest control agent.

**On developing pest-control agents:** The news article claimed to have a ‘new hope for pest control’, but it is impossible to conclude from the story that polarized light is an acceptable candidate as a control agent. Holding to the article’s title, however, it may have been fitting to reveal some facts about effective and tested methods of pest control today. A large organization that deals with attempting to control this relentless pest is the CGIAR (Consultative Group on International Agricultural Research). They have acknowledged the devastation caused by this pest to the farmland near the deserts. CGIAR’s case study noted that previously, the only effective method was a synthetic insecticide sprayed from the air and caused major ecological problems and potential human health risks (CGIAR, 2005). In the late 1980’s, a new insecticidal agent was found. “Green Muscle” was discovered by CABI Bioscience, and IITA (Institute of Tropical Agriculture) two other international organizations (Limson, 2006). Green Muscle is a natural fungal insecticide that is specific to insects of the grasshopper family and has no effects on non target organisms including humans and animals (CGIAR, 2005). The FAO has ranked this new insecticide on top for human and environmental safety (CGIAR, 2005). Green Muscle was registered and launched in 1998 to commercial markets in South Africa (LUBILOSA, 2004). This method works slower than the chemical insecticide, but is much more persistent once the fungus has established itself in its first grasshopper hosts.
On polarization vision: Not only did the BBC news article not give any informative account on pest-control as the title promised, it did not elaborate on one of the main points: polarization vision. How do insects detect polarized light? Interesting information about locust vision was overlooked in the BBC article. There has been research on the sensitivity of other insects such as bees, flies and ants towards polarized light from above (Mappes & Homberg 2004). The sun and sky provide these insects with a means of orientation. Studies done on the locust *S. gregaria* show that reception to polarized light is in the dorsal field of view (Vitzthum et al, 2002). This area, called the Dorsal Rim Area (DRA), possesses specialized ommatidia (Mappes & Homberg 2004). It was also shown that some neurons of the eye are also receptive to non-polarized light (Vitzthum et al, 2002). The results of the experiment conducted by Shashar and colleagues, help to show that polarized light sensitivity is also prevalent in the ventral visual field (Shashar et al, 2005) of the locust *S. gregaria*. Perhaps this information was not included in the article because of length restraints by the publisher; although it is a key piece of the puzzle of insect polarization vision and orientation. Locusts do use the polarization of light to help them navigate, but it is clearly not the only factor affecting their behaviour.

About the Author of the Reference Article from Journal: Biology Letters

Dr. Shashar’s paper, published by the Royal Society was referenced in the BBC news article. Nadav Shashar has a Ph.D. in biology, and did his masters in marine biology. He is a post-doctoral fellow at the Marine Biological Laboratory in Massachusetts. Most of his research is in the field of marine sensory ecology, but his main focus is polarized light vision in fish and other animals (Aquarius, 1999). He has authored 18 other publications since 1992 on the sensory biology and polarized vision in animals. Dr. Shashar is a credible source on behaviour towards
the polarity of light, the major topic of his paper. However, his research does not lie in the field of locust pest control, and there was no claim to pest-control methods in his publication.

**Suggestions on Improving the Article**

The BBC News article left out some critical information. It alluded to a ‘novel deterrent’ and ‘hope’ for pest-control; two statements based on very little information, and could mislead readers. There are two things I would suggest that could improve this article, which does in fact contain elements of the truth. Since the article gives no real evidence on how this new research could be used as pest-control, a new title would be more appropriate. Perhaps: “Mirrors affect locust navigation” or “Mirrors: a locust leash”. Another suggestion that could be made is, keep the current title, but include current methods of pest control and what is being done in the fields today. Also, the article mentions that “insects are capable of detecting polarized reflections” (BBC, 2005). They could elaborate on the visual process, or discuss the animals or other insects that can also orient by polarization vision.

**Conclusion:**

Overall, the news article by the BBC news is accurate, but could use some factual adjustments to make the story more true to scientific evidence. Generally the story kept within the major findings of the work by Dr. Shashar and colleagues, though the title was misleading. There was relevant information that could have been added to complete the story on polarization vision as well. While the article was generally interesting, it is important to note that there is much more to science than what is presented to the public in the popular press.
References:


