

A global warming flap



Two butterfly species, the small heath (left) and common blue (right), are among those in Central Europe that have become more likely in the last 30 years to have an extra generation in the same year. Since 1980, average temperatures there have also risen.

Florian Altermatt likes to chase butterflies, but he's also a scientist who thinks that butterflies might have something to tell us about the effects of global warming.

Altermatt is an ecologist — a scientist who studies how creatures interact with their environment — who works at the University of California, Davis. In a new study, he and other researchers looked at changes in the reproduction patterns of butterflies and moths in Central Europe.

Over the last 30 years, the average temperature in Central Europe has gone up about 1.5 degrees Celsius. During that same time, 44 species of moths and butterflies in an area around Basel, Switzerland, have added an extra generation to their numbers during some years, Altermatt found. That means that if butterflies of one of these species used to reproduce once per year, they now sometimes reproduce twice. And if they used to reproduce twice, they now sometimes reproduce three times. These extra generations didn't show up in this location before 1980.

The temperature increase, 1.5 degrees, may not seem like much, but it's about the difference between the body temperature of a healthy person and someone with a low-grade fever. Altermatt suspects that in Central Europe, that extra degree and a half is changing the internal clocks of many kinds of butterflies and moths. Because it's warmer outside, their breeding season begins earlier, for example, giving the insects more time to mate. Altermatt also says that the increase in temperature speeds up the development of the insects, so they're ready to reproduce earlier in their lives.

This was no small study: He and his colleagues watched butterflies and moths outdoors and also looked at historical records for more than 1,100 types of the creatures. Of those species, 263 are known to produce one or two extra generations in the location studied — but not always; only when the temperatures heat up. Altermatt found, however, that since 1980, a majority of those species started adding generations more often.

These added insects might mix things up in the ecosystem of Central Europe, says Patrick Tobin, an ecologist who works for the U.S. Forest Service in Morgantown, W.Va. An extra generation of insects provides more food to the animals that feed on them. Those predators, in turn, might start to increase their numbers, which would make life tougher on the other species the predators eat, Tobin told Science News. On the other hand, with an extra generation, an endangered insect species might have a better chance of recovering.

Altermatt also does research in evolution, which is the study of how species, or groups of the same creature, change over time. Every time an insect — or animal, plant or other organism — reproduces, the offspring might be slightly different from its parent. These differences could give the offspring a better chance of survival in the world. In this case, Altermatt thinks the additional butterfly generations may speed up evolution — and perhaps give them a better chance of survival in the face of climate change. On the other hand, maybe these changes won't make a difference: Altermatt doesn't know whether the extra generations of butterflies and moths survived.

Scientists who study the effects of climate change like to look at patterns such as insect populations because they are easy to track — and easy to connect to a warming world. And by studying such visible effects of climate change, scientists might be able to better predict the changes ahead for other populations — like humans.

Science Promotion Team:

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Vice-chairperson: So Ying Kin 蘇英健 6S

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Website: <http://210.3.43.253/~lck/science/spt0910/spt0910.htm>

科 普 講 座

日期	時間	講座名稱	地點	講員
17-4-2010 (Sat)	9:30-11:00 am	消失中的白色世界	香港新一代文化協會 科學創意中心	李樂詩博士(極地博 物館基金創辦人)

費用全免，有專車接送。有興趣同學請到化學實驗室門外壁報板上簽名，先到先得。

醫 學 公 開 講 座

17-4-2010 (Sat)	10:00-12:00am	治病於未誕 調息於更年	香港銅鑼灣中央圖書 館地下演講廳	鄧惠瓊教授 陳創斌醫生 (港大婦產科教授)
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費用全免，同學可登入 <http://www.hku.hk/facmed/publiclecture2010> 進行網上登記留座。

香港科學館專題展覽

香港科學館將於三月至八月期間展出兩個專題展覽。詳情如下：

1. 《神州生態 - 中國野生動植物標本展》(至 31-8-2010)

邀請你一同探索中國豐富的野生動植物資源，希望能喚起大家對自然生態的關注，以及認識生物多樣性和生物之間互存相依的關係。

2. 《轉基因魚快速檢測雌激素類污染》(至 11-7-2010)

越來越多的化學物，甚至那些過去被認為很 "安全" 的化學物，由於會擾亂內分泌系統，現在已被歸類為 "內分泌干擾素"。內分泌干擾素 (尤其是雌激素類內分泌干擾素) 的污染問題，正威脅著各種生物和人類的健康，成為了全球最嚴重的環境問題之一。發展一個既可靠又能準確快速檢測雌激素類內分泌干擾素的方法實為刻不容緩。由香港城市大學生物及化學系鄭淑嫻副教授領導的研究小組，最近就培育出一種轉基因耐鹽鯖鱈魚。該魚能敏銳地偵測出雌激素類內分泌干擾素的存在，並通過發出不同強度的綠色螢光來反映雌激素的活性水平。除了敏感度高及操作容易外，這方法亦兼具快速及低成本這些優點。

優惠票：\$17.5 (適用於全日制學生) 星期三免費入場之安排及博物館週票不適用於此展覽

Flu river



Tamiflu, the primary flu-fighting drug, is getting into surface waters where ducks and other water birds may pick it up. If the birds are carrying flu viruses, which many normally do, those viruses may develop a resistance to the drug, scientists now worry.

What if the solution to one problem causes other problems down the road? That may be the case in the ongoing struggle to fight the flu. Flu season is almost here, which means more and more people may be taking Tamiflu in the months ahead. Tamiflu is a popular anti-flu drug that treats both seasonal flu strains and the new H1N1 flu, an unpredictable disease better known as swine flu.

But this increased use of Tamiflu may be introducing new problems. A team of Japanese scientists recently studied three rivers in Japan and found them to be contaminated with Tamiflu's active ingredient, oseltamivir carboxylate or OC. They found the same contamination in the water discharged from local sewage plants, water that ends up in those rivers. People excreted the drug in their urine, and water discharged from the sewage plants carried it to the rivers.

Sewage treatment plants are designed to remove germs and solids from the wastes dispensed by household toilets, but many drugs can get through. OC is one of those escaping drugs.

OC in the water may be a serious problem for birds — and for people. Here's why: The flu, short for influenza, is caused by a virus, a tiny organism that invades living cells and turns them against the body. There is not one flu-causing virus; there are many. These many viruses are constantly evolving, or changing in order to survive. They find new ways to infect people and animals, and every year new kinds of flu show up. Birds are natural carriers of many flu-causing viruses.

If a bird drinks water polluted with OC, that bird may be able to fight off the types of flu that Tamiflu treats. As a result, new flus — flus that can't be cured by Tamiflu — may start to develop in the bird. Once a drug-resistant flu grows in the bird, that bird can pass it on to other animals. This new, stronger flu could eventually start infecting people. And that could mean big trouble, since Tamiflu would not help people fight this stronger flu.

The Japanese study was led by Gopal Ghosh, a scientist at Kyoto University. Ghosh and his team collected water from two places: sewage treatment plants and the rivers that carried away the treated wastewater dispensed by the plants.

They first collected samples in December of last year, when the flu season was starting. They collected more water samples in February, when the flu was bad, and collected a third set of samples later.

The scientists found OC in the sewage samples every time. They found a higher concentration in the second set of samples, from February. That's when the flu was at

its worst, and 1,738 cases were recorded in Kyoto. At the same time, in the second set of samples taken in February, the scientists found OC in the river water as well. The OC did not show up in the river in the first and third set of samples.

Scientists have known for years that sewage treatment plants do not remove OC from the water. Jerker Fick, an environmental chemist at Umeå University in Sweden, published a study two years ago that showed that most water treatment plants removed “zero percent” — or none — of the OC. In fact, Fick says, almost all the Tamiflu ingested by a human being will end up in the environment as OC.

And when the OC comes out of the sewage treatment plants, the birds will be ready. Ducks, for example, love to swim in the warm waters just downstream of those plants during the coldest months — during flu season. “I saw it myself,” Fick says.

Topic of Science Quiz 你知道唔知道? in April

9th, 26/4-7/5: DNA

Questions are posted on the notice board of Science Promotion Team near the Staff Common Room. Students can find the five questions and get the answer sheets on our board. After filling in your answers, put it into the box provided. Students who can get all the answers correct will be awarded a small gift.

Lunch Time Video Shows: 12:20 p.m. @ Chem. Lab. (Room 512)

Date	Name of Program	Phy	Chem	Bio
16/4/2010 (Fri)	The Blue Planet - Tidal Seas 藍色星球 潮汐之間 (Part 1)	☞	☞	☞
27/4/2010 (Tue)	The Blue Planet - Tidal Seas 藍色星球 潮汐之間 (Part 2)	☞	☞	☞
30/4/2010 (Fri)	The Sun 從地球到宇宙：貼近太陽 (Part 1)	☞	☞	☞
4/5/2010 (Tue)	The Sun 從地球到宇宙：貼近太陽 (Part 2)	☞	☞	☞

由太古可口可樂香港及香港科技大學合辦，全港學界環保玩具創作挑戰賽 2010 - 學生創意大比拼已於 2010 年 2 月 20 日在香港科技大學圓滿舉行。本校 2A 班黃冠賢同學、徐樂瑜同學、嚴啟彤同學及劉志謙同學所設計的 Environmental Fighter 榮獲最佳創意獎及全場總冠軍，並獲免費機票連住宿，遊覽上海世界博覽會及獎學金一千元。



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