Pollution from lawn keeping

By STEPHANIE LAM
Epoch Times Staff

Turfgrass lawns are not environmentally friendly, according to recent research by Dr. Amy Townsend-Small and Dr. Claudia Czimczik of the University of California, Irvine.

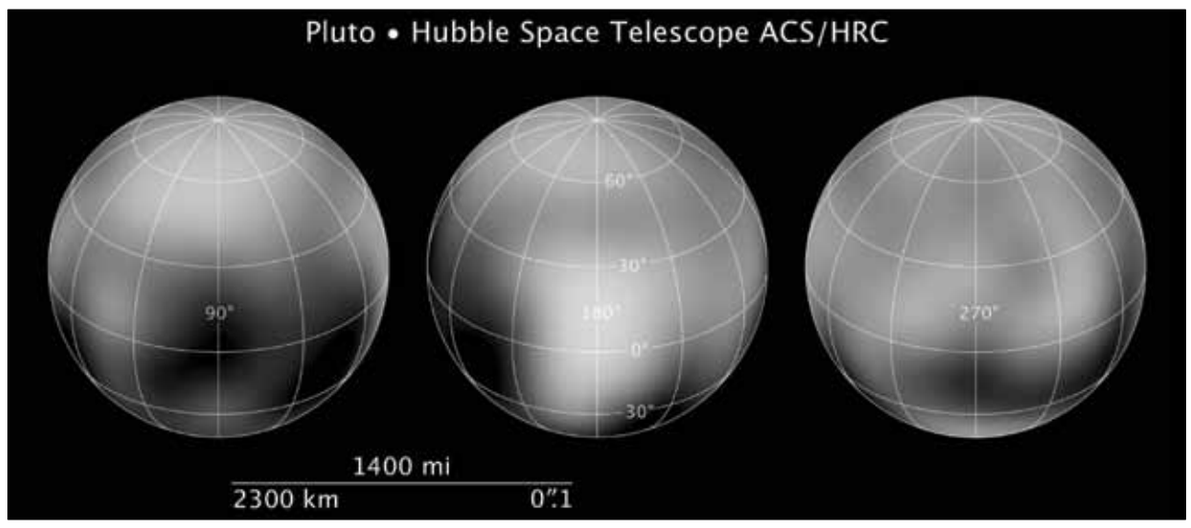
Although lawns absorb carbon dioxide through photosynthesis, maintaining them—including mowing, leaf blowing, and fertilizer production—may create greenhouse gas as much as four times the amount of the carbon dioxide absorbed by the grass.

"The carbon-storing benefits of lawns are counteracted by fuel consumption," said Townsend-Small in a press release.

Turfgrass occupies 1.9 percent of land on the U.S. mainland. It is the most common irrigated crop in the country.

To read the research paper, please visit http://www.agu.org/pubs/crossref/2010/2009GL041675.shtml

MORE HARM THAN GOOD: Greenhouse gas emission from lawn maintenance, like mowing, is four times the amount of carbon dioxide absorbed by the grass. PHOTOS.COM



DYNAMIC PLANET: In the past decade, Pluto has undergone dramatic changes on its surface and in its atmosphere. NASA, ESA, AND M. BUIE/SOUTHWEST RESEARCH INSTITUTE

Hubble telescope reveals changes on Pluto's surface

By ANDRES CORDOVA
Epoch Times Staff

NASA has published the most detailed images of the planet Pluto in the history of astronomy, taken by the Hubble Space Telescope.

Compared with pictures taken in 1995, the newer set of pictures shows that in the past decade, Pluto has undergone dramatic changes on its surface and in its atmosphere.

NASA investigators concluded that the planet's northern hemisphere is increasing in brightness, while the southern hemisphere is slowly becoming darker. Furthermore, the planet is becoming redder; this shows that Pluto is not just merely a celestial body made of ice and rock, but it is actually a dynamic planet that can indeed experience atmospheric changes.

Through detailed analysis, a strange brilliant dot has also been discovered near Pluto's equator. According to NASA, it is rich in carbon monoxide ice and has now become one of the priority targets of investigation.

Pluto is the hardest planet in the solar system to obtain a detailed portrait from, since it is a small planet located at the border of our solar system.

The images are part of the New Horizons mission, a planetary research mission that will have the New Horizons probe fly by Pluto in 2015. Hopefully these new discoveries will shed light on one of the most mysterious and interesting planet of our solar system.

The science behind 'an apple a day'

By HELENA ZHU
Epoch Times Staff

GOOD BACTERIA: Rats fed with apples have a higher amount of beneficial bacteria in their digestive systems. PHOTOS.COM

An apple a day keeps the doctor away, but why? New research by scientists in Denmark have explored the science behind the classic saying.

Microbiologists from the National Food Institute at the University of Denmark fed one group of rats a control diet and another group of rats a diet that was rich in whole apples, apple juice, purée, or pomace.

On feeding them, the scientists observed the microbial content of the rats' digestive systems.

"Certain bacteria are believed to be beneficial for digestive health and may influence the risk for cancer," said research leader Dr. Tine Rask Licht of the Technical University of Denmark, in a press release.

"In our study we found that rats eating a diet high in pectin, a component of dietary fiber in apples, had increased amounts of certain bacteria that may improve intestinal health," said co-researcher Dr. Andrea Wilcks, also from the Technical University of Denmark.

"It seems that when apples are eaten regularly and over a prolonged period of time, these bacteria help produce short-chain ideal pH conditions for ensuring a beneficial balance of microorganisms. They also produce a chemical called butyrate, which is an important fuel for the cells of the intestinal wall."

The research was published in the journal BMC Microbiology. Further research is required to determine whether a human's digestive system would respond to apples the same way a rat's did.

To read the research paper, please visit http://www.biomedcentral.com/content/pdf/1471-2180-10-13.pdf

Chocolate lovers less likely to have a stroke

By HELENA ZHU
Epoch Times Staff

Now chocolate lovers have an extra excuse to enjoy their favourite treat. According to an analysis of past research, eating chocolate may lower the risk of having a stroke.

The analysis reviewed the only three studies on the relationship between chocolate and stroke.

One study, involving 44,489 participants, found that people who eat one serving of chocolate once a week are 22 percent less likely to get a stroke than those who don't eat chocolate. Another study, with 1,169 participants, found that people who eat 50 grams (1.76 oz.) of chocolate per week are 46 percent less likely to die after a stroke than those who don't eat chocolate.

Chocolate is rich in antioxidants called flavonoids, but research is yet to show whether they have a protective effect against stroke.

"More research is needed to determine whether chocolate truly lowers stroke risk, or whether healthier people are simply more likely to eat chocolate than others," said one of the two study authors, Sarah Sahib, BScCA, with McMaster University in Hamilton Canada, in a press release.

The researchers will present their analysis at the American Academy of Neurology's 62nd Annual Meeting in Toronto from April 10 to 17.

SWEET STATISTIC: Researchers say people who eat chocolate are less likely to have a stroke. EMRE OGAN/ISTOCKPHOTO

SCIENCE MATTERS

FEBRUARY 16, 2010

Vol. 12, No. 7

Dr. David Suzuki is a scientist, broadcaster, author, and chair of the David Suzuki Foundation and Dr. Faisal Moola is the Director of Science at the David Suzuki Foundation.

Nature imposes the real bottom line

By DAVID SUZUKI with FAISAL MOOLA

In December, Canadian specialty TV channel Business News Network interviewed me about the climate summit in Copenhagen. My six-minute interview followed a five-minute live report from Copenhagen, about poor countries demanding more money to address climate change and rich countries pleading a lack of resources. Before and after those spots were all kinds of reports on the Dow Jones Industrial Average, the price of gold and the loonie, and the implications of some new phone technology.

For me, this brought into sharp focus the inevitable failure of our negotiating efforts on climate change. BNN, like the New York-based Bloomberg channel, is a 24-hour-a-day network focused completely on business. These networks indicate that the economy is our top priority. And at Copenhagen, money dominated the discussions and the outcome.

But where is the 24-hour network dealing with the biosphere? As biological creatures, we depend on clean air, clean water, clean soil, clean energy, and biodiversity for our well-being and survival. Surely protecting those fundamental needs should be our top priority and should dominate our thinking and the way we live. After all, we are animals and our biological dependence on the biosphere for our most basic needs should be obvious.

The economy is a human construct, not a force of nature like entropy, gravity, or the speed of light or our biological makeup. It makes no sense to elevate the economy above the things that keep us alive. But that's what our prime minister does when he claims we can't even try to meet the Kyoto targets because that might have a detrimental effect on the economy.

This economic system is built on exploiting raw materials from the biosphere and dumping the waste back into the biosphere. And conventional economics dismisses all the "services" that nature performs to keep the planet habitable for animals like us as "externalities". As long as economic considerations trump all other factors in our decisions, we will never work our way out of the problems we've created.

We often describe the triple bottom line – society, economy, and environment – as three intersecting circles of equal size. This is nonsense. The reality is that the largest circle should represent the biosphere. Within that, we have 30 million species, including us, that depend on it. Within the biosphere circle should be a much smaller circle, which is human society, and within that should be an even smaller circle, the economy. Neither of the inner circles should grow large enough to intersect with the bigger ones, but that's what's happening now as human societies and the economy hit their limits.

We also draw lines around property, cities, provinces, and countries. We take these so seriously that we are willing to fight and die to protect those borders. But nature pays no attention to human boundaries. Air, water, soil that blows across continents and oceans, migrating fish, birds and mammals, and windblown seeds cannot be managed within human strictures, yet all the discussions in Copenhagen were centred on countries that, in turn, were divided into rich and poor. In science-fiction movies where an alien from outer space attacks and kills humans, national differences disappear as we join forces to fight a common enemy. That is what we have to tap into to meet the climate crisis.

Nature is our home. Nature provides our most fundamental needs. Nature dictates limits. If we are striving for a truly sustainable future, we have to subordinate our activities to the limits that come from nature. We know how much carbon dioxide can be reabsorbed by all the green things in the oceans and on land, and we know we are exceeding those limits. That's why carbon is building up in the atmosphere. So our goal is clear. All of humanity must find a way to keep emissions below the limits imposed by the biosphere.

The only equitable course is to determine the acceptable level of emissions on a global per capita basis. Those who fall below the line should be compensated for their small carbon footprint while those who are far above should be assessed accordingly. But the economy must be aligned with the limits imposed by the biosphere, not above them.

Take David Suzuki's Nature Challenge and learn more at www.davidsuzuki.org.

Microbe understudies await their turn in the ecosystem limelight

National Science Foundation

On the marine microbial stage, there appears to be a vast, varied group of understudies only too ready to step in when "star" microbes "break a leg."

At least that's what happens at the Lost City hydrothermal vent field, according to research results published in January in the journal Proceedings of the National Academy of Sciences (PNAS).

The Lost City hydrothermal vent field is located in the mid-Atlantic and is the only one of its kind found thus far. It offers scientists access to microorganisms living in vents that range in age from those newly formed to those tens of thousands of years old.

A bit-player among microbes found in scant numbers in younger, more active vents became the lead actor in a chimney more than 1,000 years old where venting had moderated and cooled, changing the ecosystem, according to Phillip Taylor of the National Science Foundation's (NSF) Division of Ocean Sciences, which funded the research.

This is the first evidence that microorganisms can remain rare for such a long time before completely turning the tables to become dominant when ecosystems change, says William Brazelton, a University of Washington (UW) postdoctoral researcher. It seems logical, but until recently, scientists weren't able to detect microorganisms at such low abundance, he says.

In 2006, scientists led by Mitchell Sogin of the Marine Biological Laboratory in Woods Hole, Mass., and a co-author of this week's paper, published the first results showing that microorganisms in the marine environment had been woefully undercounted.

Using the latest DNA sequencing techniques, they found that marine microorganisms could be 10 to 100 times more diverse than previously thought.

The scientists coined the term "rare biosphere" to describe a vast but unrecognized group of microorganisms—"rare" because each individual type of microorganism appeared to be present in only very low numbers, so low that they were previously undetectable.

If the new way of determining microbial diversity was accurate, scientists were left to wonder why such a large collection of low-abundance organisms existed.

"A fundamental prediction of the 'rare biosphere' model is that when environmental conditions change, some of these rare, preadapted microbes can rapidly exploit the new conditions, increase in abundance, and out-compete the once abundant organisms adapted to past conditions," Brazelton and co-authors write in their paper.

Yet, they continued, "No studies have tested this prediction by examining a shift in species composition involving extremely rare taxa occurring during a known time interval."

Until now.

LOST CITY VENT FIELD

Lost City, discovered by University of Washington researcher Deborah Kelley and others during an NSF expedition in 2000, was named in part because it was discovered by scientists using the research vessel Atlantis.

Follow-up work by Kelley and others showed that the hot springs are formed in a very different way than the metal-rich black smoker vents scientists have known about since the 1970s.

Unlike the 700 degrees Fahrenheit black smokers, the chimneys, vents, and other structures at Lost City are nearly pure carbonate, the same material as limestone in caves. They are formed by serpentinization reactions, a chemical reaction between seawater and mantle rocks that underlie the field.

Water venting at Lost City is generally at 200 degrees Fahrenheit or less. The fluids are highly alkaline and enriched in the gases methane and hydrogen—important energy sources for the microbes that inhabit Lost City.

Lost City also differs from magma-driven hydrothermal systems in that it is very long-lived.

There have been numerous seasonal and short-term studies of microbial responses to environmental changes—lasting years at the most—but the Lost City hydrothermal vent field has provided a way to look at changes in vent ecosystems 1,000 years apart in age.

Analyses by Brazelton and colleagues revealed that DNA sequences that were rare in younger vents were abundant in older ones. Because it is likely that the older Lost City chimneys released higher-temperature, higher-pH fluids when they were younger, as the ecosystem changed, the rare microorganisms came to the fore.

This round of near-disappearance then dominance could have happened repeatedly during the more than 30,000-year lifetime of the Lost City vent field. The microorganisms present today are "preadapted" to certain conditions—and are waiting for the ecosystem to change to suit them best.

"The rare biosphere of the Lost City microbial community represents a large repository of genetic memory created during a long history of past environmental changes," the authors write. "The rare organisms were able to rapidly exploit the new niches as they arose because they had been previously selected for the same conditions in the past."

The work was funded by the NSF, NASA, and the W.M. Keck Foundation.

Authors of the paper are William Brazelton, Deborah Kelley and John Baross, UW; Mitchell Sogin, Marine Biological Laboratory at Woods Hole; Chuan-Chou Shen, National Taiwan University, Taipei; Lawrence Edwards, University of Minnesota; and Kristin Ludwig, Consortium for Ocean Leadership, Washington, D.C.