

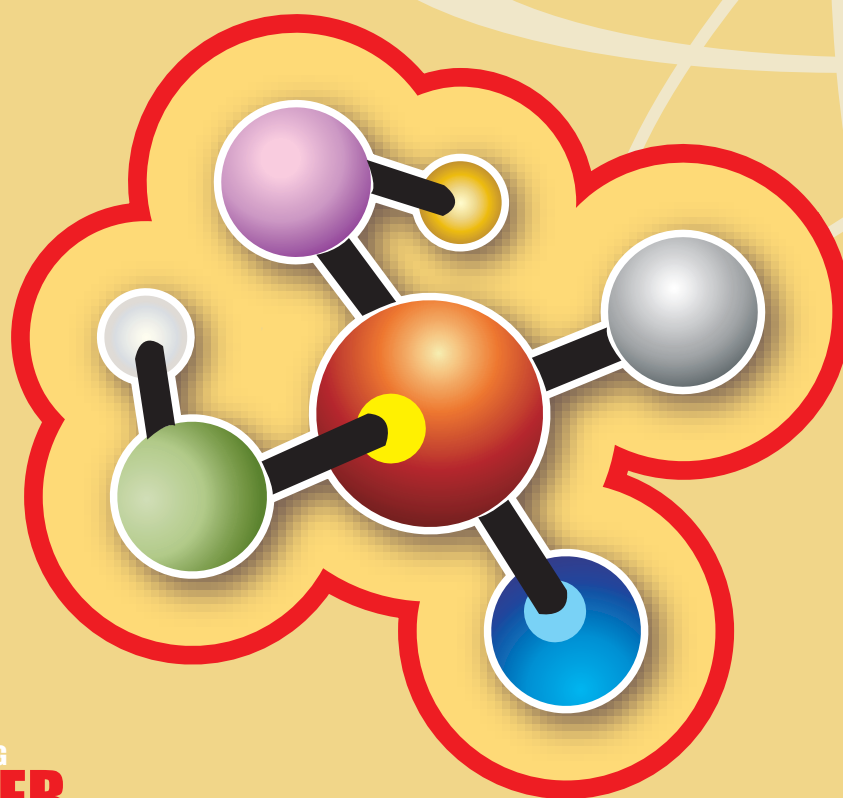


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November 3, 2008

Animal Feed Is Fishy

A third of all commercially harvested seafood goes to animals, which could undermine the entire oceanic food web. Adam Hinterthuer reports

[The following is an exact transcript of this podcast.]

It sure is a pig-eat-anchovy world out there. While that may sound like a joke, the results of a newly released study say it's no laughing matter. Farmers are fattening up their animals with anchovies and sardines at an alarming rate. In fact, one-third of the world's commercially harvested seafood now is used to feed pigs, chickens and farm-raised fish.

Researchers from the University of British Columbia and Stony Brook University spent nine years compiling data on how humans caught, processed and consumed seafood. They report that 37 percent of all the fish caught are small forage fish like sardines and anchovies. And 90 percent of that catch ends up as fishmeal or fish oil, used primarily in animal feed. Forage fish are popular because they can be caught in massive quantities and sold at cheap prices. But, researchers say, these fish support the marine food web, and they're nutritious staples for coastal-dwelling people in developing countries. So it might be time to rethink the menu. If you feed a pig a fish, it'll eat for a day. But if you feed fish to millions of pigs, well, you might just run out of fish.

—Adam Hinterthuer



November 4, 2008

Body Odors Individual as Fingerprints

Each mammal, including us, seems to have a unique body odor type, which could be further bad news for criminals afraid of CSI. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

It's true that if you eat a lot of what's fondly dubbed the stinking rose, others might notice a faint whiff of eau de garlic in your sweat. But even the pungent bulb can't mask your natural scent. In fact, scientists from the Monell Center in Philadelphia say that an individual's scent is impossible to mask through food. They published this research in the online journal *Public Library of Science One*.

All mammals have specific genetically-determined smells, known as odor types. Special sensor mice were trained to recognize other mice by their odor types. Then the odiferous mice were fed diets designed to mask their odors. They did smell different when they ate different food. But even with the dietary changes, the sensor mice could pick out the individual, personal smells.

This means our odorprint may be as individual as our fingerprints. Scientists say if animals can determine individual scents, then sensors could be designed to do the same thing. This could lead to new devices to detect those odorprints. Which means that future criminals may have to worry about wiping away fingerprints and whatever body odor they leave behind.

—Cynthia Graber



November 5, 2008

Getting Everyone a Straight Flush

The World Toilet Summit, underway in Macau, looks to improve sanitation for the 2.5 billion people without hygienic toilets. Steve Mirsky reports. More info at www.worldtoiletevents.com

[The following is an exact transcript of this podcast.]

You might think that the World Toilet Summit was a meeting of Wall Street bigwigs. But no, it's actually about toilets. The three day conference opened on November 4th in Macau. The event brings together U.N. agencies, industry leaders, civil engineering groups and others to talk about tackling the world's sanitation challenges, especially improving hygiene standards in developing countries. Toilet humor aside, two-and-a-half billion people still do not have access to a hygienic toilet. One of the U.N.'s Millennium Development Goals is to cut that number in half by 2015.

Delegates to the summit will do some hands-on learning, because state-of-the-art public toilets will serve as educational tools. The Sustainable Sanitation Pavilion showcases the latest in dry toilet technology. Also on exhibit: self-cleaning toilets, solar-powered commodes and even systems that convert waste into biogas that can be used for heating.

Global codes for toilet design are also on the table. The first initiative under discussion will look at ways to increase the traffic flow at women's public rest rooms. That session is called Potty Parity.

—Steve Mirsky



November 6, 2008

No Sex Please, We're Cloners

Critters that reproduce by cloning still manage to develop genetic diversity, which gives natural selection something to work on. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

Why bother with sex? It's a question that's bugged biologists since they first noticed that some critters do it and some don't. The answer they've come up with is that sex generates genetic diversity, which could allow a species to better adapt to changing environments. That's because sex mixes together the genes from mom and dad. And, like shuffling a deck of cards and dealing new hands, sometimes the kids will get a better combination of genes than their parents had.

So how do species that reproduce by cloning weather change? It turns out not all clones are alike. Scientists from Melbourne were studying a kind of mite that reproduces asexually. In the process, sometimes rare mutations occur, so a clone might be a little different from its parent, and from the rest of the population.

What the scientists found is that sometimes these rare mutants are favored by natural selection. Maybe they're a little better at hiding from predators. So they leave behind more offspring, and eventually come to dominate the population. When circumstances change, another rare mutant might gain favor, results that appear in the current issue of the *Proceedings of the National Academy of Sciences*. So sex isn't necessary, as long as you're willing to back somebody different when it's time for a change.

—Karen Hopkin



November 7, 2008

Document Found Older Than Dead Sea Scrolls

Archaeologists discovered a pottery shard inscribed with Hebrew text written a thousand years earlier than the Dead Sea Scrolls. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

One of the most important archaeological finds in history was the Dead Sea Scrolls. These documents include some of the earliest written records of the Bible. Now archaeologists say they've found what they claim is the most significant archaeological discovery in Israel since those documents. They found a shard of pottery that's about 3,000 years old—a thousand years older than the Dead Sea Scrolls. This would have been about the time of the legendary King David.

Pottery inscribed with ink is called an ostrakon. This ostrakon was found in the oldest Judean city unearthed to date. Archaeologists say the city is near where David killed Goliath. It's south of current-day Beit Shemesh. The site has been excavated only since June of this year. Archaeologists say what they uncover at this site will help us learn more about life at the time of David.

The ostrakon has five lines of text in black ink. It's written in Hebrew, making it the earliest Hebrew text ever found. Researchers have deciphered some of the words, including slave, judge and king. So it could be part of a legal code that might provide insight into early Hebrew civilization.

—Cynthia Graber



November 10, 2008

Sound Method to Save Manatees

Slowing down boats is the remedy for keeping manatees from getting hit. But a Florida Atlantic University scientist says that manatees can't hear the low frequencies of slow boats. Alarms could do the trick. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

Every year, scores of manatees are killed by boats in Florida's waters. Their plight is an ecological concern. And everyone from marine biologists to Marge in an episode of the Simpsons has gotten on board to save the manatees. So far, the best idea they've come up with is posting speed limits for boaters that zip through Florida's waterways. But local scientist Edmund Gerstein says that slowing boats down may do more harm than good.

According to Gerstein, manatees aren't hit because they're too slow to get out of the way. When they're motivated, they can move about 21 feet in a second. Instead, he thinks that manatees can't hear the boats coming. Gerstein's found that manatees are deaf to the sort of low-frequency sounds produced by boat engines. Making boats move more slowly makes things worse, because the resulting sound is even harder for them to hear and the boats spend that much more time in the area. His results will be presented at the acoustical society meeting in Miami on November 13th.

Happily, Gerstein has designed an underwater alarm that, when attached to the front of a boat, tells manatees to move it. Which could lead Marge to say: [Marge Simpson voice] "I can believe how many manatees we saved today."

—Karen Hopkin



November 11, 2008

Brain Sacks Out in Stages

Does the brain have a centralized sleep command center? Or can any group of brain cells begin shutting down for the day? Adam Hinterthuer reports

[The following is an exact transcript of this podcast.]

If you're too tired to think straight, it might be because parts of your brain are already asleep at the wheel. A team of neuroscientists from Washington State University is challenging the belief that a specific region of the brain makes the call to hit the sack. Instead, our brains power down in stages, the researchers say. If a certain group of cells in our brain gets fatigued, it simply shuts off. Surrounding areas respond in kind and also begin to doze. Once a critical mass of gray matter reaches this point, our brain calls it a day. The research will appear in the December issue of the journal *Nature Reviews Neuroscience*.

According to the paper, a centralized sleep command center can't account for behaviors like sleepwalking and "sleep inertia," or the sluggishness we feel when we first wake up. In those cases, parts of our brain are obviously awake while others are fast asleep. All this suggests that regions of our brain can make their own decisions about wakefulness. So next time your partner wants to talk at bedtime and asks "Are you asleep?" don't worry about saying yes. Truth is, part of your brain is probably already snoring.

—Adam Hinterthuer



November 12, 2008

Hurling at the Enemy

A species of caterpillar relies on the surface chemistry of its puke to keep its enemies busy while it gets away to safety. Karen Hopkin regurgitates

[The following is an exact transcript of this podcast.]

They say that the best offense is a good defense. And the best defense might be the most offensive. Take, for example, the barfing caterpillars of the beet armyworm moth. When threatened by marauding fire ants, these caterpillars regurgitate on their foes, rendering them less able to put up a fight. But what's so debilitating about a little caterpillar puke? Scientists used to think that bugs that protect themselves by projectile vomiting were taking advantage of chemicals they borrowed from the plants they eat—essentially spitting plant toxins at their enemies. But the beet armyworm will eat almost anything, from cauliflower to corn, and most of those plants don't produce anything that can be weaponized.

Instead, scientists have found that these caterpillars upchuck a fluid that's chock full of surfactants: chemicals that help make liquids easier to spread. The enhanced spreadability allows the spit-up to ooze over the surface of an unsuspecting ant, who then has to stop to clean the stuff off while the caterpillar makes his escape. The results were published by the Royal Society on November 5th. Some pesticides rely on surfactants to protect crops. So biotech companies might look to the caterpillar when they need some fresh ideas to throw up on the board.

—Karen Hopkin



November 13, 2008

Pregnant Moms Who Chew Fat Pass On Habit

A study in rats finds that moms fed a high-fat diet during pregnancy had pups with more brain cells devoted to increasing appetite. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

We've heard that a mother's weight during pregnancy can influence the weight of her offspring. Now a study of rats shows that the fat content in a mom's diet—regardless of her body weight—may permanently change the baby's brain. These changes can lead to overeating and obesity, according to research published in the November 12th issue of the journal *Neuroscience*.

Pregnant rats were split into two groups. One group received a balanced diet. The other got high fat-feed. The body weight of the moms remained the same. But the pups showed distinct brain differences. Those born to the moms fed a high-fat diet had a larger number of neurons that produce peptides that stimulate appetite. There was also an increased density of neuronal precursor cells in areas known to be linked to obesity. Those pups ended up eating and weighing more throughout life.

Researchers say that mother rats on a high-fat diet may be priming their offspring to metabolize and crave the same fatty foods. Perhaps today's obesity epidemic gestated a generation ago.

—Cynthia Graber



November 14, 2008

Bigger Voter Turnout Gets Better Fish Leader

Schools of fish faced with two choices of leader made better picks when there were more fish involved in making the decision. Rachel Kremen reports

[The following is an exact transcript of this podcast.]

Researchers have discovered that improving voter turnout tends to result in better decision-making—at least amongst fish. A recent study of stickleback found that they select a leader by consensus and, the more fish in the pool, the more likely they'll make a good choice.

In the experiment, a school of fish was presented with two mock candidates for leader. One of the fake fish swam left, the other right. The pack of real fish was then allowed to decide which leader to follow. According to the study, which was published recently in the journal *Current Biology*, the stickleback tended to follow the candidate that looked the healthiest. Larger or fatter fish, for example, were usually chosen over smaller fish. Fish with spots—often a telltale sign of disease—generally lost out to a non-spotty adversary. The fish also seemed to have a preference for a more richly colored candidate, though the researchers say they have yet to determine why. Maybe his environmental record won them over?

—Rachel Kremen



November 17, 2008

Multiple Planets Caught Orbiting Distant Star

Using a technique called adaptive optics, astronomers were able to produce the first image of an entire solar system far from ours. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

Science fiction is filled with stories of planets circling distant stars. Now astronomers have produced the first image of multiple planets circling a star that's not our sun. The planets are five to thirteen times more massive than Jupiter. And their order by size mimics our own solar system. The discovery is in the November 14th issue of the journal *Science*.

Astronomers faced a big challenge finding those planets: telescopes can't just catch a planet in orbit. So a common method is to determine the planets' gravitational pull on their home star. But that only works for planets whose orbit is relatively close to their sun. Newer procedures measure infrared radiation from recently formed planets. And a technique called adaptive optics is also used to create images of planets. It corrects for the fact that the glare of the home star makes nearby planets difficult to see. It was adaptive optics that made the new solar system visible to us.

In other world news, a planet's been found orbiting the star Fomalhaut, just 25 light-years from earth. Next year they'll find out who gets elected President, Reagan or Mondale.

—Cynthia Graber



November 18, 2008

Sound Method to Levitate Droplets

When a researcher noticed that bass notes from his MP3 player were making drops of liquid bounce, it began the development of a new technique to levitate droplets, thus keeping them from contamination by surfaces. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

In theory, scientists could learn a lot about our health by testing tiny amounts of bodily fluids—a drop of blood, a tear, a bead of sweat. But something this small is easily contaminated by other liquids or surfaces. So what are scientists doing? They're making liquids bounce, dance, and float lightly through the air. Researchers from Belgium's University of Liege published their findings November 18th in the *New Journal of Physics*.

Usually droplets on a surface of oil eventually just collapse. Something called acoustic levitation was introduced a few years ago, but it takes a lot of complex equipment. Then one researcher noticed something strange. Certain bass notes booming from his iPod could make droplets dance and roll around. He and his colleagues pursued this line of inquiry.

They figured out the appropriate vibrations that make the droplets lightly bounce. This keeps them separate from the oily layer underneath. The result looks as if the drops are rolling around. And the drops haven't had a chance to mix with the fluid below. Researchers say the technique could be used to manipulate tiny amounts of fluid without contamination. Yet another reason why iPods are essential pieces of laboratory equipment.

—Cynthia Graber



November 19, 2008

Animals Honestly Advertise Toxicity

Creatures that don't produce toxin can look like they do, but poisonous critters can't look innocent, because of biochemistry. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

Truth in advertising is a questionable concept, because it's often self-serving to lie. Whether you're talking about a used car salesman or a poisonous snake. No, they're not the same thing.

In the natural world there are poisonous creatures that advertise their unpalatability with bright colors. Then there are other critters that try to protect themselves by merely mimicking the bright coloration of creatures that produce nasty toxins—but without actually expending the energy on making the toxins themselves. These mimics are hoping to get by by lying about being a bad meal. But what about the beasties that really are filled with poison. Can they lie, too? Maybe save a little energy by producing a less colorful display?

Well, scientists from the U.K. say, it looks like they can't. See, when an animal makes a toxin, it also makes an antitoxin to keep it from poisoning itself. And those antitoxins are usually antioxidants, which also double as pigments. So the more toxic a critter is, the more antioxidants it needs, and the more honestly flamboyant its outfit, results published by the Royal Society on November 19th. So next time you run into a yellow-banded poison dart frog, remember, what you see is what you get.

—Karen Hopkin



November 20, 2008

Cell Phone Use Endangers Boneheads

Driving while on the phone is risky, but emergency room cases reveal lesser-known dangers of moving while talking. Steve Mirsky reports

[The following is an exact transcript of this podcast.]

The jury is still out on the relationship between cell phone use and brain tumors. But the American Association of Neurological Surgeons has issued a statement to remind people that cell phones present lots of other risks to your brain. Of course, we all know about yapping while driving. A Harvard study finds that 2,600 people die each year in accidents related to cell distraction and 12,000 more are injured. Canadian research shows that you're four times more likely to be in an accident while on the phone.

But here are some other emergency room cases that show the dangers of talking or texting while on the move: Guy talking on cell phone on an escalator falls backward, lacerating his head, where his brain lives. Guy talking on cell phone walks into street sign, also lacerating his head. Guy texting while bicycling crashes into a tree and suffers head injury. Guy texting walks right into a telephone poll and knocks himself cold. Sir, back away from the phone. It could save your life. Or at least your dignity.

—Steve Mirsky



November 21, 2008

Predicting Floods in a Flash

By measuring radiation from lightning strikes, researchers are putting together a system to quickly predict the locations of flash floods. Steve Mirsky reports

[The following is an exact transcript of this podcast.]

The most common natural disaster in the U.S. is flash flooding, which usually hits out of the not clear blue sky. Now researchers are trying to establish an early warning system for flash floods—by counting another flash, lightning.

Normal floods often come from melting snow, so there's plenty of time to prepare. But heavy rains lead to quick flash floods, which are the leading weather-related cause of death in the U.S. Colin Price at Tel Aviv University is studying the link between lightning and the flash floods that result from downpours.

Price and researchers from five European universities are measuring radiation emitted by lightning. The lightning info enables scientists to pinpoint the most intense thunderstorms, and thus calculate both the path of a storm and the locations of the heaviest rain. Add data about ground topography and vegetation cover and you have what insiders call not forecasting but nowcasting: predictions about weather in the next minutes and hours. Price says that satellites will soon provide real-time detection of lightning worldwide, which should let researchers predict floods in a flash.

—Steve Mirsky



November 24, 2008

Broken Windows Crime Theory

Cyclists littered more near a graffiti-covered wall, lending evidence to the "broken windows" theory, which says that not cleaning up petty societal offenses leads to more crime. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

It's called the "broken windows" theory and it says that in a neighborhood where buildings have broken windows, people are more likely to engage in bad behavior. Maybe because they figure no one will care. Or there's little chance they'll get caught. The idea has been embraced by people in law enforcement—crack down on petty crime and you'll also put a halt to more serious offenses. New York City, for example, used the logic to justify a "zero tolerance" approach to things like the squeegeeing of car windows. But the theory has been hard to prove. Crime did go down in New York, but was it directly related to the squeegee decline?

Now Dutch scientists say that there may be something to the whole "broken windows" thing, after all. For example, they found that cyclists who parked their bikes near a wall covered in graffiti were twice as likely to litter than people who parked near the same wall after it was painted clean. The results were published online by the journal *Science* on November 20th. I guess we should be thankful that the cyclists' bad behavior stopped at littering. And they didn't decide to, say, swipe a better set of wheels for the ride home.

—Karen Hopkin



November 25, 2008

Electronics with a Twist

Researchers at Northwestern University and the University of Illinois at Urbana–Champaign have developed methods for creating electronic circuits that can be stretched, bent or even twisted. Cynthia Graber reports

[The following is an exact transcript of this podcast.]

Electronics come in all shapes and sizes—but there's been a limit on their flexibility. Now, researchers say they've created electronics that can be shaped in virtually any way, including bent, stretched and even tightly coiled. They published their results in the *Proceedings of the National Academy of Sciences*.

Silicon is the principal ingredient in electronics, and it's inflexible and brittle. To overcome this constraint, the researchers first developed one-dimensional, single-crystal silicon electronics, which they reported in 2005. The crystals could be stretched without losing their properties.

Then last summer they demonstrated that they could build tiny circuits that were connected by tiny metal bridges. The final product could be bent and placed over a curved surface. Most recently, the researchers modified the bridges into an S shape. The additional step takes the flexibility further—the electronics can now be twisted into curves as well. One use could be a sensor on a human body. But the scientists see applications beyond the biological—they're trying to develop flexible solar cells. Flat cells need to move to follow the sun. But a flexible cell could always receive direct rays without constant repositioning.

—Cynthia Graber



November 26, 2008

Galapagos Invaders Actually Native Species

Fossil remains show that some plant species believed to have invaded the Galapagos islands about 500 years ago are in fact natives. Ecologists can examine fossil remains to determine what really belongs in a given habitat. Adam Hinterthuer reports

[The following is an exact transcript of this podcast.]

Darwin's fabled isles, the Galápagos, are in need of a makeover. And removing invasive species of plants tops the to-do list for the islands' restoration. But six species that were set to be exterminated have gotten a reprieve. Because a new study finds that they're actually natives.

The species were all thought to have been brought to the Galápagos by European travelers 500 years ago. But, by examining fossilized pollen and other plant remains, an international group of scientists found traces of each species dating back many thousands of years. Their discovery is reported in the November 21st issue of the journal *Science*.

Since millions of dollars are spent worldwide each year in battles against invasive plants, the researchers say that conservationists need to step back and reconsider what really belongs. Such deliberation is especially true in areas with high biodiversity, where thousands of different species can make an accurate ecological history hard to come by. That means paleobotanical input—the consideration of plant fossils—could play an important role in future eco-restorations. Because those who don't know history are doomed to replant it.

—Adam Hinterthuer



November 27, 2008

Wash Car after Chickens Cross Road

Cars driving behind trucks carrying chickens to the slaughterhouse were found to be teeming with poultry bacteria. Adam Hinterthuer reports

[The following is an exact transcript of this podcast.]

We all know to wash our hands after handling raw poultry. But next time you've just cruised down the interstate behind a truck full of chickens or Thanksgiving turkeys, you might want to wash your car. Because a study led by a team of Johns Hopkins scientists finds that tailgating such feathered cargo can significantly increase your exposure to poultry-borne bacteria. The report appeared in the very first issue of "*The Journal of Infection and Public Health*," which will publish research on the epidemiology, prevention and control of infectious disease.

In the study, test cars followed poultry trucks as they traveled from farm to slaughterhouse. After these road trips, researchers discovered that the interiors of cars that had their windows down were teeming with a wide variety of bacteria. And many of the bacteria were strains known to be resistant to several common antibiotics. In this age of avian influenza and antibiotic-resistant 'superbugs,' scientists are exploring all possible pathways of disease between humans and animals. This case shows just one way to keep from being exposed to pathogens that are truly foul.

—Adam Hinterthuer



November 28, 2008

Sperm Supply Tied to Competition

Studies in multiple species show that males may adjust sperm output when faced with romantic rivals, and females may seek more partners if males skimp. Karen Hopkin reports

[The following is an exact transcript of this podcast.]

If you paid attention during high school biology, you probably remember that girls are born with all the eggs they'll ever have, whereas guys are churning out sperm pretty much all the time. Now, several new studies, in animals from mice to worms, suggest that sperm supply is closely tied to demand. And that how much sperm an individual male makes may influence whether females seek multiple mates.

One study, published by the Royal Society, showed that mice make more sperm when they compete with romantic rivals. That finding is the first demonstration that a male mammal can adjust his sperm output depending on social circumstance, in this case, making more sperm to better the odds that he'll come out on top in a reproductive show-down.

Worms take the whole supply-and-demand thing to the extreme. According to a study published in the journal *Current Biology*, when females aren't around, one type of nematode worm doesn't make any sperm at all.

That kind of abstinence may work for a nematode, but for other species being stingy with sperm may backfire. According to a paper published in *Science*, when male fruit flies skimp on the sperm count, females simply mate with more partners. Something male flies might keep in mind if they want to avoid heartbreak this holiday season.

—Karen Hopkin