GENETICS

First Cloned Mule Races to Finish Line

The first equine has joined bovines, ovines, felines, rabbits, rodents, and porkers in the ranks of the cloned. On 5 May a mule named Idaho Gem was born after a normal 346-day gestation in the womb of a mare, researchers report online in *Science* this week (www.sciencemag.org/cgi/content/abstract/1086743). That makes him not only the first member of the horse family but also the first sterile animal to be cloned. Mules, sired by donkeys and borne by horses, are incapable of reproduction. But a team at the University of Idaho in Moscow headed by Gordon Woods has now shown that a mule cell nucleus, despite its odd chromosome number, can cut the mustard.

Idaho Gem is a sibling of a world-champion racing mule named Taz. The scientists didn't want to clone from an adult animal because they "wanted to take the aging component out of the equation," Woods says. Some researchers suspect that the first clone, Dolly the sheep, aged prematurely because her DNA was derived from an adult cell. So the team rebred Taz's parents, took a somatic cell from the 45-day-old fetus, and fused it with an enucleated horse oocyte that they then inserted into a mare.

Equines have proved difficult to clone; horse oocytes don't mature well in a dish and it's hard to get embryonic cells to divide. Woods's group found that calcium levels inside equine red blood cells are low compared with those from cows, leading the researchers to suspect that low calcium levels could be inhibiting cloned equine embryos' growth. They jacked up the calcium in the cultures and got some embryos to thrive.

The work was financed by donations from Taz's owner, Donald Jacklin, as well as tax money from the racing industry that is earmarked for horse research. Two other mares are expected to deliver twins of Idaho Gem in June and August.

And more equine clones are in the works. Katrin Hinrichs of Texas A&M University in College Station says, "We're hoping to have the first horse." Her group has a mare almost halfway through the gestation period with a clone. But the Italians may win this horserace. Cesare Galli of the Laboratory of Reproductive Technology in Cremona says his group has a cloned foal due in late May.

But don't expect to see a clone of Funny Cide, the gelding that is bidding to become a Triple Crown winner. The Thoroughbreds' Jockey Club doesn't even allow artificial insemination, much less cloning, and the American Quarter Horse Association has turned its thumbs down on registering clones. Woods thinks there's a place for them, though, in competitions not involving registered breeds. That would include the Olympics, where most of the horses are geldings.

The birth of Idaho Gem also bodes well for preserving endangered species. It's "awesome … I'm delighted," says Oliver Ryder of the San Diego Zoo. Now, he says, cloning may become an option for conservation efforts among the perissodactyls (creatures with odd numbers of toes) such as the endangered Przewalski's horses and Somali wild asses. –CONSTANCE HOLDEN

Up and running. Idaho Gem is a brother of a racing champ.

ITALIAN SCIENCE

Industrial Renaissance or a New Dark Age?

NAPLES—Italy's scientific community is in an uproar over long-dreaded reforms just unveiled by the government. The country's top science official has resigned and another key figure has stepped down, while rank-and-file researchers are bemoaning a shakeup that could mark a dramatic turn toward applied projects. "Basic research will die," contends physicist Carlo Bernardini of the National Institute for the Physics of Matter (INFM) in Genoa.

The measures announced on 16 May are aimed principally at the National Research Council (CNR), Italy's largest scientific organization, which has some 4300 researchers on its payroll. Several centers will be merged, and from now on, institute directors and science chiefs will be appointed by the government. Scientists say they were never consulted and fear that the reforms will allow politicians to dictate the research agenda. CNR president Lucio Bianco quit on 13 May, and Flavio Toigo, president of the powerful INFM, followed him out the door, resigning in protest on 17 May.

Scientists had been keeping a tense vigil since last August, when the plans were leaked (*Science*, 16 August 2002, p. 1106). The controversy intensified late last year when the government slashed funding for some institutes as much as 30%.

When the reform legislation finally emerged, it hewed closely to the leaked proposal. Several measures are designed to streamline Italy's scientific infrastructure. For instance, the independent INFM and four other institutes will become part of CNR. Government officials rather than scientists now will choose CNR institute directors, and a government-appointed administrator would take CNR's helm in case of "financial difficulties" or to "redirect" its mission. All that was too much for Toigo. "Science policy should be determined by scientists, not politicians," he fumes. Bianco, who is said to have opposed the reforms, could not be reached for comment.

Government officials say the reforms are needed to trim a bloated bureaucracy. ▶

New direction. At CNR, president Lucio Bianco (left) is out and applied research is in.

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And some in the community applaud the applied emphasis. Industry must play a greater role in funding research, says Fabio Pistella, president of the National Institute of Applied Optics in Florence, a center that will now report to CNR. Bianco's temporary replacement at CNR is widely tipped to be electronics engineer Adriano De Maio, rector of Luiss Guido Carli University in Rome.

As *Science* went to press, more than 9000 people had signed a petition denouncing the reforms. Outsiders, meanwhile, are bemused. "The government and the scientists only see caricatures of each other," says a member of an international team that audited CNR. Legislation implementing the reforms, already approved by Parliament, is now awaiting President Carlo Azeglio Ciampi's signature.

–JOHN BOHANNON AND ALEXANDER HELLEMANS

John Bohannon reported from Lyon, France, and Alexander Hellemans from Naples.

CONSERVATION BIOLOGY

Experts Say Big Cats Don't Leave Useful Tracks

NEW DELHI—India may be the last stronghold for the endangered Bengal tiger. But the way the government keeps tabs on the majestic animal is so flawed as to be nearly worthless for conservation purposes, says a group of scientists.

"Three decades of tiger monitoring has basically failed in India," declare the authors of a report in the current issue of *Animal Conservation*, published by the Zoological Society of London. The study, by nine U.S. and Indian scientists, goes public with long-running concerns among conservationists about India's use of pugmarks—tiger footprints—to count the big cats in the wild.

Pugmarks were thought to be unique, allowing trained eyes to track specific animals. But the authors say that even experts flunked a recent controlled test in which they were asked to distinguish the pugmarks of individual tigers. To better measure tiger trends, they recommend that India adopt statistically sound sampling methods such as transects and modern camera traps set in prime tiger habitat. But Indian officials defend their use of pugmarks, which are preserved in plaster of Paris casts or through tracings, and say they are taking steps to make the technique more accurate.

Out of step. New report says counting tiger footprints doesn't produce a reliable census.

India is believed to be home to the largest number of royal Bengal tigers, which a century ago numbered about 100,000. Its latest estimate of 3642—out of a worldwide tiger population of roughly 7500—is a drop of nearly 200 from 2000. That decline has called into question the effectiveness of the government's $7 million Project Tiger, which carries out conservation activities in 27 designated reserves and elsewhere throughout the country.

The new report says that pugmarks fall short as a counting tool because they are drawn from an "unknown fraction" of the 300,000 square kilometers of tiger habitat in India and are difficult to locate in some terrain, including hard or rocky soil as well as mangrove swamps. "The discrimination ability of the pugmark approach completely breaks down when data from different substrates is pooled in," notes co-author K. Ullas Karanth, a carnivore ecologist at the Wildlife Conservation Society in New York City.

Rajesh Gopal, director of Project Tiger, defends the use of pugmarks as "in tune with the local conditions" and says that the technique will be refined as part of a $1.1 million project now under way to map all tiger habitats. But Melvin Sunquist, an expert on tiger ecology at the University of Florida, Gainesville, says "there is too much room for identification error in the pugmark approach because of variation associated with substrate, travel rates, and stride length." For the method to work reliably, he says, park managers would need to be able to recognize each individual tiger in their area, an improbable standard for a creature that survives by its remarkable camouflage.

–PALLAVA BAGLA

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ScienceScope

Biodiversity Ticker Tapes

LONDON—The decade-old Biodiversity Treaty, long derided as a feel-good statement on the health of the planet, could soon get a boost. Meeting here last week, delegates to the United Nations Convention on Biological Diversity asked the U.N.'s World Conservation Monitoring Centre (WCMC) in Cambridge, U.K., to develop a list of 10 or so indicators that governments could use to track biodiversity health.

Biodiversity advocates hope the list will help spur government efforts to monitor biodiversity loss. "You don't know what you've got until it's gone," warned WCMC director Mark Collins, quoting folk legend Joni Mitchell. Possible gauges include the World Conservation Union's Red List of endangered species and an economic approach called the Natural Capital Index studied by the Dutch government. WCMC plans to issue its report this summer.

–QUINN EASTMAN

Gates Invests in Diagnostics

The Bill & Melinda Gates Foundation has donated $30 million to help develop better diagnostic tests for some of the world's most deadly diseases. The money will be distributed through the new Foundation for Innovative New Diagnostics (FIND) in Geneva, in close collaboration with the World Health Organization's (WHO's) Special Programme for Research and Training in Tropical Diseases.

The lack of fast and accurate diagnostic tests bedevils efforts to control many infectious diseases, especially in developing countries. For instance, the current sputum test for tuberculosis—FIND's first target—is over a century old, time-consuming, and not very reliable. FIND, led by Giorgio Roscigno, a former development director at the Global Alliance for TB Drug Development in New York City, is hoping to develop the science behind new tests and help them reach the market by working with industry, WHO, and others.

"It's a great initiative," says Carol Nacy, CEO of Sequella, a Rockville, Maryland, company specializing in new tools to fight TB. "We need better diagnostics really badly."

–MARTIN ENSERINK