

## Few replicas as first cloned cat nears 10

August 8 2011, by Bill Murphy

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Cloned German shepherd puppies Prodigy, Valor, and Dejavu are pictured here in 2009, in Los Angeles, California. Price tag which could reach six figures - is one of the main reasons why cloning pets hasn't worked out, despite predictions some years ago of a vast commercial market for the "resurrection" of beloved pets.

Nearly 10 years after scientists cloned the first cat, predictions of a vast commercial market for the "resurrection" of beloved pets through cloning have fallen flat.

The leading US pet [cloning](#) company halted operations in 2009 and the

livestock cloning business remains relatively small with only a few hundred pigs and [cows](#) cloned every year worldwide.

But CC's doting owners still consider her a great success.

She may be slowing down a bit these days, and her grey and white figure has gotten a bit plump after giving birth to [kittens](#) three years ago, but that's part of what makes CC so extraordinary: she is completely normal.

"People expect there to be something different about her," said Duane Kraemer, a Texas A&M University researcher who was part of the team that cloned her.

"We took her to a cat show once. A guy who came by to see her said she looks like any other barn cat."

CC -- which stands for Carbon Copy -- was born in an A&M lab on December 22, 2001, from a cell taken from a calico cat named Rainbow that was inserted into another cat's embryo. The embryo was then implanted into a surrogate named Allie.

While CC has Rainbow's exact genetic construct, she lacks her orange coloring because generally only two colors -- not three -- can be transferred when cloning calicos.

"Cloning is reproduction, not resurrection," Kraemer, who is now semi-retired, told AFP in an interview at his College Station home.

That -- along with a price tag which could reach six figures -- is one of the main reasons why cloning pets hasn't worked out.

Too few pet owners sought its services, Lou Hawthorne, the head of BioArts, wrote on the company's web site two years ago when explaining

why the firm was getting out of the pet cloning business.

"After studying this market for more than a decade -- and offering both cat and dog cloning services -- we now believe the market is actually extremely small," he wrote on BioArts' now-defunct website.

And while many of its dog clones turned out normal, researchers could not explain why some were plagued by physical defects.

"One clone -- which was supposed to be black and white -- was born greenish-yellow where it should have been white," he wrote.

"Others have had skeletal malformations, generally not crippling though sometimes serious and always worrisome," he added.

"These problems are all the more worrisome given that cloning is supposedly a mature technology in general."

The first successful animal clone -- Dolly the sheep -- was born in 1996 at the Roslin Institute in Scotland and was euthanized in 2003 after developing lung disease.

Researchers at Seoul National University cloned the world's first dog, Snuppy -- a combination of the university's acronym and puppy -- in 2005.

CC's history is intertwined with that of Genetic Savings and Clone, a company also headed by Hawthorne that was a forerunner of BioArts.

John Sperling, the founder of the for-profit University of Phoenix, pumped \$4 million into animal cloning research at Texas A&M in the 1990s. He wanted to clone Missy, the beloved dog of his long-time beau who is also Hawthorne's mother.

Hawthorne partnered with A&M and set up the for-profit Genetic Savings and Clone as a business that charged owners tens of thousands of dollars for cloned pets.

"When CC was born and didn't look like the donor, the business side and A&M began to have a falling out," said John Woestendiek, author of *Dog, Inc.: The Uncanny Inside Story of Trying to Clone Man's Best Friend*.

For Hawthorne, CC undermined his effort to market cloning as a way to get back a beloved pet. A&M researchers were uncomfortable that the company was telling people that it could provide replicas of pets.

Eventually, Sperling and Hawthorne split with A&M. Genetic Savings and Clone moved to Wisconsin, where it unsuccessfully tried to clone dogs. It later closed and Hawthorne went on to found BioArts.

Cloning livestock has had more success because of the commercial value of good livestock: breeders are willing to pay tens of thousands of dollars for a clone of a prize-winning cow or horse. Some livestock also are easier and cheaper to clone than dogs, Woestendiek told AFP.

Austin-based Viagen: The Cloning Company is one of two primary US companies cloning livestock and several others operate in other parts of the world.

"We have produced cloned horses from sterile donors that are now reproducing effectively and offering genetic opportunities that were not possible with the donors," Aston said.

"We have produced dairy cows that have won international competitions."

Viagen estimates that about 3,000 livestock animals have been cloned since Dolly was created, company spokeswoman Lauren Aston told AFP. About 200-300 cows and 200-300 [pigs](#) are cloned annually worldwide.

Viagen charges \$165,000 to clone a horse, \$20,000 for a cow and \$2,500 per cloned piglet. Piglet clones are usually part of a litter, and owners buy the litter.

Viagen's livestock clones, she said, have not been plagued by malformations and its researchers do not know why BioArts experienced such results when cloning dogs.

For CC, life has been good since Kraemer and his wife, Shirley, adopted her.

She has living quarters that put to shame the digs of most cats: Kraemer built a two-story, air conditioned cathouse with an enclosed porch and plenty of comfy perches in the backyard of his College Station home.

CC lives there with her boyfriend Smokey and their three offspring. While CC didn't have a biological mother, she proved a good mom who groomed her kittens and watched over them closely.

"They'd squeak, and she'd be right there," Shirley Kraemer said.

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Citation: Few replicas as first cloned cat nears 10 (2011, August 8) retrieved 20 April 2024 from <https://phys.org/news/2011-08-replicas-cloned-cat-nears.html>

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