

# Bisexual Species

Homosexual behavior is surprisingly common in the animal kingdom. It may be adaptive—helping animals to get along, maintain fecundity and protect their young

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By Emily V. Driscoll

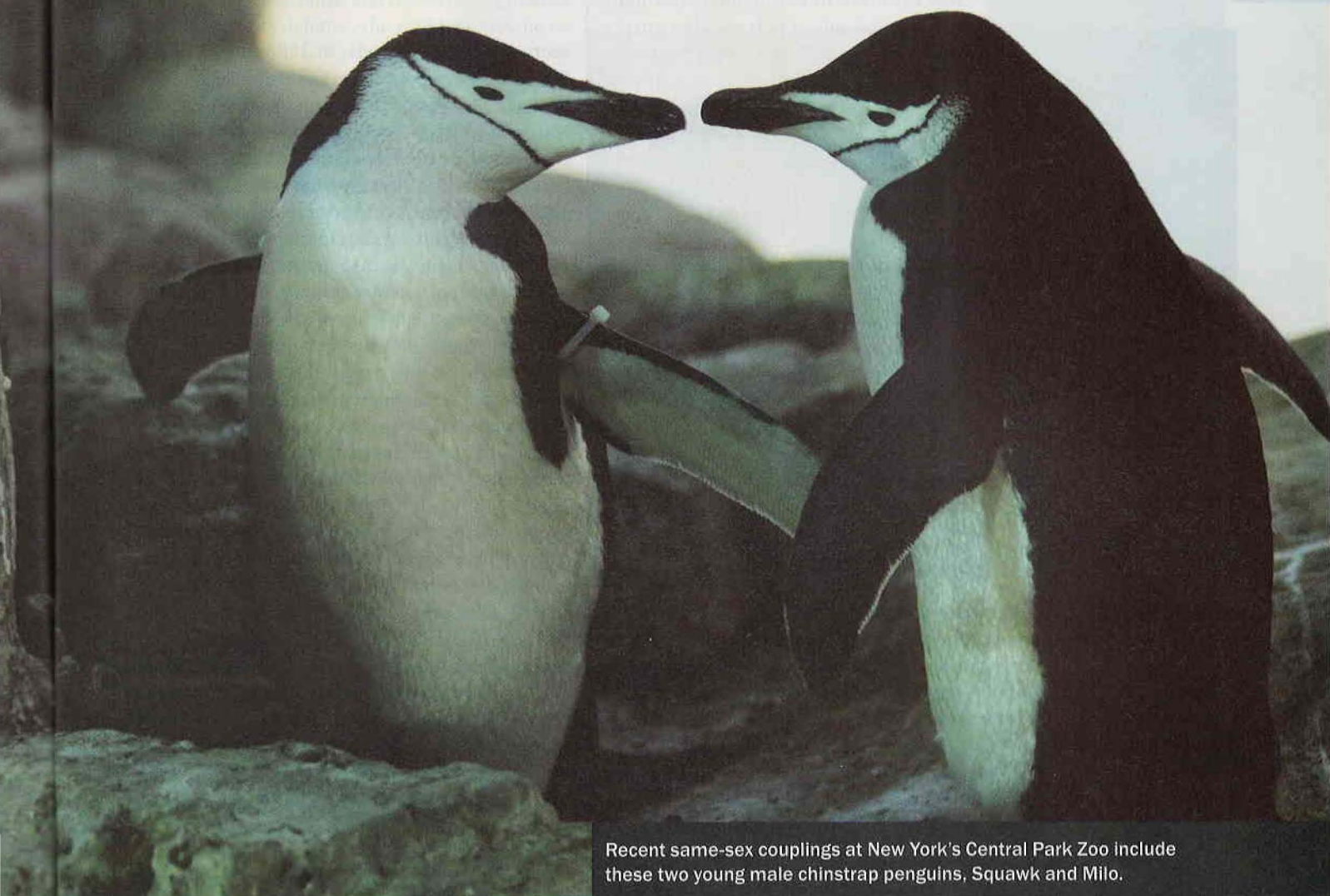
Two penguins native to Antarctica met one spring day in 1998 in a tank at the Central Park Zoo in midtown Manhattan. They perched atop stones and took turns diving in and out of the clear water below. They entwined necks, called to each other and mated. They then built a nest together to prepare for an egg. But no egg was forthcoming: Roy and Silo were both male.

Robert Gramzay, a keeper at the zoo, watched the chinstrap penguin pair roll a rock into their nest and sit on it, according to newspaper reports. Gramzay found an egg from another pair of penguins that was having difficulty hatching it and slipped it into Roy and Silo's nest. Roy and Silo took turns warming the egg with their blubbery

underbellies until, after 34 days, a female chick pecked her way into the world. Roy and Silo kept the gray, fuzzy chick warm and regurgitated food into her tiny black beak.

Like most animal species, penguins tend to pair with the opposite sex, for the obvious reason. But researchers are finding that same-sex couplings are surprisingly widespread in the animal kingdom. Roy and Silo belong to one of as many as 1,500 species of wild and captive animals that have been observed engaging in homosexual activity. Researchers have seen such same-sex goings-on in both male and female, old and young, and social and solitary creatures and on branches of the evolutionary tree ranging from insects to mammals.





Recent same-sex couplings at New York's Central Park Zoo include these two young male chinstrap penguins, Squawk and Milo.

Unlike most humans, however, individual animals generally cannot be classified as gay or straight: an animal that engages in a same-sex flirtation or partnership does not necessarily shun heterosexual encounters. Rather many species seem to have ingrained homosexual tendencies that are a regular part of their society. That is, there are probably no strictly gay critters, just bisexual ones. "Animals don't do sexual identity. They just do sex," says sociologist Eric Anderson of the University of Bath in England.

Nevertheless, the study of homosexual activity in diverse species may elucidate the evolutionary origins of such behavior. Researchers are now revealing, for example, that animals may engage in same-sex couplings to diffuse social

tensions, to better protect their young or to maintain fecundity when opposite-sex partners are unavailable—or simply because it is fun. These observations suggest to some that bisexuality is a natural state among animals, perhaps *Homo sapiens* included, despite the sexual-orientation boundaries most people take for granted. "[In humans] the categories of gay and straight are socially constructed," Anderson says.

What is more, homosexuality among some species, including penguins, appears to be far more common in captivity than in the wild. Captivity, scientists say, may bring out gay behaviors in part because of a scarcity of opposite-sex mates. In addition, an enclosed environment boosts an animal's stress levels, leading to a



**“The more homosexuality, the more peaceful the species,” one specialist says. “Bonobos are peaceful.”**



Female homosexual encounters among bonobos help the apes get along: they resolve conflicts and promote bonding.

greater urge to relieve the stress. Some of the same influences may encourage what some researchers call “situational homosexuality” in humans in same-sex settings such as prisons or sports teams.

### **Making Peace**

Modern studies of animal homosexuality date to the late 19th century with observations on in-

sects and small animals. In 1896, for example, French entomologist Henri Gadeau de Kerville of the Society of Friends of Natural Sciences and the Museum of Rouen published a drawing of two male scarab beetles copulating. Then, during the first half of the 1900s, various investigators described homosexual behavior in baboons, garter snakes and gentoo penguins, among other species. Back then, scientists generally considered homosexual acts among animals to be abnormal. In some cases, they “treated” the animals by, say, castrating them or giving them lobotomies.

At least one early report, however, was more than descriptive, yielding insight into the possible origins of the behavior. In a 1914 lab experiment Gilbert Van Tassel Hamilton, a psychopathologist practicing in Montecito, Calif., reported that same-sex behavior in 20 Japanese macaques and two baboons occurred largely as a way of making peace with would-be foes. In the *Journal of Animal Behavior* Hamilton observed that females offered sex to the more dominant macaques of the same sex: “homosexual behavior is of relatively frequent occurrence in the female when she is threatened by another female, but it is rarely manifested in response to sexual hunger.” And in males, he penned, “homosexual alliances between mature and immature males may possess a defensive value for immature males, since they insure the assistance of an adult defender in the event of an attack.”

More recently, some researchers studying bonobos (close relatives of the chimpanzee) have come to similar conclusions. Bonobos are highly promiscuous, and about half their sexual activity involves same-sex partners. Female bonobos rub one another’s genitals so often that some scientists have suggested that their genitalia evolved to facilitate this activity. The female bonobo’s clitoris is “frontally placed, perhaps because selection favored a position maximizing stimulation during the genital-genital rubbing common among females,” wrote behavioral ecologist Marlene Zuk of the University of California, Riverside, in her 2002 book *Sexual Selections: What We Can and Can’t Learn about Sex from Animals*. Male bonobos have been observed to mount, fondle and even perform oral sex on one another.

Such behavior seems to ease social tensions. In *Bonobo: The Forgotten Ape* (University of Cali-

### **FAST FACTS** **Fit to Be Gay**

**1>>** Same-sex couplings are surprisingly widespread in the animal kingdom. Observers have witnessed as many as 1,500 species of wild and captive animals engaging in homosexual activity.

**2>>** Animals may engage in homosexual acts to diffuse social tensions, to better protect their young or to maintain fecundity when opposite-sex partners are unavailable—or simply because it is fun.

**3>>** Homosexuality among some species appears to be far more common in captivity than in the wild. Captivity may bring out gay behaviors because of a lack of opposite-sex mates and a greater need for stress relief.



fornia Press, 1997), Emory University primatologist Frans B. M. de Waal and his co-author photographer Frans Lanting wrote that "when one female has hit a juvenile and the juvenile's mother has come to its defense, the problem must be resolved by intense GG-rubbing between the two adults." De Waal has observed hundreds of such incidents, suggesting that these homosexual acts may be a general peacekeeping strategy. "The more homosexuality, the more peaceful the species," asserts Petter Bäckman, an academic adviser at the University of Oslo's Museum of Natural History in Norway. "Bonobos are peaceful."

In fact, such acts are so essential to bonobo socialization that they constitute a rite of passage for young females into adulthood. Bonobos live together in groups of about 60 in a matriarchal system. Females leave the group during adolescence and gain admission to another bonobo clan through grooming and sexual encounters with other females. These behaviors promote bonding and give the new recruits benefits such as protection and access to food.

### Defended Nest

In some birds, same-sex unions, particularly between males, might have evolved as a parenting strategy to increase the survival of their young. "In black swans, if two males find each other and make a nest, they'll be very successful at nest making because they are bigger and stronger than a male and female," Bäckman says. In such cases, he says, "having a same-sex partner will actually pay off as a sensible life strategy."

In other instances, homosexual bonding between female parents can boost the survival of offspring when male-female pairings are not possible. In birds called oystercatchers, intense competition for male mates would leave some females single were it not for polygamous trios. In a study published in 1998 in *Nature*, zoologist Dik Heg and geneticist Rob van Treuren, both then at the University of Groningen in the Netherlands, observed that roughly 2 percent of oystercatcher breeding groups consist of two females and a male. In some of these families, Heg and van Treuren found, the females tend separate nests and fight over the male, but in others, all three birds watch over a single nest. In the latter case, the females bond by mounting each other as well as the male. The cooperative triangles produce more offspring than the competitive ones, because such nests are better tended and protected from predators.

Such arrangements point to the evolutionary fitness of stable social relationships, whatever their type. Biologist Joan E. Roughgarden of Stanford University believes that evolutionary biologists tend to adhere too strongly to Darwin's theory of sexual selection and have thus largely overlooked the importance of bonding and friendship to animal societies and the survival of their young. "[Darwin] equated reproduction with finding a mate rather than paying attention to how the offspring are naturally reared," Roughgarden says.

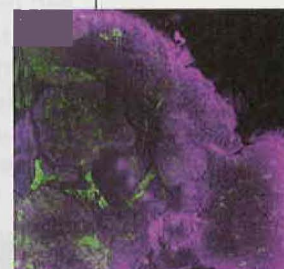
Protection of progeny, social bonding and conflict avoidance may not be the only reasons animals naturally come to same-sex relationships. Many animals do it simply "because they want to," Bäckman says. "People view animals as robots who behave as their genes say, but animals have feelings, and they react to those feelings." He adds that "as long as they feel the urge [for sex], they'll go for it."

A recent finding indicates that homosexual behavior may be so common because it is rooted in an animal's brain wiring—at least in the case of fruit flies. In a study appearing earlier this year in *Nature Neuroscience*, neuroscientist David E. Featherstone of the University of Illinois at Chicago and his colleagues found that they could switch on homosexual leanings in fruit flies by manipulating a gene for a protein they call "genderblind," which regulates communication between neurons that secrete and respond to the neurotransmitter glutamate.

Males that carried the mutant *genderblind* gene—which depressed levels of the protein by about two thirds—were uncharacteristically attracted to the chemical cues exuded by other males. As a result, these mutant males courted and attempted to copulate with other males. The finding suggests that wild fruit flies may be prewired for both heterosexual and homosexual behavior, the authors write, but that the genderblind protein suppresses the glutamate-



Up to one quarter of black swan families include parents of the same sex.



In the fruit fly brain (shown in cross section), the protein genderblind (purple) abuts neurons that communicate using the neurotransmitter glutamate (green), a pattern consistent with the idea that genderblind influences a fly's sexual preference by modulating glutamate signaling.

### (The Author)

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In some species, homosexual activity is almost unheard of **in the wild** but may surface in captivity.

based circuits that promote homosexual behavior. Such brain architecture may enable same-sex behavior to surface easily, supporting the notion that it might confer an evolutionary advantage in some circumstances.

### The Captivity Effect

In some less social species, homosexual behavior is almost unheard of in wild animals but may surface in captivity. Wild koalas, which are mostly solitary, seem to be strictly heterosexual. But in a 2007 study veterinary scientist Clive J. C. Phillips of the University of Queensland in Brisbane, Australia, and his colleagues observed 43 instances of homosexual activity among female koalas living in a same-sex enclosure at the Lone Pine Koala Sanctuary. The captive females shrieked male mating calls and mated with one another, sometimes participating in multiple encounters of up to five koalas. "The behavior in captivity was certainly enhanced in terms of homosexual activity," Phillips says.

He believes that the females acted this way in part because of stress. Animals often experience stress in enclosed habitats and may engage in homosexual behavior to relieve that tension. A lack of male partners probably also played a role, Phillips suggests. When female koalas are in heat, their ovaries release the sex hormone estrogen, which triggers mating behavior—whether or not



Wild koalas are heterosexual, but females living together in captivity in Brisbane, Australia, shrieked male mating calls and mated with one another.

males are present. This hardwired urge to copulate, even if expressed with a female partner, might be adaptive. "The homosexual behavior preserves sexual function," Phillips says, enabling an animal to maintain its reproductive fitness and interest in sexual activity. In males, this benefit is even more obvious: homosexual behavior stimulates the continued production of seminal fluid.

A lack of opposite-sex partners is also thought to help explain the prevalence of homosexuality among penguins in zoos. In addition to several gay penguin couplings in the U.S., 20 same-sex penguin partnerships were formed in 2004 in zoos in Japan. Such behavior "is very rare in penguins' natural habitats," says animal ecologist Keisuke Ueda of Rikkyo University in Tokyo. Thus, Ueda speculates that the behavior—which included both male pairings and female couplings—arose as a result of the skewed sex ratios at zoos.

Researchers have found still other reasons for homosexual behavior in domesticated cattle—which is such a common occurrence that farmers and animal breeders have developed terms for it. "Bulling" refers to male pairs mounting, and "going boaring" is its female counterpart. For cows, the behavior is not just a stress reliever. It is a way to signal sexual receptivity. The females mount

## Let Them Be Gay

Sometimes zookeepers do not know how to react to their animals' homosexual behavior. In 2005 workers at Bremerhaven's Zoo on the Sea in Germany discovered that three of their five endangered Humboldt penguin couples were of the same sex. The keepers brought in four female Humboldt penguins from Sweden in hopes of tempting the males. That action angered gay and lesbian groups around the world. In a letter to Bremerhaven's mayor Jörg Schulz, a group of European gay activists protested what they called "organized and forced harassment through female seductresses."

In the end, the males were not swayed anyway. "The males have scarcely thrown the females a single glance," said zoo director Heike Kück to the German magazine *Der Spiegel*. So more males were flown in to keep the Swedish females company.

—E.V.D.



one another to signal their readiness to mate to the bulls—which, in captivity, may cause a breeder to know when to bring in a suitable opposite-sex partner.

Homosexual mounting is much rarer among cattle in the wild, Phillips asserts, based on his research on gaurs in Malaysia, a wild counterpart to domesticated cattle. “Cattle evolved in the forest, so a visual signal was not going to be useful for them,” he says.

Stress and the greater availability of same-sex partners may similarly contribute to the practice of homosexual acts among self-described heterosexual humans in environments such as the military, jails and sports teams. In a study published this year in the journal *Sex Roles*, Anderson found that 40 percent of 49 heterosexual former high school football players attending various U.S. universities had had at least one homosexual encounter. These ranged from kissing to oral sex to threesomes that included a woman. In team sports, homosexuality is “no big deal and it increases cohesion among members of that team,” Anderson claims. “It feels good, and [the athletes] bond.”

In stressful same-sex environments such as prisons or a war zone, heterosexuals may engage in homosexual behavior in part to relieve tension. “Homosexuality appears mostly in social species,” Böckman says. “It makes flock life easier, and jail flock life is very difficult.”

### Altered Spaces

In recent decades zoo officials have tried to minimize the stresses of captivity by making their enclosures more like animals’ natural habitats. In the 1950s zoo animals lived behind bars in barren enclosures. But since the late 1970s zoo homes have become more hospitable, including more open space, along with plants and murals representative of an animal’s natural habitat. The Association of Zoos and Aquariums (AZA) regulates everything from cage dimensions to animal bedding. The AZA also outlines enrichment activities for captive creatures: for instance, two golden brown Amur leopards at the Staten Island Zoo regularly play with a papier-mâché zebra, an animal they have never seen in the flesh.

Researchers hope such improvements might affect animal behavior, making it more like what occurs in the wild. One possible sign of more hospitable conditions might be a rate of homosexuality more in line with that of wild members of the same species. Some people, however, contest the notion that zookeepers should prevent or discourage homosexual behavior among the an-



In 2004 Silo (right) deserted his longtime male partner, Roy (not shown), for a female chinstrap penguin named Scrappy (left).

imals they care for [see box on opposite page].

And whereas captivity may engender what appears to be an unnaturally high level of homosexual activity in some animal species, human same-sex environments might bring out normal tendencies that other settings tend to suppress. That is, some experts argue that humans, like some other animals, are naturally bisexual. “We should be calling humans bisexual because this idea of exclusive homosexuality is not accurate of people,” Roughgarden says. “Homosexuality is mixed in with heterosexuality across cultures and history.”

Even Silo the penguin, who had been coupled with Roy for six years, displayed this malleability of sexual orientation. One spring day in 2004 a female chinstrap penguin named Scrappy—a transplant from SeaWorld in San Diego—caught his eye, and he abruptly left Roy for her. Meanwhile Roy and Silo’s “daughter,” Tango, carried on in the tradition of her fathers. Her chosen mate: a female named Tazuni. **M**

### (Further Reading)

- ◆ **Bonobo: The Forgotten Ape.** Frans B. M. de Waal and Frans Lanting. University of California Press, 1997.
- ◆ **Biological Exuberance.** Bruce Bagemihl. St. Martin’s Press, 1999.
- ◆ **Evolution’s Rainbow: Diversity, Gender, and Sexuality in Nature and People.** Joan Roughgarden. University of California Press, 2004.
- ◆ **Heterosexual and Homosexual Behaviour and Vocalisations in Captive Female Koalas (*Phascolarctos cinereus*).** Stacey Feige, Kate Nilsson, Clive J. C. Phillips and Steve D. Johnston in *Applied Animal Behaviour Science*, Vol. 103, Nos. 1–2, pages 131–145; 2007.