Birds in male harem just yell for a mate

Life in a harem of males, ruled by one female, cramps a guy's style all right, but there's a way to fight back. Just yell.

The first detailed study of the bird call that ornithologists have nicknamed the yell—repeated, loud, raucous cries—reveals a novel way for males to compete for female favor. "They're yelling for sex," says Stuart H.M. Butchart of the University of Cambridge in England.

The noisy males, bronze-winged jacanas, belong to the 0.2 percent of bird species in which females leave the parental care to males. These 20 or so species are mostly shorebirds, such as the painted snipe, plus 7 of the 8 tropical wetland species known as jacanas.

Bronze-winged jacanas live role reversal to the max, Butchart and his colleagues report in the March ANIMAL BEHAVIOUR. The flock he studied, about 50 birds, staked out territories on the lotus leaves and other vegetation bobbing on Vembanur, a lake in southern India.

Males fight each other as they carve their floating world into territories. "They're quite violent," Butchart recalls. Females spar with each other for exclusive rights to one to four male territories.

The reigning female visits all the males in her harem who are not preoccupied with a previous brood and then presents one of the males with eggs, which may have a variety of fathers. Even though the lucky fellow faces a significant chance of wasting effort on other males' offspring, he assumes full parental responsibility. For the next 100 days, he does all the work—first incubating the clutch by snuggling it under his wing and then guarding the chicks.

When it comes to the standard male jockeying to assure paternity, the bronze-winged jacana doesn't have a lot of options, Butchart notes. The bird can't guard his mate since he can't cross the border onto a fellow harem-member's lily pads, and he can't bully his mate since she outweighs him by 60 percent on average. So he yells.

Males make the yelling noise when their female strays far away or visits another member of the harem, Butchart reports. Once a male gets tied down by parental responsibilities, he doesn't yell much at all. When the researchers broadcasted recordings of yells from a male's territory, the presiding female rushed over more than 75 percent of the time.

Why does she cave in to such dramatics? Butchart notes that a yelling male also attracts outsider females willing to fight for additions to their harem. "Males are using this as blackmail," Butchart speculates.

Peter H. Wrege of Cornell University puts a slightly different spin on the call. Among wattled jacanas in Panama, he and colleague Stephen Emlen heard similar yelling when males noticed a scary predator. Females rushed to the rescue. These males also called loudly when their female dallied in another sector, but Wrege speculates that in that case, "it's a deceitful yell." The male fakes an emergency to get the female away from another guy.

The wattled jacana system bears strong resemblances to Butchart's birds, Wrege notes. He, too, has been intrigued by harem males competing for paternity. Others' experiments with male-dominant species suggest that males slack off on parenting when they have evidence the chicks are not their own.

Male wattled jacanas can easily collect such evidence. The female makes the rounds of her harem before she settles down to egg laying. She averages some 65 matings during her tour of one to four males, Wrege and his colleagues report in the Dec. 22, 1998 PROCEEDINGS OF THE ROYAL SOCIETY OF LONDON B. Among harem males who are mating, each faces a 70 percent chance of raising a chick that is not his own. Yet the male wattled jacana, like the bronze-winged relative, tends his designated clutch.

If he doesn't, Wrege notes, all offspring, including any he fathered, die because the female doesn't step in to help. "The male is really in a bad situation," Wrege notes, "and he can't do anything about it." Except yell. —*S. Milius*

Butchart

A female bronze-winged jacana keeps one to four males in a harem and leaves all the chick care to them.

Learning may unify distant brain regions

In studies of many animal species, the brain shows signs of exerting less effort as individuals learn to perform simple tasks or to recognize relationships between repeatedly presented items. How this apparent neural efficiency arises, not to mention how it facilitates learning, remains unknown.

A new study provides clues to what underlies this efficiency. In laboratory trials, when people first try to discern the locations of various objects, separate brain areas that participate in identifying visible items or specifying their location display characteristic jolts of activity. As people learn an object's location, however, these regions not only toil in a progressively more relaxed style but form a close working relationship that has gone largely unnoted, concludes a team of neuroscientists in the March 5 SCIENCE.

"These two visual pathways in the brain work as one big system in associative learning," says Christian Büchel of the Institute of Neurology in London, lead author of the report. "Reciprocal relationships such as this may promote neural efficiency as organisms learn."

Büchel's team obtained functional magnetic resonance imaging (fMRI) scans of the brains of six adults as they learned the locations of 10 familiar objects displayed one at a time on a computer screen. Each volunteer correctly remembered the location of all 10 items by the end of eight learning trials.

The researchers took a total of 256 fMRI scans per trial for each participant. Scans showed blood-flow rates in the brain, an indirect measure of cells' activity.

The researchers focused on sites located on two previously recognized anatomical pathways in the brain's visual system. Both originate at the back of the brain in tissue that serves as the entry point for visual information. One pathway then runs along the top of the brain and handles object identities; the other takes a lower road and concentrates on object locations.

During the volunteers' early learning trials, blood flow in the two pathways surged. At the same time, a mathematical analysis of fMRI data revealed only a weak relationship between changes in the blood-flow responses along the two routes.

Neural activity slackened in both pathways on later trials, as individuals demonstrated better knowledge of object locations. At the same time, blood-flow changes in the upper and lower pathways became closely aligned.

Büchel and his colleagues view the emergence of this strong link as a sign that the two pathways increasingly pool their efforts during learning trials. Studies of electrical responses in the brain also point to joint efforts among widely separated cell clusters during learning (SN: 2/20/99, p. 122).

The new investigation represents "exciting work," but neural efficiency during learning remains poorly understood, comments neuroscientist Robert Desimone of the National Institute of Mental Health in Bethesda, Md.

Although most brain-scan studies examine one region at a time, attempts to establish functional relationships between neural regions will rapidly become more common, Desimone predicts. —*B. Bower*