

New brown dwarfs show link to planets

Planets and brown dwarfs wouldn't seem to have much in common. The former are thought to form from the flattened disks of gas and dust that surround newborn stars. The latter are thought to arise as stars do, by the agglomeration of gas in part of an interstellar cloud. Moreover, brown dwarfs, also called failed stars because they don't have enough mass to shine brightly, weigh much more than planets.

Since last fall, astronomers have reported indirect evidence of six planets orbiting nearby, sunlike stars (SN: 7/6/96, p. 11). The biggest of them has a mass about eight times that of Jupiter. The smallest brown dwarf, on the other hand, has about 80 times Jupiter's mass. Planet hunter Geoffrey W. Marcy of San Francisco State University has called the apparent gap in mass a desert that neither planets nor brown dwarfs populate.

In early July, however, Michel Mayor of Geneva Observatory and his colleagues reported at a bioastronomy meeting in Capri, Italy, that they had discovered or confirmed the existence of six brown dwarfs orbiting nearby stars and having masses between 16 and 40 times Jupiter's. The discovery of brown dwarfs with masses much closer to those of planets indicates that a desert does not exist, says Mayor. All six dwarfs have elliptical orbits, but five of six recently described planets have circular paths. He suggests that ellipticity may distinguish a brown dwarf from a planet.

Although they haven't seen the data, Marcy and his collaborator, R. Paul Butler of San Francisco State and the University of California, Berkeley, say they have no reason to doubt Mayor's findings. Mayor's team has detected 8 brown dwarfs among a sample of 570 stars and 1 planet among a sample of 142 stars. In contrast, Marcy and Butler have so far found 6 planets among a sample of 120 stars but not a single brown dwarf. Given that brown dwarfs are easier to detect because they exert a larger tug on their parent stars, Marcy and Butler say the statistics indicate that planets are more common than brown dwarfs around nearby stars.

Rocket mishap destroys Cluster

On June 4 in Kourou, French Guiana, European Space Agency (ESA) officials witnessed the maiden flight of Ariane 5, a rocket intended to become a new launch vehicle for commercial satellites. As an ESA press release put it, "The first Ariane 5 flight did not result in validation of Europe's new launcher."

In other words, it blew up.

Less than 40 seconds after launch, the rocket veered sharply off course. Apparently, a pair of onboard computers received incorrect information about the rocket's flight path and issued commands that set the rocket spinning out of control and triggered an automatic self-destruct mechanism.

The agency has other Ariane 5 rockets and hopes to fly another test launch by the end of the year. However, the rocket wasn't the only thing to go up in smoke. It carried a quartet of identical spacecraft designed to fly in formation and generate the first three-dimensional map of our planet's magnetosphere (SN: 1/13/96, p. 24). The four craft, known as Cluster, together cost about \$800 million and were not insured.

Cluster was to have joined an international armada of craft in exploring the electromagnetic connection between the sun and Earth. With space agencies in Europe strapped for cash, a rebuilding of the entire Cluster project appears doubtful.

On July 3, Europe's Science Program Committee approved funding to build a craft, dubbed Phoenix, from spare Cluster parts. To fully map the magnetosphere, ESA is considering several options for augmenting this solo flier, including building three craft similar to it or three smaller, less costly versions of the Cluster design. The science committee is expected to decide about funding the additional craft in November.

JULY 27, 1996

Female wolf spiders prefer hairy legs

Male wolf spiders, *Schizocosa ocreata*, have tufts of bristles on their forelegs. Males of the closely related *S. rovneri* lack such decoration—but that could change over the eons if females get their way, a new study suggests.

Researchers monitored female wolf spiders' behavior as the spiders watched silent videos of life-sized *S. ocreata* and *S. rovneri* males. The scientists had altered the images so that in some of the videos *S. ocreata* lacked bristle tufts and *S. rovneri* had them, report William J. McClintock of the University of California, Santa Barbara and George W. Uetz of the University of Cincinnati in the July ANIMAL BEHAVIOUR.

The females of both species reacted enthusiastically to the shows. In response to certain males, females quickly crouched down in their classic come-hither posture, which indicates that they are willing to mate. Mating rarely occurs if the females, who eat unwanted suitors, don't assume this position, Uetz explains.

The videos revealed some surprises about the *S. rovneri* females. They showed more interest in mating with the naturally bristly *S. ocreata* and the unnaturally hirsute *S. rovneri* than with the normal-looking *S. rovneri*. *S. ocreata* showed little interest in tuftless males of either species.

In other studies, however, *S. rovneri* females have proved unreceptive to real-life *S. ocreata* males, which do not make the appropriate mating calls.

When courting, *S. ocreata* males wave their legs to attract females. The tufts on their legs accentuate this motion, the researchers explain. So while *S. ocreata* has evolved to exploit the female sensory system fully, *S. rovneri* has not, Uetz suggests. Might *S. rovneri* sprout tufts in the coming millennia?

"It's entirely possible," he speculates.

The toll courtships take on primates

For many species, lengthy mating seasons are hard on males, studies have shown. They eat less well while pursuing females and suffer bruises from warding off other males.

What about the few primates that, unlike most mammals, breed throughout the year? Previous research had suggested that the brief courtships of these primates—including humans, baboons, and chimpanzees—don't exhaust the males, but a new, more detailed study challenges that view.

Susan C. Alberts of Harvard University and her colleagues studied 15 to 25 baboons in three social groups living in and around Amboseli National Park in southern Kenya. They calculated how far the animals traveled for food and how long they spent eating.

When alone, a male travels farther to find food than he does when alongside his female, which needs to eat less. The male spends the same amount of time foraging whether he is courting or not, but he has less time for eating when keeping an eye on his female, the authors report in the June ANIMAL BEHAVIOUR.

Unlike seasonal breeders, these males had little time between courtships to catch up on their calories, the authors note. Indeed, baboons and other nonseasonal breeders probably spend about the same amount of energy over their lifetime on courtships as the seasonal fellows do, the team speculates.

The group is now investigating whether the amount of food available to the baboons influences how much time they can spend courting, their success rate, and their willingness to pursue less cooperative females, say the authors.

A male (right) and female (left) baboon.



SCIENCE NEWS, VOL. 150

59