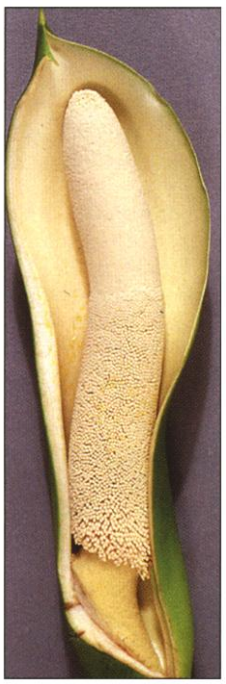
PLANT PHYSIOLOGY

Philodendrons Like It Hot and Heavy

SYDNEY, AUSTRALIA—Philodendrons may look like leafy dullards, but their image conceals a racy secret: hot sex. The reproductive antics of the tree philodendron, *Philodendron selloum*, generate as much heat as would a 3-kilogram cat. The behavior, says biologist Roger Seymour, apparently serves to attract and reward pollinating beetles, who bask in its warmth. And it's made possible by a finely honed system for rapidly getting oxygen to heat-producing cells.



Hot time. Heat-generating florets, on shaft of the bloom, attract beetles.

Seymour, of the University of Adelaide in Australia, had shown previously that *P. selloum* and a distant relative, the sacred lotus, can regulate the temperature of their blossoms during flowering. Their ability to keep their blooms warmed to about 35°C, regardless of the ambient air temperature, was a stunning finding, says plant physiologist John Beardall of Melbourne's Monash University. "It was a major conceptual leap for many people," he says.

Seymour's new work offers the first explanation of how *P. selloum* manages to get oxygen into the flower without the lungs and circulation system available to hot-blooded mammals. In an upcoming issue of the *Journal of Experimental Botany*, Seymour reports that it all begins when the plant "breathes" in large amounts of oxygen through stomata, or pores, in its flowers. The oxygen moves through the little spaces between florets, the tiny flowers dotting the plant's spiky blooms, in the sterile male band and then diffuses through the stomata and into the interstitial gas spaces. The oxygen eventually makes its way to mitochondria, power packs located inside the cells of florets, where it is used in the oxidation of lipids to release heat energy.

A key factor in a plant's "breathing" is the density of the stomata, its "airway openings." Seymour found that each floret has an average of 168 stomata, 1/20 the number in a leaf. "The airways are matched precisely to supply oxygen to the center of the floret and no more," Seymour explains. More stomata would cause excessive heat loss through evaporation, he speculates, while fewer would not let in enough oxygen for heat production.

The warm flowers release scent that attracts the large scarab beetle, *Erioscelis emarginata*, the only species that pollinates *P. selloum*. When the beetles arrive, the outer leaf envelopes them, creating what Seymour calls a "nightclub for beetles." The insects "enjoy" themselves overnight and depart the following evening after being dusted with new pollen.

"I think it's amazing that a plant can sustain the sort of metabolic [activity] that we expect of some mammals and birds," says Philip Withers, an expert in animal heat production at the University of Western Australia in Perth. Adds Seymour: "They do everything that animals do, except get up and walk ... for now." **–LEIGH DAYTON**

Leigh Dayton writes from Sydney, Australia.

GENOMICS

Canada Seeks Economic Payoff Across Species

OTTAWA—Canada has committed $175 million toward a $400 million initiative in functional genomics that aims to promote economic prosperity as well as a better understanding of disease. The first round of winners, announced last week by Genome Canada, emphasizes regional development as well as top-notch research on humans, plants, and animals.

"I've been dreaming about this for 20 years," says Willie Davidson, dean of science at Simon Fraser University in Burnaby and co-leader of a project to map the roughly 60 chromosomes of the Atlantic salmon. "What Genome Canada has allowed us to do is to dream and to dream big."

Last year, the government supported the creation of a nonprofit corporation to develop a national genomics initiative that would span agriculture, health, forestry, fisheries, and the environment (*Science*, 10 March 2000, p. 1732). Genome Canada so far has raised $400 million from a combination of federal, provincial, and industry sources, with the hope of additional funding. Officials have now awarded grants for the first 17 projects, which were selected from among 31 proposals by a scientific panel chaired by C. Thomas Caskey, president of Houston's Cogene Biotech Ventures Ltd. "It was science first," says Genome Canada president Martin Godbout. "But we [also] wanted to become world leaders in very specific niches."

Nine of the 17 projects are health-related and will receive a combined $67 million over 3.5 years. Three others, totaling $8 million, will examine ethical, legal, and social issues. Two environmental grants total $5.3 million, and there are individual grants in agriculture ($13.4 million), fisheries ($3.4 million), and forestry ($6.7 million). "It allows us to have a very coordinated, integrated approach" to genomics research, says Graham Scoles, head of the department of plant sciences at the University of Saskatchewan in Saskatoon and team leader for a project on how abiotic stresses such as cold, drought, heat, and salinity affect wheat and canola.

The potential economic payoff from those sectors is a primary reason for the initiative, according to Minister of Industry Brian Tobin. "The government of Canada is convinced that there are enormous dividends to be had by strategic investment to promote innovation in certain key sectors," he says. The initiative is unique in being "integrated across species," adds Bartha Knoppers, a professor of law at the University of Montreal, whose team will compare international policies in such areas as DNA sampling and banking. "That is something that no other program in the world has done," she notes.

In addition to the project grants, Genome Canada will spend $47 million to establish five geographically distributed "science and technology" sites. Equipped with the latest technology, they will serve all scientists in their regions. It has also allocated $1.4 million a year for 3.5 years to five regional genome centers to manage the projects and develop new ones, commercialize findings, and solicit additional funding. A second competition is scheduled for this fall, with awards to be announced in the spring of 2002. **–WAYNE KONDRO**

Wayne Kondro writes from Ottawa.

THE GEOGRAPHY OF CANADIAN GENOMICS

Region/Headquarters	Sectors	Funding
British Columbia/ Vancouver	Fisheries, health, environment, forestry	$46 million
Prairies/Lethbridge	Agriculture, ethical/legal issues	$19 million
Ontario/Toronto	Health, ethical/ legal issues	$47 million
Quebec/Montreal	Health, ethical/ legal issues	$52 million
Atlantic/Halifax	Environment, health	$12 million

CREDITS: (TOP TO BOTTOM) R. SEYMOUR; SOURCE: GENOME CANADA