the science we support

Decades of research had failed to isolate the the cause of pigeonpea sterility mosaic disease, and P. Lava Kumar (shown with his parents) knew the odds were stacked against him.

No-till is one of many innovations researched and, where appropriate, promoted in South Asia by R.K. Malik (left) and the Rice-Wheat Consortium for the Indo-Gangetic Plains.

Brian Perry's career in veterinary science has enlarged like a tree, seasonally adding growth rings while maintaining its original shape.

2004 CGIAR Science Awards for Excellence: Realizing Human Potential

Measles took the life of P. Lava Kumar's little sister and gave the world a virologist. "In one case in a million, the virus enters the nervous system," recalled the former undergraduate in chemistry and biology. "My sister was that one. When she died at the age of 17, I decided to work in virology."

A dozen years later, Dr. Kumar's contribution to the control of a stubborn crop virus won him the 2004 Promising Young Scientist Award from the Consultative Group on International Agricultural Research (CGIAR). Like the winners of the Outstanding Scientist Award, the King Baudouin Award and other CGIAR Science Awards (reported on page 12), Dr. Kumar exemplifies the human potential from which scientific excellence springs.

One in a Million

Having earned an MS degree in virology near his home in Andhra Pradesh, Lava Kumar planned a doctoral thesis on bluetongue, a viral infection of sheep and cattle. His professor urged him to apply instead for an opening at the International Crops Research Institute for the Semi-Arid Tropics. With British government support, he would study sterility mosaic disease, which depresses pigeonpea yields across the Indian subcontinent, costing poor farmers more than US$300 million annually. Decades of research had failed to isolate the pathogen that causes the disease, and the young researcher knew the odds were stacked against him.

"But we were sure of making progress on disease variability thanks to DNA markers developed in Scotland for the mite that transmits the virus," he explained. "This guaranteed my PhD. Simultaneously, we worked on isolating the pathogen. We were fortunate to make progress in both areas."

The breakthrough identification of the pigeonpea sterility mosaic virus occurred at the turn of the millennium. Dr. Kumar is now helping to develop resistant pigeonpea varieties, one of which has been released in southern Karnataka.

"We're still in the early days of understanding the virus," Dr. Kumar said. "The job now is to characterize its different strains and develop pigeonpea breeding stock with broad-based resistance. This can then be bred into varieties popular in the various disease hotspots."

Rooted in Science

The career of Brian Perry, the winner of the 2004 Outstanding Scientist Award, has enlarged like a tree, seasonally adding growth rings while maintaining its original shape.

"I've been lucky enough to avoid high-level administration," said Dr. Perry, who was born into farming in Norfolk, England. He has specialized in tropical veterinary medicine for more than 3 decades, since 1987 at what is now the International Livestock Research Institute (ILRI) in Kenya, integrating epidemiology and economics to inform policy on animal health. "I never left science behind. I'm involved in policy issues today, but science remains the basis of my involvement."

Dr. Perry described his work on the dynamics of tick-borne diseases as an early climax of his career. "In many settings you can use a combination of animals' natural resistance and periodic re-infections to achieve population immunity," he explained. "Define where such endemic stability exists and where it doesn't, and learn how to promote it. You may still need to control ticks, but you do so strategically, promoting endemic stability."

Dr. Perry's approach to animal-health constraints on trade is similarly strategic. "We try to promote the capacity of developing countries to meet sanitary requirements, to engage in trade in a way that is recognized as safe by developed markets keen to keep diseases out," he said. "At the same time, we must quantify the risks involved and ask if the rules are fair. Derived animal products are usually much safer than live animals. So what are the real risks of importing them?"

The newest growth ring of Dr. Perry's career is identifying three key livestock-mediated pathways out of poverty. This framework now underpins ILRI's research strategy and has influenced the Food and Agriculture Organization of the United Nations and World Bank strategies. Dr. Perry enumerated the pathways: "First, ensure animals' survival and so maintain the fundamental livestock assets of the poor. Second, make intensification with improved breeds, feed and drugs sustainable. And, finally, promote fair access to markets for safe products."

South Asian Champion

R.K. Malik was an early champion of no-till agriculture, an innovative method that protects the environment, saves farmers money and boosts their wheat yields. An agronomist at Haryana Agricultural University in India, Dr. Malik credits no-till with changing his whole approach to research.

No-till is one of many innovations researched and, where appropriate, promoted in South Asia by the Rice-Wheat Consortium for the Indo-Gangetic Plains, the recipient of the 2004 King Baudouin Award. Convened by the International Maize and Wheat Improvement Center (CIMMYT by its Spanish acronym), the Consortium links the national agricultural research systems of Bangladesh, India, Nepal and Pakistan with each other and with an array of research institutions, donors, NGOs, corporations and farmers groups.

Dr. Malik first saw no-till in 1995 at CIMMYT's headquarters near Mexico City, where he sought management solutions to an urgent weed problem. Herbicide-resistant littleseed canary grass (*Phalaris minor*) had emerged in the wheat fields of his native Haryana in 1993 and become a serious problem the following year.

> The winners of the Outstanding Scientist, Promising Young Scientist and King Baudouin Awards exemplify the human potential from which scientific excellence springs

"No-till allowed farmers who grew rice and wheat in rotation to advance the planting of wheat by 15 days and so reduce the emergence of *Phalaris*," he explained. "And we hoped that input savings from no-till would allow farmers to buy the expensive new *Phalaris* herbicide once it became available."

Haryana resolved its *Phalaris* crisis, but the benefits of no-till — in particular its fuel, water and labor savings — have propelled expansion of the method to a 10th of the rice-wheat lands of the Indo-Gangetic Plains: 1.3 million hectares and counting. This despite a near consensus that farmers would not accept it.

"No-till taught me to go straight to farmers' fields rather than stay on the research farm, where it was declared a dead end," recalled Dr. Malik. "We found that farmers did accept it. For them, seeing is believing. If they see high productivity and profitability, they'll adopt it right away."

Science Awards: Partner, Support, Publish and Communicate

The awards reported on preceding pages 10-11 were among eight conferred by the CGIAR at its 2004 Annual General Meeting in Mexico City. Especially notable for scientific excellence in the global battle against hunger, poverty and environmental degradation was the WorldFish Center, which won three awards.

The **Outstanding Partnership Award** went to Community-based Fisheries Management, coordinated by WorldFish. This partnership empowers Bangladeshi communities to make well-informed decisions on the sustainable use and management of fisheries. Including 11 nongovernmental and private organizations, the partnership engages more than 23,000 households living near 113 bodies of water. New fish sanctuaries in 49 of them have, along with voluntary fishing hiatuses, helped boost fish diversity by a third. Key to success has been a collaborative approach that taps the diverse range of skills found in partnership organizations.

The **Outstanding Scientific Support Team Award** honored the people behind FishBase, the world's premier database and information system on fisheries, hosted by WorldFish. Overcoming institutional challenges to network around the globe, the FishBase support team of biologists, computer programmers and web developers expanded the system's coverage from the original goal of 250 species to 28,585 species without compromising quality, utility or accessibility. The team has produced over 50 publications, posters and presentations and conducted courses strengthening capacity in Africa, the Caribbean and the Asia-Pacific region. More than 450 publications have cited FishBase, whose website receives over 11 million hits per month.

WorldFish nominated the winner of the **Outstanding Journalism Award**, Natasha Loder, for her article *The Promise of a Blue Revolution*. Published in *The Economist* on 9 August 2003, the article reports on aquaculture's potential for sustainably meeting ever-higher global demand for fish. "Commercial agriculture has developed over centuries; large-scale commercial aquaculture is little more than 30 years old," Ms. Loder wrote. "New technologies, new breeds and newly domesticated species of fish offer great hope for the future. They promise a blue revolution in this century to match the green revolution of the last."

Winning the **Outstanding Communications Award** was the Smallholder Dairy Project, jointly implemented by the International Livestock Research Institute, Kenyan Ministry of Livestock and Fisheries Development, and Kenya Agricultural Research Institute. The project developed an innovative communication strategy that helped raise awareness among key policymakers and so reform East Africa's dairy sector (see page 29).

Finally, the **Outstanding Scientific Article Award** went to *Enhanced iron and zinc accumulation in transgenic rice with the ferritin gene*. The paper reported in the journal *Plant Science* on the critical work by the International Rice Research Institute toward developing rice able to help conquer iron-deficiency anemia, which afflicts billions of people worldwide.

These awards celebrate scientific excellence in the global battle against hunger, poverty and environmental degradation

Monty Jones, co-winner of the World Food Prize

Anisul Islam received the Outstanding Partnership Award on behalf of Community Based Fisheries Management for its work in Bangladesh.

Christine Casal received the Outstanding Scientific Support Team Award on behalf of those who created and maintain the FishBase fisheries database and information system.

Natasha Loder received from Ian Johnson the Outstanding Journalism Award for her article *The Promise of a Blue Revolution*, which informed readers of *The Economist* about aquaculture.

Hezekiah Muriuki received from Mr. Johnson the Outstanding Communications Award on behalf of the Smallholder Dairy Project for its work guiding policy reform in East Africa.

Marta De Vasconcelos received the Outstanding Scientific Article Award as lead author of eight who report on the health-giving potential of transgenically biofortified rice.

World Recognition

The 2004 World Food Prize went to Monty Jones for pioneering the development in the mid-1990s of the new rices for Africa (NERICAs). The Sierra Leonean rice breeder was based at the time in Côte d'Ivoire at the Africa Rice Center (WARDA), a Future Harvest Center of the CGIAR. Dr. Jones shared the US$250,000 prize with Yuan Longping of China, recognized as the father of hybrid rice. The award is given annually by the Iowa-based World Food Prize Foundation (www.worldfoodprize.org).