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# ICARDA News

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## Agricultural Detective Work Boosts Production of Protein-Rich Lentils

ALEPPO, SYRIA and JOHANNESBURG, SOUTH AFRICA. 26 August 2002 — Tens of thousands of Bangladeshi farmers now plant a new series of disease-resistant lentils, the first large-scale use of new lentil varieties since the crop was first grown in South Asia more than a thousand years ago.

The improved varieties, known as *Barimasur* lentils, are derived from Middle Eastern lentils that provide the plant with natural disease resistance and larger seed size. More than 40,000 hectares (98,000 acres) — about a quarter of the country's lentil crop — is now planted with the *Barimasur* varieties.

“Lentils are a critical part of Bangladesh's food supply,” says Adel El-Beltagy. “They're not only affordable, they're nutritious, easy to cook, and are highly digestible, a characteristic that's important for young children.” Nutritionists rank lentils as a leading source of protein and iron, as well as the B vitamins that regulate growth and development. El-Beltagy is Director General of the International Center for Agricultural Research in the Dry Areas (ICARDA), one of the 16 Future Harvest Centers.

The new varieties were developed by geneticists at the Bangladesh Agricultural Research Institute by crossing the country's traditional lentils with disease-resistant breeding lines provided by ICARDA. The first of the four *Barimasur* lentils was released to farmers in 1995.

### Agricultural Detective Work

“The fact that the *Barimasur* varieties are being planted on such a large scale is a tribute to the inventiveness of Bangladeshi crop scientists and to the detective work of ICARDA plant breeder Willie Erskine,” says El-Beltagy.

Erskine is a veteran scientist at ICARDA with a strong sense of history.

Lentils have been around for at least 8000 years, says Erskine, and were known to the ancient Egyptians who deposited them in the tombs of the Pharaohs.

The varieties grown in Bangladesh, Erskine believes, were first brought to the South Asia region around 1000 BC by Arab tribes migrating from the Middle East.

The problem with Bangladesh's older lentil varieties, Erskine notes, is that they produce just a fraction of the crop's genetic potential. Middle Eastern and West Asian lentils, he says, are roughly twice as productive as Bangladeshi plant types because of their disease resistance.

“When we started working with the lentils in the early 1980s we thought that it would be relatively easy to transfer desirable characteristics from Middle Eastern

lentils, Erskine says. “In retrospect, if it was going to be easy, farmers would have made their own crosses long ago.”

Our first attempt to produce improved lentil breeding lines, he says, looked good in ICARDA’s experimental fields, but it turned out they could not be crossed with South Asian varieties.

Erskine theorizes that during their migration east, the ancient Arabs carried with them many different kinds of lentils, all of which performed normally until they reached the foothills of the eastern Himalayas. At that point growing conditions changed and the crop was subjected to longer days and hotter temperatures.

The handful of varieties that survived, he says, lacked the disease resistance of the Middle Eastern and West Asian varieties and also matured earlier.

“The Himalayas acted like a giant sieve, allowing just a small percentage of the genes available in Middle Eastern lentils to pass through. We also learned that lentils from the Middle East flower at about same the time that Indian and Bangladeshi varieties are ready for harvesting, which makes genetic crossing all but impossible.

The solution, Erskine says, was to force Middle Eastern varieties to flower in the laboratory at the same time as their South Asian cousins. From then on it was relatively easy to make genetic crosses and add disease resistance to Bangladeshi varieties.”

## Higher Stable Yields

“The results of those crosses in the late 1980s have been nothing short of miraculous,” says El-Beltagy. On average, *Barimasur* lentils produce as much as 40 percent more than Bangladesh’s traditional varieties, are stable yielders, and carry broad-based disease resistance. “Thousands of farmers are switching over,” he says.

The new plant types, El-Beltagy adds, are now the target of a massive farmer education campaign and are expected to spread rapidly all corners of Bangladesh over the coming years. The release of similarly bred varieties in India, the world’s largest lentil producer, is also expected.

“Willie Erskine’s detective work not only solved a centuries-old problem,” El-Beltagy says, “it created a foundation from which national agriculture research programs in South Asia could make progress. What Willie and his colleagues have done is to make it possible for national scientists to incorporate into local lentils the genes that didn’t make the trip more than a thousand years ago.”

“The mystery surrounding the origin of South Asian lentils,” El-Beltagy adds, “also points out the need for researchers to continue studying the origins and history of our basic food crops.”

“A large part of agricultural research,” he says, “is knowing how people manage their resources as conditions change. That may turn out to be the long-term lesson from this research.”

**ICARDA’s** ([www.icarda.org](http://www.icarda.org)) mission is to improve the welfare of people and alleviate poverty through research and training in dry areas of the developing world by increasing production, productivity, and nutritional quality of food, while preserving and enhancing the natural resource base. ICARDA is a Future Harvest Center.

**Future Harvest** ([www.futureharvest.org](http://www.futureharvest.org)) is a global nonprofit organization that builds awareness and support for food and environmental research for a world with less poverty, a healthier human family, well-nourished children, and a better environment. Future Harvest is an initiative of 16 food and environmental research centers that receive funding from the Consultative Group on International Agricultural Research (CGIAR).

