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THE FAIREST BEAN OF ALL?

by MACK LAING

"A backyard nutrition supermarket" and "an ice cream cone among plants" is how some researchers are describing the winged bean (psophocarpus tetragonolobus). Relatively unknown four years ago, the winged bean is now being touted as the challenger to soybean and as a keen new potential weapon in Asia's fight against hunger and malnutrition.



Why the superlatives?

The main reason is the amazing capacity for the nodules on the winged bean's roots to convert nitrogen in the air into fertilizer. This nitrogen-fixing ability (20 to 40 kilos of nitrogen per hectare, some researchers say) means the bean can grow in relatively poor soils without expensive nitrogenous fertilizers. Ploughed under, the plant enriches the soil for other crops.

Every part of the plant can be eaten -- tubers, flowers, seeds, leaves, green pods. Most parts are tasty and rich in protein, vitamins A and C and about 18 amino acids. The ivory-white fibreless flesh of the tubers has the flavor of a potato-nut blend. It has 10 times as much tuber protein as the usual tropical root crops.

Protein content of the seeds, 34 to 40 percent, compares with that of soybean seeds, is higher than peanut, and, unlike soy seeds, the toxic enzyme urease is not present. The seed oil is high in the antioxidant, tocopherol, which extends the body's use of vitamin A, whose frequent lack in tropical Asia causes much blindness.

The "wings" are the feathery seams of the four-cornered pod. Its origin may be east African, though it thrives all over the humid tropics. A main centre of original research has been the Papua New Guinea highlands where natives have grown small patches at up to 2150 meters for centuries.

The yield is phenomenal for some bean parts. Green pod yield in one New Guinea experiment averaged 10.9 metric tons per hectare (4.4 tons per acre). Dry seed yield has reached 1,000 kilos (2,200 pounds) per hectare (2.47 acres), perhaps twice that for some plants grown for seed.

The winged bean was first noticed by classifiers as early as 1790, but before 1973, it featured in only scattered scientific papers in obscure journals or agriculture department reports, Dr Tanveer Khan told an international public forum held in Manila, in January, to review the prospects and potential uses of this plant. Oxford University's Dr G.B. Masefield signalled interested curiosity ("A crop with a future?") in 1973. In 1974, the bean winged its way further up the pole at the U.S. National Academy of Sciences meeting seeking uses for under-utilized plants. The bean's 10 percent protein yield was said to be five to 10 times that of any traditional crop.

Outside Papua New Guinea the bean has not been widely grown as a field crop. Its variations are few, 150 lines at most, compared with 40,000 known rice types. The plant is a climber, needing a trellis and geneticists are tempted to "dwarf" it so it can stand on its own for easier large-scale growing and harvesting.

The bean will feature in four new centres: a main plant breeding institute and a central bean gene bank to be set up at the University of the Philippines at Los Banos; a secondary centre at the University of Papua New Guinea; a backup centre in the International Institute of Tropical Agriculture at Ibadan, Nigeria; and a long-range seed storage bank in the U.S. National Seed Storage Lab at Fort Collins, Colorado.

But will the businessman beat the scientist in developing the bean for commercial production, thus depriving the Third World of this much needed vegetable protein to convert it into animal feed?

Dr Leslie Chubb, of the British firm Spillers Ltd., estimated that winged bean oilseed meal at US \$200 a metric ton could compete against soybean (now at \$230 a ton) for animal feed and create a \$US 150 million annual market. "This could lead simply to rich people robbing poor people of food," said William Shurtleff, who demonstrated food uses for the winged bean as part of his New Age Foods Study Centre in Tokyo.

Whatever happens, the challenge is irresistible. University of Illinois Plant Geneticist, Dr Ted Hymowitz, stepping down from the winged bean steering committee, recalled three high points in his life: "In 1963 I did a thesis on an obscure plant called guar (Cyamopsis tetragonoloba) which led to a \$US 100 million business (it produces a gum used in oil drilling to soak up water). In 1964, I worked to see millions of acres of soybean planted in Brazil, India, Hungary and Yugoslavia.

"In 1974 on this steering committee, I started on a third such crop -- the winged bean." And despite the usual scientific cautions being put forward, this bean could be the fairest of them all.

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Mack Laing is editor of DEPTHnews Science Service published by the Press Foundation of Asia, in Manila. This article is adapted, with permission, from an article which appears in the latest issue of Science Forum, Canada's News Magazine of Science.