Development of a new soybean variety for human consumption

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During the past five years, the state of Guerrero has conducted an extensive research project to increase the protein content of local diets through development of soybean varieties that can be locally grown and easily assimilated into local diets. Guerrero is the location of Acapulco, host city for the World Conference on Soya Processing and Utilization. This article explains Guerrero's project and the development of a new soy variety for human consumption. Conference registrants will have an opportunity to visit Guerrero's soya fields. This report was prepared by Dr. Nuren M.S. Banafunzi, professor of plant breeding and head of the Agricultural Research Division at the Instituto Superior Agropecuario Autonómo del Estado de Guerrero (ISAAEG) and A. Man, professor and investigator of oil crops at the ISAAEG.

A rapid population growth and decreased efficiency in food production are common features in many developing nations. Mexico is not an exception and among its states, Guerrero has perhaps one of the highest birth rates combined with various degrees of malnutrition ranging from kwashiorkor to marasmus. Protein malnutrition is common in most Guerrero communities. Per capita income is among the lowest ranking in Mexico, making animal protein prohibitively costly to low income groups.

The traditional methods, in developing nations, of feeding cereals and legumes to animals to produce animal protein is too expensive for Guerrero's poor. While animal proteins provide a complete profile of essential amino acids, soy protein has about the same nutritive value. Soy protein's advantages include its availability, its use for direct consumption by humans, and, above all, its low cost.

Thus far, the major limiting factors for production of soybeans in the tropics have been: (a) a lack of varieties adapted to low and high altitudes at low latitudes; (b) a lack of proven agronomic practices; and (c) a lack of varieties mild in beany flavor and therefore suitable for direct human consumption.

There obviously is an urgent need to improve production efficiency to permit improved diets, which should be accomplished without major changes in traditional dietary habits.

A proposal for such a program was made to the Governor of Guerrero, Ing. Rubén Figueroa Figueroa in 1975 by the head of the Unidad de Investigación y Divulgacion del ISAAEG, Dr. Nuren M.S. Banafunzi. This proposal included (a) introduction of varieties for human consumption; (b) creation of new genotypes and their adaption to low latitudes at both low and high altitudes; (c) development of new technology and cultural practices for production on commercial scales as well as in backyard gardens; (d) development of convenient, simple and economic processes, within reach of housewives, to make and use soybean food products; and (e) presentation of short courses on production and use of soybeans as sprouts, green pods or dry beans.

Since its creation, this Research Center for Soybeans has been fully and exclusively supported by the Governor of the State of Guerrero.

While some soybean varieties were undergoing trial performances, other varieties specifically for human consumption were being synthesized. Simultaneously, easy and economic procedures to improve the palatability of soya as well as its incorporation into diets for youngsters and adults were investigated. Several short courses were conducted for government workers (public health, education, agricultural extension of DIF and Family Planning), for the general public in rural communities, and for housewives.

"Instantanea Agricola" contains information on ways to use soya and its nutritional benefits. Soya sprouts are rich in thiamin and Vitamin C; soya green pods are good sources of carotene, a precursor of Vitamin A; dry beans used in soya yogurt are an excellent source of Vitamin B_{12} and have high levels of methionine.

ISAAEG-BM 2

The ISAAEG-BM 2 is a new edible variety of soybean that constitutes an excellent source of plant protein and is useful for direct human consumption. The variety is disease-resistant with a wide range of adaptability (from 0° to 40° latitude, from sea level to 2,000 meters above sea level) and with high yields when recommended planting practices are followed. The ISAAEG-BM 2 variety was developed for multiple purposes (for use in green pod foods or as dried beans) and was designed for marginal growth areas as well as large commercial areas.

Origin and development

The ISAAEG-BM 2 is the result of a cross between a kahala selected line x Lee 68 made by Dr. Banafunzi and A. Mena. This work was done at the ISAAEG in Iguala in 1975. The Iguala cross selection in F_5 generation has been tested by researchers in Venezuela, Nicaragua, Bulgaria, and the state of Arkansas in the United States.

Description

The ISAAEG-BM 2 is a determinate erect variety of medium height with sparse foliage. It has purple flowers, tawny or brown at pubescence. Seeds are medium in size, yellow in color with black-colored hillium, and are round in shape. The ISAAEG-BM 2 at the green pod stage has a protein

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content in the seed that compares favorably with other vegetable soybean varieties and has more protein than peas or lima beans.

Height, maturity, seed weight, yield and chemical composition of ISAAEG-BM 2 are as follows:

height	56 cm
maturity for processing	70 days
maturity for combining	100 days
seed weight of 100 seeds for combining	18 grams
yield per hectare for processing of pods	10 tons
yield per hectare for combining	2.5 tons
protein in mature seed	38%
oil in mature seed	17%

Disease resistance

In the area of its best adaption, such as Iguala Guerrero, Yautepec Morelos in Mexico, the ISAAEG-BM 2 is resistant to bacterial postule and to root knot nematodes. This variety also has shown resistance to bacterial postule in Arkansas (USA).

Cultural recommendations

For green pod harvest, the ISAAEG-BM 2 can be grown year-round. For dried bean combining, a planting date of June 15 to July 20 is best in Iguala Valley; a date between July 1 to July 20 is better for the coast of Guerrero during the rainy season. Row width should be 81 cm, planted in double rows and with 20 cm between rows. Recommended population densities for rainy season (long days in summer) is 350,000 plants/hectare and for irrigated fields (short days of winter), 600,000 plants/hectare.

Plant variety protection

A certificate of plant variety protection (No. 113-310380-Soy-1) for ISAAEG-BM 2 was issued April 14, 1980. It is illegal to produce and market ISAAEG-BM 2 seed except as certified seed. A supply of foundation seed of the ISAAEG-BM 2 soybean is maintained by ISAAEG Agricultural Experiment Station.

Mercure to speak at opening ceremonies

Speaking on behalf of the U.S. Department of Agriculture during the opening ceremonies for the World Conference on Soya Processing and Utilization will be Alex P. Mercure, Assistant Secretary of Agriculture for Rural Development.

Mercure was appointed to his post in April 1977 by the U.S. Senate. He previously had been vice-president for regional and community affairs at the University of New Mexico.

Mercure's office has responsibility for the Farmers Home Administration and the Rural Electrification Administration. Mercure serves as chairman of the federal Assistant Secretaries Working Group for Rural Development and on the President's Interagency Coordinating Council.

A native of New Mexico, Mercure has been active in numerous community service organizations and groups designed to spur rural development.

Mercure will deliver his comments in Spanish.

AOCS 1981

Nineteen tentative symposia topics have been announced for the 1981 AOCS meeting in New Orleans by technical program chairman Tom Jacks.

A major symposium on mycotoxins is being organized by Leo Goldblatt in honor of the late Walter A. Pons, a long-time researcher of mycotoxins at the Southern Regional Research Center.

The 72nd annual meeting of the AOCS will be held May 17-21, 1981, at the Fairmont Hotel in New Orleans. Robert Ory of the Southern Regional Research Center is general chairman.

Other tentative symposia topics and chairmen are:

Fats and oils processing, J. Schnake
Cottonseed processing, W. Barger
Cotton dust in oil mills, R. Bethea
Surfactants in textiles, M. Schick
Analytical methodology in detergents, T. Matson
Surface chemistry, T. Matson
Energy in the detergent industry, T. Matson
Control of hexane losses, L. Watkins
Energy conservation, A. Gavin
Energy conservation, H. Duff
Vegetable protein chemistry and engineering, E. Lusas
Industrial protein, E. McCabe
Sterols, H. Kircher
Flavor, A.J. St. Angelo and D. Min
Lipid oxidation, W.A. Pryor
Insect lipids, E. Lambreont
Analytical methodology, R. Bower and W. Doeden
Phytic acid, W. Evans

Researchers are invited to submit abstracts on these topics or any other fats and oils related topics to Tom Jacks by Dec. 1, 1980. The full tentative program for the 1981

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