SWEET POTATOES (*IPOMOEA BATATAS*)

B. SEN

(*Vivekananda Laboratory, Almora, U.P.*)

Introduction

IN India sweet potato is commonly looked upon as an inferior food crop. In spite of the fact that sweet potato can help in a great measure to relieve our acute shortage of both food and fodder, up to this time it has not attracted the attention it deserves.

Even in the U.S.A., the increased interest in sweet potato is of comparatively recent origin. It was the demand of the Army for dehydrated food during World War II, and stoppage of normal imports from abroad of root starch, which brought out the importance of sweet potato in the U.S.A. By 1945, the total value of the U.S.A. sweet potato crop was of the order of Rs. 44 crores.

Dr. Julian C. Miller of Baton Rouge, Louisiana, has estimated the comparative nutritive values of edible portions of ordinary white potato and sweet potato. His unpublished data is produced in Table I.

It will be seen from the above table that sweet potato ranks higher than ordinary potato in most categories, particularly in carbohydrates, calcium and vitamin A. Moreover, the yield of sweet potato per acre has been found to be higher than that of ordinary potato. Tender end-lengths of sweet potato vines can also be used as a table spinach. A few plants would be sufficient to supply the spinach requirements of a family for a whole season. Small samples of sweet potatoes can easily be sun-dried by the cultivators and made into flour for their own use, as is now commonly done in villages in India where sweet potatoes are cultivated. For handling large quantities, modern dehydrating machines can be utilised with profit. Experimental trials in India have shown that 20% of sweet potato flour, or even more, can be mixed with *atta* for chapattis. The result is both nutritious and palatable.

Apart from the higher yield of the edible roots of sweet potato, as compared with ordinary potato, the vine terminals and leaves constitute an excellent source of fodder. Nearly 1¼ tons of high quality dried sweet potato leaf meal can be obtained per acre. The feed value is approximately equal to that of alfalfa hay, as will be seen from the unpublished data of Dr. Julian C. Miller in Table II.

TABLE I

Composition of food (edible portion in one pound)

	Calories	Protein	Fat	Carbohydrates	Calcium	Phosphorus	Iron	Vitamin A	Thiamine	Riboflavin	Niacin	Ascorbic Acid
		gm.	gm.	gm.	gm.	mg.	mg.		mg.	mg.	mg.	mg.
Sweet potatoes ..	567	8	3	127	159	222	3·2	17,200	·45	·32	5·9	113
Irish potatoes ..	386	9	·5	87	36	222	3·4	180	·41	·23	5·4	45

TABLE II

	Protein	Fats	Carbo-hydrates	Mineral Matter
Sweet potato leaves and terminals	12·6%	3·3%	45·5%	10·2%
Alfalfa hay ..	14·7%	2·0%	36·4%	8·3%

Thus the roots and tender vine end-lengths of sweet potato offer a very nutritious food for human beings, and the stringy roots and the bulk of the stems and leaves make an excellent fodder for cattle.

Sweet potato also has a number of important industrial uses: it can be utilised for the manufacture of starch, industrial alcohol, pectin, carotene and syrup.

Experiments

Through the courtesy of Dr. Julian C. Miller of Baton Rouge and Dr. C. E. Steinbaur of Beltsville, Maryland, I obtained two roots each of 14 strains of high yielding and disease-resistant sweet potato. Roots of two strains of Bengal sweet potato

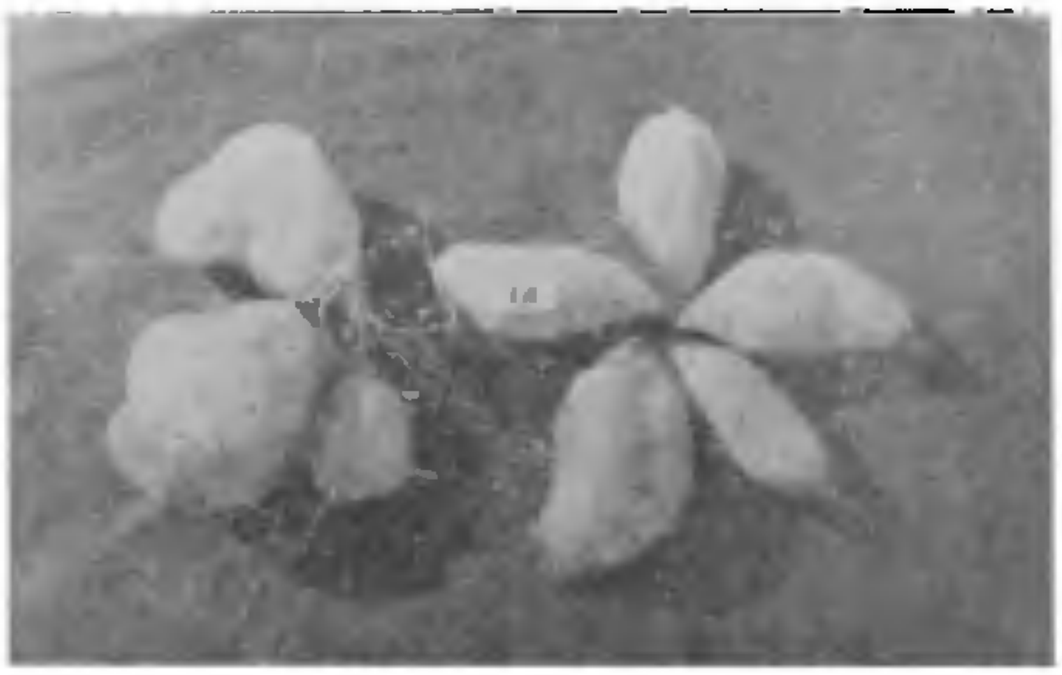
and cuttings of two strains of Bombay sweet potato were also obtained for comparative trial. All these were planted in Almora on March 21st, 1948. On account of the limited number of cuttings of each strain available at any sowing date, a properly replicated experiment could not be undertaken in 1948. Sowings were continued from May 1st to June 26th, 1948. Each strain was planted in a separate plot—10′×10′. The distance between rows was 3′ and between plants 12″. For root multiplication, a very late sowing was undertaken on July 8th, 1948, at the U.P. Government Farm at Hawalbagh. The weights of the roots and of the tops (vines and leaves) of each row were recorded at harvest time. From the nature of these preliminary experiments no exact estimate of the comparative yield of the different strains is justified.

of 220 mds. from the strain Essex. On the other hand, the highest yield of sweet potato was of the order of 435 mds. from the Bengal White variety, and 388 mds. from the U.S.A. Nancy Hall. (Photographs of roots of some the strains are given in Fig. 1). Obviously, the yield figures given in Table III are not likely to be obtained by the cultivators, until adequate facilities become available for improving their cultural practices. Under similar cultural conditions, however, not only will the yield of the more nutritious sweet potato be higher than that of ordinary potato, but the supply of much needed fodder will be an additional gain. The fresh weights of the tops of different strains of sweet potato as indicated in Table III show that it might even pay us to grow sweet potato on a large scale for fodder alone. From the records of the yield of roots from rows

Nancy Hall
(High yield and high carotene content)

Ranger
(High yield and high carotene content)

Triumph
(High yield and high starch content)



Bengal White
(High yield with high moisture)

FIG. 1

Compared to the yield of the ordinary potato, the yield of sweet potato is much higher. For instance, in a sowing of February 1948, of several strains of U.S.A. ordinary potatoes, the highest yield calculated on an acreage basis was of the order

planted at different dates, it was found that the yields from the first rows of the different strains were invariably higher than those from the latest plantings of the cuttings in the third rows. The yield of Orange Little Stem and of B. 4306, planted on

June 25th, and of M. 4, planted on July 6th, was poor, and yields of all strains planted at Hawalbagh on July 8th were much lower compared to the yields obtained from the earlier sowings in Almora (Table III).

TABLE III

Showing yield, calculated on acreage basis, of roots and tops of different strains of sweet potato observed in Almora and Hawalbagh

Strain	Roots		Tops	
	at Almora	at Hawalbagh	at Almora	at Hawalbagh
	Mds.	Mds.	Mds.	Mds.
1 Unit I ..	148	121	494	346
2 Nancy Hall	388	119	180	318
3 Triumph ..	347	120	268	166
4 Ranger ..	302	112	501	166
5 B-196 ..	291	208	451	194
6 B-219 ..	322	82	400	304
7 B-4004 ..	294	214	440	97
8 B-4306 ..	79	52	509	581
9 B-5941 ..	313	..	175	..
10 Yellow Jersey	235	113	196	137
11 Jersey Big Stem	289	92	324	28
12 Pelican Processor	289	..	201	..
13 Orange Little Stem	99	..	..	..
14 Bengal White	436	201	345	180
15 M. 4 ..	126	..	319	..
16 Bengal Purple	301	..	411	..

To find out the strains best suited for any given region, properly planned co-ordinated sowings should be undertaken in different regions with all available strains of sweet potato, both Indian and foreign. This is essential because the yield and the quality of the roots will depend not only on the strain, but also on the climatic factors of different regions. From a series of plantings at different dates, the best sowing date for a particular region has also to be determined, because the yield and the quality of the roots vary according to the date of planting. For instance, in Almora, the Bengal White variety gave the highest yield; while in Hawalbagh, U.S.A. strains B. 4004 and B. 196 gave yields higher than that of Bengal White. On the other hand, we found that the moisture content of roots of Bengal White was 83%, whereas that of Nancy Hall was 69% and of Triumph 63%. Therefore, on the basis of solids, the yield per acre of Bengal White was 74·46 mds., compared to 120·28 mds. for Nancy Hall and 128 mds. for Triumph.

I take this opportunity to acknowledge the help of all members of the staff of this Laboratory, particularly of Shri Tara Datt Pant in the supervision of the field work, and of Shri Shankar Lal Sah in the despatch of 32,000 vine cuttings, sent on request to different provinces. The expenses of this preliminary work were met from financial aid received from Shri Charat Ram, New Delhi.

A detailed paper on this subject is in the press.

SCIENCE AND RELIGION

IN a lecture on "Science and Religion" given under the auspices of the Catholic Action Association, Delhi, Dr. Wolsky of the UNESCO expressed the view that due to the particular method of scientific research there were limitations on scientific knowledge. Whilst scientists study natural phenomena by measuring them they do not tell us anything about essence and existence, about the value and final explanation of life, matter, energy, of heaven and earth. These problems cannot be measured by measurements. All what Science can do is to give us a picture of the world and the universe. To form an opinion about the meaning and value of this picture, to arrive at a firm religion is left to him who sees the picture as a whole and not only its details. This he is able to do as a free human being and aided by God's grace. Now the scientist who has the desire to form views on the essence and value of things must be aware that whilst he is forming these views he is no longer acting as a scientist but simply as a man using his mental faculties according to the general rules of logic for approaching religious truth. He must deliberately abandon his particular methods of science which are utterly unsuitable in dealing with the fundamental problems of philosophy and religion. He is now no longer a scientist and his approach cannot be scientific. When he comes to deal with the most fundamental problems of humanity, he is in a particularly more difficult position than other men of learning, *e.g.*, those employed in the humanities or in arts or letters. This is perhaps the real source