Brinjal
(Solanum melongena Linn.)

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India is the second largest producer of vegetables in the world, next only to China with an estimated production of about 105 million tonnes from an area of 6.0 million hectares at an average yield of 16 tonnes per hectare. India shares about 15 per cent of the world output of vegetables from about 2.8 per cent of the cropped area in the country. However, per capita consumption in India makes it possible to grow wide variety of vegetable crops all the year round in one part of the country or another. India can claim to grow the largest number of vegetable crops compared to any other country of the world and as many as 61 annuals and 4 perennials vegetable crops are commercially cultivated. Indians are predominantly vegetarians and depend on vegetables for bulk of their nutrients and minerals. They form the most important component of a
balanced diet. The role and the usefulness of the anti-oxidants present in vegetables for human health has been demonstrated recently, therefore, adding value and luster to these crops.

Among the Solanaceous vegetables, brinjal, commonly known as egg plant *Solanum melongena* Linn. is the most common, popular, affordable and principal vegetable crop grown extensively in almost all geographical parts of the country except at higher altitudes. Brinjal being native to India, is cultivated in kitchen gardens and in small family farms for whom it is a source of cash income for small farmers. It occupies the third position amongst vegetable crops. India remains the world’s second producer of brinjal, accounting for nearly 26 per cent of the global production. India’s brinjal economy is estimated to be close to $2 billion (9600 crore) with 1.4 million farmers cultivating it annually in nearly 550,000 hectares (1.4 million acres).

Its production will contribute not only to food and nutrition security but also to poverty alleviation and income generation. Its cultivation stimulates development because it is easy to grow, labour incentive, earns higher returns, does not involve extra skills and is available round the year. Brinjal is low in calories, high in nutrition, very high in water content and has therapeutic value. It is very good source of fibre, calcium, phosphorus, folate and vitamin B & C. It is sweet, sharp, hot, cures fevers, excessive humour of phlegm and flatulation. It is appetizer, increases virility and is light. Brinjals of small size is delicate and it cures excessive phlegm and bile in the body and is known to protect arteries from cholesterol damage. Brinjals, if taken in its meshed form or as soup with asafoetida and garlic, it
cures flatulation, insomnia and the enlarged spleen due to malaria. Brinjal may be marinated, stuffed, grilled, fried, backed or stir-fried. It is an essential ingredient in several savoury dishes, most commonly baingan ka bhartha.

There are hundred’s of cultivars of different colours and shapes available in different parts of the country and their number is growing unabatedly. As various Universities, Research Institutions and private sector companies are involved in developing high yielding and disease and pest resistant varieties. The varieties popular in the country are Arka Navneet, Pusa Ankur, Hy 6, Pusa Hybrid-5, ARBH-1, ABH-1, PPL, PPC, Ritu Raj etc. In addition to these there are region specific varieties which are popular among the people of that particular region, because of their colour preference, size or taste etc. Because being cheap as compared to other vegetables, is also known as poorman’s vegetable and is available throughout the year in the country.

Almost 40 per cent of the brinjal produced in India is destroyed by Shoot and Fruit borer. Attacks of Leucinode orbonalis is so wide spread that production has barely increased by 9 per cent in the last 10 years despite of 15 per cent larger cultivated area.

This book contains the varied and valuable information on origin, distribution, taxonomy, botany, climate, soil, crop production techniques, nutrition, improved varieties, seed production, breeding and breeders seed production and plant protection measures. The information provided in this book will help both students of Agriculture and the vegetable growers in the production of quality brinjal. This book is therefore, a synthesis of available literature, personal
knowledge and the experience shared from the vegetable growers over the years.

My sincere thanks are due to my colleagues for help rendered in various ways in the completion of this book. The author will welcome suggestions and criticisms on the contents of the book for further improvement.

Kanaya Lal Bhat
Preface

1. Introduction
   Origin and Distribution, Area and Production, Areas of Cultivation, Current Status.

2. Nutritive Value and Uses
   Chemical Constituents, Health and Nutritional Benefits of Eating Brinjal, Uses, Medicinal Value, Biological Activities, Toxicity.

3. Taxonomy
   Vernacular Names, Systematic Position, Synonyms, Classification on the Basis of Fruit Shape and Plant Spread, Classification on the Basis of Fruit Colour, Botany, Roots, Stem, Leaves, Petiole, Flowers, Calyx, Corolla, Stamens, Ovary, Berries, Fruiting, Seeds, Flower Biology and Pollination, Anthesis
and Anther Dehiscence, Pollination, Chromosome Number, Hybridization, Hybrid Vigour, Exploitation of Heterosis, Genetics, Gene Studies in Brinjal, Quantitative, Qualitative Genes, Breeding Objectives.

4. Breeding Methods/Selection Criteria

Pure Line Selection, Pedigree Method, Bulk Method, Back Crossing Method, Heterosis Breeding, Mutation Breeding, Resistant Breeding, Cytogenetics and Plant Breeding, Genetic Engineering for the Improvement of Brinjal (Solanum melongena L).

5. Varieties

Punjab Neelam, Punjab Sadabahar, Punjab–8, Pusa Ankur, Pusa Anmol, Pusa Anupam, Pusa Bindu, Pusa Hybrid–5, Pusa Hybrid 6, Pusa Hybrid-9, Pusa Kranti, Pusa Purple Cluster, Pusa Purple Long, Pusa Purple Round, Pusa Upkar (DBR-8), Pusa Uttam, Pusa Bhairav (11a × PPL)-2-4-8-2), Ram Nagar Giant, Rajindra Baingan, Ravaiyya (MHB-39), RHRBH-1, RHRBH-2, RHRBH-3, Round-14 (Indo-American Hybrid Seed Co.), Shyamal (ARBH-201), Surya (SM 6-7), Swetha (SM 6-6), Swarna Shree (CHES-157), Swarna Mani, Swarna Pratibha, Swarna Shyamli, S-1, Swarna Shakti, Swarna Ajay, Swarna Shobha, Surati Gota, Suphal, Type-3, Utkal Jyoti (BB-13), Utkal Keshari (BB-26), Utkal Madhuri (BB-44), Utakal Tarini (BB-77), Vijay Hybrid, VRBHR-1, Brinjal Varieties Grouped on the Basis of Shape and Colour of Fruits, Brinjal Varieties Grouped on the Basis of their some Morphological Distinctions, Brinjal Hybrid F1, A. Long Type, B. Round Type, C. Oval to Oblong, D. Small Sized Fruits.

6. Cultivation

Climate, Season, Soil, Nursery Raising, Seed Rate, Field Preparation, Method of sowing/Spacing, Water Management, Nutrient Requirement, Basal Dressing, Top Dressing, Deficiency of Major and Minor Elements, Ntirogen, Phosphorus, Potash, Calcium, Magnesium, Sulphur, Boron, Copper, Iron, Interculture, Other Operations, Growth Regulators, Auxin, Gibberellins, Cytokinins, Abscisic Acid (ABA), Ethlene, Effect of Growth Regulators on Brinjal, Anthesis, Number of Fruits per Plant, Fruit Size, Yield per Plant, Ascorbic Acid.

7. Major Diseases of Brinjal

Biology, Rotting and Wilting, Damage Symptoms, Wilting Tissue, Dying Tissue (Nicrosis), Verticillium Wilt, Damping Off (Pythium spp. Phytophthora spp and Rhizoctonia spp),
Control, Powdery Mildew [Leveillula taurica (Lav.)], Control, Southern Blight, Symptoms, Control, Phomopsis Blight, Control, Control, Leaf Spot (Alternaria spp. and Cercospora melongenae Chupp), Control, Bacterial Wilt, Symptoms, Control, Fusarium Wilt (Fusarium oxysporum f.sp. lycopersici (Sacc.):), Control, Fruit Rot (Phytophthora nicotianae B. de Haan var. nicotianae):, Control, Root Knot of Brinjal, Control, Brinjal Little Leaf (Mycoplasma), Control, Brinjal Mosaic Caused by Tobacco Mosaic Virus, Symptoms, Control, Alternaria Leaf Spot, Control.

8. Major Pests of Brinjal
Chewing Insect that Feed on above Ground Plant Parts, Beetles, Pests with Needle-like Mouth Parts which Feed on Above Ground Plant Parts and Extract Plant Juices, Soft-bodied, Root Feeding Pests, Shoot and Fruit Borer (Leucinodes arbonalis Guen), Control, Brinjal Stem Borer (Euzophera particella), Control, Brinjal Leaf Roller, Control, Leaf Feeding Beetles, Epilachna Beetle, Control, Thrips, Control, Jassids (Amrasca biguttula), Control, Leaf Hoppers, Brinjal Mealy Bug (Centroccoccus insolitus), Control, Brinjal Mite (Tetranychus telarius), Control, Aphids (Aphis gossypii Glov), Control, Mites, Control, Root Knot Nematodes (Meloidogyne spp.), Control, The Major Constraints in Research.

9. Harvesting and Yield
Purchasing Brinjal, Cooking, Storage and Relative Humidity.

10. Brinjal Seed Production
Land Requirement and its Preparation, Time of Sowing, Seed, Nursery Raising, Transplanting, Manure and Fertilizer, Method and Time of Application, Irrigation, Interculture and Weed Control, Mulching.
11. Isolation Requirements

Roguing, Before Flowering, At Flowering and Fruiting, At Mature Fruit Stage and Prior to Harvesting, Harvesting and Thrashing, Seed Yield, Packing and Storage, Production of Hybrid Brinjal, Seed Production of Brinjal, Disease and Pests.

Bibliography

Index
Brinjal (*Solanum melongena* L.) is one of the most important and widely grown vegetable crop in Asia. Among the solanaceous vegetables, brinjal is extensively grown in India and is very popular among people of all social strata, grown both in home and market gardens throughout the year except at higher altitudes. Brinjal has been cultivated in India for last 4000 years. It is commonly known as Egg plant, is a very common and affordable vegetable. The area under cultivation is estimated to be around 5 lakh hectares and the total production stands at about 82 lakh metric tones. It is mainly grown in small plots as a cash crop by farmers and the average yield in India is around 200–350 quintals per hectare. It is popular in other countries like Japan, Indonesia, Philippines, China and Bulgaria and to some extent in other tropical countries like Africa and America. The major producers of brinjal are China, India,
Brinjal

Japan and Turkey. In India it holds a position nearly comparable to tomato or potato. The ease with which it can be cultivated and its adaptability to a wide range of growing conditions make it popular among the vegetable growers. The nutritional and medicinal properties, make it imperative to grow it all year round. It is used in a variety of culinary preparations. It is highly productive and finds place as the poor man’s crop and is liked by poor and the rich. The crop is extremely variable in India. The export of this crop is negligible, and mostly it is consumed locally. It is a delicate perennial often cultivated as an annual. It grows 40–150 cm tall, with large coarsely lobed leaves that are 10–20 cm long and 5–10 cm broad, whereas, semi wild types can grow much larger to 225 cm, with large leaves over 30 cm long and 15 cm broad. The stem is often spiny. The flowers are white to purple, with a five lobed corolla and yellow stamens. The fruit is fleshy, less than 3 cm in diameter on wild plants but much larger in cultivated forms. The fruit is botanically classified as a berry and contains numerous small, soft seeds, which are edible but are bitter because they contain (an insignificant amount of) nicotinoid alkaloids, un-surprising as it is a close relative of tobacco. Two crops are typically grown per year in South Asia and because fruits can be harvested every week farmers are provided with an assured income and resource-poor consumers have access to a much needed nutritious vegetable in the summer months when other vegetables are in short supply.

Origin and Distribution

Brinjal is considered to have originated in Indo–Myanmar region (Vavlio, 1928). There are several theories