



# Eggplant Grafting: a Boon to Bangladeshi Farmers



IPM CRSPprogress

*“A silent revolution is going on at Gaidghat village. Farmers are now growing pesticide-free vegetables by utilizing IPM CRSP technologies. Farmers are producing eggplant and tomato by using the grafting technique”* (Quote from the Bengali newspaper, JANAKANTHA, April 24, 2003). Yes, the days when Bangladeshi farmers make their morning visits to their fields and see their precious eggplants wilting in the sun are numbered. A technique called

diseases such as bacterial wilt. Bacterial wilt (BW) of eggplant is caused by the pathogen, *Ralstonia solanacearum*. The bacterium invades and gradually blocks the vascular tissue (the food- and water-conducting vessels just beneath the epidermis), causing complete destruction of the plant, and severely limiting eggplant yields. Farmers have been using costly and dangerous pesticides without achieving successful control of this serious disease. Now, grafting technology has come to the aid of the Bangladeshi eggplant farmers.



Father and son brinjal farmers

### Eggplant Grafting

Eggplant grafting technology, first developed by the Asian Vegetable Research and Development Center (AVRDC) in Taiwan is being transferred to farmers through a collaborative effort between the IPM CRSP, Bangladesh Agricultural Research Institute (BARI), PhilRice in the Philippines, AVRDC and CARE-Bangladesh, an NGO. The Bangladesh Agricultural Research Council (BARC) is the apex

“grafting” is revolutionizing the business of producing eggplants. Grafting technology is being used to control the devastating soilborne disease of eggplant known as “bacterial wilt”.

Millions of Bangladeshi farmers earn their living from vegetable cultivation. The rich soils and climate are conducive to growing more than 40 kinds of sub-tropical vegetable crops. In a period of 22 years from 1974-75 (post independence period) to 1996-97, area planted to vegetables increased by 72% and production by 78%. There is potential to double the productivity by using quality seeds and improved production practices to control weeds, pests and



Partially wilted (left front) and completely wilted plant (right front) destroyed by bacterial wilt disease. Healthy plants seen at rear.

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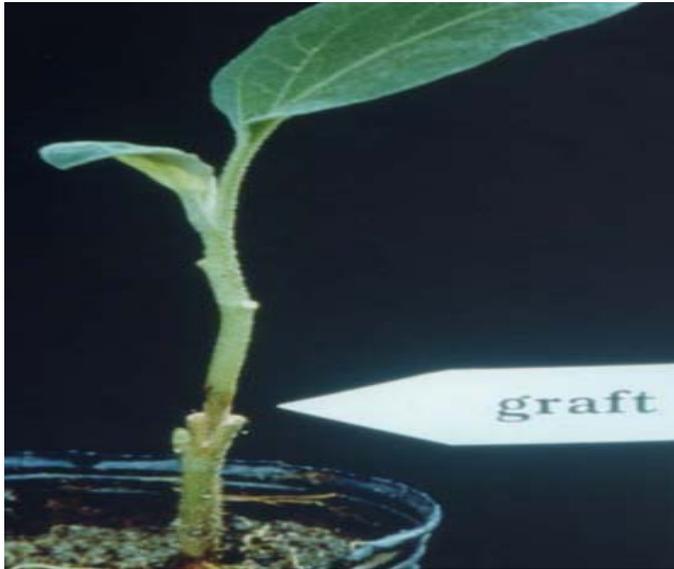


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Newly grafted eggplant



Mature grafted eggplant (left)

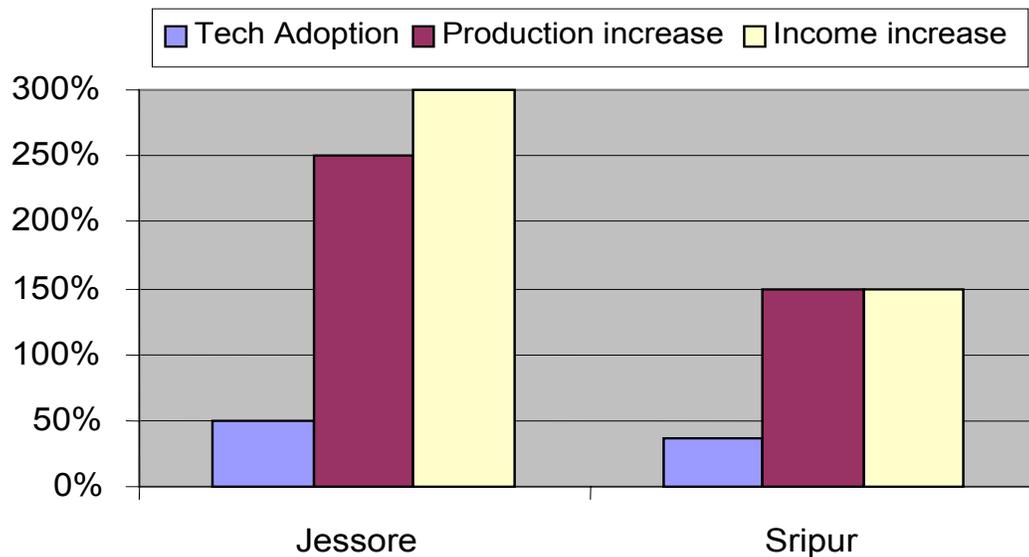
coordination body of the National Agricultural Research Systems on behalf of the Bangladesh government and the agreement between BARC and the IPM CRSP Management Entity at Virginia Tech has made it possible to carry out the collaborative activities of the IPM CRSP.

The IPM CRSP is a United States Agency for International Development (USAID) funded project which consists of a consortium scientists from U.S. universities and host country institutions working collaboratively to (1) reduce agricultural losses due to pests, (2) reduce environmental contamination, and (3) increase food production and farmer income through the development and transfer of improved IPM technologies. In Bangladesh, the U.S. universities Penn State, Virginia Tech, Ohio State, and Purdue work collaboratively to develop the eggplant grafting technology. This consortium is dedicated to the goal of providing nutritious food for millions of Bangladeshis and helping farmers to enter the vegetable

export markets. Details concerning the IPM CRSP and photos of the Bangladesh site activities can be found at: <http://www.ag.vt.edu/ipmcrsp/index.asp>

Vegetable Integrated Pest Management (IPM) technologies developed by the IPM CRSP in Bangladesh and adopted by Bangladeshi farmers have proven highly successful. This is what Mr. Ayub Hossain, a farmer organizer and the chairman of Agricultural Technology Implementation Center in Gaidghat village of Jessore had to say in a number of interviews with the press: “the IPM CRSP technologies are highly effective and profitable for our farmers. Our farmers now know how to produce pesticide-free vegetables” (Reported in the national Bengali daily “THE ITTEFAQ”, July 4, 2002).

Eggplant, (*Solanum melongena*) or brinjal as it is commonly known in Bangladesh, is an important vegetable crop which the IPM CRSP has targeted. Grafting of cultivated eggplant varieties on BW-resistant eggplant





**Field of normal, ungrafted eggplants**

rootstocks has been developed as a profitable alternative for the production of healthy, pesticide-free eggplants. The grafting technique can eliminate the risks of pesticides to the environment. Grafting of BW-susceptible cultivated eggplant (Chega) scions on BW-resistant (but low yielding) wild eggplant rootstocks, *Solanum sisymbriifolium* (*Ss*) effectively controls the disease, reduces eggplant mortality and produces 2-3 times higher yields, all without the use of pesticides.

The grafting technique so dramatically controls BW that Bangladeshi eggplant growers do away with their old custom of using pesticides. At two sites, Jessore and Sripur, 37-50% of the farmers in the community adopted the technology with as high as 250% increased production and 300% higher income.

The grafting technique is highly cost effective because the grafted eggplants (*Ss* + Chega) decrease BW-induced plant mortality by more than 70%, increase harvest duration by 29 days, increase the fruits per plant by 287%, increase yield (t/ha) by 254% and increase income by 299% over the farmers' practices of planting non-grafted eggplants (Chega) which are treated with pesticides (see table, next page).

Farmers are excited about the increased income they are receiving from their eggplant fields. Mr. Ayub Hossain, farmer and Chairman of the Agricultural Technology Implementation Center at Gaidghat village in



**Field of grafted eggplants**

Jessore district, in talking to a visiting press correspondent, said: "*Eggplant grafting has proven to be an effective and rewarding technique for successful and high production of eggplant. This year, we will grow eggplant grafts in about 10 acres of land*" (published in the Bengali daily, THE BANGLABAZAR PATRIKA, July 12, 2002).

### **Technology Transfer: Collaboration and Regionalization**

To transfer the highly profitable eggplant grafting technology to the millions of Bangladeshi vegetable farmers is an indomitable task, but not impossible. To disseminate the IPM technologies developed, the IPM CRSP-BARI in June 2003 teamed up with CARE-Bangladesh for technical exchange and support to elevate the livelihoods of vegetable farmers and alleviate poverty in Bangladesh. The eggplant grafting technology is being transferred to thousands of vegetable farmers through this collaborative effort.

Regionalization among Asian IPM CRSP sites has been a way to transfer IPM technology from one country to another. Grafting of bacterial wilt resistant rootstocks with scions of popular, but wilt susceptible eggplant varieties, was first implemented by the IPM CRSP Bangladesh team. After dramatically higher yields and profits were obtained, as compared to the farmers' practice of using non-grafted plants, the IPM CRSP Philippines site sent a team member to learn the grafting technique from

## Performance of grafted eggplants in farmer's fields at Jessore, Bangladesh, 2001- 2002

Graft & Scion	Plant mortality (%)	Harvest duration (days)	Fruits/plant (No.)	Yield (t/ha)	Net income (US\$/ha)
<i>Ss</i> + Chega (Grafted)	8.1b	89a	83a (287%) <sup>1</sup>	33a (254%) <sup>1</sup>	2271a (299%) <sup>1</sup>
Chega (Check) (Scion)	31.6a	60b	31b	13b	760b

<sup>1</sup> Figures in parentheses are the percent increases over the non-grafted (farmer's practice) eggplants. *Ss*= *Solanum sisymbriifolium*. One US\$= 58 taka.



**Vegetable growing farm family**

Bangladeshi scientists. At present, grafted eggplants are also being produced in the Philippines and will have a major impact on the economics of eggplant production there as well. Grafting is a relatively simple procedure, and with training, grafting has the potential to become a cottage industry that provides employment and income.

Grafting of eggplants to control BW has truly revolutionized eggplant production in Bangladesh. Highly impressed with the results of IPM CRSP technologies, the Minister for Agriculture, Mr. Matiur Rahman Nizami, in his address during the Farmer Field Day on January 28, 2003 stated: *“We need to increase production by using appropriate technologies and the IPM CRSP program is a highly effective means to achieve this goal. Adoption of the technologies in different areas of the country will go a long way to elevate the economic status of our farmers”* (Reported in the national Bengali daily The DAILY DINKAL on January 29, 2003). These technologies are having a significant impact on the rural economy and can increase trade and much needed foreign exchange. As stated in the Bengali newspaper, JANAKANTHA on July 13, 2003, *“Farmers are now producing pesticide-free vegetables with a dream of exporting to foreign countries.”*



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