

Are Japan's cultivation techniques and the wisdom of creative Japanese farmers applicable?

– Case study of training activities at Tsukuba International Center -

Part 2: Introduction of grafting techniques to prevent soil borne disease of tomatoes

In the first part of the series, we introduced basic efforts of training courses at the JICA Tsukuba International Center (TBIC) and approaches to teaching Japan's cultivation techniques to trainees from different countries each with their own unique problems. In the next few volumes, we are going to introduce Japanese techniques which we actually picked up during training courses. In this part, let us introduce an example of a training course in 2007 provided by a trainee from the Philippines, which focused on grafting techniques.

This trainee was working as an agricultural technologist. Her job was to provide guidance to vegetable and fruit farmers on the introduction of appropriate varieties that are suitable for the local environment, basic cultivation methods, and the introduction of environmentally friendly methods, using biological control or plant extracts, for preventing crop damage by blight and insects. According to the trainee, in the Philippines, although farmers use a large amount of pesticides, the yields remain low. In particular, it was found out that tomatoes were suffering severely from soil borne diseases and measures against wilt diseases were urgently needed. Therefore the following Japanese techniques as countermeasures were introduced and their applicability in the Philippines was investigated.

- a) Introduction of crop rotation for lowering density of bacteria
- b) Introduction of disease resistant breeds
- c) Improvement of fertilizer application techniques to move away from over application of nitrogen
- d) Grafting using disease resistant stock
- e) Disinfection of farming plots

As a result of research, it was concluded that the grafting is a useful technique that can be extended to farmers in the Philippines. It was decided that grafting using disease resistant stock plants become the theme of individual experimentations and that confirmation of specific effects and issues for extensions will be sought.

First of all, we tried to make the trainees master Japanese grafting techniques for tomatoes using special grafting clips and tubes which are commonly used in Japan. Then, we introduced how farmers had used to use Japanese paper or thin lead plates (fishing rod weights) before specialized materials were developed, so that the trainees could be provided with information for extension activities after going back to their country and so that they could learn that, with a little bit of innovation, it is possible to work with grafting without specialized materials in the Philippines. We spent time making people understand some key points and tips for grafting. For instance, it is important to adjust seeding timing in order to make the scion and stock plants compatible sizes. It is also important to do the work quickly under shade so that evaporation from the young seedling will be minimized. Efforts were also made to provide the trainees with experience and sound comprehension on how important it is to retain humid environment and adjust temperature during the first 3-4 days from the day of grafting, as well as to adjust lights from the early stage to promote growth. In addition, we ensured that the trainees mastered grafting techniques through seeding, grafting and injection of bacteria with an aim to evaluate stock plants of eggplants and tomatoes which are used to avoid soil borne diseases that are causing an increasing number of problems in the Philippines. Simultaneously, these experiments and exercises were useful for the trainees to confirm the effectiveness of disease control.

The challenges that grafting technique extension work in the Philippines face include how to avoid stocks that have negative influence on fruit quality and harvest volume. This issue involves the question of compatibility between the stocks and scions. Another challenge is to secure suppliers of well performing eggplant stocks. In addition, investigation into the financial burden of grafting and the establishment of technical training methods for grafting and naturalization are also important tasks that need to be tackled. Taking these challenges into consideration, trainees developed an action plan for conducting follow-up experimentations in the Philippines - a project which is also envisaged to serve as a demonstration. Considering local application after returning to home countries, a comparative analysis of the "tube grafting" method which was used in individual experimentation sessions, and the "yobitsugi grafting" method would be required. We are planning to continue to provide information on these techniques as part of our follow up activities.



Grafting exercise at TBIC



Observing grafting at a farm



Grafted sapling