

GRAFTING AND GROWING TOMATOES BY GRAFTED SEEDLINGS TO PROTECT FROM BACTERIAL WILT (*Ralstonia solanacearum*) IN LAM DONG PROVINCE, VIET NAM

Tomato (*Lycopersicon esculentum* Mill.) is one of the cash crops grown popularly in the World with an area of 3.1-3.2 million ha and productivity of 90-92 million tons. In Vietnam, annual area of tomato is about 14,000 ha. In the North, tomato is planted mainly in Red River Delta; in the South, it is mainly in Lam Dong province with an area of about 4000ha/year.

Tomato is often damaged by many kinds of pests and diseases, in which, Bacterial wilt (*Ralstonia solanacearum*) is considered as the most serious one because it can spread out fastly and damage almost 70-80%, event 100% of plants. In Vietnam, the damage caused by Bacterial wilt is reported in technical guiding as one of some diseases that can make largest loss and difficult to control. Mai Thi Vinh, Pham Van Bien et al. reported that in HCMC, tomato killed by *R. solanacearum* normally at a rate of 20-30%, some cases 100%.

In practice, it is so far there has not been chemicals that can control this agent. Using tolerant varieties and doing crop rotation are recommended, but in practice, there is not high tolerant variety available in markets and crop rotation is not so effective. With the big effort to find out good method or solution to control this disease, grafting a tomato scion on a rootstock of a resistant egg-plants or tomato is the best solution. Japan, Taiwan and Korea are countries growing mainly grafted tomatoes. In 1990's, the area of grafted tomatoes grown by Japan reached to 3,534 ha.



Grafted seedlings kept in house before growing

RESEARCH

From 2002 to 2003, 3 experiments using resistant tomato varieties to *Ralstonia solanacearum* were carried out in Hoc Mon District, Ho Chi Minh City and Duc Trong District, Lam Dong province. The purpose of these experiments was to find out good varieties for using as rootstocks. Seven tomato varieties were used as rootstocks to graft with normal varieties (Hoc Mon and 386). The experiment results showed that 99-100% of plants that grafted with rootstocks HW96 (other name is Viminal) resist to *R. solanacearum*. Grafted tomatoes yielded 60 ton/ha in Lam Dong, making an increase of 50% compared to non-grafted tomatoes.



Workers are grafting tomatoes

IMPLEMENTATION



An adult grafted tomato

Lam Dong, a province in Central Highlands, South Vietnam has the biggest tomato area in Vietnam, providing around 150,000 ton/year to market. This is a zone that vegetables have been developed for around 60-70 years, so bacterial wilt has become the most serious disease. It can make farmers lost 100% of harvest. Because of such important position, Lam Dong has been chosen the first province to apply the technique.

From August 2003, grafting and growing tomatoes by grafted seedlings have been introduced to farmers. The technique has spreaded out with a high speed, after 3 years, the total area grown by grafted tomatoes was around 4,000ha. In general, the yield increased from 40 ton/ha to 60 ton/ha. This brought to farmers about 30 million VND (2,000 USD) per hectare. It means that application of the technique had brought to farmers around 100 billion VND (6 million USD) on a total area of 4,000ha. In 2007, there will be an estimation of more than 40 farmers' farms producing grafted seedlings and providing enough to 3,000-4,000 ha of tomato areas in Lam Dong each year.



Tomato grown by grafted seedlings

BENEFIT

Farmers growing grafted tomatoes

Before implementing this technique, tomato growers often get 40-45 ton/ha; after applying they often get 60-65 ton/ha, increasing 20ton/ha. This brings about 30-35 million VND/ha higher than non-grafted tomatoes. With 3000-4000 ha tomatoes/year, Lam Dong farmers get benefit from this technique around 100 billion VND (6 million USD) each year.

Farmers producing grafted seedlings



A bacterial wilt-free tomato field



Grafted tomato before harvesting

As mentioned above, Lam Dong has about 40 farms in Don Duong and Duc Trong Districts. The size of each farm from 0.1ha to 2ha with 5 to 30 labors specializing in grafting every day. Each labor can graft 180-200 plants/hour with the success rate about 98-100%. With cost prize of 270-280 VND, the farm's owner sell 370-380 VND/ grafted seedling and get big benefit of 100 million VND from 1 million grafted seedlings. An average farm area of 0.5 ha with 10 grafting-labors can produce 0.5 million grafted seedlings/month, 4-5 million grafted seedlings/year and gets a benefit of 400-500 million VND/year (30.000 USD).

- Grafting and planting tomatoes by grafted seedlings is an excellent solution for control bacterial wilt. The technology can be applied widely in all most of tomato areas.

- In the locations with temperature above 30°C, some studies should be conducted more to create suitable environment including temperature and humidity. The researchers from IAS have good ability to solve problems and help any people to create grafted seedling farms as well as create a tomato growing area without losing productivity by bacterial wilt.