

GROWING TOMATOES WITH HI-TECH ORIENTATION GOT MORE THAN 200 TONS/HA IN LAM DONG PROVINCE

Background

With high-technology, tomato growers in developed countries can obtain 400-500 tons/ha. In these cases, tomato was grown in green houses fully provided with excellent conditions for growing and development. In order to produce tomato with hi-tech, it requires not only technology, investment but also management at high level.



Tomatoes grown in plastic house at young stage

Practical condition in Vietnam shows that it is impossible to go directly from low-tech up to hi-tech. Two hi-tech areas in Ha Noi and Hai Phong imported from Israel with investment cost of VND2-3 billion/1000m² had failed in getting effectiveness which was a lesson of going directly to high-tech while growers have no knowledge and techniques on hydroponics and green house.

It is considered that production with hi-tech orientation is suitable solution so far. With tomato growing in Lam Dong, a model of hi-tech orientation suggested by IAS has been combined some advanced techniques that available in practice, including: growing in plastic house with high density, plants climb up onto strings, mulching beds, drip irrigation, grafted seedlings and high yielding varieties. This model is applied for advanced farmers who have enough finance for investment with expected yield of 120-150 tons/ha, 3-4 times higher than normal (30-40 tons/ha).

This paper presented study results and creating tomato growing model following orientation of hi-tech in Lam Dong province from 2005 to 2007.

Contents and method of research

A plastic house of 800 m² was designed and constructed basing on experience and technique that combined between Lam Dong skilled farmers and IAS staff. The research was conducted with 2 steps. The first one is looking for good technical components and the second one is to combine technical components into a chain of techniques for growing tomato in plastic house.

In the first step, four experiments were conducted to answer 4 questions about techniques of growing tomato in plastic house, that is: What is suitable variety? What is good combination between mulching bed and irrigation method? What is suitable plant density? And what is good combination between plant density and fertilizer level? Besides, a comparative experiment of growing tomato inside and outside plastic house was conducted to show effectiveness of plastic house.



Tomatoes grown in plastic house at harvesting stage

Research results of technical components

The experiment results indicated that:

- Growing in plastic house, obtained the yield of 149.3 tons/ha compared to 38.2 tons/ha grown outside.
- Drip irrigation combined with plastic mulching gave the highest yield of 131.8 tons/ha meanwhile non-drip irrigation without mulching (control) gave 82.5 tons/ha.



Dr. Ngo Quang Vinh, project leader in tomato greenhouse of 237 tons/ha

- The density of 33,000 plants/ha and 1 stem/plant gave highest yield of 83.5 tons/ha and easy for crop management.
- With the rate of 420N-175P₂O₅-482 K₂O, 40 tons manure, 1.0 tons of lime, 10 kg borate, with 30,000 plants/ha, (1 stem/plant) gave the yield of 147.9 tons/ha, similar to 25,000 plant, 2 stems/plant (148.9 tons/ha).
- The density of 30,000 plants/ha was chosen due to convenience of crop management
- Red Diamond, the new variety that available in Vietnam markets is chosen to grow in plastic house due to high yield potential, quality and market preference.

Model trial results

Combining all of good technique components in the experiments, a technical package for growing tomato in plastic house was set up and implemented in Duc Trong and Don Duong Districts, Lam Dong province. The technical procedure included growing in plastic house with 33,000 plants/ha and 1 stem/plant; application of 420

N -175 P₂O₅ -482 K₂O, 40 tons of manure, 1000kg lime, 10kg borate; mulching by plastic; using strings for plants climbing up; drip irrigation to provide water and micro-fertilizer; using grafted seedlings to protect from bacterial wilt. The result showed that all of 4 varieties (Anna, Red Diamond, Labell and 386) grown in plastic house gave higher yield than those grown outside. The inside/outside yields were 191/88 tons/ha, 202/79 tons/ha, 180.6/72.5 tons/ha for Anna, Red Diamond and variety 386, respectively; and for Labell was 237.5 tons/ha (inside).

The result indicated that growing tomatoes in plastic house can get high benefit of VND 280 million/ha (US\$ 17,500) compared to VND133 million/ha (US\$ 8,300) grown outside.



Labell, a good variety gave 237 tons/ha in plastic house

Pest and diseases incidence

Although 5 tomato crops were continuously grown in plastic house within 2 year, only 45 days of target crop (to prevent nematodes) between the second and third crop was done. Pest and disease incidences were few. *Heliothis armigera* and *Prodenia litura* were slightly affected at low level for both inside and outside (signed +), *Bemisia tabaci* effected at medium level (++) in dry season but low level (-) in rainy season (inside), meanwhile it was low level in dry season and medium level in rainy season (outside). *Phytophthora* and *Fusarium* were not met inside but met at medium to high level outside in both dry and rainy seasons. Especially *Phytophthora* met at high level outside in rainy season.

Conclusions and suggestions

Growing tomato of hi-tech orientation following the

model created by IAS surely gave good result in yield, quality and economy-efficiency. This is the best model gaining highest yields in Vietnam so far with more than 200 tons/ha after 7 months. It has opened a new orientation for high yield and quality of vegetable production in Vietnam.

It suggested that a program to expand this model into large scale of production should be invested.