

USING THE GRAFTING AGAINST SOIL PARASITES OF SOLANACEAE

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Abstract : In Algeria vegetables crops growing under greenhouses are dominated by Solanaceae. These crops are attacked by various diseases and parasites (pests) particularly the nematodes. The use of chemicals is very expensive for the farmer in the developing countries. In addition, these chemicals represent a real danger for the soil and environment by their residues. In our study, we have tested the influence of grafted tomatoes on the population of nematodes and quality of tomato production grown under greenhouse.

Two varieties of tomato grown in a highly infected soil by nematodes, the first resisting one called "tresor" the second sensitive called "Lucy", the third treatment : sensitive grafted on the resisting varieties one. The grafting technique is terminal cleft part.

Obtained results show a rate of success of 93,91 %. Grafting caused a loss of precocity of 14 days. The total production was important in the grafted plants and in the resisting ones compared to the sensitive ones. Grafting does not seem to have an influence on the vitamin C. At the end, grafting decreases clearly the nematodes population in this grown soil.

Keys words : tomato, grafted plants, greenhouse, nematode.

Résumé : En Algérie, les cultures maraîchères cultivées sous serre sont dominées par les Solanacées. Ces espèces sont attaquées par plusieurs maladies et parasites particulièrement les nématodes. L'usage des produits chimiques revient trop cher pour les agriculteurs des pays en voie de développement ; de plus, ceci représente un vrai danger pour le sol et l'environnement par leurs résidus après utilisation.

Dans notre étude, nous avons testé l'influence de l'utilisation des tomates greffées sur la population de nématodes et la qualité de la production de la tomate cultivée sous abri-serre. Deux variétés de tomate sont plantées dans un sol hautement infecté par des nématodes, la première ("trésor") résistante, la seconde sensible ("lucy"), la troisième variante est issue de la variété sensible greffée sur la variété résistante. La technique utilisée est la greffe en fente terminale. Les résultats obtenus montrent un taux de réussite du greffage de 93,91 %. Le greffage a causé une perte de la précocité de 14 jours. La production totale était importante chez les plantes greffées et les résistantes comparées à celles des plantes sensibles. Le greffage ne semble pas influencer le taux de vitamine C des fruits. A la fin de la culture, le greffage a provoqué une diminution de la population de nématode dans ce sol.

Mots clés : tomate, plants greffés, abri-serre, nématode.

INTRODUCTION

In Algeria, the vegetable crops cultivated under greenhouse are dominated by Solanaceae which represent 75 % of the cultivated area. These crops are attacked by various diseases. Among these parasites, those sheltered by the soil in which the nematodes are the most important.

Several methods are used in order to reduce the damage :

- soil disinfection (chemical use) ;
- varietal selection ;
- cultural practices in particular the grafting.

The grafting used as mean of defense against the parasites can be very satisfactory in the future to protect the species belonging to this family.

In this study, we mainly focused on how to master the technique and its impact on the harvested agronomic production.

MATERIALS AND METHODS

The experiment has been done in a tunnel greenhouse at the Institut National Agronomique, El-harrach .

The soil used was limono-clay fertile, with a strong presence of nematodes.

Three treatments replicated six times were compared in a complete-block experiment design and were as follow :

- V1 Lucy ,susceptible
- V2 Trésor ,resistant (TmVFN)
- V3 grafted plant (susceptible grafted on resistant)

The grafting operation was done in terminal crack at the true 4 leaves stage. a 2 cm poll is done on the 4th leave and one incision of 1,5 cm is done. The graft is taken from below the 3th leave and heveled. Then the foliol area of the grafting is reduced (the evaporation is reduced).

The last step consists in unifying the two parts and stick them together with aluminum foil.

The grafted plants in a shadines condition and in an optimal temperature of around 20°C during one week.

Normal cultural techniques for care and follow-up are done up the harvesting time

RESULTS AND DISCUSSION

1. Grafting effect on the quality of the production

The production of grafting tomato accused a delay of 14 days compared to those not grafted. However at the end of the cycle the cumulated production was the same. The fruit of the grafted and not grafted plants have the same caliber .

The technical analysis of fruit sample did not show any influence on the rate of vitamin C.

2. Effect of the grafting on the population of Meloidogyne in the soil

We observed a regression in the number of nematodes on the grafted and resistant plants. However, in susceptible variety the number of nematodes is high and is shown in the following table :

Tableau I : number of Meloidogynes in 500g of soil.

Block Traitement	I	II	III	IV	V	VI	Mean
Resistant	5	2	3	7	2	7	4,33
Susceptible	203	225	254	254	244	227	234,50
Grafted	14	7	11	3	2	2	6,50

3. Indication of galle

Results obtained from roots are similar to the those obtained from soil.

The results show the presence of larvas on the

susceptible variety as well as on the resistant variety. However the number of Meloidogyne is less in resistant and grafted variety. (table II).

Tableau II : number of Meloidogynes in 5g of roots.

Block Traitement	I	II	III	IV	V	VI	Mean
Resistant	21	19	26	13	13	14	17,66
Susceptible	257	308	246	145	198	470	270,66
Grafted	63	31	19	34	36	33	36,00

In certain cases, there is a hatching of larva's, penetrate in the roots but they pricked cells instead of being transformed in giant cells, they necrotized leading the nematodes to death (Messiaen,1991.)

However, we notice that the susceptible plant start to produce the fruits but they

were disturbed at the end of the cycle, the fact that they were lacking vigour.

The grafted plants are more vigorous, fertile and showed healthy roots and therefore reduced the infection and the population of nematodes.

CONCLUSION

Grafting mastery requires some experience, this wished that the greenhouses must be specialized in the products of grafted plants ready to be used .

The grafting is an efficient mean of defence with the condition to do some studies taking into account the economic aspect of this technique.

In finally to eliminate definitely the parasites from the soil it is recommended to integrate others means of defence such as solarization.

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