Evaluation and Screening of Tomato Rootstocks with High Resistance and High Quality

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Background

Tomato (*Lycopersicon esculentum Mill.*) belongs to the Solanaceae vegetable. Because of its better taste and rich nutrition,it is deeply loved by people and has gradually become the main source of income for farmers in our country [1].However,with the continuous expansion of the facility tomato planting area,the planting method is mostly repeated planting in the greenhouse,and the damage caused by soil-borne diseases and continuous cropping obstacles is becoming more and more serious,this has become a major problem restricting tomato production.One of the most effective measures to overcome soil continuous cropping obstacles and prevent soil-borne diseases is grafting [2],which is also a method often used in horticultural production to deal with poor soil environments,Grafting can not only significantly improve the stress resistance of plants,but also promote plant growth and increase its yield.However,grafting also has a certain impact on the quality of the fruit:grafting can reduce the titratable acid and nitrate content in tomato fruits,and it may also reduce the content of soluble sugar, vitamin C and soluble solids in the fruit[3],but grafting has no significant effect on the reducing sugar and VC content in the fruit .

The results of previous studies mostly focused on the comparison of a certain index of fruit quality,and did not comprehensively evaluate the fruit quality and resistance.Moreover,the current tomato quality rootstock resources are few,which limits the application of grafting technology in tomato quality and efficiency production.Therefore,the screening of high-quality tomato rootstocks is of great significance for improving the quality and resistance of tomatoes and enhancing their market competitiveness.

Methods

In the experiment,Provence was used as the grafting scion, and 49 varieties of grafting rootstocks were designed,which were divided into two parts.Test 1: Rootstock was used to inoculate the pathogens of southern root knot nematode disease, root rot and neck rot. After inoculation,samples were taken for resistance gene detection.In the second experiment,the quality index of the fruit was measured.The membership function method is used to transform the data of each index,and the SPSS22.0 software is used for factor analysis,and the contribution rate of the common factor is used as the weight.The multiplication and accumulation of the first three common factors are added to calculate the factor score and the corresponding weight to obtain a comprehensive score.And then select good individual plants.

Results

As shown in Table 1,except for 8 varieties such as RTS2022-1,RTS2024-1, TRS2028-1,all other varieties have root rot and neck rot resistance genes.Except for RTTO07018,RTTO07019,and RTTO07020,all other varieties have Resistance genes of Meloidogyne incognita.The transformed data was analyzed by factor,and 3 common factors with characteristic roots> 1 were extracted,and the cumulative variance contribution rate was 57%. It can provide a reference for the selection of tomato

rootstocks.

Conclusion

The data converted by the membership function method is suitable for factor analysis;there are 3 key factors affecting the comprehensive evaluation of tomato fruit quali.The screening results of high-resistant and high-quality tomato rootstocks were RTTO07009,RTTO07024,RTTO07014,RTTO07016,RTTO07008,and RTTO07022 with better comprehensive traits.

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