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PRODUCTION OF TOMATO HYBRIDS FOR LOW TUNNEL PRODUCTION

BY

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THESIS

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ABSTRACT

This study was conducted in research facilities of the Horticulture Research Institute during the period from 1997 to 2000. Fifteen tomato true-breeding cvs. were evaluated along with the commercial hybrid Alwadi in the 1997/1998 winter season under low tunnels as potential parents for hybrids and genetic studies. Seven cvs. were chosen as parents to produce 21 F_1 hybrids in one direction. The 21 F_1 hybrids were evaluated along with hybrid Alwadi and true-breeding cv. Supermarmande as controls during the 1998/1999 and 1999/2000 winter seasons under low tunnels using drip-irrigation system to study yield and its components and fruit physical and chemical characters. Generally, in the two seasons, the hybrid Campbell 1327 VF × Scotia was superior in some characters having the highest values of fruit set percentage (FS), total yield (TY), and marketable yield (MY), but it was second in early yield (EY). It's fruit weight (FW) was about 100g. It also had round fruits having medium values of each of fruit firmness (FF), number of locules (NL), total soluble solids (TSS), titratable acidity percentage (TA), and ascorbic acid content (AA). Five crosses were made for genetic studies, viz., Supermarmande × Apex 1000 and Supermarmande × 506 Bush for studies on FS percentage, Apex 1000 × Siletz and Mountain Gold VFF × Siletz to study the inheritance of FF, and Scotia (red fruits) × Mountain Gold VFF (tangerine fruits) to study the inheritance of fruit β-carotene and lycopene contents. Parental, F_1, F_1r, F_2, and backcross populations of each cross were evaluated under low tunnels in the 1999/2000 winter season. Percentage FS was found to be controlled by one and 4 pairs of genes in the two above crosses, respectively, with over dominance of high FS percentage in the first cross and partial dominance of the low FS percentage in the second one. BSH estimates were 73.6% and 23.7% in the two crosses, respectively. Fruit firmness was found to be controlled by 3 and 8 pairs of genes in the two above crosses, respectively, with partial dominance of the low FF character. BSH estimates were 74.9% and 85.% in the two crosses, respectively. Fruit β-carotene and lycopene contents were found to be controlled by 2 pairs of genes for each pigment with partial dominance of low over high content of each. BSH estimates were 78.5% and 82.7% for fruit β-carotene and lycopene contents, respectively.

Key words: Tomato, *Lycopersicon esculentum*, Tomato hybrids, Low tunnel hybrids, Inheritance, Heritability, Fruit set, Firmness, β-carotene, Lycopene.

Use Other Side if Necessary

Ahmed A. H. Khaled E. Ali

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LIST OF ABBREVIATIONS

AA	:	ascorbic acid
AFW	:	average fruit weight
AMVRF	:	Ali Mubarak Village Research Farm
BSH	:	broad sense heritability
EP	:	experimental plot
EY	:	early yield
FF	:	fruit firmness
FS	:	fruit set
FSI	:	fruit shape index
KVRF	:	Kaha Vegetable Research Farm
MY	:	marketable yield
NL	:	number of locules
PH	:	plant height
RCBD	:	randomized complete block design
STHRS	:	South El-Tahrir Horticultural Research Station
TA	:	titratable acidity
TSS	:	total soluble solids
TY	:	total yield

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