SUMMARY

VII. SUMMARY

This study was conducted at the Experimental Laboratory and Green House of the Faculty of Agriculture, Moshtohor, Zagazig University during the seasons 1992, 1993 and 1994. Three tomato species were used for interspecific crossesing, ***Lycopersicum esculentum***, ***Lycopersicum peruvianum*** and ***Lycopersicum chilense***. Four cultivars for the first species were tested; UC-97/3, Castle Rock, Peto-86 and Heins. Three accessions for the second species were; LA : 1292, 385 and 111. While the third species, was represent by only one accession; LA : 1963 was used in this study .

For the usual crossing (conventional method), only one hybrid was succeeded; UC-97/3 x LA. 1292, All the morphological characters were studied and the results could be summarized as follows:

1- Plant height was superior in F1 than the two parents .

2- Plant shape was the same as the wild type parent (upright) rather than prostrate parent .

3- Number of leaflets per leaf was seven in the F_1 like the wild type parent.

4- For flower anthesis, it was earlier in the F_1 plant than in the two parents.

5- Significant delay of fruit maturity in F_1 was observed rather the two parents .

6- Moderate number of flowers per cluster was detected in F_1 .

7- Determinant inflorescence was shown in F_1 as in wild type parent .

8- Five anthers were detected in the flowers of the F_1 like the wild type parent .

9- Long style was observed in the flower of F_1 (9.6 mm) as compared to parents .

10- Fruit shape was globular in F_1 resembling the wild type parent, and fruit colour was orange in F_1 instead of green in wild type and red in the cultivated variety .

11- The fruit weight was 7.5 gm in F_1 and 3.3 gm in wild type while it reached 19.6 g in the cultivated parent .

Concerning viability, it was found that significant reduction appeaved in F_1 pollen grains (14%) while it reached 70% in the wild type parent and 88% in the cultivated parant.

For the interspecific hybridization by unconventional methods, it was found that :

1- Embryo callus .

1.1- Callus culture

1- Cross (Uc-97/3 x LA:385) revealed a high percentage of embryos which formed calli after three weeks in the medium(MS+2mg/L 2,4,D+1mg/L Kin+100ml/L CCM) and five weeks after pollination compared to the other crosses; (Uc-97/3 x LA:1292) and (Castle Rock x LA:1292) and parents.

2- The two crosses (Uc-97/3 x LA:1292) and (Castle Rock x LA:12925) showed high percentages of embryos which formed calli after eight weeks on the medium(MS+2mg/L 2,4,D+1mg/LKin+100ml/L CCM) and five and six weeks after pollination .

1-2. Using kanamycien as a marker for success of inter specific hybridization :

Most of clones (14 clones) for each cross; (Uc-97/3 x LA:1292) and (Castle Rock x LA:1292) revealed higher percentages of survival calli which cultured on selective medium with 500 mg/L kanamycien for five weeks .

1-3. Induction of regenerotion :

Shooting, rooting and chlorophyll formation were detected only on the fifth subculture and showed a high percentage in the (Castle Rock x LA:1292) hybrid .

2- Embryo culture :

Immature embryos of the interspecific crosses and their parents were grown to produce plantlets after four, six and eight weeks on culture medium(HLH).

1- Only the cross(Castle Rock x LA:1292) showed shooting, rooting and chlarophyll formation after four weeks on medium and after five and six weeks of pollination .

2- The cross (Uc-97/3 x LA:1292) showed shooting, rooting and chlorophyll formation in heigher percentages after six weeks on the medium and four and five weeks after pollination, followed

by (Castle Rock x LA:1292) and then (Peto-86 x LA:1292) crosses .

3- After eight weeks on the medium, all parents used in these cosses showed differentiation (shooting, rooting and chlorophyll formation) in high percentages.

3- DNA Transformation :

High percentages of survival calli were detected after transformation of the wild type DNA (LA: 385) on selective medium with 1000 mg/L kanamycien for two, three, four and five weeks in the three varieties Uc-97/3, Peto-86 and Castle Rock [treated and untreated with DNA] beside the wild type parent .

4- Estearase isozyme as a marker for success of interspecific hybridization :

4.1. Interspecific hybridization by conventional methods :

Light band at 0.67 in wild type parent was transferred to F_1 as more intensive band.

4.2. Interspecific hybridization by unconventional methods :

4.2.1 Embryo callus :

At 0.11, a band was common in the cultivated parent(Uc-97/3) and not found in wild type parent(LA:1292) while it was found in F_1. The F_1 band was darker than in the cultivated parent. Moreover, intense band at 0.19 was found in F_1 and absent in the two parents. Band at 0.53 was transferred to F_1 .

4.2.2. Embryo culture :

1- Band at 0.11 location is transferred from the wild type parent to the interspecific F_1 .

2- Also, band at 0.64 was transferred from wild type parent to the interspecific F_1 .

3- In the cross (Castle. Rock x LA : 1292), band at 0.64 was transferred to F_1 from both parents but it become lighter than in parents.

4.2.3. DNA Transformation :

Only a band at 0.5 was transferred to the transformed clones with DNA from wild type parent to ensure transformation to the clones of parents .