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# Processing Tomato Cultivar Evaluation in Al-Ain, U.A.E.

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## ABSTRACT

Based on extensive trials conducted in Egypt (Nassar et al., 1984), 18 processing tomato cultivars were selected for comparison with the locally- recommended cultivar Roma VF. Four trials were conducted over 2 years. Roma VF was inferior to most cultivars evaluated in total yield; the top yielding, good quality cultivars Castlex 1017 (F1 hybrid), Petopride #2, GS 27 (F1 hybrid) and VF 145-B-7879 were recommended to replace it. Castlex 1017 and Petoprid #2 are widely- adapted, while GS 27 is resistant to root knot nematodes and is recommended whenever this pest is a probelm. VF 145-B-7879 is highly tolerant to tomato yellow leaf curl virus (Hassan et al., 1985) and is the most acceptable processing cultivar. for fresh market use due to its acceptable fruit size, shape and excellent flavor. Use of these cultivars will extend the local harvesting season into May and early June, reduce the number of pickings to 2 or 3, reduce post-harvest losses , and enable hauling in large containers.

**Key words** Lycopersicon esculentum Mill., Processing cultivars, Evaluation trials.

## INTRODUCTION

Attention was given recently to the evaluation of vegetable cultivars suitable for processing following the establishment of the first vegetable canning factory in U.A.E. at Abu- Samrah (near Al-Ain). Tomato was given first priority and two processing cultivars , Roma VF and Rossol VFN, were recommended by the Department of Agriculture & Animal Production. (Salih, 1988). Both are long-established processing cultivars, and the latter is resistant to the root knot nematode, Meloidogyne spp., which is prevalent in the sandy soil of this region . However, they are becoming obsolete in most countries with the release and extensive cultivation of several new high quality processing cultivars adaptable to mechanical harvesting.

The desirable characteristics of processing tomato cultivars are described in several reviews (Gould, 1974; Stevens, 1979 and 1986; Stevens and Rick, 1986; Tigchelaar, 1986). They must be high yielding and suitable for mechanical harvesting, which means that they should have concentrated fruit set and good vine storage ability. Fruits should be deep red in color, blocky , oval, pear or elongated in shape to tolerate pressure in large containers, and high in total soluble solids. Juice pH must not exceed 4.4 and should be highly viscous to increase yield of the manufactured products . The majority of the new tomato processing cultivars possess most of these characters.

A nation-wide program of tomato cultivar

evaluation was recently conducted in Egypt (Nassar et al., 1984), which is a sub-tropical and semi-arid country slmilar to the U.A.E. .A total of 272 cultivars and breeding lines were evaluated, incluing most of the new processing types. Twenty- two new processing cultivars were recommended for the first time in Egypt. Eighteen of them were chosen for trial under U.A.E. conditions in comparison with the locally-recommended cv. Roma VF. The objective of this study was to find substiutes for the currently-recommended processing cultivars Roma VF and Rossol VFN which are late maturing and relatively soft.

## MATERIALS AND METHODS

Trials were conducted at the Agricultural Experiment Station of the Department of Agriculture and Animal Production, Al-Ain during the period extending from September 1986 to May 1988. Eighteen processing cultivars were compared with the locally recommended cultivar Roma VF in the fall and spring plantings. The evaluated cultivars and their sources were as follows: Castlex 1017, Castlerock and Castlong : Castle Seed Co.; GS 27 , and GS 30: Goldsmith Seed Co.; Peto 86 Peto 94, Peto 95, Peto 98 and Petopride #2: Petoseed Co.; NCX 3032: Moran Seeds; E 6203, UC 97-3, VF 145-B-7879 and Roma VF:(available from) several seed companies: and UC 204-9 and UC 211-58: Univ. Calif., Davis. The 1986 fall trial did not include 4 cultivars for the lack of seed, and the 1987 spring trial did not include cultivar Roma VF since it was recommended for the fall planting only. However, it was decided to

include it in the second year spring planting due to the lack of recommended cultivars for comparison. The number of cultivars evaluated in the second year of the study was reduced to 8 based on their performance in the first year.

A randomized complete block design was used for each test. Table 1 lists basic information about each trial concerning transplanting date (seed sowing was about 25 days earlier), number of cultivars evaluated , area of the experimental unit, number of replicates, duration of the experiment, number of pickings, and duration of the harvesting period. Clumps of 3 plants each were set 30 cm apart along drip irrigation lines placed 1.5 m apart. All trials were conducted in the open field except that of the Spring 1987, which was carried out under a plastic net providing 50% shading.

Experimental plots were fertilized during land preparation with 2 tons of compost and 50 kg of superphosphate per hectare. Plants were further fertilized with complete fertilizers in irrigation water about 2 weeks after transplanting and every 10 to 15 days thereafter for about 2 months in the fall plantings and 2.5 months in the spring plantings. About 10-15 kg of high analysis fertilizer were used per hectare each time plants were fertilized. Analysis and amount of fertilizers used depended on age and condition of the plants and weather conditions. Irrigation, weeding and disease and insect control practices were conducted as required.

Fruits were picked every 7-11 days when they

Table (1) Basic Informattion about tomato trials conducted in 1986 and 1987

| Planting | Transplanting date | No of cvs | Area of Experimental unit ($m^2$) | No of reps | Duration of the trial (day) | No of pick-ings | Harvesting period (day) |
|---|---|---|---|---|---|---|---|
| Fall (1st) | Oct. 11.1986 | 15 | 12.75 | 4 | 170 | 7 | 7 |
| Spring (1st) | Mar. 5,1987 | 18 | 8.00 | 3 | 120 | 6 | 45 |
| Fall (2nd) | Oct. 10,1987 | 8 | 12.00 | 4 | 162 | 5 | 52 |
| Spring (2nd) | Jan. 20,1988 | 9 | 13.5 | 4 | 131 | 4 | 39 |

were red-ripe, with the duration between pickings depending on the prevailing temperature at harvest. Temperature was typically very high during the harvesting season in the spring planting. The highest temperatue recorded was 49.5 C and 44 C in the 1987 and 1988 spring plantings, respectively. Data were collected on total yield, and observations were made on plant growh and fruit characteristics.

## RESULTS AND DISCUSSION

Data obtained on total yield are presented in Table 2. In the 1986 fall trial, cultivar GS 27 was

significantly higher yielding than Roma VF. Also, cultivars Castlex 1017, GS 30 and Petopride #2 out-yielded Roma VF, but they were neither significantly different from GS 27 nor from Roma VF. Cultivars Castlong, GS 22, Peto 98 and UC 204-9 were lower yielding but not significantly different from Roma VF. In the 1987 spring planting, yield was generally high and ranged from 4.34 T/dunum in cultivar Castlong to 7.77 T/ dunum in cultivar Petoprid #2, but no significant differences were found between them . The top yielding cultivars were almost similar to those found in the 1986 fall planting, viz (in descending order) : Petopride #2, GS 27, VF 145-B-7879, Castlex 1017, GS 22, UC 97-3, Peto 98 and GS 30. These cultivars were selected for further evaluation in the second year, but due to lack of seed, cultivar GS 22 was not included. cultivars Castlong was added instead because it was believed that it is potentially higher yielding than indicated in Table 2 , since plants are distinctively smaller in size and may be set in rows spaced 1 m apart.

In the 1987 fall planting, cultivars Castlex 1017 and Petopride #2 were significantly higher yielding, while Roma VF was significantly lower yielding than other cultivars evaluated (Table 2). Yield ranged from 5.26 T/dunum in cultivar Roma VF to 8.72 and 9.86 T/ dunum in cultivars Petopride #2 and Castlex 1017, respectively. Nearly, similar results were obtained in the 1988 spring planting. Roma VF was significantly lower yielding than all other cultivars evaluated except UC 97-3, and produced 1.59 T/duum. Castlex 1017 was the highest yielding but was not significantly different from cultivars Petopride #2

Table (2) Total yield of prcessing tomato cvs (T/dunum[a])

| Cultivar | Planting | | | |
|---|---|---|---|---|
| | Fall 1986 | Spring1987 | Fall 1987 | Spring 1988 |
| Castlex 1017 | 6.05 | 6.43 | 9.86 | 4.89 |
| Castlerock | - | 5.15 | - | - |
| Castlong | 3.89 | 4.34 | 6.93 | 3.67 |
| E 6203 | 2.62 | 4.43 | - | - |
| Gs 22 | 4.41 | 6.13 | - | - |
| Gs 27 | 6.71 | 7.75 | - | 3.54 |
| Gs 30 | 5.80 | 5.76 | 6.92 | 3.43 |
| NCX 3032 | 2.93 | 5.11 | - | - |
| Peto 86 | 3.24 | 5.55 | - | - |
| Peto94 | - | 5.22 | - | - |
| Peto 95 | 3.13 | 4.55 | - | - |
| Peto98 | 3.86 | 5.88 | 6.25 | 2.95 |
| Petopride ≠ 2 | 5.04 | 7.77 | 8.72 | 4.56 |
| UC 82 | 2.67 | 4.86 | - | - |
| UC97-3 | - | 5.78 | 6.42 | 2.22 |
| UC 204-9 | 4.63 | 4.59 | - | - |
| UC 211- 58 | 1.72 | 4.97 | - | - |
| Vf 145-b-7879 | - | 6.38 | 7.18 | 4.24 |
| Roma Vf | 4.67 | - | 5.26 | 1.59 |
| L.S.D(0.05) | 1.21 | n.s. | 1.22 | 1.28 |

[a]dunum= 1000 $m^2$

or VF 145-B-7879. They produced 4.98 , 4.56 and 4.24 T/dunum, respectively.

These results clearly indicate the inferiority of cultivar Roma VF to many of the other cultivars evaluated in total yield. The top yielding cultivars in these trials were Castlex 1017, Petopride #2, GS 27 and VF 145-B-7879. They are recommended to replace cv Roma VF in the Al-Ain region. Table 3 gives a comparison between them and the currently-recommended cultivar Roma VF. Information presented in the table was based on observations made under local conditions and cultivar descriptions in commercial seed catalogs.

Each of the newly-recommended cultivars is good on its own merit as follows:

1. Castlex 1017 was the highest yielding cv in 2 trials and was not significantly different from the top yielding cultivars in the other 2 trials. It is interesting to note that this cultivar was the hgihest yielding over 272 cultivars and breeding lines evaluated in Egypt (Nassar et al., 1984). It is of excellent quality for processing, and surplus production may be accepted in the fresh market.

2. Petopride #2 was the highest yielding cultivar in one trial and was not significantly different from the top yielding cultivars in the other 3 trials. It is nearly similar to Castlex 1017 in fruit characters.

3. GS 27 was the highest yielding cv in the first

Table (3) Characteristics of Roma VF as compared with the recommended cvs.

| Characteristics | Recommended cultivars | | | | |
|---|---|---|---|---|---|
| | Castlex 1017 | Petopride. # 2 | Gs 27 | Vf-145 - B-7879 | Roma VF |
| Cv type | $F_1$ hybrid | True-breed | F1hybrid | True -breed | True -breed |
| Growth habit | Deter | Deter | Deter | Deter | Deter |
| Plant vigor | vigorous | Vigorous | Vigorous | Vigorous | Vigorous |
| Growth type | Compact | Compact | Compact | Spreading | Spreading |
| Foilage cover | Good | Good | Good | Medium | Good |
| Leaf type | Normal | Normal | Normal | Rolled (wilty) | Normal |
| Conon of fruit set | Very concn | Very concn | Very concn | Concn | Not concn |
| Earliness | Very early | Early | Early | Med early | Very late |
| Fruit shape | Oval | Globe | Square round | Globe with peaked Plossom end | Pear |
| Shoulder colour of immature fruit | Uniform green | Uniform green | Uniform green | Green | Uniform green |
| Fruit colour | Deep red | Deep red | Deep red | Red | Red |
| Fruit size | Small-med | Small-med | Small | Med | Small |
| Fruit firmness | Very firm | Very firm | Very firm | Med | Med |
| Disease Resistance[a] | VF | VF | VFN | VF | VF |

a : Disease resistance V- verticillum wilt, F- fusarium wilt, N- root knot nematode.

year trial, though it was not significantly different from cultivars Castlex 1017 and Petoprid #2. It is an excellent cv for processing but its fruits are not large enough for use in the fresh market. It is resistant to root knot nematodes (Hassan et al., 1980; Medina Filho and Stevens, 1980) and should be the first choice for use whenever and wherever this pest is a problem.

4. VF 145-B-7879 was not the highest yielding in any of the trials, but it was not significantly different either from the top yielding cultivars in 2 out of 3 trials. It is not the best choice for processing, but the surplus produce may be sold in the fresh market because fruits are acceptable in size and have excellent flavor. It is one of the most tolerant commercial cultivars to tomato yellow leaf curl virus (Hassan et al., 1985) .

Additional advantage of growing these cultivars are : (a) reduction of the number of pickings to only 2 or 3 per crop because of their concentrated fruit set and vine storage ability, (b) extension of harvesting season into May and early June, (c) significant reductions in post-harvest losses due to high fruit firmness, (d) possible hauling of the crop to the canning factory in large containers and (e) production of a better quality manufactured product due to deep red fruit color and their high juice viscosity.

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# تقييم بعض أصناف طماطم التصنيع تحت ظروف العين

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## ملخص

تم بناء على دراسة موسعة سابقة أجريت فى مصر ( Nassar وآخرون ، ١٩٨٤) اختيار ١٨ صنفا من طماطم التصنيع لمقارنتها بالصنف المعتمد محليا روما فى اف تحت ظروف العين . وقد أجريت الدراسة على مدى عامين زرع خلالها أربع عروات . وقد تفوق عدد كبير من الأصناف على الصنف المعتمد فى المحصول الكلى. وبناء على نتائج الدراسة فقد أوصى بادخال أربعة اصناف جديدة فى الزراعة بدلا من الصنف روما فى اف ، وجميعها أعلى منه محصولا ، وافضل منه نوعية ، وهى كاسلكس ١٠١٧ ، وبيتو براید رقم ٢ ، وجى إس ٢٧ ، وفى إف ١٤٥ - بى - ٧٨٧٩ . ويتميز الصنفان كاسلكس ١٠١٧، وبيتو براید رقم ٢ بمدى تأقلم واسع ، ويعتبر الصنف جى أس ٢٧ مقاوما لنيماتودا تعقد الجذور ، ويوصى بزراعته فى المواسم والحقول التى تشتد فيها الإصابة بهذه الافة ، بينما يعد الصنف فى إف ١٤٥ - بى - ٧٨٧٩ من أصلح أصناف التصنيع للإستهلاك الطازج لما يتميز به من ثمار ذات حجم معقول ، وشكل مناسب ومذاق جيد فضلا عن أنه يعتبر من أكثر الأصناف التجارية تحملا للإصابة بفيرس تجعد أوراق الطماطم الأصفر. وتفيد زراعة هذه الاصناف فى استمرار موسم الحصاد حتى مايو وأوائل شهر يونيو ، وخفض عدد مرات الحصاد الى اثنتين أو ثلاث ، وخفض نسبة التالف بعد الحصاد بدرجة كبيرة لما تتميز به ثمارها من صلابة عالية مع امكانية نقل المحصول من الحقل فى عبوات كبيرة .

كلمات مفتاحيه : أصناف طماطم التصنيع ، تجارب التقييم .