New Introductions from MAS.PES, an Italian Fruit Tree Breeding Program: ‘Dulciva’ Nectarine and ‘Pulchra’ Peach

D. Bassi  
Dipartimento di Scienze Agrarie ed Ambientali  
Università degli Studi di Milano, Milan  
Italy

S. Foschi  
Crops Research Center (CRPV)  
Cesena  
Italy

L. Castellari  
ASTRA, Faenza  
Italy

Keywords: cultivar, peach, Prunus persica L. (Batch.)

Abstract
MAS.PES is an apricot and peach breeding program located in northern Italy aimed at the introduction of cultivars featuring enhanced fruit quality and disease resistance for the most important fruit growing areas. Among the most recent releases ‘Dulciva’ and ‘Pulchra’ are to be mentioned. ‘Dulciva’ is a nectarine from a ‘Big Top’ × ‘Ambra’ cross, ripening in late August (or first week of September as it is said after), around 40/45 days after ‘Big Top’; the tree growth habit is regular and of medium vigour, chilling is medium; fruit shape is round, slightly triangular, with over 70% blush, weighting over 220 g; flesh is melting, slow softening; flavour is very good, of the low acid type with soluble solids around 14°Brix. ‘Pulchra’ is a very early peach issued from a ‘Vista Rich’ × ‘May Crest’ cross, ripening one week before the pollen parent; the trees growth habit is regular and of medium vigour, chilling is medium, fruit shape is perfectly round, but prone to elongated tip in warm environments, with over 90% brilliant blush, weighting around 110 g, flesh is melting, the flavour is balanced and very aromatic. Both are highly productive, with good fruit ‘keeping ability’ during ripening. ‘Dulciva’ is meant for widening the harvest window of ‘Big Top’ nectarine in the very late season for the northern peach growing regions in Italy (between 44N and 46N of latitude), while ‘Pulchra’ is better suited for environments with mild Springs in order to enhance fruit size.

INTRODUCTION
An apricot and peach breeding program is ongoing in the south-eastern Po Valley (Italy), with the support of both public and private funds, including growers organizations. The program is aimed at the introduction of new cultivars adapted to the climatic conditions of the region and addressing disease resistance and outstanding fruit quality traits (Bassi et al., 2010). Other than traditional breeding procedure, tools for marker-assisted selection are being developed taking advantage of the peach genome sequence and innovative marker platforms (Bassi et al., 2012), even if marker identification has not been completed so far. The breeding stock for peach is made up of about 20,000 seedlings and around one hundred advanced selections, other than more than 300 accessions from a germplasm bank including commercial and local cultivars, other than landraces. Latest introductions have been the early ripening, yellow flesh ‘Bordò’ (Bassi et al., 2009b), as well as three yellow nectarines, i.e.: ‘Rebus028’, ‘Rebus038’ and ‘Rebus195’ (Bassi et al., 2009; Foschi et al., 2010), all featuring the ‘slow softening’ trait of the flesh (Ghiani et al., 2011). Recent releases are a flat yellow peach (‘Fulva’), a white non melting peach (‘Iride’) and a yellow peach tolerant to fruit brown rot (‘Nadia’), meant for the diversification of the peach fresh market (Bassi et al., 2012).

MATERIALS AND METHODS
The breeding operations are rather standard and based on manual emasculation and pollination, seedlings establishment, and field selection carried on for horticultural,
pomological and some commercial traits. Parents are chosen within the germplasm collection or from other, often foreign, programs. Once the seedlings begin fruiting (usually at the third leaf), the selected trees are grafted and further evaluated under test trials in comparison with commercial cultivars. The most promising selections are then subjected to more extensive trials under a non-propagation agreement in private orchards.

The whole process is subjected to strict observation of the virus-free status of the trees, from the choice of the parents up to the release of a new cultivar, under the supervision of the local public Plant Health Service. Selected segregating progenies are also assessed for inheritance studies, particularly for fruit quality traits and disease resistance. A trained panel of 18 tasters is employed to assess flavour and taste of the most promising selections, by the following quantitative descriptors: odour intensity (on cut fruit, off-flavours included), sweetness and acidity and their balance, bitter, astringency, aroma, juiciness, firmness. Finally, the panellists are asked to express their hedonistic appreciation in terms of odour, flavour, texture (as a result of firmness, juiciness, and mealiness) pleasantness, other than an overall quality evaluation. The score range is 1 to 9 for all descriptors.

RESULTS AND DISCUSSION

The descriptions of the two most recent introductions, ‘Dulciva’ nectarine and ‘Pulchra’ peach, follow.

‘Dulciva’ Nectarine

‘Dulciva’ was issued in 2002 from the cross ‘Bigtop’ × ‘Ambra’, both yellow nectarines, in Imola (Bologna, northern Italy) and initially selected as ‘BO 02002015’. The tree has a standard growth type, slightly upright and rather vigorous, early bearing. The flower is showy and the bloom is rather abundant, in the middle season; the yield is high. The leaf is of normal size, with reniform glands.

The fruit starts to ripe in the first week of September (northern Italy, Fig. 1), it is of large size (over 200 g), round and slightly asymmetrical; skin is yellow with a 60-70% of red blush, with some stripes and dots, tolerant to ‘streaking’ eventually caused by rain; flesh is yellow, with some red close to the pit, melting and slow softening like the seed parent, thus with a very good keeping ability both on tree and on shelf, very juicy and of good flavour, sweet and medium-low acid (Table 1); stone is of medium size, adherent to the flesh.

‘Pulchra’ Peach

‘Pulchra’ was issued in 2002 from the cross ‘Vistarich’ × ‘Maycrest’, both yellow peaches, in Imola (Bologna, northern Italy) and initially selected as ‘BO 02037004’. The tree has a standard growth type and it is rather vigorous, and needs summer pruning in order to keep a balanced canopy, as it has a tendency to show bare wood. The flower is showy and the bloom is rather abundant, in the middle season; the yield is very high and needs adequate thinning. The leaf is of normal size, with reniform glands.

The fruit starts to ripe in the first week of June (northern Italy, Fig. 1), 4-5 days head of ‘Maycrest’ yellow peach, it is of medium size for its season (over 100 g), perfectly round, but may show a protruding apex after warm Springs; skin is yellow with over 80-90% of a very attractive red blush, with stripes and dots; flesh is yellow, with scarce red, melting, firm and with good keeping ability on tree, juicy, very flavoured and aromatic; the pit, of medium size, is adherent to the flesh.

Taste by Panel Test

The results of the evaluation of the different components of flavour were very positive and both cultivars were superior or similar to comparable commercial cultivars for all overall descriptors (Figs. 2 and 3). In particular, ‘Dulciva’, compared to the pollen parent ‘Big Top’, was found more juicy and aromatic, while ‘Pulchra’ was evaluated more aromatic, sweet and juicy, even if more firm, of the early ripening ‘Springbelle’.
CONCLUSIONS

‘Dulciva’ nectarine and ‘Pulchra’ peach were introduced because of their superiority compared to the present varietal commercial standard, both in term of horticultural and fruit quality traits.

First evaluation in commercial farms confirmed the early assessment in experimental plots. In particular, ‘Dulciva’ fruit shows an outstanding slow softening evolution when still on tree and a very long shelf life. ‘Pulchra’, other being of very high yield and of nice appearance, features a distinct peach aroma, rarely found in very early ripening peaches. ‘Dulciva’ is meant for widening the harvest window of ‘Big Top’ nectarine in the very late season for the northern peach growing regions in Italy (between 44°N and 46°N of latitude), while ‘Pulchra’ is better suited for environments with mild Springs in order to enhance fruit size.

Both cultivars are being patented and are available for evaluation under a non-propagation agreement regime.

ACKNOWLEDGEMENTS

The authors wish to thank Martina Lama and Claudio Buscaroli for technical assistance in field and laboratory operations, and for virus-free status assessment. The contribution of Marisa Rizzo during the first stages of selection is also to be mentioned.

Literature Cited


Tables

Table 1. Main qualitative fruit traits of the new introductions (in bold) compared to commercial cultivars.

<table>
<thead>
<tr>
<th>Name</th>
<th>Fruit weight (g)</th>
<th>Firmness (kg/cm²)</th>
<th>TSS (°Brix)</th>
<th>Acidity (meq/100 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Bordò’</td>
<td>125</td>
<td>1.3</td>
<td>10.7</td>
<td>12.5</td>
</tr>
<tr>
<td>‘Big Top’</td>
<td>160</td>
<td>4.5</td>
<td>12.8</td>
<td>6.3</td>
</tr>
<tr>
<td>‘Dulciva’</td>
<td>219</td>
<td>3.7</td>
<td>13.8</td>
<td>5.5</td>
</tr>
<tr>
<td>‘Pulchra’</td>
<td>107</td>
<td>1.6</td>
<td>11.3</td>
<td>12.4</td>
</tr>
<tr>
<td>‘Springbelle’</td>
<td>152</td>
<td>1.3</td>
<td>10.2</td>
<td>14.6</td>
</tr>
</tbody>
</table>

*z At physiological ripening.
*y By refractometer.

Figures

Fig. 1. Ripening chart of ‘Dulciva’ and ‘Pulchra’ compared to commercial references.
Fig. 2. Panel test evaluation of ‘Dulciva’ nectarine fruit compared to the seed parent, ‘Big Top’. *Radar*: quantitative descriptors; *histogram*: hedonistic evaluation.
Fig. 3. Panel test evaluation of ‘Pulchra’ peach fruit compared to ‘Springbelle’, an early ripening yellow peach. *Radar*: quantitative descriptors; *histogram*: hedonistic evaluation.