Santafe - an Excellent Sunflower Hybrid

Ventsislav VENKOV and Necho NANKOV
Institute for Wheat and Sunflower "Dobroudja", 9520 Gen. Toshevo,
Bulgaria

Abstract

Nowadays it is known the hybrids are better than varieties in
sunflower production. All efforts are going to develop new and new
hybrids with better characters. After Albena's boom in France, now
Santafe appeared to be a new hybrid with very good potential yield,
good oil content and one very important character - earliness, which
classified this hybrid in group A of maturity. Hybrid Santafe entered
in three years testing - 1993, 1994 and 1995 under the conditions of
IWS(Northeast Bulgaria) and in State testing in competition with the
supreme hybrids Albena and Super Start.
Seed yield, oil content, oil yield, height, head diameter, 1000 seed
weight and days to maturity of these three hybrids were compared
and presented in tables. The presented results are for 1993 and 1994
testing because the data for 1995 testing is not ready yet.

Introduction

Sunflower is the main crop for vegetable oil in Republic of Bulgaria.
In 1995 the commercial fields reached 500 000 ha. Ten years ago,
cultivar Peredovik was mainly grew up, but now 60-70 % of areas are
occupied by hybrids Albena and Super Start and only 30 % by
Peredovik and edible cultivars. Hybrids have an advantages in
earliness, higher seed yield, higher oil content, resistance and
tolerance to diseases and uniformity in front of cultivars.
Albena and Super Start are supreme hybrids, adapted to the
conditions in Bulgaria, with specific characters, allowed to obtain
stable seed and oil yield, combine with tolerance to diseases.
The aim of present study was to check the performance of Santafe
under the conditions of Bulgaria.

Materials and Methods

The aim of the contemporary breeding programmes in sunflower is
to develop more new parental lines (CMS and R) with better
characters or to convert the old ones. These lines would had to be
components of new hybrids which could be successfully compete the
others included in the commercial lists all over the world. That is
why there are three ways a new hybrid to be developed:
1. Combination of entirely new components (CMS line and R line).
2. Combination of well known component (CMS or R line) and new
one (CMS or R line).
3. Combination of converted one or two components of well known
hybrid (after transferring of specific genes).
Hybrid Santafe was developed by the second way. This hybrid is
common hybrid between IWS and company Hilleshog - NK,
France. Since 1992 Santafe took place in commercial list of France and in 1994 fields occupied with this hybrid were 100 000 ha (10 %).

Since 1993 hybrid Santafe is included in Bulgarian State Testing Programme and in IWS trials. In 1993 and 1994 Santafe was tested in Representative Trials (RT), along with other perspective hybrids. The check (standard) used was the average mean of hybrids Albena and Super Start. The trial scheme was latin square, 20 entries in each trial, 4 replicates, 6 row replicate, row spacing - 0.7 m.

Oil content was read off by NMR analyzer "Newport". The screening for resistance to disease was carried out in laboratory and artificially infested field.

Results and Discussion

In Bulgaria the conditions are not so favorable for planting sunflower - without irrigation, too drought or too wet summer, rely only on rainfalls and air humidity, instead of reach soil in some regions. The hybrids Albena and Super Start are the best adapted to these conditions. In some good years the seed yield of those hybrids rises up to 4000 kg/ha, which is probably the maximum. Recently there are too many hybrids entered in State Testing, but with unstable performance through the years. Santafe is an exception because of specific characters it performed.

Seed yield
Average over two years, 1993-1994, Santafe got stability (102.3 %) on this character, exceeded 4 % Albena (tabl. 1).

Oil content/Oil yield
Santafe take advantage on one of the most important characters oil content, compared with Super Start almost equal, and better 1.5 % over Albena (tabl. 2)

In table 3. height, head diameter, 1000 s weight and days to maturity are presented. There are not great differences in height and head diameter among Santafe, Super Start and Albena, really they are in one group. Concerning 1000 s weight, it is seen Santafe exceeded Super Start 9 g and Albena 7 g. Maturity is very important character, especially for countries with different climate conditions - Santafe is the most earliest hybrid(group A of maturity) in Bulgaria (the same in France).

Santafe was tested in laboratory on Orobanche and in artificially infested field on Phomopsis and it was found out Santafe is resistant to Orobanche and tolerant to Phomopsis in some extent. Field observations during the testing showed resistance to lodging, no breaking of the head at harvesting, uniformity on the whole.

Conclusion

One of the most valuable characters Santafe presents - resistance to Orobanche and downy mildew (including the new race); tolerance to Phomopsis, resistance to lodging, gives the final draw of one hybrid, with excellent performance over those two years of testing, 1993 - 1994.
The results presented in this study showed Santafe is one very good adapted to the conditions of Bulgaria hybrid, which in the nearest future could successfully compete Albena and Super Start in the commercial production of sunflower.

References


Table 1. Performance of hybrid Santafe, combined over years, 1993-1994, seed yield

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kg/ha</td>
<td>% St</td>
<td>kg/ha</td>
</tr>
<tr>
<td>Santafe</td>
<td>2547</td>
<td>101.8</td>
<td>3001</td>
</tr>
<tr>
<td>Super Start</td>
<td>2550</td>
<td>102.0</td>
<td>2953</td>
</tr>
<tr>
<td>Albena</td>
<td>2547</td>
<td>98.0</td>
<td>2883</td>
</tr>
<tr>
<td>Standart</td>
<td>2599</td>
<td>100.0</td>
<td>2923</td>
</tr>
</tbody>
</table>

Table 2. Performance of hybrid Santafe, combined over years, 1993-1994 oil content, oil yield

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oil %</td>
<td>Oil yield kg/ha</td>
<td>Oil %</td>
</tr>
<tr>
<td>Santafe</td>
<td>43.5</td>
<td>1151</td>
<td>45.9</td>
</tr>
<tr>
<td>Super Start</td>
<td>42.5</td>
<td>1126</td>
<td>45.2</td>
</tr>
<tr>
<td>Albena</td>
<td>41.9</td>
<td>1067</td>
<td>44.4</td>
</tr>
<tr>
<td>Standart</td>
<td>42.2</td>
<td>1098</td>
<td>44.8</td>
</tr>
</tbody>
</table>

Table 3. Performance of hybrid Santafe, combined over years, 1993-1994, height, head diameter, 1000 s weight, days to maturity

<table>
<thead>
<tr>
<th>Hybrid</th>
<th>Height cm</th>
<th>Head diameter cm</th>
<th>1000 s weight G</th>
<th>Days to maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santafe</td>
<td>147</td>
<td>18</td>
<td>57.9</td>
<td>114</td>
</tr>
<tr>
<td>Super Start</td>
<td>149</td>
<td>19</td>
<td>48.6</td>
<td>118</td>
</tr>
<tr>
<td>Albena</td>
<td>140</td>
<td>19</td>
<td>50.4</td>
<td>116</td>
</tr>
</tbody>
</table>