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Sunbonnet and Toro

NELSON E. JODON

2 new midseason long-grain rice varieties

Bulletin No. 499 September

Louisiana State University and Agricultural Experiment Station

J. N. Efferson, Director
PEDIGREE OF SUNBONNET AND TORO

1918 Fortuna

1928

1932 Rexoro x Fortuna (Texas)

1944 Bluebonnet (Texas Release)

1953 Sunbonnet

Blue Rose 1912
S L (Sol) Wright

Rexoro x Blue Rose 1935
Rexoro x Rex- B.R. 1936

Sel. No. 4II-8-14 1945
(Not released)

4II-8-14 x Bluebonnet 1946

Toro 1955
Sunbonnet and Toro
Two New Midseason, Long-Grain Rice Varieties¹

Nelson E. Jodon²

INTRODUCTION

Sunbonnet and Toro are productive, midseason, long-grain rice varieties with improved milling quality released in 1953 and 1955 respectively. Both of these new varieties were selected from crosses involving Fortuna and Rexoro, and Toro also has Blue Rose in its parentage. Fortuna and Rexoro were released by the Rice Experiment Station in 1918 and 1928 respectively. Blue Rose, a fairly late medium-grain variety was distributed by S. L. (Sol) Wright in 1912. Blue Rose was the leading variety in Louisiana from about 1915 to 1945, when it gave way to Zenith, which is earlier and more suitable for combining and drying. Fortuna was especially adapted to the areas of lighter soil. It was grown on a rather limited acreage before combines came into use, but by 1946 18 per cent of the state acreage was in Fortuna. However, it soon was replaced by Bluebonnet,³ a selection from a cross between Rexoro and Fortuna. Bluebonnet has shorter straw and a more slender, better milling grain than Fortuna. Rexoro also increased in importance with the advent of combining, was grown on 29 per cent of the 1946 acreage, and is still one of the leading varieties because of the excellence of its style and quality.

SUNBONNET

Sunbonnet is the progeny of one of several varieties found in the original seed-stock of Bluebonnet. It was selected from a line that was segregating straw vs. gold hull colors in 1945, and was entered in the uniform nursery in 1949 and in the field plots in 1950. An increase field of about an acre in 1951 provided the seed for growing the

¹Cooperative investigations by the Louisiana Agricultural Experiment Station and the Field Crops Research Branch, Agricultural Research Service, U. S. Department of Agriculture.
³Selected at the Beaumont Rice-Pasture Station, of the Texas Agricultural Experiment Station.
foundation seed in 1952 that was released under the name Sunbonnet in 1953.

The field growth of Sunbonnet is indistinguishable from that of the original Bluebonnet. The name was chosen to show the relationship. While it may be rather tall when grown on heavy land, its vigorous growth probably is desirable on average and light soils in southwestern Louisiana. It is susceptible to kernel smut, although apparently no more so than Bluebonnet where the two are grown under comparable conditions. However, in foundation fields in 1952 and 1953 and in some farm fields the degree of infection was higher than ever noted in any other variety. It is probably more susceptible to straighthead than is Bluebonnet. It has greater resistance to Cercospora leaf spot, and the foliage may remain fresher at maturity.

Sunbonnet threshes readily. The tip of the hull, like that of Bluebonnet, shows purple coloration but this may fade and almost disappear by harvest time. The foundation and certified seed first distributed contained a sprinkling of off-type goldhull colored grains. However, they are similar to true Sunbonnet in shape and maturity and are not objectionable to the trade.

The yield of Sunbonnet has been practically the same as that of Bluebonnet in nursery and drill-strip plot experiments.

The grain averages slightly shorter and is more uniform in length than Bluebonnet. It is usually less chalky than Bluebonnet, and because of this and of the greater uniformity in grain size, its average milling yields have been higher. Sunbonnet that matured in the exceptionally hot August of 1951, milled rather poorly but gave distinctly higher head rice indication than Bluebonnet under the same conditions.

The cooking quality of Sunbonnet is considered excellent by most consumers. It is a dry, flaky rice similar to Rexoro. While probably not equal to Rexoro for canning, it may prove fairly satisfactory for this purpose.

TORO

Toro was selected from a cross between Bluebonnet and Selection 4-11-8-14, the latter being a midseason, long-slender-grain variety from Rexoro x Blue Rose backcrossed to Roxoro. Selection 4-11-8-14 has fairly short straw and a very clear grain, but is probably less productive than Bluebonnet. Indirectly, Toro was derived from Rexoro, Fortuna, and Blue Rose, three excellent varieties that were developed by plant
introduction and varietal selection before the cross breeding program was started.

Toro was first increased in 1951 and was entered in uniform nurseries, field plots, and date-of-seeding nurseries in 1952. Although it was increased in the sixth generation after crossing, it is uniform in plant and grain type with short straw and vigorous growth.

Toro has produced good stands at all dates of seeding. It grows about four inches shorter than Sunbonnet, or about the same height as Bluebonnet 50. It is resistant to Cercospora leaf spot, and the foliage remains fresh and green at maturity. It may be somewhat less susceptible to kernel smut than Sunbonnet and Bluebonnet. Straighthead and stem rot have not been observed to affect it to any noticeable degree.

Toro does not thresh so readily as Bluebonnet, but can be combined satisfactorily with a properly adjusted machine. It stood up exceptionally well in the foundation seed increase field where the yield was very heavy; although exposed to wind and rain storms it went down only in a few spots. Toro apparently matures more uniformly than do the Bluebonnet varieties, which of course is desirable with combine harvesting.

The yield of Toro in test plots usually has been slightly higher than that of Bluebonnet. The yield of foundation seed following winter pasture experiments was 33.4 barrels per acre, compared to 31.4 barrels from Zenith, showing that it has the capacity to produce high yields under conditions of high fertility.

The grain is essentially the same size and shape as that of Sunbonnet, but may be distinguished by the colorless tip of the mature grain. The kernels are mostly crystal clear, only a very few showing any chalkiness, thus resulting in an exceptionally high head rice turn-out in milling.

The cooked rice is less flaky than that of Bluebonnet, but is not objectionably sticky. It may be described as firmer and more moist.
HISTORY OF SUNBONNET (C. I. 8989)

A selection from Bluebonnet (C. I. 8322)

1940-43 Sel. No. B322A4-2-3-1 (Bluebonnet), from H. M. Beachell, Rice-Pasture Experiment Station, Beaumont, Texas, was grown in uniform nursery.

1944 Bluebonnet was grown as a check (row No. 760) in the progeny row nursery. This was probably sown with bulk seed from 1943 No. 225 and not a plant selection.

1945 Sixty panicle selections from 1944 row 760 were grown in rows for the purpose of repurifying the seed stock on plot No. 8058.

1946 One of the selections from 1945 plot 8058 was sown in progeny row No. 1784. It was segregating for straw vs. goldhull color, as were 4 out of 6 strawhull lines from a segregating row in 1945 plot 8058. This row was selected as having shorter straw.

1947 Progeny row No. 1666. Strawhull color, but next to another selection from 1946 row 1784 that was segregating for straw vs. goldhull.

1948 Entered in Row Block Increase, No. 4090. Best appearing milled sample among several Bluebonnet selections. (Plot 4090 was adjoined by a goldhull selection from Bluebonnet.)

1949 Entered in uniform nursery for first time. Increased in row blocks, No. 4094 & 4095. Noted as being Cercospora resistant, uniform in height, and as giving a better milled sample than Bluebonnet. (Plot 4095 was adjoined by a goldhull selection from Bluebonnet.)

1950 Entered in field plot tests for first time (Variety 41). Less Cercospora observed than in Bluebonnet.

1951 One increase field of about 3/4 acre was grown from 1950 V 41, producing about 17 barrels of seed. It was partly lodged, although not so badly as some other varieties, owing to wind and rain before it could be thoroughly rogued. A milling test on samples from the drilled plots showed 33 per cent head rice for Sunbonnet and 17 per cent for Bluebonnet.

1952 Two increase fields totaling about 25 acres were grown, and about 200 barrels of re-cleaned seed were available for distribution. A considerable number of goldhull plants were present in the increase fields, and many of these were missed in roguing. The grain type of these off-color plants is very similar to the true type, however, and the trade does not object to the presence of some grains with gold-colored hulls. There were probably 3 to 5 of these per pound after cleaning.

In addition to the milling data shown in the preceding table, an unofficial test made on samples from the Stuttgart Uniform Nursery gave about 49 per cent head rice for Sunbonnet and about 11 per cent for Bluebonnet.

1953 Released as a new variety and foundation seed distributed. The name was chosen to indicate the relationship to Bluebonnet and to distinguish it from the other Bluebonnet varieties being grown.
PEDIGREE OF TORO (C. I. 9013)
A selection from 4-II-8-14 x Bluebonnet (1946 Cross 711) released to growers in 1955

1907-11 Off types were found in a Japanese rice by F. F. Shoemaker, and from these S. L. Wright selected Blue Rose.

1912 Blue Rose (C. I. 1962) first grown commercially.

1918 Fortuna (C. I. 1344), selected by Charles E. Chambliss & J. M. Jenkins from an introduction from Formosa, was released by the Rice Experiment Station.

1928 Rexoro (C. I. 1779), selected by Charles E. Chambliss & J. M. Jenkins from an introduction from the Philippines, was released by the Rice Experiment Station.

1932 The cross Rexoro x Fortuna was made by H. M. Beachell at the Rice-Pasture Experiment Station, Beaumont, Texas.

1936 A backcross of Rexoro x Blue Rose to Rexoro was made by the writer at the Rice Experiment Station.

1938 Bluebonnet (C. I. 8322) released by Rice-Pasture Experiment Station.

1946 Selection 4-II-8-14 from the backcross Rexoro and Blue Rose combination made in 1936 (which matured ahead of Fortuna and had a Rexoro type grain) was crossed with Bluebonnet. 1946 Cross Number 711.

1947 F₁ plants of the Cross 4-II-8-14 x Bluebonnet, were grown in plot number 5034-3.

1948 F₂ population was grown in plot number 6068.

1949 F₃ plant selection was grown in row number 1936.

1950 F₄ plant selection grown in row number 2198 was a productive appearing, short-straw strain.

1951 F₅ plant rows grown in a block (4020) to check uniformity, growth characteristics, and grain quality.

1952 F₆ plant rows grown in a block, Number 4105. Entered in field plot (V36) where it gave same yield as Bluebonnet. It was also entered in Uniform Nurseries and in Date-of-Seeding Nurseries.

1953 F₇ seed from the 1952 row-block was used to seed a one-acre increase. Field plot and nursery tests were continued. These showed the selection to have short strong straw, good yielding ability, and exceptionally high milling quality.

1954 A foundation seed field of 20 acres was seeded from the one-acre increase of 1953. Field and nursery tests were continued. Named “Toro” because (1) “oro” indicates the Rexoro inheritance received from both parents, (2) the Spanish word Toro (meaning bull) characterizes its sturdy plant and hard grain type.

1955 About 400 barrels of foundation seed made available to growers for the production of certified seed of Toro.
RESULTS FROM TESTS 1952-1954

Three-year average results from uniform nursery tests at three stations are shown in Table 1. Data from the Arkansas station are available as a result of cooperative USDA Arkansas Agricultural Experiment Station Rice Breeding Project, Stuttgart, Arkansas, by courtesy of Dr. T. H. Johnson. Data from the corresponding project at the Beaumont Rice-Pasture Station of the Texas Agricultural Experiment Station are similarly available by courtesy of Mr. H. M. Beachell.


<table>
<thead>
<tr>
<th>Variety</th>
<th>Days Seeding to Maturity</th>
<th>Height (inches)</th>
<th>Yield per Acre (Lbs.)</th>
<th>Milling Yield % Head-Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arkansas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toro</td>
<td>148</td>
<td>45</td>
<td>3560</td>
<td>58.71</td>
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<tr>
<td>Bluebonnet 50</td>
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<td>46</td>
<td>2880</td>
<td>50.71</td>
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<tr>
<td>Bluebonnet</td>
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<td>49</td>
<td>3281</td>
<td>49.70</td>
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<tr>
<td>Sunbonnet</td>
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<td>52</td>
<td>3362</td>
<td>54.71</td>
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<tr>
<td>Improved Bluebonnet</td>
<td>152</td>
<td>46</td>
<td>3335</td>
<td>49.70</td>
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<tr>
<td><strong>Louisiana</strong></td>
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<tr>
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<td>2925</td>
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<td>Improved Bluebonnet</td>
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<td>Toro</td>
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<td>3319</td>
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<td>53</td>
<td>3516</td>
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<tr>
<td>Improved Bluebonnet</td>
<td>143</td>
<td>50</td>
<td>3692</td>
<td>53.68</td>
</tr>
</tbody>
</table>

Five varieties are included for comparison: Toro, Bluebonnet 50, Bluebonnet, Sunbonnet, and Improved Bluebonnet. Bluebonnet 50 is a short-straw re-selection from Bluebonnet which was released in Texas in 1951. Improved Bluebonnet is a selection from Rexoro x Nira, and was released in Texas in 1947.

In these tests Toro matured at the same time as Bluebonnet 50 and had slightly shorter straw. Toro gave the highest average yield in Arkansas and Louisiana, but in Texas it averaged below Improved Bluebonnet. Toro was one of three long-grain varieties yielding 20 barrels per acre at the Everglades Experiment Station, Belle Glade, Florida, according to Dr. V. E. Green, Jr. The head rice turn-out of Toro was distinctly high at all stations, Sunbonnet being next best.
<table>
<thead>
<tr>
<th>Year</th>
<th>Toro</th>
<th>Bluebonnet 50</th>
<th>Sunbonnet</th>
<th>Bluebonnet</th>
<th>Bluebonnet set.</th>
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<tr>
<td>DAYS SEEDING TO MATURITY</td>
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<td>140</td>
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<td>142</td>
<td>143</td>
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<td>41</td>
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<td>48</td>
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<td>48</td>
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<td>1953</td>
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<td>50</td>
<td>52</td>
<td>54</td>
<td>52</td>
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<td>YIELD PER ACRE, LBS.</td>
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<td></td>
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<tr>
<td>1952</td>
<td>2596</td>
<td>2389</td>
<td>2244</td>
<td>2616</td>
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<td>1953</td>
<td>3570</td>
<td>2830</td>
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<td>2736</td>
<td>2831</td>
<td>2836</td>
<td>3022</td>
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<td>MILLING YIELD, % HEAD &amp; TOTAL</td>
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<td>1952</td>
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<td>65-69</td>
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<td>56-68</td>
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<tr>
<td>AVERAGE</td>
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<td>49-68</td>
<td>58-69</td>
<td>55-70</td>
<td>47-69</td>
</tr>
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</table>

Results from the replicated drill-strip experiments at the Rice Experiment Station are shown in Table 2. Data for the individual years are given in this table.

Five varieties are included in this comparison also, but an un-named Bluebonnet selection replaced Improved Bluebonnet. This selection was made at the same time as Sunbonnet and has a more slender grain, but does not mill so well and is not being released.

In these tests Toro matured at essentially the same time as the other varieties, had slightly shorter straw than Bluebonnet 50, and gave the highest average yield. It was exceeded in yield only in 1952 when Bluebonnet outyielded it by a mere 20 pounds per acre. Milling results were obtained only for 1953 and 1954, but indicate superior milling quality for Toro and Sunbonnet.

Toro, Bluebonnet 50, and Sunbonnet were included in a date-of-seeding experiment. The results are shown in Table 3. There were 11 tests in the three years 1952-1954. These three midseason, long-grain varieties which were compared in the date-of-seeding tests matured at the same time, but the length of the growing period ranged from 191 days for the February seeding to 136 days for the May seeding. Toro averaged one inch shorter than Bluebonnet 50 and three inches shorter than Sunbonnet. It yielded more than Bluebonnet 50 and Sunbon-
TABLE 3.—Maturity, plant height, grain yield, and milling quality of Toro, Bluebonnet 50, and Sunbonnet grown in a date-of-seeding experiment at the Rice Experiment Station, Crowley, Louisiana, 1952-54

<table>
<thead>
<tr>
<th>Seeding Date</th>
<th>Seeding&lt;sup&gt;1&lt;/sup&gt; to Heading (Days)</th>
<th>Plant Height</th>
<th>Grain Yield, Per Acre</th>
<th>Milling Yield, Head—Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Toro (In.)</td>
<td>Bluebonnet 50 (In.)</td>
<td>Sunbonnet (In.)</td>
<td>Toro (LBS.)</td>
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<tr>
<td>2-8-54</td>
<td>191</td>
<td>39</td>
<td>42</td>
<td>2149</td>
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<td>3-25-52</td>
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<tr>
<td>3-6-53</td>
<td>157</td>
<td>47</td>
<td>50</td>
<td>2626</td>
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<tr>
<td>3-12-54</td>
<td>159</td>
<td>41</td>
<td>43</td>
<td>2624</td>
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<tr>
<td>Mean 3-14</td>
<td>156</td>
<td>45</td>
<td>46</td>
<td>2745</td>
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<tr>
<td>4-16-53</td>
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<td>2945</td>
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<td>Mean 5-14</td>
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<td>6-11-52</td>
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<td>1942</td>
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<td>6-28-54</td>
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<td>49</td>
<td>2809</td>
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<tr>
<td>Mean 6-18</td>
<td>137</td>
<td>44</td>
<td>46</td>
<td>2564</td>
</tr>
<tr>
<td>Mean all tests ...</td>
<td>45</td>
<td>46</td>
<td>48</td>
<td>2656</td>
</tr>
</tbody>
</table>

<sup>1</sup>Same maturity for all varieties.
net in 7 of the 11 tests, but was exceeded by Sunbonnet in 2 tests and by Bluebonnet 50 in 4 tests. Toro produced distinctly higher percentages of head rice on the average than the other varieties.

[For a comparison of Sunbonnet and Toro, see the back cover page.]
Two New Varieties Compared

SUNBONNET

-ORIGIN-
Reselection from Bluebonnet (a Rexoro × Fortuna Cross)

1953

-RELEASED-
March to June

-DISEASE-
Susceptible to straighthead & kernel smut

-PLANT HEIGHT-
Same as Bluebonnet

-STRAW STRENGTH-
Stands well

-THRESHING-
Easy

-YIELD-
Same as Bluebonnet

-HULL COLOR-
Straw color, purple tip (may fade)

-GRAIN TYPE-
Similar to Bluebonnet, more uniform, less chalky

-MILLING-
Usually better than Bluebonnet

-COOKING-
Flaky, “dry,” like Bluebonnet

TORO

-ORIGIN-
From crosses involving Rexoro, Blue Rose & Bluebonnet

1955

-RELEASED-
March to June

-DISEASE-
Seems fairly resistant to all important diseases

-PLANT HEIGHT-
No taller than Bluebonnet 50

-STRAW STRENGTH-
Stands up exceptionally well

-THRESHING-
About like Zenith

-YIELD-
Slightly higher than Bluebonnet

-HULL COLOR-
Straw color, colorless tip

-GRAIN TYPE-
Similar to Bluebonnet, very clear

-MILLING-
Exceptionally high

-COOKING-
Firmer, “moist,” good flavor