Fourteen Cottonwood Clones Selected for Midsouth Timber Production

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Southern Forest Experiment Station
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This paper describes the first 14 cottonwood (Populus deltoides Bartr.) clones selected by a team of geneticists and silviculturists from the Southern Forest Experiment Station as part of a program for improving the species' performance in Midsouth plantations. Clones were chosen primarily on the basis of rapid early growth. Their performance was evaluated in replicated test plantings, one of which was located in the Midsouth. The clones described here were selected from well-adapted natural populations nearby. Parents of all the clones were not evaluated before being placed in long-term tests.

Most of the descriptive data reported in this paper were obtained from two 5-year clonal tests. Both measured performance of 79 clones. 39 selected in preliminary tests and 40 from seedlings collected randomly from sandbars.

The tests had randomized complete blocks with five replications and four-ramet row plots. One planting was established on a Commerce silt-loam soil considered excellent for cottonwood and the other on a Sharkey clay soil that, at best, is marginal for commercial cottonwood plantations. The establishment techniques outlined by McKnight and Biesterfeldt were followed. Unrooted cuttings 20 inches long were planted at a spacing of 10 by 10 feet.

The plantation on the silt-loam soil was thinned after its third growing season to two ramets per plot (218 trees/acre) and again after its fifth growing season to a single ramet per plot (109 trees/acre). Diameters of all surviving trees (usually 10 ramets/clone) were measured after the fifth year and before thinning. Heights were measured on felled trees (usually five ramets per clone). Volumes were determined from measurements made at 4-foot intervals on three stems per clone.

On the clay soil one replication was thinned after the fourth growing season. The remaining four replications were thinned at the end of the fifth growing season. Mean clone diameters for the fifth year were computed from measurements of the 18 ramets per clone standing at the end of the fifth growing season. Height measurements were made on two cut ramets per clone in each of the four replications thinned during the fifth year.

The fifth-year mean diameter of clones on the silt-loam soil was the primary basis for

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1 When this paper was prepared the authors were stationed at the Southern Hardwoods Laboratory, which is maintained at Stoneville, Mississippi, by the Southern Forest Experiment Station, USDA Forest Service, in cooperation with the Mississippi Agricultural Experiment Station and the Southern Hardwood Forest Research Group. Mohn is now Assistant Professor, School of Forestry, University of Minnesota. McKnight is Assistant Area Director, Cooperative Forest Management, Southeastern Area, State and Private Forestry.


selection. Evaluation was confined to this planta-
tion because the site is typical of those being
planted commercially and because trees had reach-
ed pulpwood size. Selected clones were those that
had mean fifth-year diameters in the top 25 per-
cent of the test population. Clones that met this
requirement were rejected if ramets consistently
demonstrated serious defects such as low forking,
 exceedingly large persistent branches, or extremely
crooked boles. The 14 clones described in this
paper are those that were not rejected.

Average 5-year growth of the 14 as a group
is compared with that of a control group in table
1. The controls, 40 clones selected at random,
are typical of unimproved materials now being
planted in the Lower Mississippi Valley. On the
silt-loam site the 14 select clones exceeded the con-
trol group by approximately 20 percent in mean
diameter (7.6 vs. 6.3 inches) and by 10 percent
in total height (56.8 vs. 51.2 feet). Volume dif-
fernces between the two groups were even larger;
mean stem volume to a 3-1/2-inch top (bark in-
cluded) was 6.5 cubic feet in the select group and
3.7 cubic feet in the control group.

On the clay site, differences between diam-
eters in the select and control group were smaller
than on the silt loam. Since the two sites are
radically different and all variation among clone
means in rate of diameter growth is not genetic,
this result is not surprising. The differences found
on clay were substantial, however. The select group
exceeding the control by about 13 percent in diam-
eter (3.8 vs. 3.3 inches) and by 11 percent in
height (31.6 vs. 28.4 feet).

Although the data indicate that early planta-
tion growth can be increased substantially with
the selected clones, it is important that the limita-
tions of the testing be recognized. The tests were
adequately designed, but they were confined to a
single geographic location. Trees were planted on
only two soil types, and observed for only 5 years.
These limitations reduce the accuracy with which
the general performance of these clones can be pre-
dicted. Accurate predictions will require testing
for at least one-half a timber rotation over a wide
geographic area and on a range of soils representa-
tive of those considered suitable for commercial
planting. Such tests are now being established,
but 10 to 15 years will be required for their com-
pletion. In view of the potential returns from the
selected stock on the extensive acreages now being
planted, this delay will be unacceptable to most
persons. A logical alternative is to plant partially
tested materials and accept the associated risks.

These risks are small when reasonable pre-
cautions are taken. Gains can be expected in the
characters for which the clones were selected.
Since selection was based on growth in plantations
given intensive care, the clones are likely to im-
prove production most where cultivation and pro-
tection from insects are provided early in the life
of the stand.

A mixture of at least 10 clones should be
included in a plantation to insure against pest

<table>
<thead>
<tr>
<th>Test soil</th>
<th>Mean d.b.h.</th>
<th>Mean height</th>
<th>Mean stem volume to 3 1/2-inch top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select</td>
<td>Control</td>
<td>Select</td>
</tr>
<tr>
<td></td>
<td>--Inches--</td>
<td>--Feet--</td>
<td>--Cubic feet--</td>
</tr>
<tr>
<td>Commerce Silt Loam</td>
<td>7.6</td>
<td>6.3</td>
<td>56.8</td>
</tr>
<tr>
<td>Sharkey clay</td>
<td>3.8</td>
<td>3.3</td>
<td>31.6</td>
</tr>
</tbody>
</table>

1 Select values are average for 14 select clones, control values are average for 39 randomly obtained clones.
2 D.b.h. measurements are based on 10 ramets per clone on silt loam and 18 ramets per clone on clay soil.
3 Height measurements are based on 5 ramets per clone on silt loam and 8 ramets per clone on clay soil.
4 Volume measurements are based on 3 ramets per clone.
problems that could be associated with a small proportion of the clones. Planting a mixture also reduces the risk of growth loss due to selection of a clone that is not as good a performer as the limited tests indicated.

Since five of the clones described are open-pollinated progeny of a single female parent, the group of 14 is none too large. A group of 20 to 30 would be more desirable, and if promising clones from other improvement programs can be obtained they should be included in the plantation. Sufficient information for choosing supplementary clones can be obtained in tests such as those described by Farmer and Wilcox.5

The clones described are probably best adapted to the climatic conditions near their origin—in the Mississippi River Valley between Memphis, Tennessee, and Vicksburg, Mississippi. Clones from the same area have performed very well in 4- and 5-year-old plantings near Cairo, Illinois, and use of the select clones somewhat north of Memphis can be reasonably considered. No information is currently available concerning their performance south of the test area. Where climatic conditions are significantly different from Greenville, Mississippi, these clones should be used only on an experimental basis.

Only the first step in the cottonwood improvement program has been completed, and the present clone mixture should be viewed as temporary. Individual clones may be replaced after evaluation on a large number of sites over a long period. Clones of equal or more promise will be identified in improvement programs in the region, and these can be used to supplement or upgrade the mixture. Careful maintenance of the identities of the original clones in nurseries will be required to facilitate these changes.

CLONE DESCRIPTIONS

The individual select clones are described on the following pages. Each is identified by the name Stoneville and a number. To insure uniformity, it is suggested that this identification be used exclusively. Descriptions are still incomplete, but they incorporate all currently available information. In the future they will be updated and new selections will be described.

Unless otherwise stated, comparisons made in the descriptions are with the mean performance of

all clones in the tests described previously. At present, data regarding pest and disease resistance are almost completely lacking. Such data are obviously needed, and they are being sought. No quantitative data on growth habit (branching and stem form) are available, but short subjective descriptions are provided. The sex of some of the clones is unknown because they have not yet flowered. Also lacking is information on rooting characteristics, which were not considered during selection. Recent tests have indicated substantial clonal variation in field survival from unrooted cuttings. Since survival is greatly influenced by treatment of cuttings, weather conditions, and planting techniques, the data given must be interpreted with caution.

STONEVILLE 63

Identification
Species: Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 4) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Unknown
Foliation date: 42 days after 2/28; mean for tests, 39 days
Defoliation date: Average relative to local cottonwood

Habit
Trunk: Below average straightness
Branches: Average number, small

Pest and Disease Information
Melampsora rust: Average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: Mean first-year survival of unrooted cuttings in 4 tests, 69 percent; mean for 19 or more clones in same tests, 81 percent

Wood Characteristics
Specific gravity:

Bark
Surface: Smooth
Thickness: 0.25 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 63 on two sites¹

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 63</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>7.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>57.2</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>5.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>5.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

¹ Means for Stoneville 63 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 66

Identification
Species: *Populus deltoides* Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 7) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Male
Foliation date: 37 days after 2/28; mean for tests, 39 days
Defoliation date: Late relative to local cottonwood

Habit
Trunk: Below average straightness
Branches: Above average number, relatively large

Pest and Disease Information
Melampsora rust: Average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: First-year survival of unrooted cuttings in 4 tests, 93 percent; mean for 19 or more clones in same tests, 81 percent

Wood Characteristics
Specific gravity: Mean of 0.34 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Average roughness
Thickness: 0.45 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 66 on two sites1

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 66</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>8.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>58.6</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>8.1</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>7.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

1 Means for Stoneville 66 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 67

Identification
Species: Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 7) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Unknown
Foliation date: 40 days after 2/28; mean for tests, 39 days
Defoliation date: Average relative to local cottonwood

Habit
Trunk: Above average straightness
Branches: Average number, relatively large

Pest and Disease Information
Melampsora rust: Average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: First-year survival of unrooted cuttings in 4 tests, 83 percent; mean for 19 or more clones in same tests, 81 percent

Wood Characteristics
Specific gravity:

Bark
Surface: Average roughness
Thickness: 0.35 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 67 on two soils

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 67</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>7.8</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>59.3</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>6.4</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>5.7</td>
<td>3.2</td>
</tr>
</tbody>
</table>

1 Means for Stoneville 67 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 70

Identification
Species: *Populus deltoides* Bartr.
Open-pollinated progeny of phenotypically superior tree (Stoneville 7) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Unknown
Foliation date: 37 days after 2/28; mean for tests, 39 days
Defoliation date: Late relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Average number, average size

Pest and Disease Information
*Melampsora* rust: Below average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: No data available regarding first-year survival of unrooted cuttings

Wood Characteristics
Specific gravity: Mean of 0.33 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Extremely rough at age 5
Thickness: 0.45 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 70 on two sites¹

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 70</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>7.4</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>53.4</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3½-inch top (cubic feet)</td>
<td>6.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>4.0</td>
<td>3.2</td>
</tr>
</tbody>
</table>

¹ Means for Stoneville 70 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.

² Volume for Stoneville 70 was estimated because poor survival prevented cutting trees.
STONEVILLE 71

Identification
Species: Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 7) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Unknown
Foliation date: 42 days after 2/28; mean for tests, 39 days
Defoliation date: Average relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Above average number, average size

Pest and Disease Information
Me1ampsora rust: Average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: No data available regarding first-year survival of unrooted cuttings

Wood Characteristics
Specific gravity: Mean of 0.33 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Very rough
Thickness: 0.60 inch (single thickness) at d.b.h. at age 5 on silt loam; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 71 on two sites

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 71</td>
<td>Control</td>
</tr>
<tr>
<td>D. b. h. (inches)</td>
<td>7.4</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>57.2</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>5.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>4.9</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Means for Stoneville 71 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 72

Identification
Species: Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 7) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Female
Foliation date: 40 days after 2/28; mean for tests, 39 days
Defoliation date: Average relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Average number, average size

Pest and Disease Information
Melampsora rust: Above average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: No data available on first-year survival of unrooted cuttings

Wood Characteristics
Specific gravity: Mean of 0.33 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Very rough
Thickness: 0.40 inch (single thickness) at d.b.h. at age 5 on silt loam; mean for 40 randomly obtained clones in same test. 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 72 on two sites

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 72</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>7.6</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>61.4</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>6.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>5.9</td>
<td>3.2</td>
</tr>
</tbody>
</table>

1Means for Stoneville 72 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 74

Identification
Species: Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 8) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Unknown
Foliation date: 44 days after 2/28; mean for tests, 39 days
Defoliation date: Average relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Average number, average size

Pest and Disease Information
Melampsora rust: Below average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: Mean first-year survival of unrooted cuttings in 3 tests, 78 percent; mean for 19 or more clones in same tests, 86 percent

Wood Characteristics
Specific gravity: Mean of 0.31 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Average roughness
Thickness: 0.30 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test. 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 74 on two sites

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 74</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>8.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>57.1</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>7.6</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>6.5</td>
<td>3.2</td>
</tr>
</tbody>
</table>

¹Means for Stoneville 74 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 75

Identification
Species: *Populus deltoides* Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 11) found in Issaquena County, Mississippi (32°37'N, 91°W)

General Information
Sex: Male
Foliation date: 43 days after 2/28; mean for tests, 39 days
Defoliation date: Late relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Average number, average size

Pest and Disease Information
Melampsora rust: Below average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: Mean first-year survival of unrooted cuttings in 4 tests, 60 percent; mean for 19 or more clones in same tests, 81 percent

Wood Characteristics
Specific gravity: Mean of 0.31 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Average roughness
Thickness: 0.30 inch (single thickness) at d.b.h. at age 5 on silt-loam; mean for 40 randomly obtained clones in same test. 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 75 on two sites

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 75</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h (inches)</td>
<td>7.6</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>55.2</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3½-inch top (cubic feet)</td>
<td>7.8</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>7.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

1Means for Stoneville 75 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 81

Identification
Species: Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 14) located in Issaquena County, Mississippi (32°40'N, 91°05'W)

General Information
Sex: Female
Foliation date: 41 days after 2/28; mean for tests, 39 days
Defoliation date: Late relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Average number, average size

Pest and Disease Information
Melampsora rust: Average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: Mean first-year survival of unrooted cuttings in 4 tests, 56 percent; mean for 19 or more clones in same tests, 81 percent

Wood Characteristics
Specific gravity: Mean of 0.32 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Average roughness
Thickness: 0.40 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test. 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 81 on two sites¹

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 81</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>7.4</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>55.9</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3½-inch top (cubic feet)</td>
<td>6.3</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>5.7</td>
<td>3.2</td>
</tr>
</tbody>
</table>

¹Means of Stoneville 81 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 91

Identification
Species:  Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 21) found in Issaquena County, Mississippi (32°40'N, 91°05'W)

General Information
Sex: Male
Foliation date: 42 days after 2/28; mean for tests, 39 days
Defoliation date: Late relative to local cottonwood

Habit
Trunk: Below average straightness
Branches: Average number, relatively large

Pest and Disease Information
Melampsora rust: Average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: No data available regarding first-year survival of cuttings

Wood Characteristics
Specific gravity:

Bark
Surface: Smooth
Thickness: 0.30 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 91 on two sites¹

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 91</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>7.4</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>56.1</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>6.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>6.3</td>
<td>3.2</td>
</tr>
</tbody>
</table>

¹Means for Stoneville 91 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 92

Identification
Species: Populus deltoides Bartr.
Origin: Open-pollinated progeny of phenotypically superior tree (Stoneville 21) found in Issaquena County, Mississippi (32°40'N, 91°05'W)

General Information
Sex: Unknown
Foliation date: 42 days after 2/28; mean for tests, 39 days
Defoliation date: Late relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Average number, average size

Pest and Disease Information
Melampsora rust: Less than average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: First-year survival of unrooted cuttings in 3 tests, 88 percent; mean for 19 or more clones in same tests, 86 percent

Wood Characteristics
Specific gravity:

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam Stoneville 92</th>
<th>Control</th>
<th>Sharkey clay Stoneville 92</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.b.h. (inches)</td>
<td>7.4</td>
<td>6.3</td>
<td>3.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>54.9</td>
<td>51.2</td>
<td>29.6</td>
<td>28.4</td>
</tr>
<tr>
<td>Volume, including bark, to 3⅞-inch top (cubic feet)</td>
<td>5.9</td>
<td>3.7</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>5.3</td>
<td>3.2</td>
<td>.....</td>
<td>.....</td>
</tr>
</tbody>
</table>

Bark
Surface: Smooth
Thickness: 0.30 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 92 on two sites

Means for Stoneville 92 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 107

Identification
Species: Populus deltoides Bartr.
Origin: Seedling collected from sandbar in Bolivar County, Mississippi (33°47'N, 91°W)

General Information
Sex: Male
Foliation date: 30 days after 2/28; mean for tests, 39 days
Defoliation date: Early relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Average number, average size

Pest and Disease Information
Melampsora rust: Above average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: No data available on first-year survival of unrooted cuttings

Wood Characteristics
Specific gravity: Mean of 0.33 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Smooth
Thickness: 0.35 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 107 on two sites¹

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 107</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>7.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>55.7</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3 1/2-inch top (cubic feet)</td>
<td>5.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>5.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

¹Means for Stoneville 107 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 109

Identification
Species: Populus deltoides Bartr.
Origin: Seedling collected from sandbar in Bolivar County, Mississippi (33°47'N, 91°W)

General Information
Sex: Female
Foliation date: 32 days after 2/28; mean for tests, 39 days
Defoliation date: Average relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Above average number, relatively large

Pest and Disease Information
Melampsora rust: Above average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: No data available on first-year survival of unrooted cuttings

Wood Characteristics
Specific gravity: Mean of 0.35 for disks taken at breast height at age 5; range of 20 clones in same tests, 0.31-0.36. Basis: 3 ramets per clone on each of two soils

Bark
Surface: Average roughness
Thickness: 0.40 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 109 on two sites

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.b.h. (inches)</td>
<td>Stoneville 109</td>
<td>Control</td>
</tr>
<tr>
<td></td>
<td>7.2</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>55.4</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to 3½-inch top (cubic feet)</td>
<td>5.4</td>
<td>3.7</td>
</tr>
<tr>
<td>Volume, inside bark, to 3-inch top (cubic feet)</td>
<td>5.0</td>
<td>3.2</td>
</tr>
</tbody>
</table>

1Means for Stoneville 109 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.
STONEVILLE 124

Identification
Species: Populus deltoides Bartr.
Origin: Seedling collected from sandbar in Issaquena County, Mississippi (32°55'N, 91°05'W)

General Information
Sex: Male
Foliation date: 40 days after 2/28; mean for tests, 39 days
Defoliation date: Early relative to local cottonwood

Habit
Trunk: Average straightness
Branches: Above average number, relatively large

Pest and Disease Information
Melampsora rust: Average juvenile incidence
Other: No serious damage noted to age 5

Cultural Information
Propagation: First-year survival of unrooted cuttings in 4 tests, 83 percent; mean for 19 or more clones in same tests, 81 percent

Wood Characteristics
Specific gravity:

Bark
Surface: Average roughness
Thickness: 0.30 inch (single thickness) at d.b.h. at age 5 on silt-loam soil; mean for 40 randomly obtained clones in same test, 0.30 inch. Basis: 6 determinations per clone

Average 5-year growth of Stoneville 124 on two sites

<table>
<thead>
<tr>
<th>Character and unit of measure</th>
<th>Commerce silt loam</th>
<th>Sharkey clay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stoneville 124</td>
<td>Control</td>
</tr>
<tr>
<td>D.b.h. (inches)</td>
<td>8.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Height (feet)</td>
<td>58.3</td>
<td>51.2</td>
</tr>
<tr>
<td>Volume, including bark, to</td>
<td>8.5</td>
<td>3.7</td>
</tr>
<tr>
<td>3½-inch top (cubic feet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume, inside bark, to</td>
<td>7.6</td>
<td>3.2</td>
</tr>
<tr>
<td>3-inch top (cubic feet)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Means for Stoneville 124 and the control (made up of 40 randomly obtained clones) are based on measurements of 10 ramets/clone for diameter, 5 ramets/clone for height, and 3 ramets/clone for volume on the silt-loam soil. On the Sharkey clay means are based on 18 ramets/clone for diameter and 8 ramets/clone for height.