MISSISSIPPI STATE COLLEGE
Agricultural Experiment Station
CLAY LYLE, Director
STATE COLLEGE MISSISSIPPI

FENCE POSTS FROM DELTA HARDWOODS GIVE GOOD SERVICE

J. S. McKNIGHT[1] and J. W. JOHNSON[2]

Do bottomland hardwoods make durable fence posts? To answer this question, the Southern Forest Experiment Station and the Mississippi Agricultural Experiment Station have been carrying on two tests of the life of fence posts in actual service in the Delta.

One test has now been running 15 years, the other 10 years. Both indicate that posts from most species of bottomland hardwood trees, if carefully selected, prepared, and treated, will give excellent service.

1937 Test of Species Normally Used

The first test was established in February, 1937, with the object of learning the expectable life of untreated fence posts made from naturally durable woods. The species tested were osage orange (bois d'arc), red mulberry, baldcypress, overcup oak, honeylocust, and both hill-grown and Delta-grown black locust. The hill-grown black locust was from trees that had grown much slower than their counterparts in the Delta.

The cypress, overcup, and honeylocust posts were from the sapwood second-growth timber. Posts of the other species were mostly heartwood. Within each species group were some round and some split posts, and some that had been cut in June and some in December of the year before they were set.

For comparison, treated posts of loblolly pine, shortleaf pine, sweetgum, and cottonwood were set out at the same time. As table 1 indicates, there were about 24 of each of these species, half of them pressure-treated with an average of 6 pounds of creosote per cubic foot of post and half treated with an average of 12 pounds (8.7 pounds of creosote equal to about 1 gallon). Fifty-six iron posts, samples of most of the varieties on the market in 1937, were also installed.

All of these posts were part of a fence on the Delta Experimental Forest, near Stoneville. They were set in typical poorly-drained buckshot (Sharkey clay) soils.

Since 1941, the posts have been inspected each year. In making his annual rounds, the inspector first throws his weight against the post to see if it will break or if it is still capable of holding up its share of the fence. Those posts that are still serviceable he examines just below the groundline to see if any rotten spots are developing.

Of the untreated posts, osage orange has given by far the best performance: all 80 posts are still serviceable. Forty percent of the mulberry posts and 42 percent of the hill-grown black locust posts have survived, but the Delta-grown black locust has suffered heavily. All of the sapwood posts have long since disappeared.

Recommendations

While further differences in the posts will probably show up as the years pass, the tests have already demonstrated several facts important to post users.

The first of these is that untreated sapwood posts are useless for anything except temporary fencing. This is true even for sapwood of species like cypress. Before an untreated post is set, it should be visualized as it will appear after the sapwood has rotted off. Only if it is then large enough will it be worth using in a permanent fence.

On the other hand, heartwood posts of durable species like osage orange, mulberry, and cypress (which can be recommended even though no heart cypress posts were tested) will give good service even if not treated.

Finally, the tests show that many species of Delta hardwoods, as well as of pines and other upland trees, will give excellent service if they are treated with preservative. Willow and cottonwood, however, are very difficult to treat satisfactorily with oil-base preservatives.

Since heartwood posts of durable species are becoming scarce and expensive, many farmers have begun to treat their own posts. Advice on chemicals and methods suited to farm use is available at the Mississippi Agricultural Experiment Station.

The test clearly demonstrated that in untreated posts it is only the heartwood that is durable. The overcup oak and honeylocust sap posts had an average life of 4½ years. The sap cypress posts lasted 5½ years (heart cypress, of course, would have done much better). Of the mulberry posts, those that remain are the ones that had a large amount of heartwood, while those that disappeared had little or none. Moreover, while all of the posts that are still serviceable show signs of decay, most of it is in the sapwood only and will not become serious until it gets well into the heartwood.

When size of post and amount of heartwood are considered, there seems to be little or no difference between round and split posts.

Of the creosoted posts, all of the pines and all of the sweetgums and cottonwoods with the 12-pound treatment are still in service. The cottonwoods with the 6-pound treatment have many failures. There have also been two casualties among the sweetgum posts with the 6-pound treatment. Decay is showing up in all of the other 6-pound treatments, but it appears that several years will elapse before it causes additional failures.

All of the iron posts are in good condition. It has been noted, however, that the very wet winters of the Delta soften the ground so much that iron posts tend to push over and pull up too easily.

1941 Test of Treated Posts

The purpose of the second test, which has now been running 10 years, was to test the durability of creosoted fence posts from trees commonly found in the first bottoms of the Delta. The species included were overcup oak, water oaks (willow oak and Nuttall oak), bitter pecan, persimmon, sweetgum, American elm, hackberry, green ash, honeylocust, baldcypress, red maple, cottonwood, and willow.

Both heartwood and sapwood and split and unsplit posts are included. The posts were treated in the spring of 1941 by the hot-and-cold-bath method using a hot bath of coal-tar creosote and a cold bath

[1]Delta Branch, Southern Forest Experiment Station, U. S. Forest Service. The Delta Branch is maintained at Stoneville, Mississippi, in cooperation with the Mississippi Agricultural Experiment Station.

[2]Formerly with Delta Branch.

(over)

of 50 percent coal-tar creosote and 50 percent Diesel oil.[3]

As will be noted in table 2, the amount of preservative absorbed per cubic foot of post varied from 6 to 13 pounds.

In June 1941 the posts were installed as part of the boundary fence of the Delta Experimental Forest. They are standing in flat buckshot soils and support a tight hogwire fence that has been kept fairly free of brush and vines. Nine untreated posts of specially selected heartwood honeylocust were installed at the same time. All of the posts are inspected annually, by the same method as those in the 1937 test.

Of the 335 treated posts in the test (originally there were 356, but 21 were lost from other causes than decay and termites), 309 are still in service.

All of the bitter pecan, cypress, green ash, overcup oak, persimmon, red maple, American elm, and sweetgum posts are still sound (table 2). The treated honeylocusts and the water oaks have done nearly as well. Some of the hackberries have sustained casualties, but it is too early to draw conclusions about this species. All species, of course, have some posts that show the beginnings of decay, but most of the infected individuals still have considerable life left to them.

The same cannot be said of willow and cottonwood. These posts have given the poorest service of all, and show signs of complete failure in the near future. The first willow broke in 1946. Today only about half are left, and all have decayed spots. Sixty-eight percent of the cottonwoods are still standing, but most of the survivors are spotted with decay.

This test and the one that was begun in 1937 both indicate that willow and cottonwood should be avoided as fence post material in the Delta. A post of either of these species will take up great quantities of preservative, but the absorption and penetration are very likely to be patchy. As a result, some parts of the post will have more preservative than necessary and some will be completely unprotected. Success in treating wood of any kind depends not so much on the amount of preservative that is absorbed, above a certain minimum, but on deep penetration and even distribution of preservative.

[3]For details of the hot-and-cold-bath method, see Bulletin 483 of the Mississippi Agricultural Experiment Station, "Fences for bottomland farms in the Delta," by L. C. Maisenhelder and J. S. McKnight.

Among these treated posts, no differences have yet been noted between those from heartwood and those from sapwood, or between round and split posts.

The nine untreated heartwood honeylocust posts did not last long. The first failed in 1945 and the last in 1949. Their average life was 5.8 years, or a little more than a year longer than that of the sap honeylocusts in the 1937 test.

Table 1. Untreated fence posts in the Delta after 15 years of service.

Species	Treatment	Number of posts in test	Percent serviceable after 15 years	Average life
				Years
Osage orange	Untreated	80	100	----
Red mulberry	Untreated	79	40	----
Black locust (hill)	Untreated	48	42	----
Black locust (Delta)	Untreated	143	17	----
Baldcypress (sappy)	Untreated	35	0	5.6
Overcup oak (sappy)	Untreated	40	0	4.5
Honeylocust (sappy)	Untreated	80	0	4.5
Loblolly pine	6 lbs. creosote	12	100	----
Loblolly pine	12 lbs. creosote	12	100	----
Shortleaf pine	6 lbs. creosote	12	100	----
Shortleaf pine	12 lbs. creosote	12	100	----
Sweetgum	6 lbs. creosote	12	83	----
Sweetgum	12 lbs. creosote	9	100	----
Cottonwood	6 lbs. creosote	12	8	----
Cottonwood	12 lbs. creosote	12	100	----
Iron posts	----	56	100	----

Note: All species of posts that received the 6-pound treatment were handled in one charge of the treating cylinder. All species in the 12-pound treatment were likewise prepared in a single charge.

Table 2. Creosoted fence posts after 10 years of service in the Delta.

Species	Treatment (pounds of preservative per cubic foot)	Number of posts	Percent serviceable after 10 years	Percent with decay and termite damage
American elm	11.1	10	100	30
Bitter pecan	6.0	9	100	44
Bitter pecan	7.6	8	100	25
Bitter pecan	8.8	24	100	13
Cottonwood	8.9	25	68	89
Baldcypress (sappy)	6.8	9	100	33
Green ash	8.9	15	100	33
Green ash	11.9	9	100	11
Hackberry	8.0	10	90	44
Hackberry	10.1	23	78	45
Hackberry	12.7	8	100	38
Honeylocust	Untreated	9	0	100
Honeylocust	7.5	22	95	28
Honeylocust	8.3	8	100	25
Honeylocust	9.8	13	100	23
Mixed oaks[1]	8.3	17	88	19
Overcup oak	6.1	14	100	57
Overcup oak	8.9	25	100	48
Overcup oak	9.5	8	100	88
Persimmon	7.9	12	100	58
Red maple	8.2	8	100	50
Water oaks	8.5	29	90	78
Water oaks	9.6	7	100	28
Sweetgum	11.0	9	100	22
Willow	8.4	13	54	100

[1]Overcup oak and the water oaks.