

AMERICAN PAULOWNIA ASSOCIATION

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Growing and Care of Paulownia Plantations

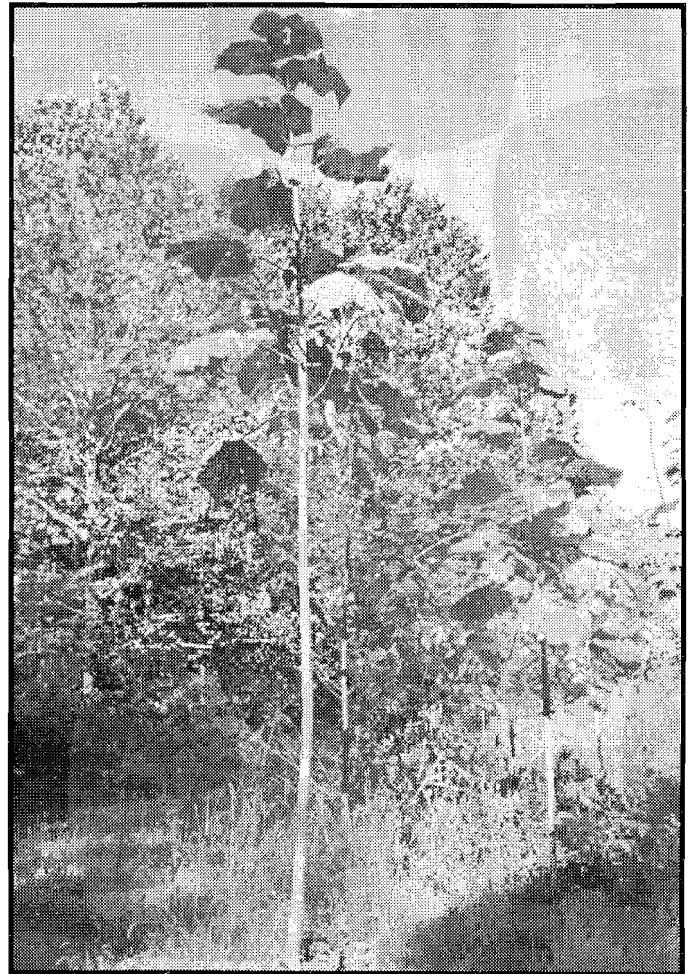
Robert Edney
Halifax, Virginia

The first part of this paper is concerned with the establishment and care of Paulownia field plantings. As far as I can determine, the 1962 Paulownia tomentosa planting, and later the 1979 P. elongata planting, were the first aimed at primarily commercial purposes in this country; so I think it is relevant that I give you a brief background on both. Later, my techniques and recommendations will follow and, last but not least, ongoing work towards finding a domestic use for the wood.

I was raised in a section of western North Carolina where P. tomentosa had been growing for perhaps a hundred years. Once I measured a tree of 48" d.b.h. but the center was defective so the age could not be accurately determined. I guessed it to be over 75 years old. Later on in graduate school, I made a study of the tree in preparation of a thesis. In 1962 I planted an acre of P. tomentosa with container seedlings. These were 2" redi-pots grown under plastic in the early spring of that year. For many years farmers in my area of Virginia had been producing their tobacco plants in the spring under tobacco cloth. I experimented in 1960 and '61 with Paulownia, but did not get the success that I wanted. When I switched over to plastic, good results were obtained with germination and growth of the seedlings. The containers were set on a 7'x7' spacing with the idea of thinning back to a 14'x14' spacing if too many survived. If survival was poor (which was the case), enough were planted to make a full stand. First year's survival was 36% or 319 trees. The seedlings could not be watered conveniently and were weeded only the first summer. The soil, which had formerly been a good yellow poplar-locust site, had a deep

black top organic layer and trees grew very fast, but competition also was crowding the plants.

In May of 1965 I truncated by machete the entire



Allowing enough years for root development before coppice, this tomentosa tree has grown 23 feet tall in just one year. Some reports, in the south, indicate that 28 to 30 feet of growth is possible for elongata in one growing season. stand at ground level, the 292 Paulownia trees. The surrounding hardwood competition was then

President's Message . . .



Best wishes to all of the members of APA and may 2000 be a productive year for all of your ventures with Paulownia and Paulownia products.

Each organization is responsible for defining the mission, goals and objectives. The APA mission has been stated each year in the program for the annual meeting. The goals and objectives should be renewed for each year.

One goal for 2000 is to increase the number of members in APA.

A second goal is to retain the members that we have.

And the major objective for APA this year, is to develop increased participation by both old and new members.

Your assistance is vital to APA. We are a volunteer organization that has a very minimum of administrative support. I ask you to find new members and suggest a way that you may help the association. And when asked to serve, accept with pride and yell if you need something done.

Tom

sprayed with 24S-T 4 lbs. acid equivalent per acre. This entirely eliminated any further competition, and by October of 1965 a nice stand of Paulownia sprouts was the result. Sprouts were thinned back to 234 in late winter of 1966. The average stand diameter in October of 1969 measured 3.5". As trees reached 12" d.b.h., I sold a few, and in 1992 the logs averaged \$4.00 a foot. Also, trees have been stolen twice and 20 were stolen this year. I should mention that the trees were pruned (first log) in the winter of 1968.

The elongata stand was planted in 1979 with balled, large bare root stock. They had been grown in a nursery during 1978, out-planted, and were very large when set. Spacing was 14'x14'. At the same time, an acre of P. tomentosa was planted with 3" redi-pot container seedlings. The area was previously logged and cleared of brush. Site was very high -- I estimated as being around 90 for yellow poplar. The soil type under all these plantings is Porters Stony Loam, the top layer being very high in rich organic matter.

Both the elongata and tomentosa were weeded once during 1979. The elongata simply outgrew its competition. In July of 1990, 185 root systems supporting 248 stems were measured on the elongata stand. The stand d.b.h. average was found to be 13.46" per root system; height average was 41'. Since the P. tomentosa stand was not properly taken care of, only about 25% are surviving today, with a stand

average of 8" d.b.h. Another acre of P. elongata was planted with 3" Jiffy pot container seedlings in 1991. An acre of improved P. elongata using dormant seedlings grown in the summer of 1994 in 6" pots were planted this year.

Based on what I have learned thus far, here are my recommendations;

1. Young first year's container seedlings must be constantly watered, weeded, and fertilized once during the first year. If the summer is extremely hot and dry, you can expect some mortality.
2. For a higher survival rate without having to constantly water when planted, container seedlings grown the first year in the nursery, which will be much larger and toughened, can be planted the

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following spring while still dormant. I have had excellent results with these. Bare root seedlings also give a better survival rate; however, they require much more labor both in uptake and out-planting.

3. The mountainous location where my trees are growing require hand weeding with a commercial-type weed eater. Great care must be taken not to injure the plants. Chemical control is effective, such as Round-Up, but must be applied two or three weeks before planting. Even then, it is a good idea to scrape the vegetation around the immediate area to be planted. I lost an acre of *P. tomentosa* in 1965 which had been sprayed with 2-4D one week before planting containers.
4. Fertilizer, both organic and chemical, really makes the difference in growth. This year I viewed several plantings, both fertilized and non-fertilized. The difference is readily apparent both in leaf color and size of plant. Organic fertilizer is especially beneficial since it also lightens the soil. I use 10-10-10 granulated since it's convenient to work with on the side of a mountain. I've seen good results using both hog and chicken manure.
5. If you are working with sandy type soils that have generally supported pine, the ph may be very low and you should have the soil ph tested and limed, if necessary. Hardwood type soils that have supported yellow poplar may be sufficiently high in ph.
6. Pruning and truncation. Pruning, as I consider it to be, is removing the lateral limbs or buds mostly located just above the leaf petioles (or, for that matter, may be found anywhere on the stem). If the lateral buds are not removed early enough, they will develop into suckers and limbs rapidly. Truncating is the removal of the entire stem from the root collar in order to grow a better form. Also, the upper part of the stem may be truncated during dormancy (usually just above the top two or three leaf stems locations). This results in two new shoots, one of which must be removed in order for the selected one to grow upright for a second log extension. I don't exactly favor this because there is danger of winding up with a long, slender plant with very little diameter growth. My method is to bud prune the first log until it reaches the desired height (18' to 20' or more), then let the suckers which will form branches develop above the pruned area. These branches will cause lower diameter to develop

into a stronger stem for future second log extension. I do not favor over pruning the lower leaves. Remember that you want maximum photosynthesis to get that growth. Some lower leaves obviously are not healthy and contributing to photosynthesis as the season progresses; these can be removed. If they are healthy and green, I leave them alone.

I am not concerned with pruning the first year's plants unless, of course, they are developing well and will not be truncated during the winter. The first year I want a thick, large diameter stem which means a large root system to put up a new and final first log for next year.

Soils. Soils make a difference in the growth of Paulownia. This year I studied three stands in different locations. All the soils and plants were treated the same way, so I am safe in comparing only the results.

Stand I, in Halifax County, Virginia, is typical Piedmont area on fairly hard compact clays and averaged 2.95" in diameter and 15'8" in height.

Stand II, located in Nash County, North Carolina, on light, Sandy loam soils, averaged 3.5" in diameter and 20'8" in height.

Stand III, located in the upper coastal plains of South Carolina, averaged 2.97" in diameter and 19'3" in height on very sandy soils.

Paulownia favors a light, sandy soil, and heavy soils can be altered somewhat with subsoiling.

One last important thing is good drainage. Areas that allow water to stand at or just below the surface during the summer can be bedded. I lost a beautiful stand of *P. tomentosa* during the summer of 1965 on the Staunton River bottomland. The area flooded and did not drain for several days during hot weather and 100% mortality occurred. For years the large paper companies in the Southeast have been bedding poorly drained land in order to improve the site for pine, that is, until recently when our bureaucratic friends in the Fish and Wildlife Service have tried to put a stop to it. Paulownia needs plenty of water, but the site must be well drained.

For the last part of this paper, I will touch briefly on a problem that must be dealt with and that, of course, is developing a domestic use for this wood. The long rotation age required to produce a log commanding a high price on the Japanese market, coupled with what the future of this market will be, say, thirty years from now, forces us to look toward a domestic market. From the data obtained this year

on 1994 plantings and history of the 1979 elongata stand, I can assure you that we can grow a ply log or saw log in ten years or less.

This year I donated four tractor-trailer loads (tree length) to industry for the express purpose of using this for research. First reports are encouraging and tests will continue.

1. CROWN MOULDING. Samples thus far indicate the wood to be ideally suitable for this product. Its ability to stain uniformly, machine and sand well, and be very stable is encouraging further research.

2. VENEER. Two prime logs were sliced by the Norfolk Veneer Company and no problems were encountered. We have known for years, however, that Paulownia slices well. The veneer produced will be made into furniture panels by the Cramer Manufacturing Co., High Point, North Carolina.

3. ORIENTED STRAND BOARD. This product is taking over from construction type plywood. It takes a long rotation age to produce a pine peeler log; on the other hand, small diameter pulpwood timber can be reconstituted into a building board. Small diameter elongata bolts were tested in the lab for a major board company. The lab tests indicate that a 50%-50% Paulownia-Southern Pine combination in the board face with a 100% southern Pine core gave a superior board over that of a 100% Southern Pine board.

An 80% Southern Pine board with 20% Paulownia throughout the board also gave better physical properties than a 100% Southern Pine board.

The lab which ran these tests indicates that a 30% Paulownia mixture may be achievable. If only a 20% usage of Paulownia in OSB can eventually be used, the volumes necessary to supply this requirement would be staggering. I emphasize that these were only lab tests and not production run tests, so we have just made a start. Tests are to be resumed sometime this Fall.

Other possible uses for the wood such as particle board, lumber for furniture, picture frames, etc. will be investigated as time and available wood supplies permit.

In closing, let me say that from the standpoint of the rate of growth on very short rotations and the encouraging information I've received towards possible domestic usage, I am confident that Paulownia has a bright future in this country. 🌳

My Love Affair With The Princess "Princess Paulownia"

About five years ago, I heard about the tree known as Paulownia. So living on a farm I ordered 50 trees. As soon as I planted them I had problems. Planted in a row next to a corn field, the farmer spraying his field for weeds killed almost half of my trees with a herbicide, because his sprayer had a pin hole that allowed the herbicide to hit the trees. Soon after that, hurricane "Fran" came along and bent or broke more trees. Dry weather that year did not help either.

The next year I ordered 1000 trees from the state and planted them throughout the farm. Another real dry year and these did not make it. At this time, I learned how to reproduce the Paulownia tree from root cuttings from the few remaining trees.

The next year I got 500 trees, again poor results.

I then got papers from China as to how they were growing these trees for 2000 years. With this information I ordered 600 trees from the state. Following the Chinese instructions, I planted the 600. Knowing about root cuttings, and also, that by removing all but the top tree leaves, I can plant them even in the hottest and driest weather and they live. Now that I have learned some of the secrets of this tree, I am ready to recommend this tree to others. I have been transplanting trees all summer and having excellent results, I am planting in the third field as my plants become available from roots, seeds, and suckers.

The Paulownia Tree is an excellent producer of fine wood in a short period of time and reforestation to cut pollution as well.

I am 81 years and seek no monetary gain, only urging others to see the value of this unique tree. 🌳

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ANNOUNCING

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Paulownia versus Balsa in Strength to Weight Applications

Balsa wood first entered the US in the 1920's. It is a tropical timber tree that grows in Central and South America. It is imported into this country at 10 million BF per year. The light weight but strong wood has many applications where strength to weight is critical. In fact, Balsa is considered to have the best strength to weight ratios of any wood in the world. Most of the use in this country is for marine applications involving ship and boat construction. However, the wood is used in transportation, airplane modeling, military air lift pallets, van conversions, train and airplane interiors, buses, RVs, surfboards and other uses.

Paulownia has an average weight of 18 lbs. per cubic foot as compared to the average weight of Balsa at 10 lbs. per cubic foot, making Paulownia twice as heavy. However, in the strength department Paulownia was measured at over twice as strong (see table 1) as Balsa. Also, some Balsa core material is sliced 3/8 inch with end grained material, Paulownia could be cut to 3/16 inch and be the same weight as well as the same strength. In fact, referring to Gary Pugh's comments in the October newsletter, about Balsa soaking up too much epoxy, that alone might tip the scale in favor of Paulownia.

In paneling applications, 1/2 inch thick Balsa is used as the core with veneer such as, Mahogany or Black Walnut being mounted on the top for many transportation uses. If Paulownia were used as a core material, it could be sliced only 1/4 inch thick to be just as strong and light as Balsa. There would also be a space savings bonus, because Paulownia would be only one half as thick. In conclusion, more testing needs to be done to discover where Paulownia might fit into these existing markets where strength to weight is everything. 🌳

Lyndle Seaton, Editor

TABLE 1

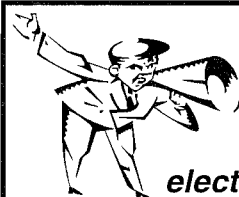
Strength modulus of rupture mor (psi)	Modulus of elasticity moe x 10 to 6th psi
Balsa 2800	Balsa 0.550
Paulownia 5740	Paulownia 0.758

Source: Dr. R.C. Tang, Auburn University
Auburn, Alabama

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The official home of A.P.A. has changed. It will be hosted by the newly elected officers for 2000, Vice-president Dan Blickenstaff and Secretary/Treasurer Sharon Blickenstaff. All A.P.A. business correspondence will go through this new address.

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DEAR PAULOWNIAC:

As you undoubtedly know, the value of Paulownia logs/timber, in the USA, plunged from dollars to pennies per Board Foot, when Japan stopped buying USA Paulownia. Obviously, each of us in the USA, who has Paulownia logs/timber/products, ready to sell now, or in the near future, must do his/her utmost to generate new markets for our Paulownia.

In doing this, it is essential to remember that prices are dependent on "The Law of Supply & Demand". We see this at work every time we do our grocery shopping. Can you imagine any store asking \$4.00 per lb. for tomatoes, when they are selling for 30 cents a pound everywhere else?

Currently, I am working on some projects that may increase the demand for USA Paulownia substantially. If successful, the increased demand will trigger a rise in USA Paulownia prices. However, right now, the demand for Paulownia is very low, compared to the supply, and therefore, the price is also very low.

In order to promote the projects on which I am working, it is important for me to find out who, in the USA, has Paulownia logs/timber to sell, right now, in what quantities, and, at what realistic prices.

Do you have Paulownia logs/timber to sell? Do you want to be included in the above-mentioned projects? If so, then, let me know: (1) What quantities of Paulownia logs/timber you are prepared to sell, right now; and (2) What realistic prices per Board Foot you are prepared to accept

for these, right now.

As most of you know, I have long been involved with Paulownia. Like most of you, I was never enthusiastic about the lack of control that we had over our own enterprise, especially the sale of our USA Paulownia trees. There was only one buyer, of USA Paulownia, in the entire world, and that buyer (Japan) had only two representatives in the USA. I called the Embassy of Japan in Washington DC, and they were unable to get any information about Paulownia, from any source in Japan, or elsewhere.

In the mid-1980's, an Agency of the Canadian Government began funding a number of developing countries, that had virtually wiped out their forests to provide their masses with wood, mostly for cooking and heating. The tree that was selected, was Paulownia, because it grew bigger, faster than any other tree on earth, and automatically re-grew, again and again, whenever it was cut to the ground. Within 10 years, one of these funded-growers (China) already had more than one BILLION Paulownia trees growing. This was (and is) the greatest reforestation program the world has seen.

It is not surprising that the world's only buyer-manufacturer (Japan), should buy Paulownia logs/timber from the much closer, much cheaper, grower-supplier (China) than from the USA.

This brings us back to the USA and to our own Paulownia growers, including myself, who wrote this, and you, who just finished reading it, and, again I ask: "Do you have Paulownia logs/timber to sell? If so, how many Board Feet, do you have for-sale, right now; and, what is your present, realistic, asking-price per "Board Foot". Please send this information to me as soon as possible." 🌳

Contact Emanuel Orlick at: E-mail: eorlick@aol.com, 16815 Milltown Landing Road, Brandywine, MD 20613

MARCH BUSINESS MEETING
The March business meeting for the APA will be held in early March. As of this issue, plans have not been finalized. If you plan to attend please contact President Tom Copas at (423) 675-6281

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Highlights From The Eighth Annual Conference

Our association's 8th annual conference was another great success! This year it was held at Roosevelt State Park near Morton, Mississippi on September 17th. There were 107 people from 8 states and India in attendance. The wealth of talent and expertise of each of the speakers in attendance was thoroughly enjoyed by all.

Our gracious hosts this year were Tim Traugott, Forestry Specialist, Mississippi State University and Dr. Stephen Dicke, Forestry Specialist, also with Mississippi State University. They were assisted by APA members Thelma Kinard and Peggy Williams, with her plantation of Paulownia trees.

The morning speakers started with incoming president for 2000, Tom Copas. He helped to set the tone and welcomed everyone. Next, Tim Traugott talked about biology and establishment techniques of Paulownia trees. He first started with tomentosa because it grows there naturally, then started experiments with elongata and fortunei. He established 3 different location plots in Mississippi. In the northern location he found that tomentosa was best to plant, and the central and southern location seemed to be more promising for elongata and fortunei.

Doug Hamm from Athens, Georgia, told about his experiences with clay soil. He also discussed his various establishment techniques with Paulownia.

Dr. Ben Bergman, from North Carolina State University, told us of some groups that think Paulownia is an exotic pest. Finally, before lunch, Robert Davis past president talked about where APA has been and where it will be going into the new Millennium.

After a delicious lunch, catered by Roosevelt State Park, D. V. Sivaprasad Reddy and D. Prabhakar Reddy, both from India, told us of Paulownia plantations there. They have been spraying Gibberellic acid, and it really helps the growth of the trees. Next, Dan McConaughy, White Hall, Maryland, presented the hobby crafters market aspects. He also showed different ways that Paulownia could be promoted.

Richard Ebata, Kagiya Trading Co., Nashville, TN, highlighted market trends for the Japanese market. He said there is an uncertain future to that market. The last speaker was Dr. Emily Schultz, Associate Professor, Mississippi State University. She spoke about the 3 trial plots, planted for species suitability in each part of the state. Growth

continued on page 8

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and survival characteristics were also discussed.

To top off the affair, we saddled up and went on the field trip to Peggy Williams' home in Scott County. She has beautiful trees that she has

worked on for several years. There is a mix of tomentosa, elongata, and fortunei growing there together in the same soil, weather conditions, and site aspect.

In conclusion, I took to the meeting a display of Paulownia products. There was an end table, raised panel door, veneer samples, balsa core, as compared to Paulownia core paneling. I also took 5 different kinds of moulding samples made of Paulownia. Research continues on domestic uses for Paulownia. Slowly, but surely, our tree farms are also producing more and more volume of the wood each year. Both of these facts lead me to be very positive about Paulownia in the next century. Best regards and happy growing to you for 2000.



Lyndle Seaton, Editor

New Directors were nominated and approved as follows:

- Oliver "Buck" Mizzell - SC**
- Grady McIver - SC**
- Andy Griffis - MS**

The following Directors were re-elected for a 2 year term:

- Ann Brown - NC**
- Thelma Kinard - MS**
- Dan McConaughy - MD**
- Ronald Nix - AL**
- Monte Gillis - WA**
- Douglas Hamm - GA**
- Dorothy Nelson - AL**

New Officers were announced for the year 2000:

- President - Tom Copas**
- Vice-President - Danny Blickenstaff**
- Secretary-Treasurer - Sharon Blickenstaff**
- Editor - Lyndle Seaton**
- Past President - Don Augustine**

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