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Where are the black walnut trees in Ohio?

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Production of high-quality hardwoods is important in Ohio and black walnut ranks as one of the most valuable tree species in the State along with cherry, white and red oak, and ash. Ohio has more walnut growing stock volume than any other state, according to the most recently completed forest inventories in the East. The fourth and most recent measurement of Ohio's forests in 1991 estimated that more than 35 billion trees (including 31 billion seedlings) of 103 different species grow in Ohio's forests and that more than 99 percent of these were hardwoods. The periodic inventory was conducted by the Northeastern Forest Experiment Station in cooperation with the Ohio Department of Natural Resources (Griffith et al. 1992). To accomplish this survey, forest inventory analysts examined 77 thousand photo points and field crews measured 4,807 forest plots in the State.

Inventory analysts figured that more than 75 million walnut trees and a half-billion board feet of walnut sawtimber were growing on timberland in Ohio. There were 19 million walnut trees 5 inches in diameter or larger. The inventory crews found and measured 763 live walnut trees in the State. Of these, 322 were poletimber trees 5 to 11 inches or larger in diameter and 328 were sawtimber-sized, greater than 11 inches in diameter.

When seedlings were included, only 2 of every 1,000 trees growing in Ohio were walnut. The abundance of walnut trees jumps to 2 out of every 100 trees in the State for trees larger than 5

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inches. Walnut trees were well distributed too. One or more black walnut trees were found on 347 plots in the forests of 74 of the 88 counties in Ohio as shown in Figure 1. Based on the inventory, one or more walnut trees could be found on 1.6 million acres or 22 percent of the 7.6 million acres of timberland in Ohio. Almost all (95 percent) of the timberland where walnut grows in Ohio was owned by nonindustrial private (NIPF) owners. Public agencies own 76 thousand acres with walnut trees. Corporations other than forest products companies own 134 thousand acres with walnut trees and are included in the NIPF estimate above. Timberland is capable of producing 20 cubic feet of industrial wood per acre per year and is not otherwise reserved from harvesting. Although no walnut trees were found on forest plots in 14 counties, it is likely that some walnut trees grow there. The relatively small sample of inventory plots may miss detecting a single species such as walnut or a rare condition, especially for single counties. Each plot where walnut occurred represented almost 5,000 acres. So, caution is indicated when using these numbers.

Figure 2 shows the number of walnut trees by 2-inch diameter class, except for seedlings. The largest walnut tree found in the latest Ohio inventory was 30 inches in diameter. More than 25.3 million sapling and poletimber trees in the 2- to 10-inch classes represent the future walnut sawtimber resource for Ohio. Ohio has an abundance of sawtimber-sized walnut trees in the 12- and 14-inch diameter classes compared to larger diameters. The number of trees declines for classes greater than 14 inches in diameter suggesting that significant harvesting takes place when trees reach this size.

Growing stock trees are live trees of commercial species that meet certain merchantability requirements. The inventory estimates that 95 percent of all trees 5 inches and larger were classified as growing stock trees. The remainder were classified as rough or rotten. Trees that are rotten or are of poor form are classified as non-growing stock. The average quality of large trees, greater than 22 inches, was generally lower because the best trees are often harvested before they reach this size. One-third of the trees larger than 22 inches in diameter were classified as rough or rotten.

There were 183 million cubic feet of growing stock volume in walnut trees 5 inches in diameter and larger. Figure 3 shows how this volume was distributed across the State. The survey estimated that the walnut sawtimber volume on timberland in Ohio was 511 million board feet and growing at a rate of 3.8 percent annually. Figure 4 shows that 59 percent of the sawtimber volume was in the 12- and 14-inch diameter classes and only 3.8 percent was in the 20-inch and larger classes.

In 1991, annual growth of black walnut trees in Ohio averaged 4.7 million cubic feet of growing stock volume and 17.9 million board feet of sawtimber. The data shows that radial growth rates for walnut in Ohio were similar to the rate we've found in other states. The average remeasured walnut tree was 11.7 inches in diameter in 1991 and had grown 1.7 inches in diameter over the 12.6 years between measurements, based on 520 remeasured trees. Average radial growth for walnut trees was 0.068 inches per year. At this rate, it takes a walnut tree 7.3 years on average to grow 1 inch in diameter.

Volume growth of walnut trees depends a lot on diameter as shown in Table 1. An average walnut tree in the 12-inch diameter class was growing at an average annual rate of 11.2 percent, based on the average tree volume in the class. Average annual growth for 12-inch trees was 2.7 cubic feet of volume and 7 board feet. In comparison, growing stock volume for individual trees in the 22-inch class increased at an annual rate of only 0.7 percent. These trees grew, on average, 2.1 cubic feet and 1.7 board feet each year. Although sawtimber growth rates decline sharply for larger diameter trees, sawtimber quality and lumber yield generally increases, leading to higher market values per board foot.

Most walnut trees in Ohio grow in natural stands. The survey crews found only 10 plots representing 36 thousand acres with one or more walnut trees that they classified as plantations. No treatment opportunity was indicated on 81 percent of all acres where walnut occurs and 75 percent of all acres in sawtimber stands. Other acres had opportunities such as thinning, partial cutting or regeneration that could improve overall stand productivity.

Many measures can be used to compare the abundance and distribution of walnut. The inventory data indicates that walnut was particularly common and may occur on 50 percent or more of the timberland acres in 13 counties. These counties include Miami, Pickaway, Seneca, Putnam, Fulton, Delaware, Allen, Henry, Greene, Highland, Erie, Montgomery, and Fayette. Many of these counties have relatively little forest land however, so few plots were measured and the statistical margin of error for such estimates is high.

Another measure of the abundance of the walnut resource is the amount of sawtimber volume. Fifteen counties had at least 10 million board feet (MMbf) of sawtimber as shown in Table 2. Harrison County had the most walnut sawtimber -- 34.6 million board feet. Two counties not on the list deserve particular attention. Muskingum and Morgan counties each had more than a million growing stock walnut trees. Although the average tree had only 4.8 cubic feet in these counties, total growth of growing stock volume was very high. As these walnut trees grow into sawtimber-size classes, these two counties will become top-ranked walnut sawtimber producers.

Ohio's walnut sawtimber resource is worth a considerable amount of money. Based on the fall 1995 statewide average stumpage price of $490 per thousand board feet (Ohio Ag. Stat. Service 1996), the 510.8 million board feet of walnut sawtimber is worth, on average, $250 million on the stump. Economic activity due to harvesting and processing walnut in value-added wood industries considerably increases the potential contribution of the walnut resource to the State's economy.

The forest inventory data and reports provide a useful source to learn more about the forest resource in each State. Forest inventory records are available in printed reports and in electronic data base format in the Eastwide Forest Inventory Data Base (Hansen et al. 1992). If you have access to the Internet, you may want to try the Eastwide Forest Inventory Data Base at http://www.srsfia.usfs.msstate.edu/scripts/ew.htm. For more information, contact your State Forester, or the USDA-Forest Service Forest Inventory and Analysis units indicated below.

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References

Griffith, Douglas M., Dawn M. DiGiovanni, Teresa L. Witzel, and Eric H. Wharton. 1992. Forest Statistics for Ohio, 1991. USDA-Forest Service, Resource Bulletin NE-128. 169 p.

Hansen, Mark H., Thomas Frieswyk, Joseph F. Glover, and John F. Kelly. 1992. The Eastwide Forest Inventory Data Base: Users Manual. USDA-Forest Service. General Technical Report NC-151. 48 p.

Ohio Agricultural Statistics Service. 1996. Ohio Timber Prices. Columbus, OH. February 5, 1996. 1 p.

Table 1. Average annual growth rates for walnut trees in Ohio by diameter class.

Diameter class	Growing stock volume growth		Sawtimber growth	
	cubic feet		board feet	
inches	per year	percent	per year	percent
6	5.8			
8	3.9			
10	2.9			
12	2.7	17.8	7.0	11.2
14	2.3	11.2	3.3	3.7
16	2.5	8.4	2.7	2.0
18	2.6	7.1	2.4	1.5
20	2.1	4.3	1.1	0.5
22	1.8	3.4	1.7	0.7

Table 2. Number of growing stock trees, growing stock volume, sawtimber volume, and net growth of growing stock and sawtimber for the top 15 walnut counties in Ohio based on sawtimber volume.

County	Growing stock trees	Growing stock volume	Sawtimber volume	Sawtimber growth	Growing stock growth rate	Sawtimber growth rate
	thousand.	MMcf	MMbf	Mbf/year	%/year	%/year
Harrison	379	8.9	34.6	680	2.5	2.0
Licking	556	7.5	24.9	1,034	2.4	4.1
Hocking	551	6.7	23.1	895	1.8	3.9
Monroe	387	5.7	21.3	797	2.1	3.7
Ross	664	5.8	16.0	412	2.4	2.6
Highland	554	5.6	14.2	836	1.8	5.9
Adams	470	5.3	13.8	726	2.9	5.3
Guernsey	627	5.8	13.8	501	2.7	3.6
Medina	512	5.7	12.7	383	5.0	3.0
Fulton	155	2.8	12.2	665	3.6	5.4
Delaware	396	4.1	11.8	718	5.2	6.1
Huron	159	2.9	11.8	566	4.4	4.8
Noble	876	6.0	11.4	640	3.7	5.6
Knox	386	3.6	10.8	259	4.0	2.4
Hardin	276	2.7	10.0	332	2.7	3.3
Ohio	18,308	183.1	510.8	17,853	3.2	3.8

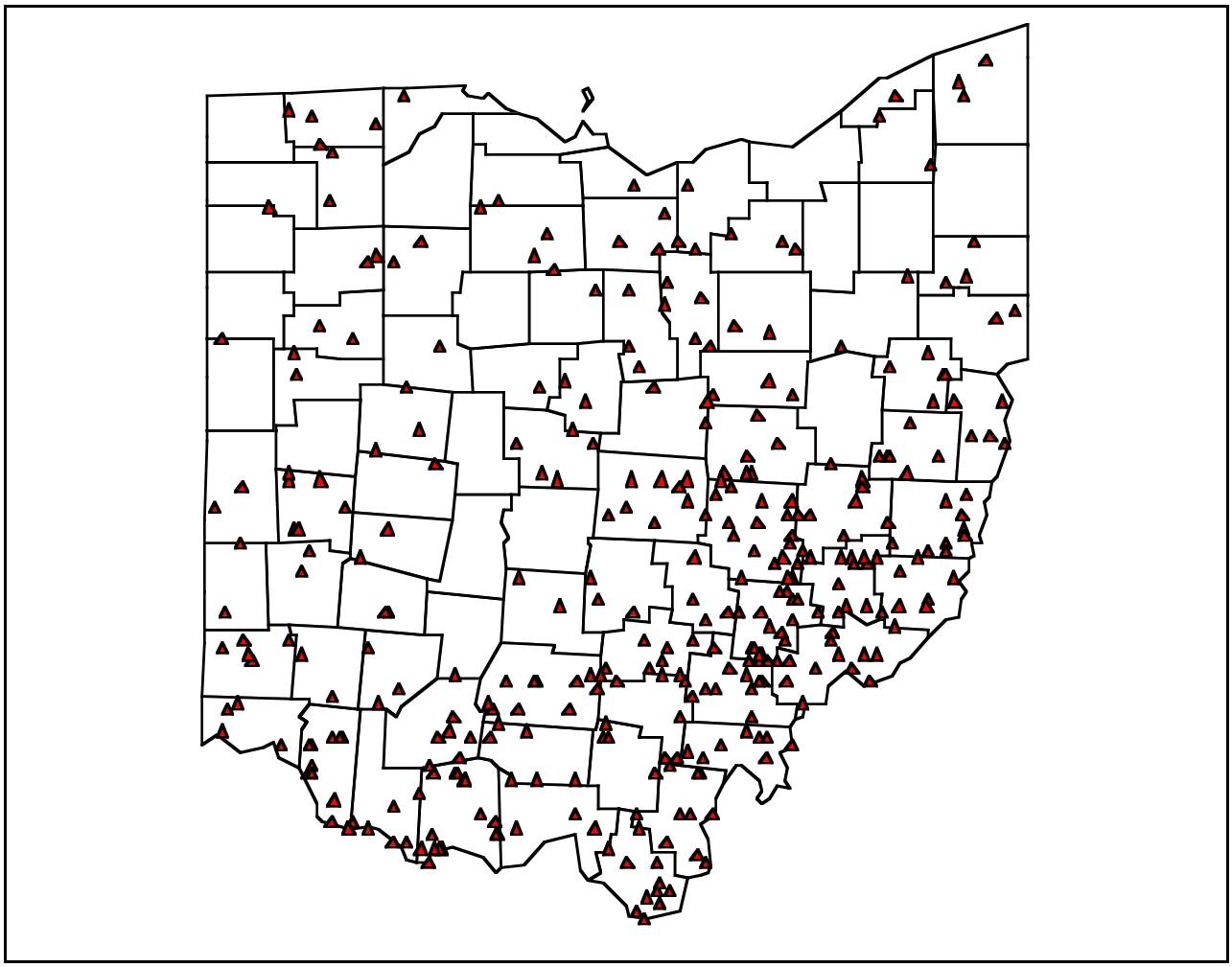

Figure 1: Location of forest inventory plots in Ohio where black walnut trees were found in the 1991 forest survey.

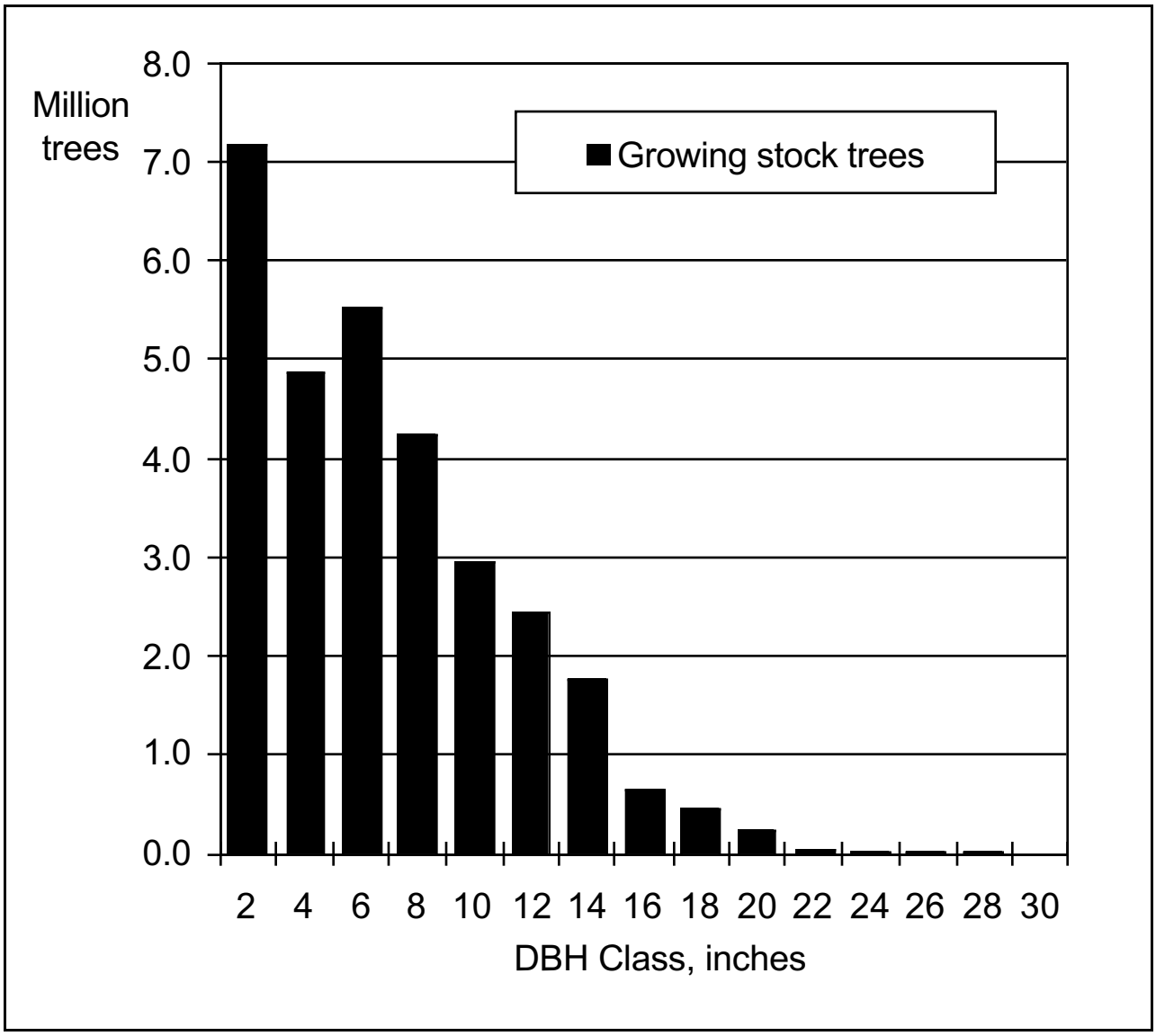

Figure 2: Estimated number of black walnut growing stock trees on timberland in Ohio, 1991, by diameter class.

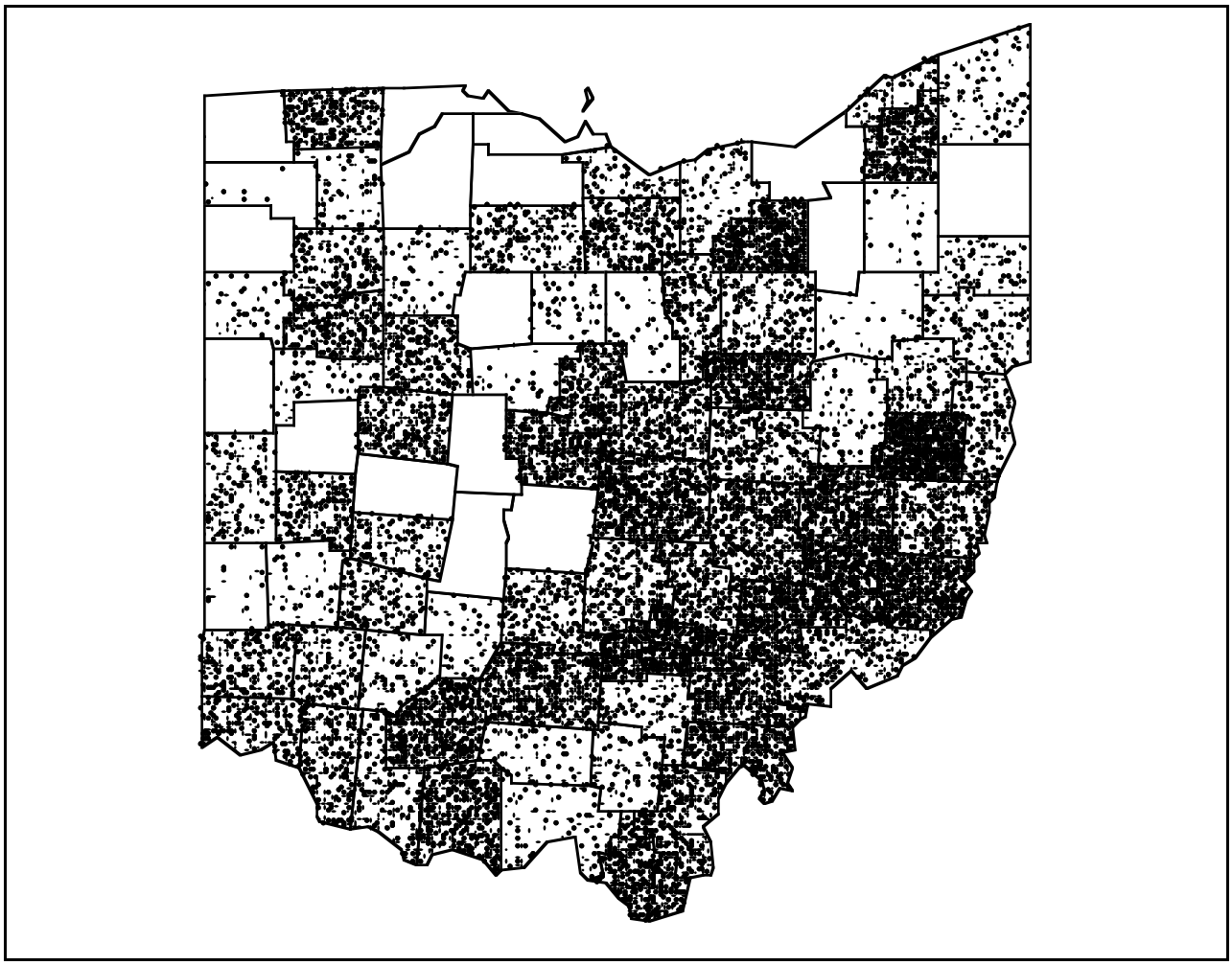

Figure 3: Distribution of black walnut growing stock volume on timberland for Ohio counties. Each dot represents 10,000 cubic feet of growing stock timber. Dots are shown randomly distributed in each county and do not represent specific locations. Some counties with plots may show no growing stock volume because all walnut trees were less than 5 inches in diameter or classified as non-growing stock trees.

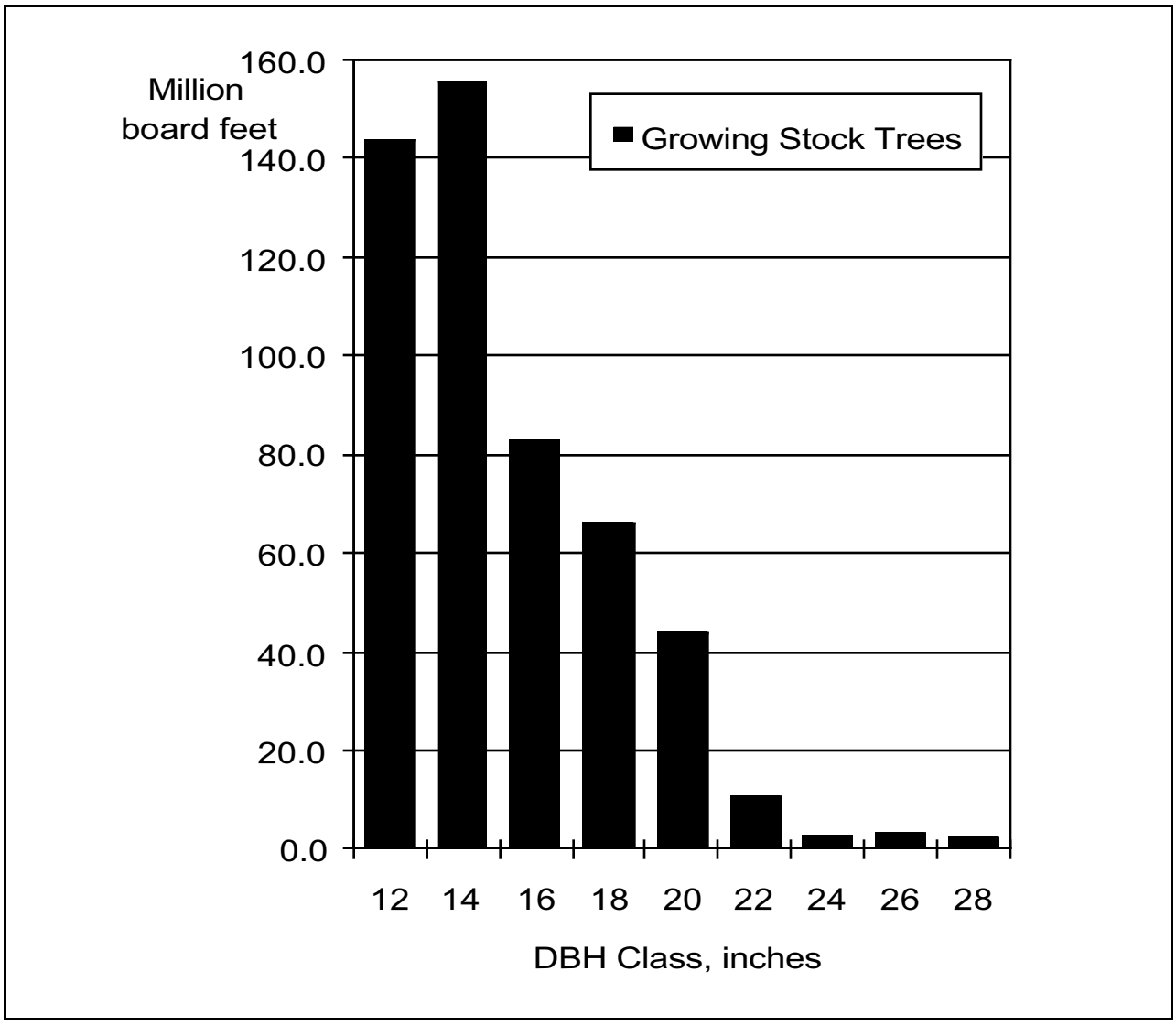

Figure 4: Estimated sawtimber volume of black walnut trees in Ohio, 1991, for sawtimber trees on timberland, by diameter class.