FOREST RESEARCH

at

THE OHIO AGRICULTURAL EXPERIMENT STATION

September, 1952

Introduction

The Ohio Agricultural Experiment Station initiated forest research forty-eight years ago in accordance with the enabling act of 1904 which stated that it should "carefully inquire into the character and extent of the forests of the State, the causes of their waste and decay, and methods for their preservation and development."

The survey of Ohio's forest resources, completed in 1944, revealed a vital truth - that continued research must provide the solution of many of the state's important forestry problems. Since forestry is an important phase of soil conservation and sound land use, it is essential that the research facilities of both the state and federal forestry agencies be adequately and competently manned and soundly financed. The example of private enterprise in this respect might well be emulated.

It is the purpose here to present a brief progress report on the work of the Department of Forest Research and to suggest projects which should be initiated.

Organization Chart - Department of Forestry

L.L. Rummell  
Director

W.E. Krauss  
Associate Director

O.D. Diller  
Chairman

WOODLAND MANAGEMENT and OAK WILT  
W.R. Anderson  
J.W. Meteer

FOREST PRODUCTS  
R.L. Sarles

STRIP-MINE RECLAMATION  
L.L. Knudsen  
P.E. Struthers  
Vacant**

PLANTATION MANAGEMENT  
J.A. Gibbs  
(3/4 time)

FOREST GENETICS  
Vacant

SECRET ARBORETUM  
H.R. Muckley  
and 3 laborers

General Assistant  
I. W. Wade

* Soil Scientist assigned by Agronomy Department to Forestry
** Proposed pasture specialist
Projects Completed During the Period 1950-52

Ohio Maple Syrup ... some factors influencing production.

A study of the factors which influence the returns from maple sugar products in Ohio was conducted jointly by the Departments of Agricultural Economics and Forestry during the period 1946-1951.

At current prices maple syrup production has an annual value of one-half to one million dollars in Ohio and five to ten million dollars in the United States. A crucial need is for the more general adoption of management practices which will enable more producers to realize a profit and maintain production.


Wood Waste in Ohio.

Wood waste has been a problem for many years and this was the first large scale attempt to determine the actual supply in Ohio. An intensive survey of 23 northeastern Ohio counties showed that nearly 5,000 tons of wood waste per week is produced in this area. An extensive survey over the remainder of the state revealed a weekly production of 2,200 tons from only the larger secondary mills.

Research Bulletin 698 by J. W. Meteer gives an analysis of such factors as use and disposal, value, availability, types of material, size of plants and loading and transportation.

Ohio Sawmill Directory.

In January 1951 a survey of sawmills, timber buyers, and other primary wood-using industries was initiated in order to meet the defense and essential civilian needs for lumber and also to supply information needed for future economic and utilization research studies.

Forestry Circular No. 1 by R. L. Sarles and J. F. Clovis, published in February 1952 contains (1) an alphabetical listing of sawmillers, buyers and other primary wood-using industries by county; (2) a classified directory of timber buyers and other primary wood-using industries; (3) a sawmill distribution and production map for the State of Ohio. A summary of the data shows a total of 1,776 sawmills in the state for the year 1951.

Inventory of State Forests.

Prior to 1948 no accurate information was available on the amount of timber which existed on the various state forests nor on the amount and species which should be removed to maintain the maximum growth of high quality sawlogs and other products.

The survey of twenty state forests, comprising over 130,000 acres of timberland showed that these lands support approximately 400 million board feet of merchantable saw-timber of which two-thirds is "good" growing stock and one-third is "poor". The forests average a little over three thousand board feet per acre. The average annual increment is 135 board feet per acre per year.
Research Circular No. 3 by E. A. Conway, entitled "Timber Survey of the Hocking State Forest" illustrates the type of data obtained in the survey. A manuscript report on the extensive sawtimber inventory on all state forests and a recommended forest management plan was prepared in December 1950.

**Research in Progress**

**Woodland Management (State Project No. 136)**

There are 3½ to 5 million acres of virtually unmanaged native hardwood forests in Ohio. In addition to being some of the most complex forests in the country, they have a history of destructive grazing, fire, and unplanned cutting; the timber management problems are legion.

The experimental forests project was established for the purpose of making long term studies of the financial and silvicultural aspects of rebuilding and managing these stands for timber production. Since 1945, the department has established 33 areas in 28 counties, with major emphasis on studies of timber growth and management by short cutting cycles. These experimental forests are scattered throughout the state in order to cover the wide diversity of forest types, species, sites, conditions of past history, and soils. About one half of the areas are publicly-owned and the remainder are under stable private ownership.

Growth studies are aimed at the production potential of the various species, types, and woodland conditions. Management considerations involve the determination of how, what, when, how often, and how much to cut, so as to favor the most valuable species and those best suited to the site, and in general to chart the future course of the woods.

Preliminary results of growth studies clearly indicate the value of good management practices as applied by use of the proper cutting techniques.

Unmanaged-uncut woods have been found to produce an annual growth seldom exceeding 100 - 150 board feet per acre (the state average is less than 100).

Occasionally cut woods with a semblance of management (cut at 10-15 year intervals) have yielded an annual growth of 150 - 200 board feet per acre.

One frequently cut well managed woods is yielding an annual growth of 260 board feet per acre.

Continuous inventory stand data has shown mortality to account for an annual loss of 50 board feet per acre in some woods, while proper management has reduced this to nil in others.

The continued study and development of management techniques and methods of cutting (coupled with the knowledge of growth and silvicultural characteristics) should lead the way toward a greatly increased timber production and the wise use of this major renewable natural resource.
Oak-Wilt (Sub-project No. 2, State Project No. 250)

Because of the serious threat of oak wilt during 1951 the Departments of Botany, Entomology, and Forestry prepared a Master Plan with three sub-projects to study the disease and to determine possible methods of control. The Emergency Board appropriated funds to initiate this study and in addition, grant-in-aid funds were made available through the Ohio Forestry Association and the National Oak-Wilt Committee. No method of control has yet been found but some important basic information is being accumulated.

Chemical Control of Woody Plants (Sub-project #7) (In cooperation with Agronomy Department) R.M. #20.

Wild grapevines and cull trees are a serious problem in many Ohio woodlands and it appears that chemical methods of control are more efficient and economical than cutting. Also, chemical debarking of standing trees is a new and important field in that it eliminates the need for peeling posts and pulpwood after cutting. The present study involves the use of 2,4,5-T; 2,4-D, and mixtures of these two materials; ammato, sodium arsenite, and other herbicides.

Preservative Treatment of Fence Posts (State Project No. 81)

In 1944 a post preservation project was started in which three-hundred and fifty posts of American elm, soft maple, and shortleaf pine were treated with creosote and copper napthenate, using pressure, hot and cold dip, and cold dip treatments. In 1948 an additional 500 posts were treated and placed in service in Station fences. Annual inspections are being made of all treated posts to determine their resistance to decay. Further work is being done on a wider variety of species, different concentrations of preservative, and different lengths of treatment. The posts are nearly all obtained as thinnings from the Secrest Arboretum and are being placed in service on the Station farm.

The Production, Processing, and Utilization of Ohio Grown Timber for Farm Buildings. (In cooperation with Dept. of Agricultural Engineering) (State Project No. 263)

The objectives of this study are (1) to study the factors which influence the production, processing and utilization of native timber as related to farm building, construction, and repairs and (2) to correlate the findings of this study into a satisfactory means of servicing farms with efficient, durable, and economical buildings with special emphasis on the use of home-grown timber.

An example of the type of building which is being studied under this project is a new pole type turkey shelter just constructed at the Station. This building is 39 feet wide by 126 feet long, with 40 white pine and catalpa poles serving as the basic framework.

This building will not only serve as a study for new methods in turkey production, but it is also the beginning of a long term observation to determine the durability of poles used.

The Reclamation and Use of Strip-mined Land in Ohio. (State Project #231)

A survey from 1951 aerial photographs produced an estimate of 76,000 acres of stripped land in Ohio, varying in the 27 counties from 3 acres in Monroe to 16,000 acres in Harrison County. Field reconnaissance is serving to determine the approximate distribution of the various spoil types.
The current research program consists of three phases, namely field trials, greenhouse studies, and laboratory work.

Field trials consisting of 17 species of legumes, grasses, and surface cover crops; 14 species of forest trees; and 3 species of small fruits have been established on a total of ten different areas and are being evaluated. Treatments of lime, fertilizer, and sawdust mulch were used with certain of these species. Summer plantings of oats and buckwheat have been established for determining the effects of an anchored mulch on the survival and growth of trees planted the following spring.

Greenhouse studies are being made to test plant response to lime and fertilizer and to provide plant material for spectrographic analysis.

Significance of sampling and reaction testing techniques are being evaluated for use on spoil materials.

Plans for future work consist of fall plantings of pasture mixtures to be made for comparison with spring plantings. X-ray diffraction studies will be made of clay minerals from spoils for predicting land use capabilities. Analyses of spoil materials and plant samples for nutrient and toxic elements will be made after perfection of spectrographic techniques.

Use of the Spectrograph for Analysis of Soil Extracts and Plant Material.

(R & M Project No. 43)

The general objective of this project is to develop spectrographic techniques for the analysis of soil extracts, extracts of coal strip-mine spoil material, and plants.

Work in progress includes development of spectrographic techniques and sample preparation procedures. Plants are being grown on soil and spoil samples, under special conditions designed to prevent contamination, to provide plant material for spectrographic analysis. The results will prove the significance of the direct analysis of chemical extracts of the soils.

The spectrograph promises to be a valuable instrument for the simultaneous rapid determination of a large number of mineral elements, and particularly in the realm of minor element studies.

Commercial Nut Crops. (In cooperation with Dept. of Horticulture)(State Project #211)

The Forestry and Horticulture Departments of the Experiment Station are cooperating with the U. S. Soil Conservation Service in a nut tree program for Ohio. The major emphasis is on blight resistant chestnuts and superior varieties of black and English walnuts for both timber and nuts. There is a great deal of interest in this field in Ohio, and there is a good prospect that a commercial nut industry may develop in Ohio if an adequate breeding and selection program is carried on.

Multiflora Rose as a Living Fence. (State Project No. 229)

Experimental fences have been planted at Wooster to determine the length of time required to develop a stock-proof fence, and to determine whether or not rose plants would invade pastures and woodlands and thus become an obnoxious weed.
Survival has been excellent in all the plantings, but growth was poor when planted directly under the canopy of trees. It is apparent that at Wooster at least five years will be required to obtain sufficient height growth and density to turn livestock. There is also some indication that this plant may spread into pasture fields and create a serious brush problem.

Management of Forest and Christmas Tree Plantations. (State Project No. 258)

There are well over 100,000 acres of forest plantations in Ohio, most of which have been established within the past 20 years. This study has as its objective the determination of the silvicultural and financial aspects of forest plantation management in Ohio.

Another phase of this project is Christmas tree plantation management. There is an excellent potential market for locally produced Christmas trees. Each year hundreds of thousands of Christmas trees are imported into the state, while high quality trees can be grown locally at lower cost. Some of these trees can be produced as thinnings from existing plantations, but the majority will necessarily come from plantations expressly established for Christmas tree production.

A third study under plantation management is a study to determine the best method of establishing hybrid poplar plantations. There are thousands of acres of poorly-drained bottomlands in Ohio which were cleared for farming which are now in either an abandoned or poorly productive state. The recently developed hybrid poplars show excellent promise for reforesting such areas. Also, extensive tests are now in progress to determine their suitability for planting on coal spoil banks.

Additional Research Needed

The crux of our forestry problem appears to be the proper handling of our existing and potential forests so as to maintain their full productivity, coupled with improved utilization of forest products. Also, since so much land in Ohio is better suited to trees than other crops, the economic aspects of tree planting and forest management should be further investigated. There is also a need for a systematic, long term forest tree improvement program.

Listed below are a few of the more important problems which should be attacked in the near future.

Forest-tree Breeding and Selection.

The objective of a forest genetics project would be to breed and select forest trees possessing superior qualities.

Examples of species of high economic importance which show possibilities for marked improvement are borer resistant black locust; sugar maples for sweeter sap; fast growing soft maples for lumber and pulpwood; fast growing, disease resistant cottonwood and aspen for pulpwood; and black walnut having good form, vigorous growth, figured wood, and high quality nuts. Formal research in forest genetics is practically non-existent in the central states, but the opportunities for genetic improvement of Ohio forest trees are great.
The Use of Commercial Fertilizers in Forestry. (In cooperation with the Department of Agronomy)

There is little information available on the effect of fertilizers on the establishment of forest plantations, or on the growth of trees in natural forest stands. Such a project would have as its objectives to determine the practicability of using fertilizers in: (1) The artificial establishment of plantations, (2) the natural establishment of tree reproduction, (3) in favoring the growth of forest stands, either artificially or naturally established, (4) the effect on yield and sugar content of maple sap, (5) the induction of seed crops of desirable species in forest stands, and (6) to improve and maintain better color of Christmas trees and possibly density of foliage.

Preliminary studies on the use of fertilizer (NPK) on hybrid cottonwood on spoil banks have indicated a decided favorable effect on growth during the first growing season. It has also been observed that nitrogen application greatly improves the color of spruce Christmas trees.

Forestry Publications 1950-52


In Process of Publication


