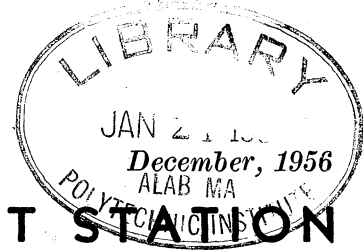


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# AGRICULTURAL EXPERIMENT STATION of The Alabama Polytechnic Institute, Auburn, Ala. E. V. SMITH, Director

## Urea-Formaldehyde Fertilizer As A Source of Nitrogen for 1-0 Loblolly Pine Nursery Stock

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**R**EPEATED NITROGEN topdressings of pine seedlings (*Pinus taeda* L.) has been a standard practice in forest nurseries. These topdressings are expensive, but nitrogen must be available throughout the growing season for rapid growth of seedlings. A fertilizer material that gradually releases nitrogen during the growing season could eliminate the repeated nitrogen applications, thus saving labor and expense.

A recently-developed product, urea-formaldehyde,<sup>1</sup> has been tested since 1955 by the Agricultural Experiment Station of the Alabama Polytechnic Institute to determine its usefulness as a fertilizer material and its ability to release nitrogen over a long period.

Urea-formaldehyde is a type of plastic that has many of the favorable characteristics of organic nitrogen (Lunt and Sciaroni<sup>2</sup>). It contains 38 per cent nitrogen that is released over a prolonged period. About 25 per cent of the nitrogen is in the form of a readily soluble fraction consisting of unreacted urea and urea-formaldehyde polymers of low molecular weight. Nitrification of the soluble urea-formaldehyde is about as rapid as that of ammonium sulfate. The other 75 per cent of the nitrogen is in a slowly available form referred to as water-insoluble nitrogen. In laboratory tests 55 to 60 per cent of the water-insoluble nitrogen was nitrified in about 6 months (Kralovec and Morgan<sup>3</sup>). Under field conditions the rate of nitrification may be increased or decreased as a result of differences in soil type, pH buffer capacity, microbiological activity, plant nutrient content, and climatic conditions.

### PROCEDURE

Five nitrogen treatments replicated 4 times in a randomized block design comprised the investi-

gation. Dimensions of individual plots were 4 feet by 50 feet. During the first week in April, 1955, all plots received uniform applications of 400 pounds of 48 per cent concentrated superphosphate, 200 pounds of 60 per cent muriate of potash, and 15 tons of sawdust per acre, prior to sowing.

The five nitrogen treatments applied prior to sowing were:

1. No nitrogen.
2. Urea-formaldehyde fertilizer—217 pounds per acre (82 pounds nitrogen).
3. Urea-formaldehyde fertilizer—435 pounds per acre (165 pounds nitrogen).
4. Urea-formaldehyde fertilizer—653 pounds per acre (248 pounds nitrogen).
5. Check plots received the standard nursery treatment for 1955, 1,141 pounds of ammonium nitrate (376 pounds nitrogen) per acre in eight applications: 200 pounds prior to sowing; May 31, 100 pounds; June 19, 115 pounds; July 3, 168 pounds; July 15, 168 pounds; August 1, 140 pounds; August 16, 140 pounds; and September 1, 110 pounds.

All presowing applications of fertilizers were thoroughly disked into the seedbed with a Seaman Tiller. Postsowing applications of ammonium nitrate were made through the overhead irrigation system.

### RESULTS

Preliminary results of the tests indicate that it is feasible to use a fertilizer material for loblolly pine seedlings in the nursery that gradually releases available nitrogen throughout the growing season. A single application of urea-formaldehyde prior to sowing of loblolly pine seed in 1955 resulted in seedlings whose heights were equal to

<sup>1</sup>Furnished by E. I. DuPont de Nemours and Company under the trade name Uramite.  
<sup>2</sup>Lunt, O. R. and Sciaroni, R. H. 1955. Synthetic Fertilizer Tested. Agricultural Newsletter, Vol. 23, No. 5: 93-94.  
<sup>3</sup>Kralovec, R. D. and Morgan, W. A. 1954. Urea-Formaldehyde Fertilizers. Agricultural and Food Chemistry, Vol. 2, No. 2: 92-95.

**EFFECT OF NITROGEN TREATMENT ON GROWTH OF LOBLOLLY PINE SEEDLINGS,  
APRIL 12 - SEPTEMBER 12, 1955, AUBURN, ALABAMA**

Nitrogen treatment per acre			Seedling height				
Pre-seeding	Post-seeding	Total	Block 1	Block 2	Block 3	Block 4	Average
Pounds	Pounds	Pounds	Inches	Inches	Inches	Inches	Inches
0	0	0	2.97	3.15	3.57	3.71	3.35
82	0	82	4.33	3.32	4.95	4.61	4.30
165	0	165	5.80	4.35	6.17	5.85	5.54
248	0	248	7.12	5.19	6.25	6.68	6.31
66	310	376	6.42	5.83	6.29	6.33	6.22

those grown with repeated topdressings of ammonium nitrate. Given in the table are average heights attained by the seedlings resulting from the various treatments during the period April 12 to September 12, 1955.

**CONCLUSIONS**

1. A urea-formaldehyde fertilizer compound resulted in loblolly pine seedling heights directly proportional to the amounts applied.

2. In 1955 a single application of 632 pounds per acre of urea-formaldehyde (248 pounds of N) prior to sowing resulted in seedling heights equal to those of seedlings receiving 1,141 pounds per acre of ammonium nitrate (376 pounds of N) in eight applications.

3. Results to date indicate that under conditions similar to those prevailing in 1955 the use of urea-formaldehyde fertilizer compound may eliminate the need for periodic nitrogen applications during the growing season.