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RABBITEYE BLUEBERRY ESTABLISHMENT STUDIES AT OVERTON

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INTRODUCTION

The number of small, commercial rabbiteye blueberry plantings in East Texas is increasing. There have been problems associated with plant establishment, including poor growth and apparent nutrient deficiencies. The problems appear to be soil-related due to the fine, shallow, fibrous root system characterized by a lack of root hairs. Blueberry root systems require a well-drained, acid soil. The soils of the Texas A&M University Agricultural Research and Extension Center at Overton are characteristic of many East Texas soils. They are well-drained, acid, and sandy. The nutritional status of the soil, as determined by soil testing, reveals low levels of N, P, K, Mg, and Ca. However, Zn, Fe, and Mn are at high levels. A revealing weakness of these East Texas soils is low organic matter content of about 0.3%. Organic matter contents of at least 2.0% are reported for the blueberry soils of North Carolina.

Peat is recommended as an organic amendment to overcome possible organic matter deficiencies. Decreasing supplies and quality, coupled with the rising cost of peat are making it less practical for use in commercial plantings. This study compares plant growth in peat with growth in soil and in several locally available, inexpensive organic soil amendments. Varying rates of nitrogen fertilization were also utilized to compensate for possible nitrogen fixation caused by decomposition of the organic matter.

MATRIALS AND METHODS

This field study was conducted in 1981 at the Texas A&M University Agricultural Research and Extension Center at Overton. Five alternative amendments were utilized: pine bark, fresh sawdust, aged sawdust, hay, and oak leaves. Peat and non-amended soils were selected for comparison. Nitrogen was supplied as ammonium sulfate (21-0-0) at the rates of 0, 50, and 100 lb./ac.

The amendments were incorporated early in February. Each amendment was mixed with soil from the planting hole at a rate of 1/2 bushel of amendment to 1/2 bushel of soil. At this time, phosphorus (0-46-0) at a rate equivalent to 25 lb./ac and potassium (0-0-60) at 50 lb./ac were added. The components were blended in a cement mixer until a homogeneous state was reached. This mixture was placed in the planting hole that was 18 in. in diameter by 18 in. in depth.

Nursery stock, 12 to 18 in. in height, of 'Tifblue' were planted March 2 and 3. Plants were spaced 4 ft. apart with 8 ft. between rows. The nitrogen treatments were surface applied in 4 applications at 5 week intervals beginning 3 weeks after planting.

The plants were dug the first week in November, 1981, at the onset of dormancy but prior to leaf fall. Total dry weight was evaluated. The experimental design was factorial with 7 soil amendment treatments and 3 nitrogen rates for a total of 21 treatments. The study was replicated 4 times with 4 plants per plot. A total of 336 plants were utilized.

RESULTS AND DISCUSSION

Total plant dry weights revealed large differences in growth between treatments. Both soil amendment and nitrogen rate influenced growth. Mean growth ranged between a high of 752.5g with peat and 50 lb. N/ac and a low of 54.0g with non-amended soil and 0 N/ac (Figure 1). With peat, the highest mean growth was from plants receiving 50 lb. N/ac. High nitrogen (100 lb./ac) was toxic to some plants in peat-amended soil and caused the average weight gain of the 100 lb. N/ac treatment to be lower. Only plants in pine bark and oak leaf soil amendments responded beneficially to the high (100 lb./ac) N treatments. The weight of plants grown in pine bark (504.5g) was the highest of all the alternative amendments.

Peat as a soil amendment with 50 lb. N/ac provided the highest mean growth of all treatment combinations with a mean weight of 752.5 g. Growth of plants in pine bark was the highest of the alternative amendments, although growth in sawdust was nearly the same. The 50 lb. N/ac rate provided maximum or near maximum growth for peat, fresh sawdust, aged sawdust, hay, and nonamended soil treatments. This indicates that the additional nitrogen (above 50 lb./ac) was not utilized by the plant or, in the case of peat, was detrimental to plant growth.

All of the plants exhibited poorest growth without supplemental nitrogen. Plants in peat-amended soil showed significantly more growth than those planted in alternative amendments. The peat probably provided enough nitrogen to encourage growth throughout the season, while the alternative amendments were able to provide only small amounts of available nitrogen.

Nonamended soil was the poorest treatment at all nitrogen rates, indicating some positive benefits from the addition of organic matter to the soil.

The growth of plants in soil amended with fresh sawdust was significantly greater than those in aged sawdust. Total plant growth, on a dry weight basis, in soil amended with fresh sawdust was nearly double that in aged sawdust (100 lb. N/ac, 309.25 to 131.25 g; 50 lb. N/ac, 301.00 to 138.75 g). These data are contrary to studies that indicate that the use of fresh sawdust is detrimental to blueberry growth. Studies on other crops have revealed that fresh sawdust can be successfully utilized as an organic amendment if enough nitrogen is supplied to compensate for nitrogen fixation by the sawdust.

Pine bark was consistantly the best growth medium when compared to the other alternative soil amendments at all N rates, but did not provide growth (on a total dry weight basis) equal to that of peat.

SUMMARY AND CONCLUSIONS

Peat was superior as a soil amendment, but pine bark-amended soil fertilized with 100 lb. N/ac provided the best medium of the alternative amendments.

These results demonstrate that N fertilization is beneficial, especially with use of alternative amendments for establishing growth. Peat supplied enough N to initiate and maintain growth throughout the season, but use of 50 lb. N/ac with peat produced superior growth. The data suggest that, in treatments exhibiting good growth, the N rates applied were sufficient to provide for amendment decomposition and plant growth.

Fertilization at 100 lb. N/ac greatly increased growth of plants in soil amended with pine bark and oak leaves. In the case of peat and aged sawdust the high rate (100 lb./ac) of N may have been detrimental to growth, because of apparent N toxicity.

The goal of this study was to find an amendment(s) that could be practically and effectively substituted for peat. The results of this study suggest that soil amended with 1/2 bushel of pine bark per plant and fertilized with 100 lb. N/ac is the best alternative to peat for establishment and growth of rabbiteye blueberry plants.

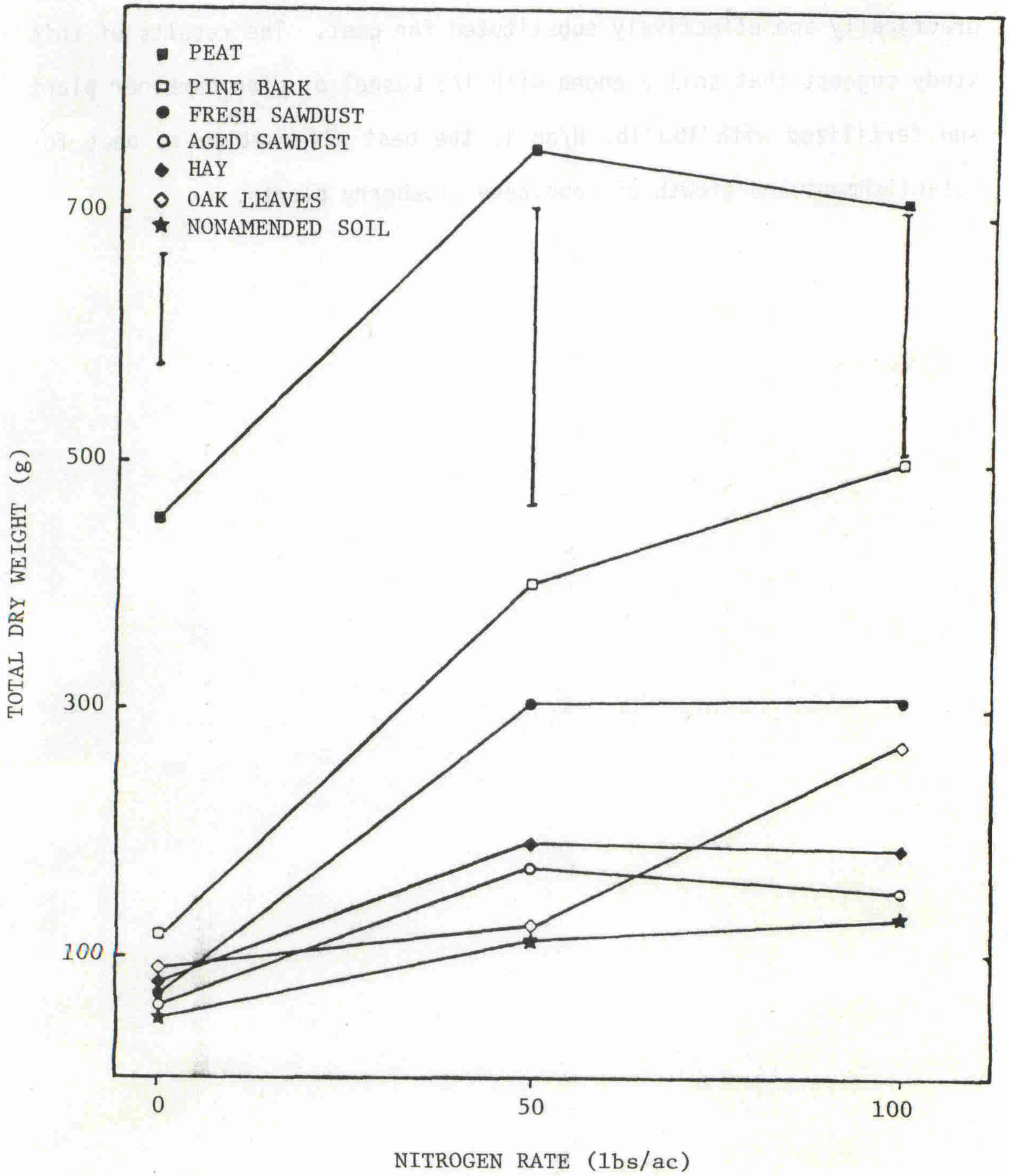

Fig. 1. Mean total dry weight (g) of 'Tifblue' plants grown in 6 soil amendments and nonamended soil at 3 N rates. Vertical bars indicate mean separation at each N rate for the 7 soil treatments using LSD at the 1% level. Weights represent the means of four-plant plots with 4 replications per treatment.