

responses have been too inconsistent to support recommendations at this time.

3. What fertilizer rates and sources should be used?

The recommended rate of P is 50 to 60 kg P/ha (100 to 120 lb P₂O₅/acre). However, on highly deficient Group A and some Group B soils, as little as 20 to 30 kg P/ha (40 to 60 lb P₂O₅/acre) produces a large growth response that lasts for the entire 20- to 25-year rotation. Figure 2 illustrates the wood volume responses to P fertilization for a range of soils.

The long-term response of pines to phosphorus is not dependent on the phosphorus source. Ground rock phosphate is equal in effectiveness to soluble sources such as super phosphate or ammonium phosphate. Thus, the choice of P source is generally based on cost and application considerations. (To obtain a 50 kg P/ha rate apply 220 pounds of 0-46-0, 220 pounds of 18-46-0, or 320 pounds rock phosphate per acre.)

The recommended rate of N is 45 to 55 kg N/ha (40 to 50 lb N/acre). The recommendation is based on the observation that young plantations do not have the ability to utilize a large quantity of N. Diammonium phosphate (18-46-0) is the most frequently used N source in young stands because it is a convenient form in which to apply the recommended rates of both N and P (i.e., 220 lb 18-46-0/acre gives 40 lb N and 100 lb P₂O₅/acre).

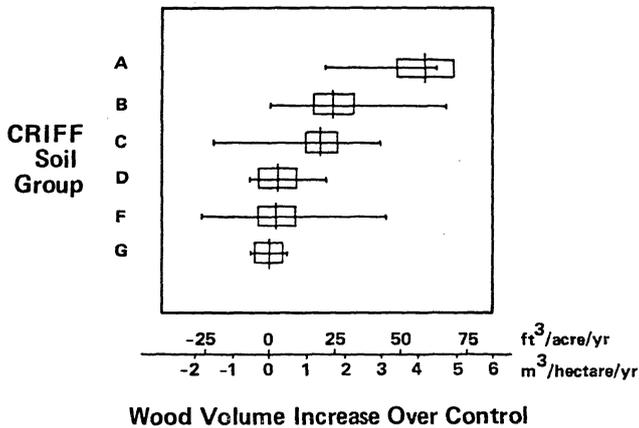


Figure 1. This graph presents the results of long-term slash pine fertilization experiments which were fertilized with 90 kg P/ha (180 lb P₂O₅/acre) at the time of planting. Eight years after planting, the wood yield of the fertilized and unfertilized plots were compared on each of the soil groups. The vertical line is the average for each soil group, the box shows the standard error, and the horizontal line shows the range of responses measured at the various sites where the experiment was conducted. For example, on Group B soils, fertilized pines produced an average of 1.7 m³/ha/yr (24 cu ft/acre) of wood more than the unfertilized trees. However, the response ranged from practically zero increase at one location to 4.7 m³/ha/yr (68 cu ft/acre/yr) at another location. The standard error is used as a statistical estimate of the probability of response. In this example, 2/3 of Group B soils would be expected to give a response of 1.2 to 2.3 m³ of wood/ha/yr (17 to 33 cu ft/acre/yr) to P fertilization (data from Kushla and Fisher, 1980).

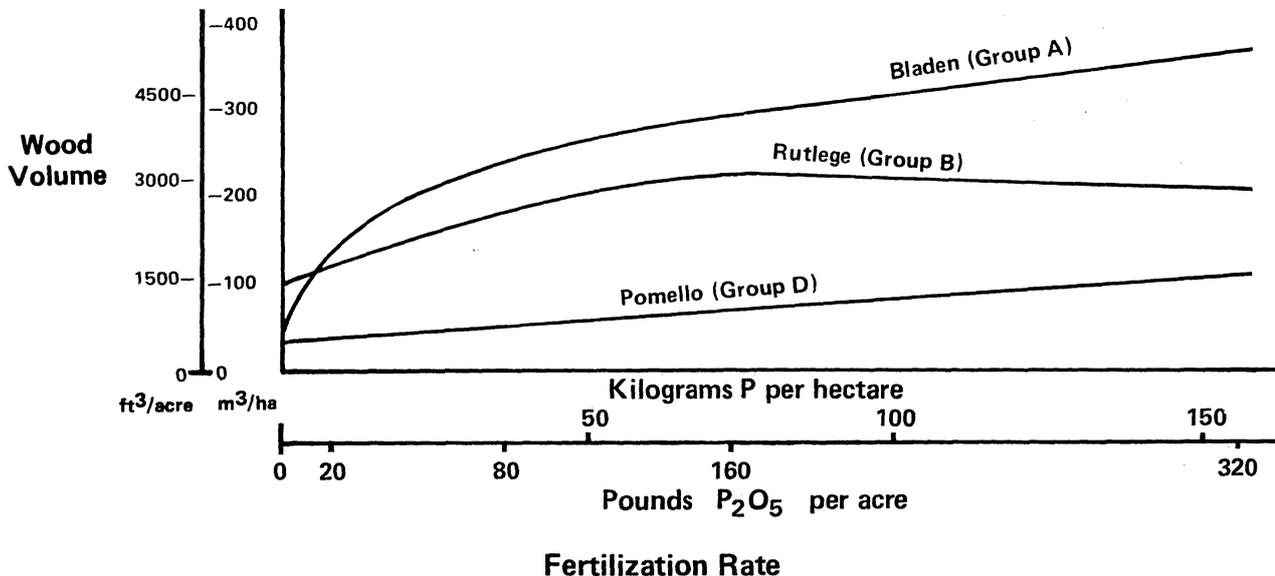


Figure 2. This graph shows the effect of phosphorus fertilization on soils of Groups A, B, and D. Different rates of phosphorus were applied at planting and the wood yields were measured 17 to 20 years later. It may be appreciated that pines on Group A soils responded much more dramatically to P fertilization than did pines grown on Group D soils (data from Pritchett and Comerford, 1982).