THE USE OF CHEMICALS for weed, insect, and disease control in forest tree nurseries is becoming standard procedure. Although these materials aid in controlling pests, their addition to the soil involves certain hazards. Investigators in other fields (1, 2, 3, 4, 5, 6, 8, 12) have found that many of the commonly used chemicals, when added to plants, accumulate in the soil, and are metabolized slowly. The effects of these compounds in forests, where they may cause reduced survival or growth in forest plantations, assumes even more importance because of the variety of tree vigor, or chemical constitution of the tree species chemically treated. Such interactions may be partially or wholly offset the toxic effects of the chemicals. Previous research relating to nursery practices (9, 10) indicated that humus material might be useful for this purpose. Two types of humus, an arthropod fine mull and a matted mycelial mor (7, 11), which preliminary trials showed were particularly beneficial, were selected for this study. The properties of these two humus types, and the control soil, Plainfield sand, are described in table 1.

The biocide and humus additions were mixed thoroughly with the soil which was placed in 1-gallon glazed crocks. Treatments were duplicated except for the control which was replicated four times. Twenty-five Monterey pine seedlings were sown per crock. The rates of biocides used were heavier than those normally used in practice in order to obtain definite toxic symptoms and beneficial responses. Such concentrations might occur in soils through applications, accumulation from successive treatments, or movement through the soil.

The seedlings were harvested after a 6-month growing period. Dry weight of tops and roots was determined and the tops were analyzed for nutrient content. Growth data for selected treatments are presented in table 2.

Growth was retarded by all of the biocides used. Calomel, thiosan, and chlordane caused the greatest reductions in growth. Calomel, allyl alcohol, and thiosan caused noticeable reductions in survival. Presumably, these chemicals, partially or wholly offset the toxic effects of the chemicals.

To investigate the possibility of a counting hysteresis existing in probe 1, two equal size (3-foot cube) constant-temperature baths (1 and 2) at 24.5° and 46.0° C., respectively, were used. When the probes were taken from either bath, a 15-minute count was taken before the probe was inserted into the other bath. Two thermal characteristic curves should be determined for each probe. Probe 1 was inserted into bath 2 (or 1) where 1-minute counts were recorded until thermal equilibrium was reached. The resulting thermal characteristic curve should be determined for each probe. A counting hysteresis is not present in the shape of the curve (probe 1) figure 1 may not be used in study gave incorrect counts when its temperature was above 32° C. The effect on neutron counts in going from a high to a low temperature with probe 1 in air or soil may be seen in figure 2. Consequently, whenever the temperature was above 32° C. a temperature correction may not be feasible.

The purpose of this greenhouse study was to evaluate the changes in growth and nutrient uptake of Monterey pine (Pinus radiata) seedlings caused by the addition of certain biocides to the soil; and also to test the different types of humus to counteract the chemicals. The properties of these two humus types and the control soil, Plainfield sand, are described in table 1.

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