seems to be that the individual trees were selected on the basis of their apparent vigor, health, and good stem form as compared with their associates in the various stands throughout the United States and Canada, where the collections were made. This, then, suggests that a positive correlation may exist in this genus between maleness and such desirable characters as vigor and form.

Further support of this hypothesis is revealed by a check of the old cottonwood or black poplar clones long cultivated in Europe. G. Houtzagers (*Het Geslacht Populus in Verband met zijn Beteekenis voor de Houtteelt* (The genus *Populus* and its significance in silviculture). Wageningen, Netherlands: H. Veenman and Zonin, 1937), for instance, in his description of poplar clones cultivated in Holland, notes that of the 8 most commonly planted, only 2 (25%) are females.

If the accumulation of more extensive data confirms these preliminary observations, it is needless to point out that this knowledge will be an invaluable tool to tree breeders and silviculturists interested in the genus *Populus*.

SCOTT S. PAULEY

Harvard University,
Harvard Forest, Petersham, Massachusetts

Weed Control—A Liquid Concentrate of the Isopropyl Ester of 2,4-D Miscible With Oil or Water in Any Proportion

A number of proprietary concentrates of various esters of 2,4-D are on the market, but few, if any, of them carry more than 40–45% of the parent ester. When added to the diluting water, many of these concentrates produce a smooth white emulsion which remains in stable suspension for only a very limited time. Thus, in about an hour, two distinct layers may begin to form, the upper water-like and the lower a dense white flocculation. A casual examination of the white flocculent material would suggest that this substance consisted of a precipitate of 2,4-D acid in fine division. A consideration of the chemical reaction which occurs upon the preparation of the ester would appear to support the suggestion that 2,4-D acid was depositing at the bottom of the container by virtue of a reversal of the acid-alcohol to ester-water reaction.

An associate in this laboratory has shown that the so-called hydrolysis of the ester in the diluting water does *not* take place, except at a very slow rate. A difference in density between the ester, its coupling agent, and the diluting water accounts for the precipitate of dispersed globules of oily material settling out by gravity. Obviously, the spraying of such a dispersion in the field or glass house, without frequent agitation, introduces errors not only in the uniformity of the application of the active constituent of the herbicide, but also in the subsequent evaluation of the treatment.

An effort was made in this laboratory to develop a concentrate of 2,4-D which would carry about double the amount of 2,4-D to be found in proprietary preparations of this character. A simple process, involving dilution with water, was also recommended to plantation workers in which the precipitation of oily globules could be inhibited for a sufficient length of time to assist materially in a more even application of the spray components. With fuel oil, Diesel oil, and other petroleum oils, this concentrate forms a clear solution.

The formula follows:

Concentrate No. 1

Dissolve, in the cold, 15 lbs of conditioning agent[1] in 85 lbs of clear isopropyl ester of 2,4-D (weight approximately 10 lbs/gal). This carries 70.4% of 2,4-D (calculated to acid) or about 7 lbs of 2,4-D acid/gal.

To inhibit rapid settling of heavy oily globules in the water dispersion of Concentrate No. 1, add from 8 to 10 pints of Stoddard solvent to each gallon of concentrate before incorporating the diluting water.

Observations made in current pre-emergence field studies indicate that 1¼ pints of Concentrate No. 1, diluted to 25 gals with Diesel oil and applied evenly upon the bare soil surface over 1 acre of planted sugar-cane seedpieces, will arrest the germination and growth of weed and grass seeds and seedlings for 7 weeks. This treatment has not shown as yet any abortive effect upon the germination and growth of the planted seedpieces.

Concentrate No. 1, diluted with Diesel oil at from 2 to 4% equivalent of 2,4-D acid, shows promise of controlling the growth of woody pests such as guava, lantana, Java plum, etc. Application should be made to the basal portion of the plant, not the foliage. From 50 to 100 ml of the diluted concentrate may be used. No primary treatment of the tree or shrub is required. A slight cupping out of the soil where the plant emerges from the ground may be helpful. The effect of the treatment may show progressive action for 5 or 6 months. The conditioning agent, it is believed, renders the diluted concentrate miscible with plant moisture after the treatment permeates the bark.

Concentrate No. 1 has one outstanding disadvantage. It employs the isopropyl ester of 2,4-D, the latter exerting an appreciable vapor tension. Even when diluted to 160 times its original volume with Diesel oil, the "vapor drift" of the ester may carry to nearby sensitive vegetation.

FRANCIS E. HANCE

Experiment Station,
Hawaiian Sugar Planters' Association, Honolulu

[1] There are several conditioning agents which may be used. Good results were obtained in Hawaii in which we employed an oleate of polyoxyethylene hexahydric alcohol (Atlas G-1096).