on the number of seeds produced.

The data in this experiment (Table 3) show that pollen variety has no influence on the seed content or the fruit size of the 'Orlando', other than for the incompatible 'Orlando' and 'Minneola' pollens, which resulted in virtually seedless fruits that were much smaller than the seedy ones. Thus, the 'Orlando' does not exhibit metaxenia and growers cannot expect the pollinator variety to directly influence fruit size.

LITERATURE CITED

INFLUENCE OF OIL EMULSIONS ON ABSORPTION OF CARBON DIOXIDE BY CITRUS

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INTRODUCTION

In a recent investigation using infra-red CO₂ analysis it was shown that pure paraffinic hydrocarbons applied to leaves of Citrus sinensis, Osbeck, variety Valencia, depress CO₂ absorption; and, that the recovery from the depressive effect correlates with the dissipation of the hydrocarbons (1).

Because of the differences in the physical and the chemical properties and the methods of application of the pure paraffinic hydrocarbons used in the above study, it was considered hazardous to extrapolate from the results to the performance of a field application of a typical oil emulsion, also, on CO₂ absorption.

The present investigation was initiated in order to obtain specific data concerning the effects of a typical oil emulsion on CO₂ absorption under as near normal conditions as practical.

MATERIALS AND METHODS

Leaves of nursery grown trees of Citrus sinensis, Osbeck, variety Valencia, were utilized as a source of plant material. Determinations of CO₂ absorption were made using continuous infra-red CO₂ analysis with sequential multipoint sampling, as described previously (1). Air from the atmosphere, at thirty liters per hour, was passed over leaves placed in water-cooled plastic chambers, through a dririte drying column, a flow meter, and a Hartmann & Braun URAS Infra-red CO₂ analyzer. A switching unit permitted sequential sampling from several sampling points for five minute periods. A purge pump maintained a constant flow at thirty liters per hour over leaves not being channelled through the analyzer.

Apparent photosynthesis, CO₂ absorption, was measured by the amount of CO₂ in ppm, removed from the air stream in daylight. Respiration, CO₂ evolution, although recorded during the dark period has been disregarded in the present investigation.

All measurements were made on outdoor growing plants. The leaves were enclosed in
water-cooled plastic chambers only for the periods of measurements, generally 12 to 24 hours. Because of inherent limitations it was only possible to return to the same leaf for measurement every second or third day.

Sunlight served as a source of illumination, i.e. that light that passed through the chamber. For consistency and purposes of comparison data was recorded only for sunny days. It was found that light was a limiting factor on cloudy and rainy days.

The emulsifiable oils used in the present investigation met Florida recommended specifications: the oil labeled 6E was equivalent to FC 412-66, while the oil labeled 7E was equivalent to FC 435-66 (3). The applications of the oil emulsions were made to the leaves after a constant pattern of CO₂ absorption was established. The applications were made to both leaf surfaces to run-off.

All experiments were repeated several times with only minor variations.

Fig. 1.—Influence of a 1% "light" oil (6E) emulsion and a 1% "heavy" oil (7E) emulsion on CO₂ absorption. Dark periods are not shown.
Fig. 2.—Influence of a 1% and a 10% "heavy" oil emulsion on CO₂ absorption. Dark periods are not shown.
RESULTS

The effects of various oil emulsions on CO₂ uptake are shown in Figures 1 and 2. Figure 1 illustrates the effects of a 1% “light” oil emulsion (6E) and a 1% “heavy” oil emulsion (7E) on CO₂ absorption. It can be seen from the figure that the application of either oil emulsion depressed CO₂ uptake and that recovery from the depressive effect occurred in time. The data indicated that recovery from the “light” oil was more rapid than recovery from the “heavy” oil.

Figure 2 illustrates the effect of an application of 1% and a 10% “heavy” oil emulsion to the leaves of citrus. It can be seen from the figure that recovery from the 1% emulsion was more rapid than recovery from the 10% emulsion.

Comparisons between Figure 1 and 2 concerning recovery times are not valid since the experiments were conducted several weeks apart and consequently under different environmental conditions. In addition, as may be noted from the figures, differences in the initial amounts of CO₂ absorption for each of the leaves negates comparison.

DISCUSSION

The results of the present investigation indicate that the effects of oil emulsions on CO₂ absorption are similar to effects of pure paraffinic hydrocarbons (1). The application of either to a leaf results in a depression of CO₂ absorption; and recovery from the initial depression appears to correlate with the dissipation of the hydrocarbon. The mode of action in both cases appears to be attributed to the mechanical interference of the petroleum product on gaseous exchange. These results are in general agreement with those of others (2, 5, 1).

Of special significance in the present investigation was the demonstration of the above effects under nearly natural conditions, i.e. attached leaves, normal CO₂ concentration, ambient temperature, sunlight, etc.

Toward the selection of an agricultural oil for use on citrus with a minimum phytotoxic effect the data suggest attention be given to the distillation range of the oil as well as to the concentration of oil in the emulsion. These results are in agreement with those of Trammel and Simanton (4), Riehl and Wedding (2), McMillan and Riedhart (1), and Wedding et. al. (5).

In the continuing effort to minimize phytotoxic effects it would appear advantageous in future studies to place more emphasis on dissipation rate and its influencing factors.

LITERATURE CITED


SPHAEROPSIS KNOT, A DISEASE OF ROUGH LEMON ROOTSTOCK

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ABSTRACT

In two areas of Jamaica West Indies, a rootstock disease was observed on dying four-year-old Valencia trees budded on Rough lemon.

Wddy knots of varying sizes were prevalent throughout the root crown of the tree up to the bud-union, and were strikingly similar to those caused by Sphaeropsis knot on Rough lemon.

At the Botany Department of the University of the West Indies, isolation experiments yielded cultures of the fungus Sphaeropsis tumefaciens Hedges from knots cut off the Rough lemon rootstock. Subsequent inoculation experiments (with isolates obtained from woody knots) resulted in knot formation on most of the inoculated branches of Rough lemon, West Indies lime, and Ortanique (a natural cross of tan-

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