

Spraying Liquid Insecticides From Air Lessens Drift

(Continued from page 3)

The by-passed liquid also serves for agitating the material in the storage tank.

A clutch is provided on the power take-off drive so the plane's full engine power can be utilized in lifting it from the ground.

Droplet Size

Some materials such as selective weed sprays seem to be more effective when applied as coarse sprays. This is fortunate because the drift problem is much less critical with the larger droplet sizes in the range of 300 to 500 microns.

Insecticides, in general, give a more uniform and effective deposit when atomized to smaller droplet size, probably in the range of 50 to 300 microns.

The degree of atomization by the boom-with-nozzles type of disperser may be changed greatly by the location of the nozzles on the boom. For example, with nozzles discharging downward and at 90 degrees to the air flow, the liquid is broken up much finer than when the nozzles are directed to discharge backward with the air flow.

Seeding and Weeding by Plane

The airplane has been used successfully for seeding thousands of acres of rice, barley and legumes.

Herbicides have been applied successfully by plane on grain field, rice fields, alfalfa, and on irrigation and drainage ditches.

Even the broadcasting of fertilizer by plane has been done extensively and successfully.

These diverse agricultural applications for the airplane make it possible for the commercial operators to use their equipment over a greater portion of the year and as a result, lead to better equipment and less cost to the grower.

O. C. French, assistant Professor of Agricultural Engineering and Assistant Agricultural Engineer in the Experiment Station, Davis, resigned Sept. 1, 1947.

Control Measures In Trichomoniasis Abortion By Cows

(Continued from page 1)

the bull when breeding a cow. The organism — trichomonad — causing the disease lives deep in the sheath of the bull and does not affect the semen.

The cow may conceive normally from the service, but if trichomonads are also introduced into the uterus with the semen, ideal conditions are created for their multiplication with the result that the developing fetus is eventually killed by the trichomonads. This can occur any time after conception and may result in an abortion too small to be observed.

Spread of the Disease

A cow may come in heat in two or three days after an early abortion, and be rebred, perhaps to a different bull, with the result that the second bull may become infected. The vagina of the cow is likely to harbor numerous trichomonads for several days following abortion.

The first symptom in the herd is the return to heat of a number of cows, assumed to be with calf, because of having shown no heat following breeding two or three months previously.

Being an infectious and venereal disease a considerable number of cows are likely to be involved, and the majority of them traced to service by a particular bull. Vaginal discharge, whitish in color, from cows supposedly with calf is also observed.

When an abortion is seen it is usually during the first half of gestation and the fetus shows evidence of having been dead in the uterus for some time. In some cases there is little but skin and bone accompanied by considerable brownish colored fluid.

Diagnosis Difficult

Diagnosis is difficult and can best be made from the breeding records of the herd. A positive diagnosis consists of finding the organisms in fresh discharge following abortion. This is not always possible since trichomonads die rapidly on leaving the pregnant uterus.

Treating Row Crop Seeds With Fungicides As Control Measure Against Decay Or Damping-off

L. D. Leach

Treating seeds of several vegetable or field crops with the proper fungicides may improve stands by reducing the amount of seed decay or damping-off. In addition, several seed-borne diseases can be controlled by seed treatment.

To be satisfactory the chemical must be non-injurious to the germinating seed but toxic to the organisms that cause seedling infection. For this reason the treatments used upon various crops differ considerably.

Lima Beans

Lima beans are quite susceptible to seed decay when planted in cool, moist soil but prior to 1940 practically no seeds were treated because the fungicides then available caused severe injury to germinating seeds. About that time new fungicides, safe upon lima beans, were introduced and by 1945 over 75,000 acres of large lima beans, or 75% of the total acre-



Control of damping off of sugar beets by seed treatment. The sixteen rows to the right of the center were planted with nontreated seed, while the rows to the left and the extreme right were planted with treated seed.

age in California was planted with treated seed in the five southern coastal counties of Santa Barbara,

The possibility of this infection getting into the herd is one of the reasons for maintaining good breeding records including a record of the performance of each bull in the herd. A bull infected with trichomonads will show a very poor record; over a period of one hundred services he may show as few as six normal calvings.

A tentative diagnosis may be made from breeding records, and control measures adopted immediately because these measures are such that they constitute, today, good dairy management.

Condemned Practice

The infection is usually introduced into the herd through the purchase of a herd sire that has been used elsewhere. Since diagnosis is difficult in the male there is danger that the infection may become widespread throughout the herd unless curbed. Unfortunately, it has been customary to breed a cow to a different bull if she fails to conceive from the first. This practice should be abandoned, it leads to spread of infection to other bulls.

Slaughter of Bull

When infection is suspected or found in a herd, the infected bull should be slaughtered. There is no reliable cure. The infected bull can be determined from breeding records. Infected cows will recover following abortion; that is, the organism will disappear from the genital tract within a few weeks.

Recommendations

A bull should be assigned to a group of cows. If a cow fails to conceive she should be bred back to the same bull unless, in the meantime, the bull has been proved of no value as a breeder, in which case, two heat periods should be missed and the cow bred to another bull on the third. This will allow time for the elimination of any infection acquired from the service by the first bull.

Adherence to this practice at all times is good herd management and if infection of this type gets into the herd, it will be confined to one group only.

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Other Row Crops

Some crops such as radish, carrot, celery, onion and lettuce are not particularly susceptible to damping off and usually are planted without protective seed treatments. Other crops including spinach, sugar beets, melons, cantaloupe, and peas are frequently subject to seedling diseases and often show considerable benefit from proper seed treatment.

High temperature crops such as beans, melons and cotton are most apt to suffer from seed decay when they are planted in cold moist soils because under these conditions the soil fungi that rot the seeds grow relatively faster than the seedlings. At high temperatures, on the other hand, these same crops may entirely escape seedling infection.

Low temperature crops like spinach and peas are more subject to seed

decay or damping off at moderate than at low temperatures providing soil moisture conditions are similar.

Sugar Beets

Sugar beets present a special problem because in addition to being quite susceptible to seedling infection by several soil-borne fungi, some seed lots carry spores of a fungus that causes damping off in cool moist soils. It has been found that dusting the seed with organic mercury compounds gave effective control of these diseases but storage of such treated seed for prolonged periods resulted in seed injury.

Recently two new organic compounds were introduced commercially that gave reasonably good protection and avoided storage injury. In a dust form, however, both proved to be irritating to operators and a modification of the method of application appeared desirable.

Methods of Mixing

Most seed treatments are applied as dusts by mixing the seed and fungicide in commercial continuous-flow seed treaters or by mixing measured batches in diagonal barrel treaters or in cement mixers.

To eliminate the dustiness of treated seeds and to increase adherence one of the commercial companies recently developed a process for applying the fungicide in a moist, pasty mixture by the so-called "slurry method." This method proved satisfactory upon corn and is being tested on other types of seed.

Other methods of applying concentrated suspensions by spraying the material over the seed during agitation are also being investigated.

Fungicides Available

Nearly all fungicides used for seed treatment have been developed and are offered for sale by commercial chemical companies. The chief function of a special series of fungicidal experiments has been to evaluate these materials with regard to the tolerance of different seeds to specific fungicides and to the protective effects of the fungicides against specific pathogenic organisms.

On the basis of safety and efficiency as well as cost, availability and ease of application the producers are enabled to decide which materials are most suitable for their purposes.

L. D. Leach is Professor of Plant Pathology and Plant Pathologist in the Experiment Station, Davis.

Improved Flavor—Color Produced In Evaporated Milk

N. P. Tarassuk

There is no known effective method of preventing the cooked or caramelized flavor and brown discoloration of milk processed at high temperatures to render it sterile.

Experiments involving a 5% lactose solution containing phosphate buffer revealed the manner in which heating and storage can effect the discoloration. Slight differences in color were intensified when a lactose solution was sealed in a container with different gases in the free space.

Chemical Changes

The chemical changes in the milk which are brought about are an uptake of oxygen, and the production of carbon dioxide by at least one constituent in the milk which is heat-labile—altered by the application of heat.

The decrease in oxygen would account for only a small part of the increase in the percentage of carbon dioxide. The increase in carbon dioxide, in the free space of the container, can not be the result of heat on the carbon dioxide soluble in the milk.

Solubilities of Gases

The solubilities of carbon dioxide and oxygen vary as the partial pressures of the gases change in the free space in the can.

After milk has been heated it will contain more dissolved carbon dioxide and less oxygen. The reaction which produces the browning discoloration releases carbon dioxide and uses oxygen, as shown by an analysis of the gas in the free space.

Ratio of the Gases

Evidenced by the changes of the gases in the free space in the can, the ratio of carbon dioxide produced, to the oxygen used, averaged 0.12 when evaporated milk was sterilized at 244°F for 15 minutes. When the same milk was heated at 168°F for five minutes, the ratio was only 0.09%. Apparently this ratio is much closer to a unity than indicated by the data on the gases in the free space.

When pure moist lactose was discolored by heating in a closed container at 212°F, the ratio of carbon dioxide produced to oxygen used was 0.66.

There is no doubt that lactose is the principal source of the carbon dioxide given off during the discoloration of the milk under a high heat treatment.

Color and Flavor Improved

Evaporated milk was improved in color and flavor by replacing the oxygen in the free space in the can with nitrogen before the milk was sterilized.

In this experiment the nitrogen containing cans and a control can with the usual oxygen in the free space were sterilized in a commercial plant for 15 minutes at 242°F and at 243°F.

In comparison with the control can of ordinary evaporated milk, those with the nitrogen was found to have only a mild caramelized flavor.

In other experiments, when some of the oxygen dissolved in the milk was removed, and the oxygen in the free space was reduced to 0.69% before sterilization, the resulting evaporated milk had an even greater improvement in color and in flavor.

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ABSTRACTS OF NEW PUBLICATIONS

BRUSH REMOVAL

IMPROVING CALIFORNIA BRUSH RANGES, by R. Merton Love and Burle J. Jones. Cir. 371, August, 1947. (31 pages).

Not all of the 10 to 20 million acres of brushland in California can be cleared profitably, but large areas can be made to support additional livestock.

Well-planned programs of brush removal by individual ranchers can change certain adaptable California brushlands into valuable grasslands that produce greater crops of meat and wool.

Any brush clearance project must be well planned if it is to succeed. It involves the choice of areas which will offer support for forage growth after clearance, the proper clearing of the land through fire and machinery, and reburning of cleared lands at intervals to prevent regrowth of brush.

The second phase of range improvement is revegetation. The area should be examined before burning to determine whether or not artificial seeding will be necessary to establish a forage crop. After the crop is established, adjusted grazing is essential to insure permanent stands.

Information on this three-fold plan for improving range lands through removal of brush, revegetation of cleared areas, and control of grazing is to be found in the circular listed above.

HOME FRUIT GROWING

HOME FRUIT GROWING IN CALIFORNIA, by W. L. Howard, revised by Reid M. Brooks. Ext. Cir. 117, September, 1947. (81 pages).

Deciduous fruit trees for the small home orchard can be grown almost anywhere in California, within the limitations of climate, site, and soil.

The kinds of fruit to plant depend upon the geographical location, the owner's taste, and the amount of land available. With sufficient irrigation water, favorable climatic conditions, and enough space, a good selection might be apples, apricots, peaches, plums, pears, cherries, walnuts, and almonds. If possible, one should try to have a succession of fruits ripening, from the earliest to the latest.

Trees may be selected from many good nurseries in the northern and the southern parts of the state, and should be ordered as early in autumn as possible, for tree digging begins in December.

In most parts of California, the best time to plant deciduous trees is in January, when the trees are dormant; evergreen trees on the other hand, may be planted at any time if the roots are balled or in containers.

Immediately after deciduous trees are planted, the tops should be shaped so that growth will be directed properly. Care should be taken to keep young trees adequately watered. A continuous program of irrigating, pruning, and spraying will prove rewarding.

Climate, soil, selection of trees, planting, and cultural operations for both standard and dwarf fruit trees, and for nut trees, vines, and bushes are discussed in this revised circular for the home fruit grower.

DONATIONS FOR AGRICULTURE RESEARCH

Gifts to the University of California for research by the College of Agriculture, accepted in September, 1947

BERKELEY

Italian Swiss Colony.....\$500.00
Division of Plant Nutrition
Sugar Research Foundation.....\$80.00
(First installment of total grant of \$3,550.00) Division of Plant Nutrition
Sugar Research Foundation.....750.00
(One-half of \$1,500.00 grant) Division of Food Technology

DAVIS

California Fertilizer Association.....\$1,500.00
(One-half of \$3,000 grant) Research with fertilizers

MISCELLANEOUS GIFTS

American Cyanamid Co.5 lbs. of 15% 3422 wettable powder
3 drums insect or fungicide Agric NOIBN O/T Liquid
Chipman Chemical Co., Inc.....5 lbs. of Berako Livestock Spray Powder
The Dow Chemical Co.....1 bag DN Dust, weight 76 lbs.
1 drum DOWAX, weight 55 lbs.
2-1 gal. drums agricultural insecticide OTIQ
1 Fibre Pak Agricultural insecticide OTIQ
Mr. Leo Gardner.....100 lbs. 5% DDT dust containing 1% oil
100 lbs. 5% DDT dust containing 2% oil
100 lbs. 3% DDT dust containing 2% oil
O. E. Linek Co.....4 lbs. 1A1 HOU-EZ
Merck and Co., Inc.....5 lbs. Potassa Sulfurated
Rohm and Haas Co.....100 lbs. Rhothane WP-50
2 bags—50 lbs. each RHOTHANE WP-50