

## AGRICULTURE

## Wind Machines Plus Heaters To Fight Frost Off Fruit

See Front Cover

► WIND MACHINES plus orchard heaters provide the best frost protection at the least cost for southern California's citrus groves, four agricultural engineers in that state have found.

To beat the icy crop killer, they recommend taking advantage of the earth's atmosphere as a heat source, drawing the warm upper air down to the ground. Temperatures 30 to 40 feet above the ground are often from five to ten degrees warmer than those within a few feet of the soil. Wind machines whip this warmer air down to the ground, literally putting the heat on Jack Frost, the most effective protection method.

The cost of operating wind machines with eight to 15 heaters per acre was only 67 cents per acre hour in tests they ran at the University of California's College of Agriculture at Davis. When used alone, 25 to 50 heaters are required for the same amount of protection. Cost for the heaters would be \$3.60 per acre hour, Drs. F. A. Brooks, C. F. Kelly, D. G. Rhoades and H. B. Schultz have calculated.

They placed their machines about 600 to 800 feet apart in the orchards. The slowly rotating towers bring a blast of air to a given direction every four or five minutes. The propellers are 32 feet above the ground and directed slightly downward to give air gusts penetrating the orchard about 80 feet away.

Science News Letter, December 29, 1951

*Vegetable oils* may become more important than petroleum in the economy of the Southwest; they come from crops which are renewable each year while petroleum comes from a source that can not be replenished.

Mechanical pickers are now in use gathering snap beans.

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## ERRATA, Vol. 60, Nos. 1-26, July-December, 1951

PAGE	TITLE BEGINS	CORRECTION
63	Do You Know	Line 6, after the insert soup fin; line 8, A for D.
69	New Theory	Par. 2, line 7, Niels for Neil.
76	Snails	Col. 2, par. 3, lines 10-11, delete a snail . . . anomaly; insert after habitats, "some species, however, are found on the desert."
85	Plants Made Poisonous	Par. 4, 8, 9, 15 and 16, read phosphonous for phosphonus; last par., phosphonous acid (British usage) is $H_2P(\rightarrow O)OH$ , phosphinic acid (American usage).
86	Time Differences	Col. 3, lines 6-10, read, Twenty-two hours after the day began, it reaches the Hawaiian Islands, at 6:00 a.m. EDT. Two hours after that the midnight meridian . . . Delete last two sentences of article.
87	First Tree Felled	Sub-title, line 2, 9,000 for 7,000.
107	Salmon May Smell	Par. 3, line 9, read, University of Wisconsin report. Delete lines 10-11.
107	Puncture-Proof Tire	Line 5, 2,563,466 for 2,563,446.
124	2,000,000 Filters	Par. 3, lines 7-8, read one long tube, . . . ureter, Line 6, W. for B.
137	Magnetic Fluid	Par. 4, Delete last sentence.
162	Cold spray	Par. 2, line 3, insert after have, already.
216	Week-Old Babies	Par. 1, line 2, protein quality for protein content.
242	More Protein	Par. 2, Read In some climates the tendency for conductors to dance may require use of otherwise unnecessarily wide spacing, J. E. Sproule. . . .
278	Find Cure for	Col. 3, lines 4-5, Ciencia e Investigacion (Buenos Aires) April for Science and Investigation (April)
327	Red Blood Cells	

## CHEMISTRY

## Chemical for Elm Disease

► DUTCH ELM disease, which once threatened doom to the popular shade tree, can be prevented in seedlings in all but a few cases by a newly developed chemical treatment.

Dr. A. E. Dimond, chief plant pathologist of the Connecticut Agricultural Experiment Station at New Haven, reported that the chemical, 2-methylcarboxymercaptobenzothiazole, has given better results against the dread disease than any other method now being used.

The compound acts from the inside of the tree, being absorbed by the elm to attack the disease-causing fungus at its source. It can, however, be sprayed on the tree, a method much less cumbersome and expensive than applying a compound to the soil under pressure as is required for the two chemicals previously most effective against the disease. Many city trees cannot receive soil treatments because they are surrounded by pavement.

Seedling elms treated with the new chemical and then inoculated with the Dutch elm disease fungus showed only five per cent disease at the end of the season. Untreated elms inoculated in the same way were 45% diseased at the end of the same period, while those treated with one of the previously most effective chemicals were 12% diseased.

The compound is not yet on the market and still has to pass a few more seasons of extensive testing, Dr. Dimond told the American Phytopathological Society meeting in Cincinnati, Ohio.

Since introduced into this country in 1930, the Dutch elm disease has destroyed

thousands of priceless elms. It has spread as far west as Colorado and as far south as Virginia.

Besides the chemical treatment of the tree from the inside out, known as chemotherapy, scientists battle to save the elm by halting the insects that spread the Dutch elm disease and another serious threat to the shade tree, phloem necrosis. To fight the insects carrying the twin blights, high-pressure, high-dosage DDT sprays are used. When the blast of chemical mist is enough to soak completely the foliage of a tree, the job of protection is about 40% done, scientists have found.

One hope for the future are strains of disease-resistant elms being studied by the U. S. Department of Agriculture. But worried scientists are concentrating on ways to save the present generation of elms, as a new generation may come too late.

Science News Letter, December 29, 1951

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