

Sweet discovery for the wine industry

Anaheim, Calif., used to boast of profitable vineyards, until Pierce's disease killed off the vines in the 1930's. Pierce's disease remains a problem for California grape growers, but some recent work by three University of California at Davis plant pathologists brings control of the disease a little closer.

Jaime G. Auger, Thomas A. Shalla and Clarence I. Kado report in the June 28 *SCIENCE* that they have identified the cause of the disease. They were able to isolate a small, non-motile, rod-shaped bacterium which is probably a new species and therefore as yet unnamed. Before their work, a virus was suspected of causing the dwarfing, leaf-burning disease.

It has been known since 1939 that the disease vectors are leafhoppers and spittle bugs. The leafhopper also infects alfalfa, California's number one acreage crop, transmitting alfalfa-dwarf disease. This was shown earlier to be caused by the same infectious agent that causes Pierce's disease and that the team has now isolated.

They conducted several tests to make the positive identification. First, two groups of noninfective leafhoppers were fed healthy plants and plants with Pierce's disease. Spittle taken from the insects was incubated on agar, and small white bacterial colonies grew from the excreta of those fed diseased plants. In another test, insects fed on diseased plants were treated, ground up, and the semiliquid material were spread on agar. More white colonies appeared. Finally, bacteria were injected into noninfective leafhoppers, and these were placed on healthy grape leaves. Controls were run with noninfective insects and sterile injections. After six weeks, all of the plants exposed to the infected insects showed the symptoms of Pierce's disease.

Until now, grape growers have fought the disease by trying to eliminate the leafhopper. "Any plants near streams, irrigation ditches or canals are more prone to catch the disease because of contact with leafhoppers," Kado told *SCIENCE NEWS*. "They try not to plant near streams and have

been roguing out the weeds that grow along the banks, but that practice has become somewhat of a controversial issue here."

Now that the causative agent and vector are both known, more effective control will be possible. "You can regulate the vectors by spraying with insecticides, or it would be possible to use antibiotics against the bacteria" under FDA supervision, Kado said. "Or you could use biocontrol. Through tests, we found that the bacterium is highly labile to moderate temperatures. One possible therapy would be treating the grape vines with hot water to kill the bacteria but not harm the plants."

Kado explained that the Joachim and Napa valleys have had less severe problems with Pierce's disease than Anaheim and northern regions due to the hotter southern temperatures being less favorable to the bacterium.

"Before, when everyone thought it was a virus causing the disease, there really wasn't much to be done. Now that we know it's a bacterium, control should be easier. Bacteria are more susceptible to therapeutic treatment," Kado said.

A cool solution for an energy problem

A refrigerator is the biggest single energy user in the average home. It uses more electricity than electrical space heating, air-conditioning and the television combined. And over the average 14-year lifetime of the appliance, the purchase price represents only 36 percent of the total cost. More than half (58 percent) of the total dollars goes into electricity bills.

But that may change if some relatively simple alterations are made in refrigerator designs, several scientists report. A large research team at the Center for Policy Alternatives at Massachusetts Institute of Technology and the Charles Stark Draper Laboratory, Inc., headed by J. Herbert Holloman, released a report on servicing consumer durable goods. In addition to considering the life-cycle costs of buying, operating and servicing appliances, the team also suggested design changes which would raise the initial cost, but lower the lifetime energy costs of the appliance. The team focused on refrigerators and televisions, which rank at the top of the list of annual consumer expense for major appliances.

The refrigerator's trouble really

started with the addition of the no-frost feature. It approximately doubled the electricity consumption. But because the no-frost feature is so popular, the team examined ways to have that feature and energy conservation, too.

Substituting polyurethane insulation for fiber glass would mean a \$14 markup in the purchase price, but a net savings of \$85 over 14 years. Additional windings in the compressor motor would add \$20 to the purchase price, but save \$55 in energy costs.

Suggestions for energy-saving techniques, such as these, are a large and needed step towards an energy-conserving society. □

New California observatory?

Ambient light can pose severe problems for astronomers. City lights near an observatory produce a backscattered skylight that enters the telescopes and seriously degrades the images of faint objects (*SN*: 12/15/73, p. 381). As cities grow, a number of observatories that once had nice dark sites are finding themselves in trouble. A notable example is the University of California's Lick Observatory. The observatory is located on Mt. Hamilton just east of the southern tip of San Francisco Bay, and in recent years the growth of San Jose has caused difficult skylight problems.

Lick also shares another problem with just about every other observatory in the world: too little telescope time for the astronomers who want to use it. Lick's Director, Donald E. Osterbrock recently told the University regents that all available clear night time is used and some hours of the day, and still there is a long waiting line.

For these two reasons the observatory has resolved upon a long-term plan to construct a new astronomical observing center at a site much darker than Mt. Hamilton. The chosen place is Junipero Serra peak in the Santa Lucia Mountains some distance to the south of the present location of Lick's headquarters (the university's Santa Cruz campus).

The site was chosen after a survey by Merle F. Walker of Lick, in which the "seeing" at various locations in California and elsewhere was compared. Seeing depends on atmospheric turbulence and clarity, and Walker concluded that the best seeing is at locations on the western edges of continents or isolated islands where cool sea air passes smoothly over the area. Junipero Serra also has the advantage of being in the Los Padres National Forest, which means that it is a dark



Leaves infected with the bacterium.