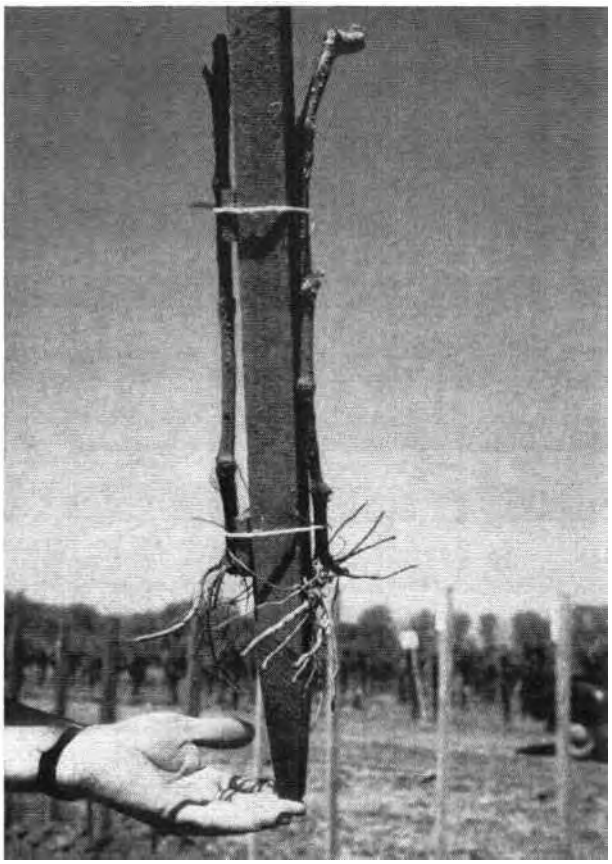


A ⅜-inch lath was used next to the stake (left) to avoid contact of vine for comparison with vine (right) held firmly against the treated stake.

Chemical treatment of GRAPE *may young*

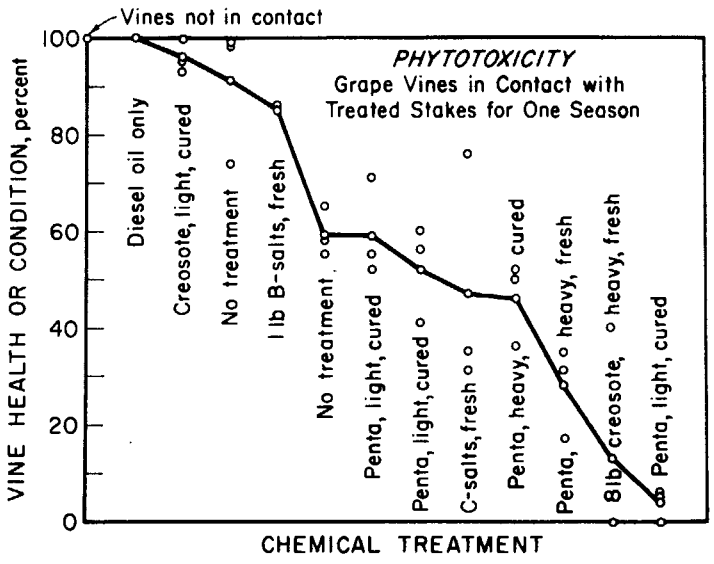
L. W. NEUBAUER • A. N. KASIMATIS

Recent tests point out the danger of phytotoxicity to young grapevines when planted in contact with freshly treated grape stakes.

IN THE PAST there was little evidence that grapevines or other plants would suffer from contact with, or proximity to, supporting stakes or posts. Most of the wooden stakes in use were untreated redwood or cedar and apparently nontoxic. With the increased use of chemically treated grape stakes in recent years, there were reports that grapevines were frequently damaged by planting with such stakes (see photo). However, conflicting reports resulted in planning a series of experiments to study the effect of treated pine, redwood, and Douglas-fir stakes

A heavy treatment of chemical on these stakes, set in a commercial vineyard without curing, caused severe injury to young vines. Note how the chemical has soaked and darkened soil.

GRAPH 1. PHYTOTOXICITY TO GRAPE VINES IN CONTACT WITH TREATED STAKES FOR ONE SEASON



STAKES *weaken vines*

compared with untreated redwood or other species when set in contact with grape rootings or young vines.

Tests

A number of different chemicals were applied either by pressure treatment or by the cold-soak method. One-year-old vines and stakes were planted together, some in definite contact, and others separated by the thickness of a lath or a one-inch board (see photo). Most of these experiments were conducted at Davis during 1960–1963.

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Following a series of plantings, observations were made monthly and semi-annually to study the appearance, health, growth, and size of the vines, and to grade them comparatively. A few vines died, others were weakened in various degrees, and some remained undamaged.

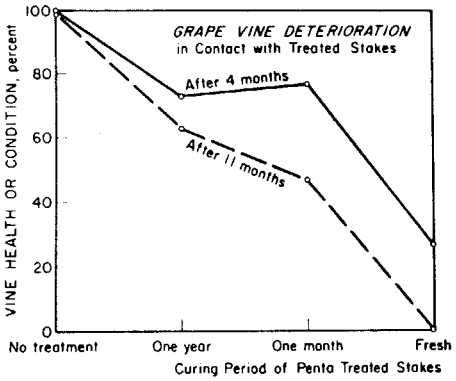
Grapevines burned

Some vines were seriously burned on contact with certain of the chemicals, resulting in stunting or death of the plants. Other vines appeared to recover from the effects of small burns. More generally, however, vine condition deteriorated with the passage of time, resulting in poorer vine health and growth after eleven months than after four months. It was also obvious that fresh chemicals were more damaging than those that were old, cured, or had dried out on the stakes (see graphs 1 and 2).

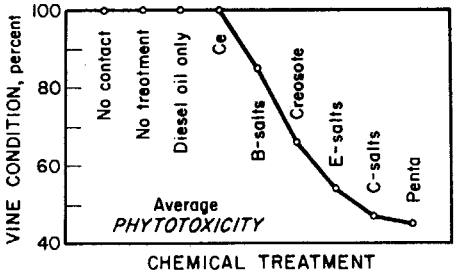
In one series of tests, freshly treated stakes averaged 62% damage to vines, as compared with 46% damage with the cured and dried stakes, indicating a significant differential. Another factor was the actual amount of the original chemical treatment. Damage caused by light chemical treatments averaged 36% while 54% deterioration resulted from heavy treatments of the same chemical. Stake treatments and the basic composition of chemicals tested are listed below in order, beginning (1) with those apparently having no toxicity, and ending (9) with the most toxic (also see graph 3).

1. No contact
2. No treatment (stakes not durable, see photo)
3. Diesel oil alone (stakes not durable)
4. Ce: Pentachlorophenol in liquefied gas
5. B-salts: Chromated zinc arsenate
6. Creosote, commercial
7. E-salts: Chromated copper arsenate
8. C-salts: Ammoniacal copper arsenite
9. Pentachlorophenol in light oil.

GRAPH 2. GRAPE VINE DETERIORATION IN CONTACT WITH TREATED STAKES



GRAPH 3. AVERAGE PHYTOTOXICITY RESULTING FROM CHEMICAL TREATMENT



This research has shown that severe damage can result from the phytotoxicity of wood-treating chemicals on contact with young grapevines. To reduce or prevent this deterioration, the following conditions or precautions have been found helpful: avoid physical contact between vine and stake at the time of planting; leave about one-inch distance between the vine and stake; cure or dry treated stakes as long as possible before using; select chemicals that are least harmful but provide maximum protection for the wooden stake.

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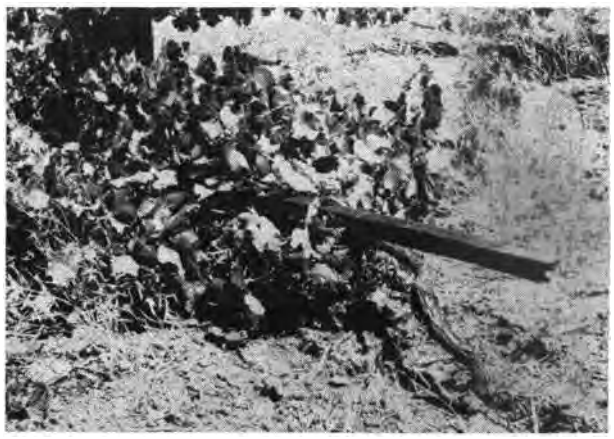

Untreated stakes may have a short life and break at the soil level with a heavy crop of grapes.