A die-back disease affecting primarily the Boysen and Young trailing blackberries was prevalent in nearly all berry-growing regions of California during the winters of 1947-48 and 1948-49. It did not occur, or was much reduced in severity during the 1949-50 and 1950-51 winters.

In general, berries in the interior valley and southern interior counties were affected more seriously than berries in the coastal counties.

This disease condition was characterized by dying back—during the dormant season—of the terminal portions of the canes, and by the occasional dying of leafy shoots after growth started in the spring. Most frequently, just those portions of the canes wound around the trellising wires died.

**Study of Causes**

The fact that this disease occurred suddenly and in severe intensity in widespread areas of California, and that the distal portions only of the canes were typically affected, made it improbable that the cause was an infectious agent such as a bacterium, fungus, virus, or nematode. Notwithstanding, studies were undertaken to investigate the possibility of the infectious nature of this disease.

First, a cultural study of dead and dying portions of canes failed to reveal the presence of organisms known to be plant pathogens. Species of the fungus genus *Cladosporium* were isolated most consistently. These widely spread fungi occur in nature as organisms living on dead or wounded tissues. They are not primary fungus pathogens of brambles. A number of experiments were inaugurated at the peak of the trouble to investigate the relation between die-back and the number, length and amount of lateral growth of trellised canes. In a typical experiment, two, three, four, six, and eight canes only were put up on the wires. In one series the canes were pruned short—eight to 10 feet—and in another left long—12 to 18 feet. This trellising was done in July. In January, the lateral growth arising from the trellised canes was either pruned back to eight to 10 buds, or put up in its entirety.

Die-back did not occur during either the 1949-50 or 1950-51 winters in the localities where these experiments were conducted, consequently specific data relative to the problem were not obtained. There was a lesser tendency, however, for plants with canes pruned short to suffer during hot, windy periods such as the one which occurred in June 1950. This probably reflects some plant-water relationships.

**Suggested Prevention**

Results of studies and indications from other observations permit certain general recommendations that are believed to be safeguards against winter die-back. These suggestions apply primarily to the Fresno area where the fruit crop matures within a relatively short period.

A close planting of 3½ to 4½ feet in the row makes unnecessary much of the winding of canes around the wires during trellising. In such rows, only the most intensive die-back occurred during the 1947-48 and 1948-49 winters is not attributable to any such short cold periods.

Evidence indicated that injury from cold was not responsible for the die-back. In the 1949-50 winter—when there was virtually no die-back—there were two more days in which a temperature below 32°F was recorded than in the 1947-48 winter in which die-back was severe. Also, a low of 21°F was recorded for the 1949-50 winter as compared to a low of 25°F for the 1947-48 winter. If weather permits, berries often make growth rather late into the fall season. Such growth, not properly hardened off, could be injured by a sudden cold period. However, the extensive die-back which occurred during the 1947-48 and 1948-49 winters is not attributable to any such short cold periods.
sweet orange or sour orange roots. Tri- 
foliate orange grows well as a replant and 
some strains are fairly resistant to nema-
todes. It grows best in acid sandy loam 
soils, but is fairly susceptible to injury 
by high salt content in the soil.

Present use of trifoliate orange as a 
rootstock should be restricted to oranges 
and for limited replanting purposes only.

**Cleopatra Mandarin**

The Cleopatra mandarin is a stock 
which has done well with all species 
and varieties in experimental trials of the 
Citrus Experiment Station.

Oranges and grapefruit budded on 
Cleopatra stock are tolerant to quick de-
cline. Cleopatra root is equally as resist-
ant as sour orange to gummosis. No other 
diseases are known to be a factor. Lemon 
shellbark seems to be less severe on trees 
budded on Cleopatra than on Rough 
lemon, grapefruit or sour orange stock. 
Lemon decline is less pronounced in trees 
budded on Cleopatra than on other stocks 
observed.

Yields of all varieties budded on Cleo-
patra have been equally as good as those 
varieties budded on sweet orange. Fruit 
quality of varieties budded upon it is 
comparable to that of fruit from trees 
budded on sweet orange or sour orange. 
Fruit sizes are average. Trees budded on 
Cleopatra are equally as hardy as trees 
budded on sour orange stock. It makes 
a good growth as a replant. Cleopatra 
does well on heavy soils and is better 
adapted for saline soils than sour orange 
or Rough lemon.

Use of this stock in California for all 
scion varieties is recommended for com-
mmercial trial.

**Sampson Tangelo**

Use of the Sampson tangelo as a root-
stock in California has not been extensive 
except for lemons. Eureka lemons are less 
prone to shellbark and lemon decline 
when budded upon Sampson tangelo than 
on most other stocks. Yields of lemons 
have been as good or better on trees 
budded on Sampson tangelo than of trees 
budded on sweet orange and have in-
creased as the trees become older.

In California, because of quick decline, 
Sampson tangelo stock should be used 
only for lemons.

**Troyer Citrange**

Troyer citrange rootstock is so new 
that its ultimate value is somewhat specu-
lative. The Troyer citrange is a hybrid of 
sweet orange and trifoliate orange and 
apparently has inherited some of the good 
qualities of both. It is highly resistant 
to gummosis.

Oranges budded on it appear to be 
tolerant to quick decline. The trees come 
into bearing early and bear good crops of 
large fruit of excellent quality. The 
trees are more resistant to cold than trees 
budded on sweet orange or sour orange. 
Its ability to grow as a replant in old 
citrus soils has been outstanding.

Use of this stock should be restricted 
to oranges and grapefruit. Lisbon lemons 
are growing well on it, but Eurekas have 
not as yet proved adapted to it.

**BLACKBERRIES**

Continued from page 4

vigorous five to seven canes per plant 
need be trellised.

Trellising should be done soon after 
harvest, and with as little breakage of 
canes as possible. Tip-pruned to eight to 
10 feet at the time of trellising, the sup-
porting canes will force lateral growth 
over much of their length. Such lateral 
growth can either be pruned back to eight 
to 20 buds in the winter, when the plant is 
fully dormant, or trellised on the wires. 
The pruning saves labor and results in 
larger, more uniformly sized berries, the 
relationships between yields of all ber-
ries are similar. The many lateral 
shoots which arise from such canes is always 
weaker than the original and is believed 
more subject to die-back.

**CANTALOUPE**

Continued from page 10

The experiment showed that fruit 
drop occurs so soon after full bloom, 
that some ovaries may mature several 
fold before dropping.

These drops which showed early 
growth frequently lengthened at the same 
rate as fruits which continued on to ma-
tury. They cease to grow suddenly but 
remain green, turgid, and firmly attached 
for several days. Finally many of the 
fruits turn yellow, shrivel, and drop from 
the vine.

In fruits which drop, abscession always 
occurrs several days after the ovary ceases 
to grow, and thus appears to have a sec-
ondary role in preventing fruit set.

Embryo sac development, pollen-tube 
growth, and the early stages of seed deve-
lopment were studied in growing fruits 
and in drops. For the insect-pollinated 
flowers on unthinned vines, there was no 
evidence that fruit drop was caused by 
the misfunction of any of these processes.

The changes which bring about fruit 
drop apparently affect the growth of 
the fruit as a whole and then the de-
velopment of structures within the ovule. 
The sequence is just the reverse of what 
could be expected if processes associated 
with fertilization or embryo or endo-
sperm development were the cause of fruit 
drop.

Fruit set in this test did not appear 
to be limited by the number of ovules fer-
tilized. Counts of fertilized and nonfer-
tilized ovules were made from sections 
of 13 growing fruits, and from sections 
of comparable drops.

Of 78 ovaries in the fruits growing nor-
manly, 15% were not fertilized; of 116 
ovules observed in the drops, 10.2% were 
not fertilized. Although more extensive 
data are needed, there is no present indi-
cation that drops have fewer ovules fer-
tilized.

**CHICKEN**

Continued from page 2

chickens which would meet specifications 
for USDA Grade A and most of those 
which would be included in the USDA 
Grade B classification.

A grading system at retail would focus 
consumers' attention on quality as one 
aspect of their buying and would serve 
to reduce the price spread noted for each 
grade.

**ROOSTOCK**

Continued from page 8

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