reduce dry matter losses. For example, a settle-packed tower silo had a much higher dry matter loss than a continuously packed and immediately covered bunker silo. More samples were used in the 1967 study, and the earlier trends were more clearly defined.

The complete proximate analyses of the 52 samples stored at 13 levels in an uncovered bunker silo in 1967 are presented in the table. The table also gives the average chemical composition of the 52 samples not ensiled. The increased water content in the top 4 ft of stored silage was undoubtedly caused by the 10.24 inches of rain which fell during the 130-day storage period, as was the moisture increase in the lower 2 ft of the stored silage. An apparent increase in percentage of crude fat, ash and crude fiber content in the upper few feet of the silage mass apparently resulted from the more rapid leaching of the more soluble nutrients by the rain. Judging from the reduction in the upper layers and the gain in the middle layers of the nitrogen-free extract (NFE), which represents the more soluble parts of the silage, nutrients must be leached from the upper to the middle and lower layers of the silage mass, depending upon each component's solubility. Although run-off was not measured, it is conceivable that some of the more soluble nutrients were leached through the silage mass and lost as part of the silage run-off, as the decrease in dry matter in silage near the floor of the silo seems to suggest.

The most severe losses appear to have occurred as a result of combustion of dry matter in the silage mass, particularly in the upper one-half of the silage. Average losses increase from a low of approximately 151/2 per cent in the middle layers to a high of 55.6 per cent in the top layer (graph 2). This severe loss in the upper foot was due to both the leaching effect of rain and the exposure to air which allows combustion of dry matter into carbon dioxide, nitrogen and other gases (which are then lost in the air). That the increase in crude protein in the upper two feet is misleading is evident in calculations of the actual amount of crude protein lost (graph 3) on the basis of a comparison of the original and final weights of the silage samples. This loss very closely parallels the loss in dry matter content—except that here the greatest loss occurred 3 and 4 ft from the surface. An average of approximately 15 per cent of crude protein was lost in the bottom 7 feet of the silo—a figure considered excessive by many research workers.

The loss in other chemical constituents beside TDN does not appear excessive until combined with the actual loss in weight of the silage represented in the sample bags. The reduction in per cent NFE (graph 4) in the upper layers indicates a substantial loss of sugars and starches when the dry matter loss is taken into consideration. The changes in ash or mineral content of the various layers reflect the downward movement of these constituents, particularly the increase in ash content of the top layer. The loss in weight throughout the entire profile of the silage mass averaged 18.8 per cent of the dry weight of the material placed in the silo. Dry weight losses of the original corn silage averaged 38.7 per cent in the upper 4 ft and 55.6 per cent in the upper foot. Losses of this magnitude indicate a need for an adequate cover to protect the silage from air and rain.

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TIBA

ulator on open branching for mechanical shaking
topped to cause sprouting of buds around the trunk which could be used to form the scaffold framework. The varieties of citrus included: Koethen sweet orange, Cleopatra mandarin, Troyer citrange, and Rubidoux trifoliate orange. Length of new shoot growth varied from 2 to 9 inches at the time of spraying.

Nine single tree replications were used for each treatment. The foliage of each tree was sprayed to runoff with TIBA at concentrations of 25, 50, 100, and 200 ppm with 0.02 per cent X-77 added as a surfactant. After five months, the plants were again headed to remove all leaves and laterals and the test was repeated using the same concentrations.

The test was repeated a third time using a tenfold increase in the concentration of TIBA. A fourth test was carried out using a series of three applications at three-week intervals using the higher concentrations of 250, 500, 1,000 and 2,000 ppm plus 0.02 per cent X-77 added as a surfactant (see photo).

Concentration increased

TIBA concentration which was increased tenfold in the third test produced leaf curl and slight shoot tip malformation on all varieties at 2,000 ppm. This was soon outgrown and the plants returned to normal.

In the series treatment, applications of TIBA at concentrations of 500 ppm caused outward bending of branches. There was slight leaf curl and twisting of the growing shoot tips. Slight overall growth reduction occurred. At concentrations of 1,000 and 2,000 ppm there was increased leaf curl and shoot malformation along with marked reduction in growth. While leaf and shoot malformation increased with higher concentrations of TIBA, there was little increase in outward bending or drooping of branches.

Four varieties

The four varieties of citrus tested did not react as readily to foliage sprays of TIBA as reported for apples. This may in part be due to the waxy cuticle of the citrus leaf, which retards penetration. However, repeat sprays at increased concentrations caused an outward bending of growing shoots, and slight reduction in total growth.

The outward bending of branches to form an open scaffold branch structure would be of value for mechanical harvesting.

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Rubidoux trifoliate orange sprayed three times at three-week intervals with TIBA at rates indicated below plants.