Mineral Nutrition of Stocks

need for potassium can be anticipated by soil analysis to determine calcium-potassium ratio

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**Stocks**—*Matthiola incana*—comprise the second largest floricultural field crop, in terms of acreage, produced in California.

In recent years, the average annual production has been above 900 acres. The yearly gross value of the crop is between two and three million dollars.

Nutritional studies recently conducted have found this plant to be normally high in potassium. Contents of 4% to 6% potassium in the dry leaf tissues were common.

A field survey completed in 1953, covering 35 plantings in 27 representative areas of six counties, indicated a mean potassium content of 3.43% dry weight in the lower leaf samples. The potassium-deficient plantings included in this average survey value had percentages ranging from 0.67 to 1.59. The better fields, in contrast, contained levels between 3% and 6% potassium in the lower leaves.

Growers consider good plantings of stock to have 12 to 16 plants per linear foot of row. This, as shown by the photograph, creates a dense ground cover as well as significant root competition for plant nutrients and moisture. If an average of 12 plants are grown per linear foot in rows 30 inches apart and they produce a mean dry weight of twenty grams per plant, there would be 4.6 tons of dry plant material per acre. This would remove about 323 pounds of potassium per acre from the soil—assuming an average tissue content of 3.5% potassium—and at least 369 pounds of nitrogen.

Sixteen commercial varieties of stocks were tested under comparable conditions as to their relative ability to absorb and utilize potassium. Although differences were found among the varieties that were statistically significant, they were not large enough to be considered important under commercial growing conditions. Increasing the potassium level was reflected in the plant by the greater dry weight, stem diameter, nitrate and potassium content, although it did not influence the height of the plant.

A series of experiments aimed at determining the critical level for potassium deficiency in stocks showed that in the absence of sodium and ammonium ions, the visible symptoms appeared on the leaves when they contained from 1.25% to 1.5% potassium. Sodium appeared to be of benefit to stocks under conditions of low potassium. Below a certain point, however, it could not substitute for potassium.

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An excellent example of stock production, showing the relative distances between rows and the competitive growth of plants within the row brought about by close seeding methods.
of the collapsed trees—100%—may actually have lost some of their mineral content through leaching and therefore have a lower sodium content than the trees 75% declined.

These data lend support to previous results obtained at Riverside indicating that relatively high sodium content of roots was associated with a high degree of decline in lemon trees. Although a high sodium content of roots has been found to be associated with trees exhibiting severe decline symptoms, this is not critical evidence that sodium is the cause of decline.

A known direct cause of tree collapse is root deterioration resulting from the girdling action of sieve tube necrosis at or near the bud union. It is possible that increased sodium absorption by roots instead of being the cause of sieve tube necrosis—may be a result of a change in the physiology of root cells. The root cells may have become depleted of reserve carbohydrates after the sieve tube necrosis—caused by unknown factors—has reduced the movement of carbohydrates from the leaves to the roots.

The question of the relationship of sodium to decline and collapse of lemon trees is being further investigated by observing the effect of varying the amount of sodium in the soil and by periodic analyses of roots in an orchard where collapse is occurring.

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The study clearly demonstrated that fumling of brushlands with no plan or effort thereafter to maintain an open cover to favor invasions of desirable herbaceous vegetation is likely to be wasteful of time and money. Moreover, burning of inferior sites, such as those occupied by chamise or manzanita where the soil is thin and the slopes are steep, is often done, is seldom profitable for livestock grazing.

There is still much room for better management of burned areas, such as re-seeding for soil protection and for increasing forage yield; proper grazing use; and treatment to control seedlings and sprouts, though there is a definite trend toward an improvement of this situation. As more information becomes available, through research presently in progress, the acreage of unmanaged burns should decrease.

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surface deposit of 1,000 micrograms per square centimeter of DDT, malathion, lindane, aldrin, dieodrin, parathion, chlordane, methoxychlor, DDD, and allethrin.

In the use of admixed dusts, 40 days were required to kill 90% of the larvae confined on wheat treated with eight ppm—parts per million—malathion dust, and at two ppm only 26% were killed. Similar experiments on the adults of rice weevil, granary weevil and lesser grain borer when exposed nine days to wheat treated with two ppm malathion dust resulted in 100% kill.

In the fumigation experiments, several times as much acrylonitrile or methyl bromide was required to kill 95% of the larvae as was required to kill adults of the rice weevil, granary weevil and lesser grain borer.

Both the contact and fumigation tests were conducted on larvae collected at Imperial in early March 1954, and these may have been overwintering larvae which are possibly more resistant to insecticides than the more active larval stages.

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