

PHYSIOLOGICAL STUDIES CONCERNING
FOLIAR NUTRITION AND FLOWER
BUD INDUCTION IN ALMONDS

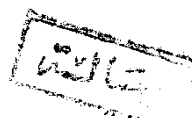
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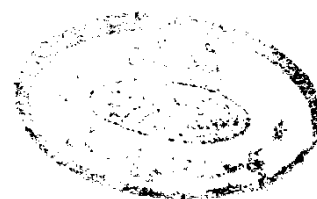
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I N T R O D U C T I O N

Almond (Prunus amygdalus L.) is one species of the "Rosaceae" family. The almond has been cultivated from time immemorial. It is thought to be native to the Medeterranean basin.(5). There are many references to almond in the Scriptures for it occurred freely in Palestine in a more or less wild state. Almonds were among the presents taken down to Egypt by the sons of Jacob. Nawadays almond is exported mainly from Spain, Italy, France, Portugal, Morocco, the Canary Islands and Persia (23).

Almond trees can thrive on almost all types of soils providing adequate draingage. It can grow satisfactory in slightly saline soils and under conditions of low soil moisture (21). On the other hand, some varieties of almond are more sensitive to salinity than others, e.g. Texas variety is more sensitive than Non pareil (8).

In Egypt, almond is grown with a fair degree of success on the Northern coast from Alexandria Westward in addition to the coastal strip of Sinai and Arish Valley. Most almond cultivation are located in arid regions where many other fruit trees fail to grow. Yet, maximum yield could not be

obtained in these regions unless we supply the trees with their sufficient requirements of water and nutrients.

In the present investigation the major aim was to study the ability of supplying the almond trees with urea nitrogen as foliar sprays since soil application could not be adapted where the rains which are the main source of water supply, are scarce and only limited within a certain period (from October to April). Another major aim in this investigation was to study the effect of urea foliar fertilization on flower bud induction and differentiation as well as fruiting of the tree.

REVIEW OF LITERATURE

The absorption of urea sprays

Nowadays, urea foliar fertilization has become a popular method of applying nitrogen to some horticulture crops. Hamilton *et al.* (22) in 1943 mentioned that in many areas in the United States, nitrogen fertilization of apple trees by spraying them with urea solution has become an established practice. They added that this method of application gave more rapid response than soil application of other fertilizers. Furthermore, Baynton (6) and Fisher (16,17 and 18) found similar results from their field experiments.

As for the ability of stone fruit trees to absorb and benefit from urea foliar sprays, Proebsting (33) mentioned that these trees have generally absorbed only a little urea and showed negligible response.

Data concerning the ability of almond leaves to absorb and utilize urea foliar nitrogen are scarce in the available literature. Norton and Childers (29) working on Mission almond seedlings grown in sand culture in crocks covered with vinylite caps to prevent contamination by urea spray dust or rain water, showed that urea sprays applied at 5 lb and 10 lb per 100 gallons caused less leaf drop late in the

season, slightly darker green and a significant decrease in growth. They added that almond trees proved to be more sensitive than peach and were almost defoliated by urea at 1.0% which was the maximum tolerated without foliar burning by peach. Walker and Fisher (40) reported that the biuret impurity in the urea products was associated with the injury since there was no apparent injury with the crystal urea spray.

Flower bud induction and differentiation

Angiola (3) mentioned that the first external change of future almond flower buds was observed in mid-May. A change of the apical meristem occurred at the end of July. The beginning of the formation of the individual flower parts was marked by a sudden stop of the apical formation of leaf initials. The last of which ceased growth and lost their meristematic character remaining as small protuberances of the apex. The apical first flattened at the top and ceased to grow, assuming the form of a cup. From the edge of the cup to the bottom, different floral organs were differentiated in the following order : calyx, corolla, stamen and ovary. In the later half of October, the flower was completely formed, then its further growth and histological differentiation took place. At the end of January pollen grains were