

## Advances in Pistachio Nutrient Management

It is well known within the pistachio industry that our present fertility management guidelines are frustrated by the fact that the so-called critical values (levels below which visual deficiencies are evident) are based upon tissue samples taken in late July to early August. This sampling period was established by the late Dr. Kay Uriu, one of our beloved Pomology Professors at UC Davis who did all of the early nutrition research on pistachios, and a multitude of other crops. He, in concert with his trusty and highly competent Staff Research Associate, Jim Pearson, performed studies in concert with farm advisors, such as Rocky Terranishi, retired, Madera County, and me. Dr. Uriu identified the high Boron requirement of pistachio, which was later shown to be affected by rootstock by Drs. Louise Ferguson and Patrick Brown. It was this uniquely high micronutrient requirement which prompted Kay to postpone tissue sampling until the presently recommended timing to allow its concentration to stabilize, and thus obtain an accurate estimation. Since other deciduous crops do not have this large boron demand, they are routinely sampled in late June to early July.

With the constant improvement in plant material, production practices, and UC-based knowledge, yield expectations in pistachios have skyrocketed. No one would have ever thought this Middle East, desert tree would eventually produce up to 7,000 in-shell dry pounds when first planted on the verticillium susceptible *P. atlantica* stock. Although improvements in rootstocks have accounted for much of this increase, decades of research on its fertility requirements have also contributed significantly. In addition to Brown and Ferguson, Dr. Steve Weinbaum and his former graduate students Dr. Richard Rosecrance, and Dr. Franz Niederholtzer (now a UC Farm Advisor in Sutter/Yuba Counties) painstakingly dismantled trees fed isotopically-labeled nitrogen and potassium, and then dug the entire tree out in order to partition it into growth stages for chipping, drying, and analysis. Their findings established kernel development as the period of greatest nutrient demand for these two macro nutrients.

The continued pistachio nutrition research of Dr. Brown, in cooperation with his most recent PhD student, Ismail Siddiqui, has now taken us to the next frontier of fertility management. Their most recent report of research funded by the Pistachio Research Board provides seasonal nutrient concentration curves for important elements, thus allowing growers and consultants the opportunity to correlate tissue levels taken at any time during the growing season with the August critical values. This allows us to now adjust fertility levels in-season, and thus be more proactive in our management. They also provide statistically tested sampling populations which suggest that a minimum of 17 trees, each spaced at least 25 yards apart is needed for a reliable tissue sample.

Finally, Dr. Brown and Ismail have developed a new critical value for magnesium at .45%, down from our current 0.6% level. Statistical and observational analysis of the relationship between excessively high levels of potassium and reduced yield may be a consequence of induced Mg deficiency. Additional research is in progress to further explore the interaction between potassium and magnesium.

Please find their complete nutrition report for your review at <http://cekings.ucdavis.edu/files/143361.pdf>. Expert growers and crop consultants will most assuredly study this document and implement its findings for superior production. It represents the next important stage of nutrition management, and should be the basis of future discussions among us.

We are entering a new phase in perennial crop fertility management with the possibility of having to physically document a balanced nutrition program. Therefore, the importance of applying the RIGHT RATE, at the RIGHT TIME, in the RIGHT PLACE, using the RIGHT SOURCE of fertilizer should become the mantra of the knowledgeable pistachio grower!

The University of California acknowledges Paramount Farming and Agri-World for their added financial and field support of this important research.

Happy Farming!

Bob Beede