

NITROGEN

BEST MANAGEMENT PRACTICES QUICK GUIDE

The recommended approach to nitrogen fertilization scheduling consists of the following seven steps. These steps should be repeated each crop year, for each cultivar and orchard block.

- STEP 1** Conduct a pre-season (January) estimate of expected yield based on historic yield trends for the orchard, last year's yield, and experience.
- STEP 2** Estimate annual inputs of nitrogen in irrigation water, cover crops, composts, etc.
- STEP 3** Calculate preliminary fertilization rates and timings, and apply the first fertilization just prior to 70% leaf out, which in most orchards occurs in early March.
- STEP 4** Collect and analyze your April leaf nutrient sample.
- STEP 5** Conduct an in-season yield estimation in April or May.
- STEP 6** Adjust your fertilization strategy for the remainder of the year to reflect in-season leaf and yield estimates.
- STEP 7** Apply nitrogen, irrigate and manage your orchards according to the best management techniques discussed in the Almond Board of California's Nitrogen Best Management Practices.

Should you observe that your orchards appear to require greater amounts of nitrogen than recommended, that may be a sign that nitrogen is being lost to the environment. An assessment of the possible sources and causes of this loss should be conducted.

These guidelines are based on extensive research conducted in four high-yielding orchards across California from 2008-2013, and as such are considered to be representative of good growing practices. The applicability under all growing circumstances, however, cannot be predicted with certainty — grower judgment remains critical.

4 Rs of Nutrient Management



The 4 Rs of Nutrient Management (Right Rate, Right Time, Right Place, Right Source) provide a framework to help growers understand and manage nitrogen optimally.

-  **Right Rate:** apply nitrogen in proportion to tree demand.
-  **Right Time:** align nitrogen application timing with tree uptake, which begins at 70% leaf out and is complete soon after harvest.
-  **Right Place:** apply nitrogen to the tree's active root zone or on foliage, irrigating effectively, and, if possible, vary nitrogen application to address in-orchard variability in soils and yields.
-  **Right Source:** use the form of fertilizer best suited to the crop and the environment, optimizing other nutrients, as needed.

Research shows there are significant opportunities to increase nitrogen use efficiency through approaches encompassed by the 4 Rs Principle, including improved methods of application, better integration with irrigation practices, strategic choice of nitrogen sources, optimization of soil organic matter (to further improve soil health), and the adoption of precision field management.