Topics in Subtropics Newsletter

University of California Cooperative Extension

Fresno, Kern, Madera, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Tulare, & Ventura Counties

News from the Subtropical Tree Crop Farm Advisors in California

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Editor's Note:

Please let us know if your mailing address has changed, or you would like to add someone else to the mailing list. Call or e-mail the farm advisor in the county where you live. Phone numbers and e-mail addresses can be found in the right column.

Please also let us know if there are specific topics that you would like addressed in subtropical crop production. Copies of Topics in Subtropics may also be downloaded from the county Cooperative Extension websites of the Farm Advisors listed.

Ben Faber
Editor of this issue

Special Announcements

NRCS EQIP Program

The USDA Natural Resources Conservation Service (NRCS) is now accepting applications for conservation planning on farms and ranches. Cost share assistance is available for developing and implementing conservation plans addressing soil erosion, irrigation efficiency, water quality and wildlife habitat. Cost share is also available for IPM monitoring. The deadline for cost share assistance through the Environmental Quality Incentives Program (EQIP) is Nov. 2, 2007. More information on the program can be found at www.ca.nrcs.usda.gov/programs/. Contact your local NRCS office usually found with the Resource Conservation District office or the State NRCS office at 530-792-5644.

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Leaf Analysis

Ben Faber

It's that time of year when citrus and avocado growers need to collect leaf samples for nutrient analysis to guide fertilizer applications. Leaves are collected between August 15 and October 15 and sent to the lab for analysis. For perennial crops, leaf analysis is the most important guideline for managing tree nutrient applications. Many growers think that soil analysis is as important as leaf analysis, and is for annual crops, but is much less valuable for tree crops. Because a tree stores nutrients in its various parts, such as roots, trunk, branches, stems and leaves, it does not have to get all of its immediate nutrients from the soil the way a lettuce plant does. Trees also have a root association with beneficial fungi called mycorrhizae (fungus/roots) which aid in the uptake of nutrients such as phosphorus and zinc, and this ability is not reflected in a soil analysis. A leaf analysis integrates everything the tree is "seeing" – weather, soil, in-tree storage, water, crop load, disease – which is then reflected in the leaf analysis.

Leaf analysis is done at this period, because the leaf nutrients are somewhat stabilized. Young leaves are high in such nutrients as nitrogen and potassium, but low in zinc and iron. As the leaf matures it loses nitrogen and potassium, but gains in iron and zinc. A fully expanded four-month old leaf from the spring flush taken at this time of year has been found to best reflect the tree's nutrient status. For a discussion on leaf sampling, see our fall 2003 edition of Topics in Subtropics - http://ceventura.ucdavis.edu/newsletterfiles/Topics_in_Subtropics3707.pdf.

If leaf nutrients are low or high, it can indicate not only what nutrient is the problem, but also what sort of corrective actions should be evaluated. It may not be the lack of something like iron, but waterlogging from too long or frequent irrigations. Waterlogged soils reduce iron uptake, and this deficiency might be better addressed by correcting the irrigation practice than spending money on iron applications. Zinc deficiency might be a result of root rot killing root hairs that take up zinc and addressing the disease issue is going to have a longer term improvement on tree nutrient status than simply applying zinc fertilizer. And then of course, if leaves are showing toxicities to sodium or chloride, correcting irrigation leaching and infiltration issues is the way to solve this nutrient problem, since this the easiest way to solve the problem.

This does not mean soil and water analyses are not important, on the contrary. A pre-plant analysis for water and soil can tell you before hand what you might be dealing with and allow you to correct the problem before planting. A high pH is best corrected before trees are in the ground. Trying to correct a zinc, iron, manganese, or copper deficiency with the trees in the ground is expensive and can take years to correct. It is easier to apply sulfur or sulfuric acid to the ground before planting and can be done relatively quickly without harm to the trees. The micronutrient availability is controlled by pH and once soil pH is in the 6-7 range, it is less likely for these deficiencies to occur. Trying to lower pH when the trees show iron deficiency, must be done slowly, since adding too much acidifying material at one time can kill the tree and during the process of acidification, some sort of stop gap measure, such as foliar feeding or fertigation must be employed until the soil pH has slowly been corrected. A water analysis too can forewarn you if you will be having problems with such things as high salinity, chloride, sodium, magnesium, boron or pH, and allow you to select appropriate rootstocks tolerant of the problem or again address it with soil amendments pre-plant.

A soil analysis in conjunction with water analysis can also be used for an ongoing determination of how well irrigation is being managed. Soil from trees doing poorly can be analyzed to see if adequate leaching is being accomplished with the frequency and amounts being applied. Generally, though, a soil analysis is a poor indicator of guiding a tree nutrition program and as an ongoing practice should be used for identifying the toxicity problems of salinity, boron, sodium, chloride and pH.

Citrus Leafminer Update

Ben Faber & Tom Shea

Citrus leafminer(CLM) has a worldwide distribution and is well established in all citrus production regions except for the San Joaquin Valley. Citrus leafminer was first found in the US in Florida in 1993 and has since made it through Louisiana, Texas and into California (Imperial County, 2000). It is now found in San Diego, Riverside, Orange, San Bernardino, Los Angeles, Ventura, Santa Barbara, and San Luis Obispo Counties. In September 2006 live larvae were found in citrus leaves of multiple mature citrus orchards in Kern Co. The likely source of these infestations is adult moths that flew (likely wind-aided) over the hill from areas around Castaic (Magic Mountain) where this pest is reported to be in high numbers in backyard trees. Adult citrus leafminer moths have also been caught in pheromone traps in very low numbers at sites in Tulare and Fresno Counties, though no live larvae in leaves have been found to date. In Riverside County where the infestation dates from 2001, CLM males are continuing to be trapped, but leaf damage has diminished. More parasitized larvae are found in the leaves, when damage is found. At this time we only recommend treating young trees (less than 4 years of age). The impact on coastal lemon production with multiple leaf flushes a year is still not clear, but because there as never been any evidence throughout this pest's worldwide range that it causes economic losses to mature citrus, treating mature trees is still not recommended. Additionally, the cost for treatment from multiple sprays would be excessive.

Are all Phosphorous Products the Same?

Ben Faber and Jim Downer

South African plant pathologists were the first to show that root rot in avocado could be controlled by trunk injection with both phosphorous acid and the patented material Aliette®. Aliette was briefly registered in California in the late 1980's, but the registrant soon lost interest in pursuing a full pesticide registration when it became apparent that other researchers believed phosphorous acid could be registered as a fertilizer - a process much less costly and simpler than a pesticide registration. The company continued to hold on to the patents for the product and the breakdown products that were useful in root rot control. By holding onto the patent, this effectively stopped other companies from pursuing a pesticide registration for phosphorous acid. In 1990, a publication reported that phosphite could be used as a source of phosphorus fertilizer and this became the basis for the registration of phosphite as a fertilizer. Subsequently, when the original patent expired, at least two materials have been registered as fungicides containing phosphite – Fosphite® and Agri-fos®. There are, however, numerous phosphite materials that have been registered as fertilizers (for some brands see Brunings *et. al.*, 2005, http://edis.ifas.ufl.edu/HS254), and every day seems to bring more brands onto the scene each making claims of having the best efficacy.

We wanted to see if we could detect an efficacy difference between Aliette, a second registered phosphite fungicide and four different materials registered as fertilizers, for a total of six materials. In a greenhouse, three-month old 'Topa Topa' seedling avocados with cotyledons removed were planted into a *Phytophthora cinnamomi* -inoculated organic potting mix. A control was also planted without the inoculum, as well as an inoculated control. One of six different materials was then applied as a soil drench until draining from the bottom of the liner. The materials were applied at the equivalent phosphorous acid concentration. There were 20 replicates for each of the controls and treatments. The experiment was repeated twice.

At harvest, root fresh and dry weights were highest for the non-inoculated trees and lowest for the untreated, inoculated controls, in both trials. All treatments' associated weights intermediate between these two were statistically the same. Even a repeat application of one of the treatment materials in trial II didn't result in greater root weights than single application treatments. Shoot weight, both dry and fresh, was much less affected by root rot and treatments. There were no differences in fresh shoot weight in the second trial, not even between the inoculated and noninoculated controls. The root and shoot weights of all the treatments in the second trial were higher than in the first trial, indicating that either the inoculum was not as effective or that the trial was not continued long enough to produce as much damage.

Root rot treatments often have dramatic effects on root weights while shoot weights may show little treatment effects. It is clear from our data that phosphites, regardless of material source, reduced the severity of root rot in this study.

Analyzing the Farm Business: Most Common Financial Statements and Ratios

Eta Takele

Farm managers need to constantly evaluate the performance of their businesses by investigating the strengths and weaknesses of their administration, and operations. One way they can accomplish this is by analyzing the information in their farm records. The data in the farm records summarized and converted into a set of analysis tools provide a meaningful summary of the farm's financial performance over time as well as its efficiency compared to other similar operations. This article describes how the most common financial statements and ratios are calculated and interpreted for analyzing the farm business.

The three most common financial statements-the Balance Sheet, Income Statement, and the Cash Flow Statement provide the basis for calculating various financial ratios that are used to 1) assess the financial strength and 2) monitor the financial performance of the business.

The Balance Sheet is the listing of all farm assets and liabilities. Farm assets include any property or securities that are controlled by the farm and can be converted to cash. Farm liabilities include all liens or financial obligations against the farm's assets. The difference between the assets and liabilities provides net worth or equity. The Cash Flow Statement is the summary of cash available and cash required. The Income Statement is the summary of revenues and expenses.

The Balance Sheet and the Cash Flow statements provide liquidity and solvency ratios which are used to assess the financial strength of the business. The Income Statement provides profitability and efficiency ratios that rate the performance of the business. Financial statements and ratios based on assets and liabilities valued at the current market value will be better indicators of the current purchasing power than when valued at the cost basis.

Liquidity Analysis

Liquidity analysis shows the ability of the business to convert assets to cash to meet current commitments without disrupting the ongoing operation of the business. One way to assess the liquidity position is checking the Cash Flow Statement for cash available and the cash needs on a monthly basis. Another approach is to analyze the Balance Sheet through the following methods:

Current Ratio: One of the most frequently used measures of liquidity is calculated as:

Current Assets/Current Liabilities

This ratio measures the number of dollars available to service each dollar of short term debt. For example, if the ratio is 2:1, there is $2 of liquid assets for each $1 of current debt.

Acid Test Ratio: This test is more specific than the current ratio. It provides the immediate liquidity capacity of the business. In the current ratio a more general method of liquidity is given, therefore it should be carefully interpreted because some current assets are not as liquid as others. For example, one farmer may hold most of his current assets in cash, savings deposits, and very liquid inventories. Another farmer may hold more of his current assets in less liquid forms such as cash invested in growing crops. Thus, while the two farmers may have the same current ratio, the first farmer may be in a better position than the second farmer to meet an unexpected expense. The Acid Test Ratio which is also referred to as the "quick" ratio is identical to the current ratio except inventories, supplies, and cash invested in growing crops are excluded from the numerator.

Solvency Analysis

Solvency measures are indicators of financial security. They are also considered as measures of financial risk. A business is said to be solvent if all debts could be covered by liquidating all assets. The more that is left over, the more the business is considered solvent. Solvency measures include:

Leverage Ratio: Measures the relationship of debt to equity--that is measures the capacity of equity to payoff debt.

Total Liabilities/Net Worth
or
Debt/Equity

Where net worth (equity) is the difference between the assets and liabilities in the business.

If the ratio exceeds 1.0, the creditors have more invested in the business than the owner. As expected, lenders pay particular attention to this ratio.

Net Capital Ratio: shows the relationship between the total assets and total liabilities in the business. It is calculated as:

Total Assets/Total Liabilities

A value greater than 1.0 implies that liquidation of the business would produce enough cash to payoff all creditors. This ratio is also used as a measure of risk bearing capacity. It shows the percentage that the value of assets could decline and still cover liabilities. For example, a value of 1.4 indicates that for each $1 of debt, there is $1.40 in assets. This means that if the value of assets could decline by roughly 40%, the business would still remain solvent.

Debt-to-Asset Ratio: The inverse of the net capital ratio. It provides the percentage of asset values that would be needed to retire all debts.

Profitability Analysis

Profitability analysis helps to answer questions such as: What interest/return did I make on my investment? How much did I make for my labor and/or management?

Profitability analysis is evaluation of the net farm income. Net farm income is the value of farm production plus gain (loss) from the sale of intermediate and long-term farm assets minus farm expenses. It is a return for several resources in the farm business for which no charge have been made. These resources include: 1) unpaid labor (operator and/or family), 2) unpaid management, 3) debt capital, and 4) equity capital. To calculate the returns to any of these resources, the general approach is to assign values to all but one of the resources Then subtract the assigned values from the net income, the residual will be the return to that one resource for which no values has been assigned for.

Values of resources can be estimated as follows:

1. ***Unpaid Labor:*** The total number of hours spent by the operator and each family member in the farm multiplied by the expected wage rate for farm labor..
2. ***Unpaid Management***: The total number of hours spent by the operator and family members exclusively in management alone multiplied by the expected wages of farm managers.
3. ***Debit Capital***: Since the interest charge for borrowed capital is already included in the income statement; it should not be subtracted from net farm income when calculating returns to labor, management, and equity capital. However, it should be added to net farm income to calculate the returns to debt capital.
4. ***Equity Capital*****:** The farm equity multiplied by the interest rate of the next best business opportunity (e.g., a money market fund or 12- month Treasury Bills) provides the value of equity capital.

The return generated to these resources {unpaid labor, unpaid management, debt capital, and equity capital) using the above calculations can by themselves be efficient indicators of the profitability of production activities in the business.

However, we can also use ratio analyses which to compare across different sizes of farms as well as with non-farm investments. Profitability ratios relate dollars of income per dollar invested. The most commonly used ratios are:

1. ***Rate of Return to Assets from Current Income****:* The per dollar return on farm assets from current income measures how efficiently the farm business uses its assets and is calculated as:

   Returns to farm assets from current income/Farm business assets

2. ***Rate of Return to Assets from Real capital gains***: The per dollar return on farm assets from real capital gains is calculated as:

   Real capital gains on farm business assets/ Farm business assets

3. ***Rate of Return to Equity Capital****:* The rate of return per dollar of equity capital that is invested in the farm or ranch is calculated as:

   Returns to Equity/ Average Farm Equity

In the calculation of these ratios, a couple of points must be noted. First, asset values and equity vary during the year. Therefore, the value of farm assets and equity (the denominators used to calculate the rate of return to assets and equity capital) are the average of the beginning and end of the year values.

Second, the rate of return to assets should include not only returns from income (as is usually the case), but also returns from capital gains (losses). The rate of return to assets from capital gains (losses) equals the estimated capital gains (losses) divided by the average farm assets. Also, the rate of return to equity from capital gains (losses) equals the estimated gains (losses) divided by the average farm equity.

Obviously, all the ratios that can be used to analyze the farm business are not dealt with here; however, the ones we mentioned here are the most commonly used ones. More are covered in farm management and financial analysis books.

Use of Financial Ratios to Analyze the Farm Economy

The ratios defined above are often used to look at the health of individual farms as well as the farm economy as a whole. These ratios are usually derived by the United States Department of Agriculture (USDA) and often printed in the popular press.

Table 1 shows the rates of return to assets and equity for all U.S. farms for selected years. The figures reveal the decline in returns in the 1980s. Negative capital gains, resulting primarily from declining land values, kept total returns low. However, with improvement in capital gains and income, the overall rates of return have been positive in the 1990s and 2000s.

Table 2 is a distribution of farms by gross annual sales and average debt-to-asset ratio from a USDA survey. The figures show that the average debt-to-asset ratio increases when moving to a higher gross annual sales category.

Farms with gross sales of $1,000,000 or more showed a high debt-to-asset ratio and constitute 1% of all farms surveyed. In contrast, small farms growing less than $100,000 per year showed a low debt-to-asset ratio and constitute 85% of all farms surveyed.

Summary

Analyzing the farm business may take several forms. The most common measures of financial statements and ratios are discussed above. We encourage growers to use these measures frequently to investigate the performance of their business, evaluate the weakness and strengths; as well as to set goals and strategies for improvement.

Please let the Farm Management advisor know of specific subjects you would like to see discussed. We value your reactions, suggestions, and contributions.

Table 1. Average Rates of Return to Assets and Equity (%) on United States Farms

	Year								
Item	1960-69	1970-79	1980-89	1990-99	2000	2001	2002	2003	2004
Returns to assets from:									
Income	2.94	3.54	2.97	3.17	1.99	1.98	0.66	2.25	3.40
Capital gains	2.46	5.59	-4.78	1.39	3.13	2.59	2.51	4.38	7.95
Total	5.40	9.14	-1.81	4.56	5.12	4.57	3.16	6.63	11.35
Returns to equity from:									
Income	2.33	2.66	1.18	2.19	0.89	1.07	-0.38	1.52	3.06
Capital gains	3.22	7.70	-4.82	2.06	4.09	3.38	3.18	5.24	10.35
Total	5.55	10.37	-3.63	4.26	4.97	4.44	2.79	6.75	13.42

Source: Farm Balance Sheet 1960-2004, Economic Research Service, USDA.

Table 2. Farm Debt-to-Asset Ratios by Gross Annual Sales

Gross Annual Sales	All Farms %	Average Debt-to-Asset Ratio (%)
All Sizes	100	10.25
$ 1,000, 000 or more	1	20.27
$500, 000 - $999, 999	2	15.52
$250, 000 - $499, 999	4	14.68
$100, 000 - 249, 999	8	11.00
Less than $100, 000	85	7.09

Source: Agricultural Resource Management Survey (ARMS), USDA, 2005.