



Biomasters Global, Inc.



SINCE 1996

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Report on Grapes in Fresno CA

Dr. Layan D. Said, Consultant



NATURAL RESOURCES CONSERVATION SERVICE SECOND YEAR - NUTRIENT MANAGEMENT PROTOCOL FOR



S & A FARMS

ALBERT SMITH, OWNER/OPERATOR
FRESNO, CALIFORNIA 93723

S & A Farms is a 3rd generation family owned and operated organic farm certified organic by the California Certified Organic Farmers Foundation. The farm is comprised of approximately 80 acres of Thompson seedless and 10 acres of Crimson Red grapevines grown for raisins and the table/wine grape market, respectively.

S & A Farms is a participant in the Natural Resources Conservation Service's (NRCS) Nutrient Management Program, which established a Conservation Practice Standard for the primary purpose managing the amount, source, placement, form and timing of the application of plant nutrients and soil amendments. A NRCS field agent monitors all farm activities to insure that all program participants are in compliance with this Standard and, thus, can maintain their organic certification.

Biomasters, Inc. Protocols (plans and specifications) for nutrient management are in keeping with this Standard by describing and implementing organic practices to achieve its intended purpose(s), using nutrients to achieve production goals and to prevent or minimize resource impairment. Our nutrient management plan was developed based on scientifically validated natural farming mandates and on the requirements of the current NRCS Standard and any applicable Federal, state, or local regulations, policies, or programs.

Our initial purpose was to develop site-specific protocols for sustainable viticulture production by determining the nutritional status of the crop, i.e., diagnose or confirm nutrient (energy) imbalance, determine the nutritional (energetic) needs of the crop, then implement appropriate protocols to restore the nutrient energy balance between the soil and the crop.

In order to produce a healthy crop, soluble nutrients must be available from the soil in amounts that meet the minimum requirements for the whole plant, while at the same time, enhancing the total soil ecosystem. The intent of our authentic organic production nutrient management system is in balancing soil fertility to supply required plant nutrients at a time and at sufficient levels to support healthy plant growth, as restrictions in any one of the needed nutrients will slow growth and will reduce crop quality and yields.



Our primary challenge in the application of our authentic organic production system was in synchronizing nutrient release with crop requirements, particularly with nitrogen, from the residual organic sources present in the soil from previous management activity, when combined with our production application protocols.

This was accomplished by the use of MicroSoil®, EnRich™ N48, MacroFoliage®, and TripleRich™, all perfectly balanced and highly concentrated blends of 100% naturally occurring nutrients and soil microorganisms, approved by CCOF for organic and sustainable viticulture. In addition, organic molasses (a bio-stimulant) was applied as a quick fix to supply carbohydrates and alter the carbon to nitrogen (C/N)

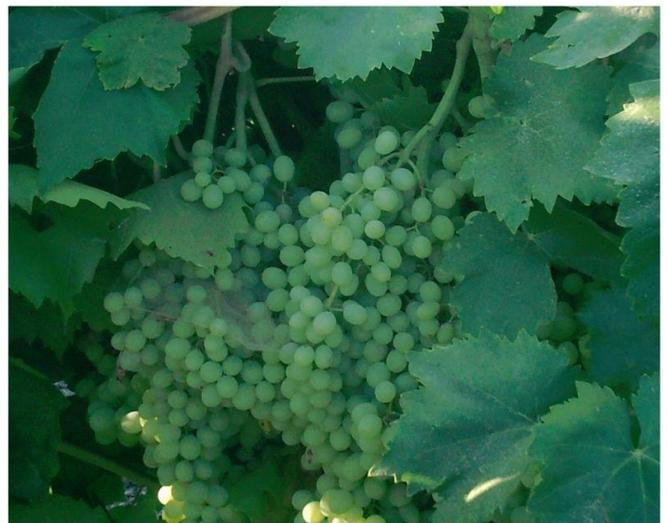
ratio. This has a positive effect on the soil microbial ecology as an immediate source of quick energy, stimulating the plant to make more chlorophyll.

The availability of all essential macro- and micronutrients elements are critical for optimum vine performance and profitable grape production. When one or more of the essential nutrients is deficient, vines may exhibit foliar deficiency symptoms, reduced growth or crop yield, and greater susceptibility to insect attack, disease, and winter injury or death.

Our goal is to demonstrate, under field production conditions, the efficacy of our Protocols in the development of an all-season nutrient management/monitoring system that will create the foundation for the revitalization of the organic production ecosystem and thereby develop operational protocols which pave the way to the establishment of a sustainable viticulture farm which can produce for generations to come.

Our key considerations when managing vine nutrition organically, include filling the trellis without promoting excess vine vigor, meeting crop demand, managing soil pH to optimize the potassium and magnesium balance (as per soil test results), all with the understanding of the carbon to nitrogen (C/N) ratios in all organic matter applications.

When we began developing our nutrient management plan, there were no prior production input information or yield data available for a comparative analysis, as the vineyard was under a lease contract. During the term of the lease, the vineyard suffered from gross mismanagement.



Therefore, the objective of the 2011 Protocol was to initiate the process of soil building through the establishment of a vibrant soil micro-ecology suitable to sustain and enhance the growth and development of the beneficial microorganisms responsible for soil and plant nutrition (energy).

Soil samples were taken to determine the energy status of the soil (nutrient reservoir) and petiole samples were taken to determine the nutritional status of the grapes, i.e., evaluate nutrient movement and use.

The BRIX test, a measure of the ratio of the carbohydrate (sucrose sugar) level by weight in plant juices to liquid (water) in the fruit (1BRIX Degree means 1 gram of sugar to 99 grams of water), was used to evaluate vineyard conditions. High BRIX foods are sweeter and have a high mineral density (high immune status); disease is the result of mineral deficiency.

Soil test results of Feb. 3rd reveal the fact that, although the average pH is relatively high, the nutrient spectrum appears to be balanced with an adequate amount of nitrogen to start the growing season. Sixty per cent of the vine's nitrogen reserve at the start of budburst comes from nitrogen absorbed during post-harvest and is stored in the roots, trunk, and root stock. The only nutrient component deficient was carbon, i.e., organic matter. If the carbon to nitrogen ratio is low, the soil microorganisms will out compete with the plants roots for all available nitrogen and the plant suffers, even though the soil analysis may indicate adequate nitrogen. This appears most evident with the table grape soil analysis showing adequate post-harvest nitrogen carry-over, however, the petiole analysis of July 18 indicating low nitrogen 0.50, the norm 1.20. Also, sulphur, copper, potassium, and boron were all low. These deficiencies make the crop look like a veritable feast to the leafhoppers, which were first noticed on April 30.

First application via drip system: April 10, MicroSoil®, EnRich™ N48, Pure Fulvic™ Trace Minerals, and molasses; followed by a two-day rain.

Second application, foliar, MacroFoliage®: May 26.

Third application, foliar, TripleRich™: June 15.

[See the attached 2012 Protocol application schedule for application details.](#)



On June 30th, the table grapes began to color, much earlier than normal, however, as time progressed, the coloring was not uniform in the bunch. The leafhopper infestation was enormous. In July, food-grade diatomaceous earth was applied and on August 23rd and September 6, a total of 240,000 green lacewing eggs were released for leafhopper control. Evidence of positive impact was noticed before the end of harvest. There was one more post-harvest application of Microsoil and molasses and, in October, all rows were planted to cover-crop.

Discussion

There are several variables that come into play which ultimately affect crop performance. Any attempt to identify, isolate, and treat each variable to bring about the “perfect” set of production criteria is beyond the scope of our Protocols, too many unknown variables. The nutrient management plan determines current basic field conditions through the use of soil analytical data, interprets that data, from which a ‘best fit’ nutrient formulation and application schedule is developed to best address any deficiencies based on crop response to management (via soil and plant tissue analysis and observation) over time.

Table Grapes - Crimson Red.

Despite the fact that there were many variables affecting the table grapes, e.g., soil nutrient deficiencies, pest infestation, pre-mature yellowing of canopy, etc., at harvest, the average brix value and yield was higher than the local area's production data.

The nutrient management plan was designed to address several soil conditions that have to do with establishing a nutrient or "energetic" balance in the soil, which improves the plant immune response to insect and disease attack and improve plant quality and quantity over several soil conditions.



Thompson Seedless

Overall, the Home Ranch's response to this year's management plan resulted in the production of 30 more bins than last year. The Belmont vineyard yielded 4 bins less. There are a few problems areas in the field that have been identified and which will require special attention in the 2013 season. Production data will be discussed in the meeting.

In the final analysis, thus far, the soil microbial populations are being established and reinforced, fortified with applications of 74 different trace minerals, enzymes, co-enzymes, broad based stabilized amino acids, vitamins, polypeptides, polysaccharides, and organic nitrogen.



Soil and plant tissue test results indicate that the soil is actually more energetically balanced than crop information reflects, however, the nutrients are not optimally released and absorbed. The continued source of nutrients, the "nutrient sink," i.e., organic matter is what is deficient. The microbial populations can maintain their diversity and potency only with a generous supply of organic matter, at least 2%. Then, and only then, will the full value of our nutrient management plan will come into fruition and will be reflected in crop yield and quality.

The plan for the 2013 season will begin with soil sampling and then the application of 5 to 10 tons of organic matter per acre. Adjustments to our perfectly balanced and highly concentrated blends of 100% naturally occurring nutrient formulations will be based on soil test data to insure optimum nutrient supply over the entire crop cycle.





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January 9, 2013

Final Results Report on Grapes in Fresno CA

Dr. Layan D. Said, Consultant

NATURAL RESOURCES CONSERVATION SERVICE SECOND YEAR - NUTRIENT MANAGEMENT PROTOCOL

FOR

S & A FARMS

ALBERT SMITH, OWNER/OPERATOR

FRESNO, CALIFORNIA

Thompson Seedless Grapes – 80 Acres

PRODUCTION

2011 Total Production: 291,804 lbs. (145.9 tons) or 1.82 T/Acre

2012 Total Production: 286,117 lbs. (143.0 tons) or 1.78 T/Acre

2012 - 5,687 lbs. (2.84 tons) less or 0.035 T/Acre less

ORGANIC MATTER

OM 0.8%

OM 1.1%

BRIX

Avg. Brix = 20.2%

Avg. Brix = 22.6%

Crimson Red Table Grapes – 10 Acres

PRODUCTION

2011 Total Production: 130,740 lbs. (6.50 T/Ac);

2012 Total Production: 181,462 lbs. (9.07 T/Ac);

2012 Total Increase in Production: 50,722 lbs. (25.36 tons)

TOTAL INCREASE 2.53 tons per acre

BRIX

Avg. Brix: = 22.41

Avg. Brix: = 21.14

Total Brix: 1.27 less

ORGANIC MATTER

2011 OM 1.0%

2012 OM 1.4%

PROTOCOL REQUIREMENT – 2.0%



In all, comparing amount of product used in 2011 vs 2012, the differences are:

	MicroSoil®	MacroFoliage®	TripleRich™	PureFulvic™	EnRich™ N48	Molasses
2011	108 (l)	72 (l)	36 (l)	0	80 (gal)	36 gal (l)
2012	80 (l)	40 (l)	40 (l)	22.5 (gal)	120 (gal)	40 gal (l)

SAN JOAQUIN VALLEY GROWING CONDITITIONS

2011 Production Season

In general, the Valley experienced cool and wet weather in early spring causing increased mildew problems earlier in the season. Rainstorms forced some growers, including S & A Farms, to send wet raisin grapes to packers to be dehydrated and reconditioned to remove any sand. Crops were smaller on fewer acres.

The Table Grapes suffered from a substantial leafhopper infestation, which affected yield and overall quality. This level of infestation damaged the leaves causing them to lose their green color, reducing photosynthetic activity, which delayed berry sugar accumulation. At harvest, the leafhopper population caused worker annoyance, which affected productivity.

There was no leafhopper activity in the Thompson Seedless grapes, which were adjacent to the Table grapes.

2012 Production Season

According to the Raisin Grape Objective Measurement Survey forecast, funded by The Raisin Administrative Committee and conducted in July, the California raisin-type variety grape crop (all varieties) was shaping up to be the smallest crop since 2006, due in part to spring frost damage. Raisin estimates at the end of August were down 13.4% from the 2011 Final Production numbers. Average bunch counts per vine totaled 29.1 compared to 38.7 recorded in 2011.

This season, the Table Grapes suffered a more severe infestation than the 2011 season. There was a WEEDY field across the field access road from the Table Grapes and adjacent to the Thompson Seedless, which served as an overwintering haven for the leafhoppers. This field was subsequently plowed under as a preventative measure for the 2013 season.

On April 20th, leafhoppers were first noticed and on July 2nd, diatomaceous earth was first applied followed by another treatment two weeks later. On August 23rd and again on September 6th, 120,000 green lacewing eggs on each date were released as a control measure. Masks were purchased for the workers as protective equipment to prevent the inhalation of the leafhoppers; however, due to the impact of the treatment, the leafhopper population was reduced such that the masks were not needed.



PRELIMINARY PROTOCOL EVALUATION AFTER TWO YEARS

Despite the fact of inclement production weather, LOW ORGANIC MATTER (OM), and severe leafhopper infestation in the Table Grapes, the Nutrient Management Protocol Treatment Program is increasing overall plant vigor, quality, and subsequent yield due to the creation of a more diverse and enhanced soil microbial ecology, which increases the availability of essential nutrients for plant growth and development, and also establishes the foundation for enhanced plant immunity to pest infestation and incidence of disease organisms. In 2011, a cover crop planted to every other row helped to stabilize the soil ecosystem. In 2012, a cover crop was planted in every row to further increase the organic matter content and provide a suitable habitat for beneficial microorganisms to thrive on in the off season.

The 2013 season will begin with the application of five to ten tons per acre of organic matter, which will be turned under with the cover crop to increase organic matter content and to create optimum C/N ratio for efficient microbial decomposition, thus providing a reservoir of balanced nutrients for plant root absorption.





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Since 1996

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March 26, 2012

2012 Protocol

90 acres of GRAPES

Grower: Mr. Al Smith

First Application: Early April

40 liters of MicroSoil®

40 Liters of EnRich™ N48

22.5 gallons of PureFulvic™ Trace Minerals

80 gallons of Molasses

Second Application: FOLIAR Application to be about Mid- May, but should be sprayed on (1) one week before flowering

40 liters of MacroFoliage®

Third Application: Foliar to be sprayed on (1) one week after flowering

40 liters of TripleRich™

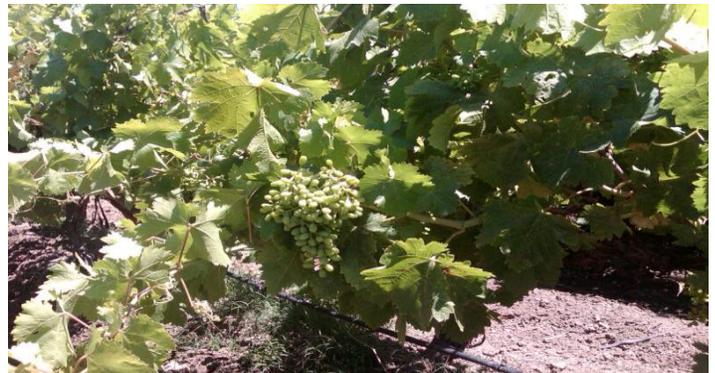
IMPORTANT: June 1, 2012

We want to do at least (4) four more soil analysis in same vineyard areas as tested previously and based on these test results, if merited, we will custom formulate a MicroSoil® blend, using only our CCOF Approved products, to address any deficiencies found in the soils.

Fourth Application: Mid (?) June, per Al Smith's schedule

40 Liters of MicroSoil®

NOTE: We highly recommend, if practical, that a mound of some type of animal manure, composting or mulch be placed around the root stock of each plant in order to retain moisture, keep root area cooler and increase organic matter.



IMPORTANT: Application rates, routines and any other specifics needed will be detailed in our protocol provided Dr. Layan Said.