

The Berry Basket

Newsletter for Missouri Small Fruit and Vegetable Growers

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Some Numbers Do Have Meaning!

by Ben Fuqua

Numbers have become the language of today's society. Almost everything we buy is coded by a number - a product identification number, an order number, a sell-by-certain date number, the price tag, etc. Even humans are identified by special numbers such as a social security number, driver's license number, telephone number or the numbers in your street address.

While numbers have been an integral part of agricultural decisions for many years, understanding numbers that identify fertilizer grades and pesticide rates is essential in producing another important number: net profit.

Fertilizer Grades: The series of numbers on the fertilizer bag, tag, or bill-of-sale is the fertilizer grade. The fertilizer grade identifies the amount of plant nutrients in the fertilizer materials. Three numbers will always be present, for example 22-11-11, 13-13-13, or 34-0-0. Each group of numbers represents the percent (based on container weight) of nitrogen (N), phosphate (P_2O_5), and potash (K_2O). A 50 pound bag of 22-11-11 contains 11 lb. nitrogen, 5.5 lb. phosphate, and 5.5 lb. potash, while a 10 pound bag of 22-11-11 has the same percent of nutrients, but contains only 2.2 lb. nitrogen, 1.1 lb. phosphate, and 1.1 lb. potash due to the lesser weight. Today, many manufacturers are including additional nutrients, such as magnesium, sulfur, iron, and zinc, resulting in fertilizer grades that contain 4, 5 or even 6

From the Editors

by Marilyn Odneal

We hope everyone is enjoying the beautiful fall weather. Winter is a good time, as Dr. Ben Fuqua writes, to brush up on your numbers - but don't forget your letters either. Internet sites are a valuable source of information. If you are snowed in for the winter, never fear. You can retrieve lots of helpful information at home. Go to muextension.missouri.edu/xplor/ to access Missouri Extension bulletins. Also visit the SMSU Department of Fruit Science site at www.smsu.edu/MtnGrv for many fruit related links. Most up-to-date pesticide labels are now available at chemical company websites, too. If you have found valuable websites, please share them with us. Direct any website addresses you have found helpful to: Marilyn Odneal, SMSU Research Campus, 9740 Red Spring Road, Mountain Grove, MO 65711, phone: 417-926-4105, fax: 417-926-6646, e-mail: mbo774t@mail.smsu.edu.

numbers. A 27-6-9-2(Mg)-1(Fe) fertilizer, for example, would contain 27% N, 6% P₂O₅, 9% K₂O, plus 2% magnesium, and 1% iron. Fertilizers sold as containing “micronutrients” must also have the guaranteed amount of these nutrients stated on the fertilizer bag or tag.

The amount of nutrient to apply is determined by the difference between what the plant needs for growth/production and what the soil can supply. Therefore, growers must know something about the nutritional requirements of the plant being grown as well as the nutrient supplying power of the soil. While there are several published guidelines on nutrient requirements of blueberry plants, a soil test is still the best way to determine the soil fertility level. When the plant requirements for a specific nutrient(s) is greater than the amount available from the soil, additional nutrients (via organic or chemical fertilizers) must be added to make up the deficit. The amount of fertilizer to apply can be calculated by dividing the amount of nutrient needed by the percent of the nutrient in the fertilizer. For example, a grower wanting to apply 90 lb. N using ammonium nitrate (34-0-0) as the fertilizer would need to apply 265 lb. (90 lb. N/0.34). An application of 200 lb. of urea (45-0-0) or 430 lb. of ammonium sulfate (21-0-0) would provide 90 lb. of actual nitrogen. Growers preferring organic sources use the same calculations to determine the amount of fertilizer to apply. They should remember that organic fertilizers need to be applied 4 to 6 weeks earlier than chemical fertilizers to allow the organic compounds enough time to break down (mineralize) and release the nutrients for plant uptake.

The grade of liquid fertilizers is also based on container weight, not volume. Thus, a 28% N solution weighing 11.2 lb. per gallon would contain 3.1 lb. of actual nitrogen. To supply 90 lb. N with this particular nitrogen solution would require 29 (90 lb. / 3.1 lb.) gallons.

Pesticide Rates: Blueberry growers use smaller amounts of pesticides than most any other fruit producer. Herbicides are usually

applied annually, fungicides applied as needed to control disease organisms, but insecticides are rarely used in blueberries. When using any pesticide, the grower must be aware of and follow the “numbers” on any of the labels. Every pesticide has a label. The label gives the applicator instructions on how to use the product most effectively and states the proper amounts to use. The recommended rates of herbicides, fungicides, and insecticides are normally expressed in weight (pounds, ounces, grams) or volume (teaspoons, ounces, pints) of material per area (square feet, per acre, etc). Pesticides can be applied by several different methods to control target pests. One of the more common ways to apply pesticides is by the use of dilute sprays. Dilute sprays are solutions of the pesticide and water and are usually applied at rates of 80-200 gallons per acre. All application equipment should be calibrated on a regular basis to insure the correct amount of the diluted spray solution is being applied. Too little pesticide usually results in inadequate pest control. Too much pesticide becomes expensive, can damage blueberry plants and fruit, cause adverse environmental effects, and puts both the grower and consumer in imminent danger. It is also illegal. **Remember the label is the law.**

Confusion with stated label rates is often caused when recommendations are listed as the amount of active ingredient (ai) of chemicals rather than the amount of spray material. A 50% wettable powder, for instance, means that 2 pounds of the powder are needed to equal 1 pound of the active (chemical) ingredient. To supply 1 pound of the active chemical using a 80% ai product you need 1.25 pounds of the product.

Another potential source for error occurs when the recommended rate is made on a per acre basis. Many herbicides, for example, are applied to the soil surface/mulch and the amount to use should be based on the area actually being treated. Since blueberries are normally planted in 3 to 4 foot wide rows spaced 10-12 feet apart, with the space between rows being maintained in

permanent vegetation, only a fraction of the soil area needs to be treated. To calculate area, growers simply multiply the length of plant row times the row width. A blueberry row measuring 300 feet long with a 4 foot row width would have a total of 1200 foot² area. Since this represents only 0.028 of an acre (1200 ft²/43560 ft²) only 2.8% of the herbicide recommended per acre is needed to supply the correct amount.

Fungicides and insecticides, on the other hand, are usually sprayed on the above ground parts of plants rather than the soil. The recommended rate listed on the label is the amount of pesticide to be applied to an acre of plants. While the number of blueberry plants per acre can vary significantly by changing plant spacings (both between rows and in-the-row), the same amount of pesticide is required to control the target pest. For example, blueberry plants in rows 10 feet apart with 4 feet intervals between plants (1089 plants per acre) and blueberry plants growing in rows 12 feet apart and 5 feet between plants (726 plants per acre) require the same rate of pesticide and the same volume of spray solution (pesticide + water). Therefore, growers must consider the average number of plants per acre, based on the plant spacing in their field, when calculating the amount of spray solution to mix. The amount of pesticide and the volume of water to use must be proportional to the number of plants per acre in order to maintain the same pesticide concentration. A field with 450 plants in 10 foot rows and 4 foot spacing would only need 0.41 (450/1089) of the per acre amount in order to supply the correct rate of pesticide, but one with 450 plants in 12 foot rows spaced 5 feet apart would need 0.62(450/726) of the per acre amount to supply the proper rate.

Conclusion: I'm often reminded that while certain numbers don't matter: age – you're only as old as you feel; shoe size-buy ones that are comfortable; weight-just grow taller(?), there are many numbers that have a major impact in determining our standard of living. Most growers can identify additional numbers such as yields, number of available pickers, selling price,

bird population, etc., that are just as important as fertilizer grades and pesticide rates in successfully growing blueberries. The bottom line, however is to use each of these numbers to maximize the black ink on the net profit side of the ledger. After all, that is the most important number.

Centennial of the Missouri State Fruit Experiment Station

by *Patrick Byers*

"Victory, victory, victory, victory" was the telegraph message sent November 15, 1899, from Jefferson City announcing the choice of Mountain Grove as the location of the Missouri State Fruit Experiment Station. Mountain Grove was in competition for the proposed research station with West Plains, Springfield, Nevada, and other towns and had offered 190 acres of land north of the city. The decision by the Missouri General Assembly to locate the State Fruit Experiment Station at Mountain Grove was the beginning of a fruitful relationship that continues today.

Missouri was a major producer of grapes, apples, peaches, strawberries, and other fruits at the turn of the century. Much of this production was centered around Mountain Grove in the south central Ozarks. The General Assembly recognized the importance of this industry by establishing the first Experiment Station in the nation devoted exclusively to fruit research.

The first Station manager was Professor John T. Stinson, who had previously served as horticulturist and head of the horticulture department at the University of Arkansas. He at once began planting orchards and vineyards at the new site as well as starting the construction of buildings. By the time he left the Station in 1902, the Administration Building, a large greenhouse, the director's residence, and other buildings were either completed or underway. The original Administration building, Faurot

Hall, housed offices, a laboratory and meeting room, a library, and a basement cold room for plant propagation and fruit storage.

The succeeding director of the Station was Paul Evans, appointed in 1903 and serving for fifteen years. Mr. Evans was a former professor at the University of Missouri, and was associated with fruit production near Olden. He introduced fruit breeding programs and developed new techniques of managing fruit pests. The library at the State Fruit Experiment Station is named in his honor.

Frederick W. Faurot, who was assistant horticulturist at the Station from 1902 to 1909, returned as director in 1918 and served until 1933. His particular area of expertise was plant culture. He worked extensively with variety evaluation and wrote many bulletins on fruit production. Mr. Faurot's contribution was recognized when the Administration Building was renamed in his honor. His son Don went on to football fame at the University of Missouri.

Paul Shepard became Station director in 1934, and served until his death in 1961. He was a noted horticulturist, and emphasized the breeding of new fruit varieties. He introduced to the public forty fruit varieties developed at the Station, including "Loring" peach and "Ozark Premier" plum. Shepard Hall, the present administration building, honors his memory.

The fifth director of the State Fruit Experiment Station was Dr. Kenneth Hanson, who served from 1963 until 1984. Dr. Hanson continued to release new fruit varieties, such as "Ozark Gold" apple and "Topaz" peach. During his tenure the Station was assigned to Southwest Missouri State University as a result of the reorganization of state government in 1974. The association with SMSU has resulted in the expansion of research and education programs to serve Missouri's fruit industry.

The present Station director, Dr. James Moore, also serves as head of the SMSU Department of Fruit Science. The Department conducts research programs in pomology, plant pathology, entomology, viticulture, enology, and

biotechnology and advisory programs in fruit production, enology, and viticulture.

The Station site was designated the SMSU Research Campus in 1994, and undergraduate and graduate education are important parts of the campus mission. With all the changes that have occurred over the past 100 years, the mission of the Missouri State Fruit Experiment Station today remains the same as in 1899 – to serve the fruit production and processing industries of Missouri.

Two of the buildings at the State Fruit Experiment Station are of particular historical significance. The Missouri General Assembly appropriated \$9,350 in 1900 to construct several buildings of "first class quality" at the newly established State Fruit Experiment Station. State Architect Henry H. Hohenschild designed the Administration Building (today's Faurot Hall) and the Director's Residence. The Administration Building served the Station until 1968, when a new building was constructed. Faurot Hall was scheduled to be demolished in 1973, but interest in its preservation by local citizens, who consider the building a community landmark, caused those plans to change. Southwest Missouri State University cooperated with local groups to restore the building. More recently the Missouri General Assembly has appropriated funds to completely renovate this historic building, which was placed on the National Register of Historic Places in 1979.

Faurot Hall was designed in the Queen Anne style popular at the turn of the century. The building is constructed of brick that was fired from clay dug on the grounds of the State Fruit Experiment Station. The building was named in honor of Frederick Faurot, a prominent horticulturist and former director of the Station. The Director's Residence is a distinctive example of the Shingle Style, also popular in the early years of the 1900s. We will be celebrating the Centennial of the Missouri State Fruit Experiment Station in the coming months. Centennials offer a unique opportunity to celebrate the past, present, and future. The State

Fruit Experiment Station is the first segment of Southwest Missouri State University to reach this landmark, and a number of events are planned to highlight 100 years of public service to Missouri and the nation. The tentative schedule of events is listed below:

Midwest Grape and Wine Conference

- January 1999

Missouri Small Fruit Conference

- February 1999

**American Society of Enology
and Viticulture Symposium**

- July 1999

Centennial Field Day

- October 1999

News from the Blueberry Council

by Bob Hershey

On Tuesday, September 29, 1998, C. L. (Doc) Scrivner and myself spent the day in Jefferson City. The morning was spent with the Joint Commodity Groups consisting of heads of most of the grower organizations in Missouri. We heard reports from many government and university experts on the farm prices crisis. This was one of the most informative and educational meetings I have ever attended.

The economists say pork and beef producers are into a two to three year slump. Basically we as small fruit producers are fortunate that we can still control our own prices.

The afternoon session was the closing of the Small Farm Hearing at the capital. This was supposed to be an inquest into the problems of the small farmer. I did not agree with the legislative committee allowing the folks from the corporate hog and poultry organizations to testify. These corporations are essentially farm factories.

A lot of people said Missouri needs farm programs to teach them how to raise alternative

crops. I disagree with the theory that we need more and new programs. Missouri has very good resources like the Small Fruit Conference, the Small Farm Trade Show, the Missouri Horticulture Society, and many other programs the universities and extension services already have in place. However, many of these programs need our support as well as additional support from the government. Let your state representative and senator know you favor more funding for alternative crop research and also to increase the support for research at the university and extension levels.

This year, the "Taste of Agri-Missouri Banquet" will be Sunday evening, December 13, 1998, at Tan-Tar-A. It is our tradition to serve bluebeny sauce at the dessert table. I need to know who will be attending to help serve. We also need sauce donations. This conference is one of the best opportunities we have to promote Missouri Blueberries. I need an RSVP as soon as possible if you are attending and I need to know how much sauce our members can supply. Tan-Tar-A has special rates for this conference; just mention that you are attending the Governor's Conference if you need a room for Sunday night. It is recommended that commodity groups arrive mid-afternoon. Group pictures are at 4:30 pm and serving begins at 5 pm until 7 pm this year.

P.S. If you did sign up for this event at the February meeting, please reaffirm that you are going to attend and the amount of sauce that you are willing to supply. Some farms had a good crop of blueberries and others did not. Call me at (573) 547-4448 or you may fax to (573) 547-4502.

Editor's Note: The 1999 Missouri Small Fruit Conference will be held February 15-17, 1999, at the Sheraton Hawthorn Park Conference Center in Springfield, Missouri.

Vegetables and Herbicides

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It's very common for me to get calls from vegetable growers who are having troubles with their transplants. Quite often, it's a similar story. The vegetables are transplanted and seem to do fine for about a week or so. Then they start dying. Losses may vary considerably, but are usually substantial by the time the grower calls me. Some producers may see 100% losses.

After hearing the grower's story, I usually have a hunch what has happened, but I always like to send a sample up to the Plant Diagnostic Clinic in Columbia to get their analysis. Unless there is clear evidence of disease or other problem, it's usually the same diagnosis: herbicide injury.

Sometimes this is due to carry-over from a previous crop. Watermelons, for example, won't tolerate cotton herbicides, and if enough is left over from last year's crop, you're bound to see problems. Normally these chemicals break down over the winter, and don't cause trouble. But I've noticed that after colder-than-normal winters, there seems to be more carry-over problems. This is accentuated by drier conditions.

Unfortunately, sometimes the problem is due to improper use of a labeled herbicide. A common one is Treflan. This herbicide is labeled for watermelons in the middles, between rows, but not in the row itself. I've seen numerous examples of where growers have used it in the row, before transplanting. That's playing with fire, so to speak. Melon plants are sensitive to Treflan, and the growers found that out quickly.

Occasionally, I may hear of a grower who has used a herbicide which is not labeled for the vegetable crop at all. Now that's *really* playing with fire. Not only is it illegal, but it will probably damage their plants. Sometimes these growers may get by, but often the reason these herbicides are not labeled for the crop is that they will cause crop injury. The herbicide may be completely safe for other crops, but the crop the vegetable grower wants to use it on happens to be on its hit list.

If you see herbicide injury on your vegetables, and want to replant, you'll have to weigh all the factors involved and determine your chances of success. If the damage isn't too bad, sometimes surviving plants will develop enough of a root system to grow roots into areas that are herbicide-free, and the plant will take off. Usually you need optimal conditions for that to happen, especially proper temperatures for the crop. If the damage is severe enough, and conditions are poor, you may be wasting time and money by replanting. The herbicide will still be there to damage your new transplants.

Dr. Andy Kendig, Weed Scientist at the Delta Center, tells me that a very rough rule of thumb is that a crop will recover from approximately 30% injury with little yield effect, but injury more than 40% usually means yield losses. Again, this depends on the year... good growing conditions, and you'll get recovery... poor conditions, and you will lose yield.

The bottom line is... don't use non-labeled herbicides on *any* crop for which they are not labeled, and use the labeled ones according to label directions. Vegetables are sensitive to most herbicides, and you're taking a chance when you try something on your own. Not only is it illegal, but it's most likely going to cost you money.