

Soil Notes—And That's the Truth! Part II

Barry Sperling — Alexandria, Virginia

[This article covers the soil mixes used by a non-representative collection of azalea growers in the Middle Atlantic States and is not meant to be the definitive essay on soils in general, Ed.]

Did you ever notice how some of the greatest sports stars are busts as coaches? How can this be? One possibility is that they don't **know** how they perform their magic: it is just natural. When I started growing azaleas here in northern Virginia and needed to find out about the best soil for them, I ran into this same "self-selection" problem.

Self-selection means that many of the people who enjoy azaleas do so because the plants are so easy to grow. When asked about soils and planting, they shrugged and said that they just stuck twigs into the ground and these grew into 10-foot bushes covered with flowers. No wonder so many ASA members are from the Southeastern and Middle Atlantic states! If you read my first article [*The Azalean* March 2000. 22(1): 10-11], you might remember that the debris-strewn clay fill around my house is inimical to all plant life and could be used as a herbicide. I had to make my own soil, read a lot, and ask many people how to do it. The task was made more difficult by the self-selection characteristic, but over time I found people who had done a little work and were willing to talk about it. This second article covers what they said.

We'll start out by covering soil for plants in the landscape (that is how most of us see or imagine them), then soil in pots, and finally, for the specialists, soil for seeds and cuttings.

Plants in the Landscape

Biochemistry 101

The first bit of chemistry we apply as gardeners is in reading fertilizer labels. The prominent three numbers in a row stand for Nitrogen (N), Phosphorus (P) and Potassium (K). Make sure to get a soil test, revealing where things stand and what needs to be added. Following is just a review, based on what you've read many times in the books listed at the end:

Nitrogen: Necessary for growth, and a factor in chlorophyll, it is easily leached out in most forms and needs to be replenished yearly. Mulches will release N during decay if they are not very woody, but woody mulches (hardwood sawdust is the worst) will absorb a lot of N while rotting and should be avoided. [Side note: Don

Voss said that a fungus that grows in hardwood mulch may make it impervious to water. Don Hyatt felt that toxic trace elements could build up with its usage, too.] As growth after midsummer risks being lost in freezing weather, N applications are usually safest from late winter to mid-spring. Nutrient uptake seems less efficient in azaleas than in a lot of other plants and this has encouraged people to claim that you should give them little or no N beyond what is in the soil. Since I am holding the floor in this article, I will state my personal opinion, not backed by scientific study. More (than most people give them) is better, and it varies a lot with the type: a fast growing, large-leaved plant needs a lot more than a slow growing, low plant with small leaves. In a perfect world researchers would be studying this and then give us values for the pounds of N used by specific hybrids of specific sizes. In the real world, not in my lifetime. I intend to experiment with my more-is-better theory, but be aware that conventional wisdom is the opposite.

Phosphorus: P is used in the maturing of the plant in general, growth, flower bud initiation, and hardening off. A deficiency may lead to pale flowers and less growth. It is relatively insoluble, so it should be included in the soil mix prior to planting, but can be sprinkled on the top later, if needed. A little granular triple-superphosphate is easily mixed and spread. Since it doesn't leach away easily, it shouldn't be applied yearly, unless deficiency symptoms appear (little new growth, very dark leaves with purple spots underneath).

Potassium: K is also rather insoluble and needn't be added yearly. It is necessary; but, similar to enzymes, it helps the development of much of the plant without actually becoming part of the root and stem structure. K deficiency leads to iron deficiency, which shows up as chlorosis (yellowing of the leaf between the veins). However, calcium and magnesium deficiencies look the same; so, once again, a soil test gives you food for thought.

Soil Mixes

Frank Reger recommends as much humus as possible in your soil mix. Humus is an amorphous conglomerate, clumping irregularly with many air spaces. Water will dis-

solve nutrients from the surrounding humus making them easily available to the roots in those spaces. In contrast, compost still has recognizable bits of debris, making the nutrients less accessible.

As I am writing this, a discussion on the ASA's e-mail list is covering the beneficial fungus mycorrhizae. The argument for this fungus is that azalea roots have no root hairs and that mycorrhizae convert nutrients into a form that is more easily available to azaleas. Galle (p. 318) notes that the fungus actually penetrates the root cells and delivers nutrients directly. Air spaces encourage this fungus, which is more common in older plants and rare in new plantings.

Air spaces are absent in heavy clay soils, and, again on the e-mail list, Tom Hughes has had an excellent tutorial on the use of a calcium clay-breaker such as gypsum. He says that clay particles are thin, flat plates that are covered with negative ions, making them slippery, by repulsion, thus not leaving any air spaces. The calcium replaces the negative ions with positive ones and the particles stick together in larger aggregates (flocculate) thereby leaving the desirable spaces for air and water.

Recommendations of Local Experts

- Don Voss has good soil without amendments, but has mixed fine pine bark with his soil.
- Joe Klimavicz mixes fine pine bark and compost, as deeply as he can go.
- Barbara Bullock recommended digging the planting hole 1 foot deep and filling with 2/3 of the mix as original clay soil, 1/3 "new stuff." The soil surface should be irregular to prevent runoff, and oak leaf compost should top it. She noted that if the improved soil is like a pot, holding water, cut a path from it to good drainage.
- Charles and Wanda Hanner make a mix of good soil and humus with the top of the root ball 2" above the soil, in a tapered mound, then mulch to form a bowl.
- Jane Newman plants with peat moss, ground-up pine trimmings and yellowish, coarse builder's sand, all mixed in with her clay. Ferrous sulfate is dumped, as a powder, near the roots, but she doesn't use fertilizer.
- Bob Stewart maintains one of the more unusual outdoor plantings. He makes large pots from 55-gallon drums, rather than using the ground, to avoid competition from tree roots. He checks underneath them with a lever, on occasion, and cuts any such roots rising up out of the soil and into the single large drainage hole. The mix is 50% fine pine bark, which has aged outside for a year, and 50% local soil with a leaf compost mix. (The wooden bin he uses to compost the pine bark is 4 ft x 4 ft, built of unfastened stacks of 2" x 8" lumber. Thus, it is easy to break down the bin and get at the compost.)

- Milt Lerner builds large beds with 4" of construction sand as a base followed by leaf mould and dirt, tilled to a depth of 2 ft on top of the sand. A large area of his backyard is devoted to the rotting leaf mould, which had been cut up by a lawn mower when the leaves first fell.
- Bruno Kaelin also prefers beds to holes. He lives on a 6:100 slope, which is good for drainage. In areas that are not well sloped, he makes raised beds, or puts the plants on top of the soil, then slopes up the amendments. He uses 2/3 clay soil and 1/3 compost (leaf mould and mown grass, composted for a year or two). Superphosphate is tilled in, and, if he needed potassium he would use Greensand, but he doesn't. His mulch is hardwood chips, not sawdust, refreshed yearly. This is in contrast to the notes above in the "Nitrogen" discussion. He feels that pine fines as mulch would block the air (they are good in the soil mix, though). A 1-1/2- to 2-foot saucer of soil is made to divert water toward the plant. Wesco granular azalea fertilizer is spread every year, using a scoop, from plant base to drip line. He believes that azaleas like a pH of 5.0-6.0, whereas rhododendrons prefer 4.0-5.0. If needed he would put ferrous sulfate on top of the soil to acidify it.

Personal Recommendations

So, after listening to the above, truly experts all, and others (whose notes I couldn't find...sorry...), I've come down to the following for my own attempts. My land is very flat, so raised beds are necessary to encourage good drainage and keep open the crucial air spaces. I dig down about 4", and from there, build a bed which is about 2" above ground level at the lowest, southeastern end, and raise it up about 1-1/2 feet on the northwestern end. This tilts the plants toward the morning light and helps shield the roots from the cold winter winds, which come from the northwest and west.

As for the soil mix, I have three:

1. The quickest, easiest and probably **lowest quality mix** is a 50-50 mix of a bag of pine bark and a bag of topsoil, with amendments of 2 shovelfuls of commercial organic humus, 1 shovelful of Perlite[®], 2 tablespoons of Epsom salts, 3 crushed tablets of pond-plant fertilizer (slow release), a light sprinkling of triple superphosphate, and a light sprinkling of garden sulfur. This is a quick mix for when I just received a lot of plants and want to put them in some kind of soil, but don't have the time to make the two higher-quality mixes below. This mix is put directly on top of the soil in a raised bed. Plants in this for about two years have refused to die.
2. This **middle-quality soil mix** takes about twice as long to mix as the first. It is about 1/2 native clay, crushed with a shovel to nearly a powder and then mixed 50-50 with a bag of commercial organic humus. This makes about 2 cubic feet. One shovelful of Perlite[®] is thrown on, about

1 cup of gypsum clay-breaker is put on the clay, and Epsom salts, fertilizer, sulfur, and phosphate are added, as above. This is mixed thoroughly and spread on top of the ground as a raised bed. Having done this for several years, I am surprised to note that the plants are very happy with it and grow as well as in the next, high quality mix, which takes a *lot* longer to make.

3. The **high-quality soil mix** forms the top 8" or 9" of the raised, tilted beds described earlier. The base of these beds is a 50-50 mix of native clay and bagged organic humus with no further amendments, filling the bottom and tilted up in the shape described. The high quality top starts as 1/3 powdered clay, 2/3 oak leaf humus-compost mix. If the clay is too wet, it can't be worked well and this job is put off for another weekend. The humus-compost mix is cleaned by hand to remove woody bits and undigested leaves (and rocks, toy soldiers, etc. Since this composting takes years in the pile, my son no longer has an interest in such discoveries). Amendments are similar to the above: 2 shovelfuls of commercial humus, gypsum, Epsom salts, fertilizer, sulfur, and phosphate. This is mixed to a smooth consistency and makes about 1-1/2 cubic feet (taking about 1 hour). This slow accretion of quality soil limits my ability to add plants, but Dave Nanney notes, with a wink, that this is a good thing, as I can give closer attention to each one. I'm so lucky not to be "burdened" with thousands of plants as he is! Anyway, the plants are not growing any better in this high-quality soil mix than in the middle-quality, which I can make more of in less time. If that remains the case after a few more years, I'll probably move to some version of the middle quality soil mix.

Soil for Pots

When our little ones aren't ready for the "Big Time" and need to stay in pots, there are again interesting varieties of materials and methods, though these are more similar than are the previous landscape methods. My experts offered the following advice.

Larger Pots

- Larry Martin uses a mixture of three items: a) 1/3 topsoil with sand, b) 1/3 very fine pine bark, and c) a 50-50 mix of Perlite[®] and sphagnum peat moss. This sits through the winter in the open, and is ready for use in the next year.
- Don Hyatt makes an even more complex mix: 4 to 6 cubic feet of peat moss, 4 cubic feet of Perlite[®] and 3 to 4 80-pound bags of coarse sand (currently Sakrete[®] brand). He avoids play sand or sand that might be high in salt or calcium. The above is 2/3 of the mix; the other 1/3 is composed of composted pine fines and composted oak leaves (that have been chopped up with a lawn mower).

- Bruno Kaelin puts 1/3 coarse peat, 1/3 coarse Perlite[®] and 1/3 pine fines in his pots.
- Don Voss uses 1/3 each of pine bark, Perlite[®], and sand, with 1/2" of coarse pine bark in the bottom.
- Bill Miller uses fine pine bark, peat moss, and sand or Perlite[®].
- Bob Stewart uses the same mix listed in the Landscape section above for his gallon pots.
- Joe Klimavicz's mixture is 1/2 sphagnum moss and 1/2 a combination of 2-year-old leaf compost and fine garden soil.

Smaller Pots

Slight differences may appear when using small plants and cuttings in 4-inch pots.

- Bob Stewart will put in 50-80% fine peat moss with the rest being Perlite[®].
- Don Hyatt will use the mix that makes up the first 2/3 of his potting mixture, as shown above, alone.
- Milt Lerner uses 1/2 pine bark, 1/2 half Perlite[®]. If he used sphagnum moss, it would only be the coarse type, which is hard to find. He has noted that a pH below 5.5 has killed his cuttings, so the acidity should be checked.
- Mike Creel, in the South Carolina midlands, sent me some extensive notes on a very unique and creative method of rooting cuttings and starting seeds outdoors, but the details are beyond the limits of this review. In essence, two different and fast-draining layers together half-fill a pot, which is then mostly covered by a clear plastic humidity dome. The diameter of the dome is smaller than that of the pot to allow for overhead watering. The lower mixture is made of coarser materials than the one above, both having a large component of pebbles. A very thin layer of azalea humus, which he collects from underneath his older plants, tops this. An interesting feature of his cuttings (unrelated to soils, but I'd like to pass it on anyway) is the use of branched cuttings, rather than single sticks, which are taken from low on the plant.

Growing From Seed

If you have the time, temperament, and facilities to grow plants from seeds, consider the following recommendations.

- Bob Stewart uses only sterilized, coarse sphagnum peat moss.
- Joe Klimavicz uses 25% Perlite[®] and 75% fine sphagnum peat moss. He finds the coarse peat hard to work with when separating seedling roots.
- Finally, nothing lasts forever on the Web, but Don Hyatt does have a link to his extensive instructions on

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“Raising Rhododendrons and Azaleas From Seed,” as well as other links to valuable information about cuttings, at <http://www.donaldhyatt.com/garden.html>

Conclusion

And the truth is... that all of the methods mentioned above are perfectly good ways of handling azaleas, which have shown a tolerance for a wide variety of conditions centered

around some common themes. Which of the combinations will be the best for you might depend on your microclimate, lighting conditions, local pests, or even air quality! Experiment with the above, and your own variations. Someday we will all know exactly what to do in every situation for every variety. Someday...

References

1. Galle, Fred C. 1987. *Azaleas*. Timber Press. P. 323ff.

2. Reiley, H. Edward. 1992. *Success With Rhododendrons and Azaleas*. Timber Press. P. 109ff.

Barry Sperling taught mathematics and computer science in Fairfax County for 31 years. He retired in June of 1999. He has since worked as a programmer, and is spending time learning about and disseminating knowledge on the azalea e-mail list and the ASA Web site. He is the current president of the Northern Virginia Chapter.

Azalea Survey

William C. Miller III — Bethesda, Maryland

Dear Azalea Enthusiasts:

From time to time, people ask me which azaleas they should buy. The people are usually from everywhere but here (Bethesda, Maryland), and they are really asking which azaleas will perform for them in Chicago, Quebec, Dodge City, Key West, Bogotá, Dover, and the like. It is not an easy question to answer because I have no experience in growing azaleas anywhere but in Bethesda, Maryland, and there are so many variables to consider—but I do my best to develop a reasonable response.

I conducted a modest survey in 1984 that was published in the June 1985 issue of *The Azalean*. The article was entitled “A Survey of Favorite Azaleas” and reported the responses of a small but representative

sample of ASA members selected for their expertise and location. They were asked to supply responses to a series of categories like: “Favorite Red,” “Favorite Foliage,” “Favorite Glenn Dale,” “Favorite Satsuki,” “Favorite Yellow Native,” “Most Heat-hardy Deciduous,” and “Most Unusual Evergreen Azalea.” Recent events suggest that it might be useful to launch a new survey.

Please take the time to thoughtfully complete both sides of the survey (using the copy that is reproduced on the inside covers of the wrapped stapled to this issue of *The Azalean*) and send the survey instrument back to me at your earliest convenience. Don't be concerned if you are unable to fill every category. Just do the best that you can. There are no wrong answers unless you tell me that a Gable

cultivar is your favorite Glenn Dale hybrid..... or ‘Windsor Buttercup’ is your favorite Exbury. If you are unsure of the classification, check with Lee, Galle, or a comparable reference.

While I'm asking for your name, address (including county), and phone number (for clarification purposes and for subsequent data analysis), your response will be confidential in the summary of results that will be published in a future issue of *The Azalean*.

Thank you.

Bill Miller
7613 Quintana Court
Bethesda, MD 20817
(301) 365-0692
bill@theazaleaworks.com

Azalea Survey

Please fill out this survey and send it to: Bill Miller, 7613 Quintana Court, Bethesda, MD 20817

Name: _____ Address: _____
Street, City, State, Zip

Phone: _____

Please list your favorite azalea in each category. Survey continues on next page.

Part 1: Evergreen Hybrids

Red	Bordered	Loblolly Bay
Pink	Foliage	Marlbank Farm
Purple	Early Bloomer	Belgian Indian
White	Mid Bloomer	Mayo
Striped, Flaked, or Sectored	Late Bloomer	Brooks
	Fall Bloomer	Monrovia