

Color Perception in the Garden

by Glen Williams

Nearly two years ago the subject of color identification in hosta leaves, petioles and flowers went through the robin like a tornado. Facts were argued, lines were drawn in the sand, opinions were rife. Steve Chamberlain and Frank Nykos did excellent pros and cons articles for *The Hosta Journal*. I became involved because I was particularly interested in color, had some competency, and was looking for a long term project that I might share with the hosta community. As I look back, I think I was/am trying to prove that my last seat placement in science classes was only a matter of the first letter of my last name and not related to my incredible lack of competence. A quixotic quest to say the least.

The basic idea was simple. Make a color chart by which colors in hostas could be judged and compared. This simple start evolved into the following possible goals:

1. Standardize color descriptions of various parts of the hosta so that these descriptions could be used in registration.
2. Facilitate catalogue color descriptions so the buyer will know what he is getting.
3. Prepare a database of existing colors so that research into the color of hostas can examine the effect that zones, soil composition, additives have and can be explored more readily.

I was drawn to this project because of my background (teaching art) and, I must admit, also because a number of people said that it was an impossible task because of the sheer variety of colors, subtle distinctions, the number of variables, and why did we need it? What more stimulus does a child need than to be told that he can't, shouldn't, and will be wasting his time.

This summer I recorded 110 leaf color evaluations between June and October. I used the RHS Colour Chart to do this. More about this later. I am going to present this information in three parts. The first is this introduction. The second part is about color perception, color reality, and what affects how we process color in our minds. The final part will be a description of the procedure I used, some of the results of color evaluation of hosta leaves, and some of the things which I think are interesting with my preliminary results.

Just to be provocative I would suggest that most of what you know about color is wrong. That in attempting to match one color with another you are invariably using the wrong method. And finally that our response to color is both through nature and by nurture thereby making the business of perception and conception that much more difficult.

Color Perception, Reality, and Mythology

Color is not what you may think it is. A color is not likely to be what you remember it as. What you see is not what you get. And just to give you an idea of the nature of color comprehension, try and imagine a new color, a new wave length that will suddenly register through our optic nerves. If you can, give it a name and patent it! Then try and explain what that color is to another person. After this is completed sign up for the Nobel Prize in communication and buy a bumper sticker proclaiming you have experienced the first human version of the Vulcan Mind Meld.

If you hear the first four chords of Beethoven's *Fifth Symphony* you will no doubt recognize it and would probably be able to repeat it so that another could recognize it. If you are able to read music and read a simple melody you may be able to hear it in your head. Another person with the same capacity would hear the same melody. A test could be made to validate this. Simple. No Wagner allowed!

With color perception neither of these acts can be accomplished with any degree of certitude. When you

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read about a gold-leafed hosta, 50 people reading that sentence may well visualize a different gold. If you attend a cut leaf show and see a wondrous leaf of *H. 'Sum and Substance'* how can you know that you are all seeing the same color? Leaving that leaf behind and having memorized the color, could you pick that color out a day later from a series of color swatches? Don't bet the farm or your clump of *H. 'William Lachman'* on it.

In looking at a color each person will receive the same projection on the retina, but no one can be sure that each person has the same perception.

Color is the most relative medium in the visual arts. It continually deceives. A single color evokes many readings. These three statements are taken from the work of Joseph Albers just as a number of the other ideas in this posting are. In terms of how gardeners need to understand color, Albers ideas are very pertinent.

We are almost never able to see isolated color in the garden. A color exists in a context of many other colors. This is a critical factor in understanding what we think we see. **COLORS ALL INTERACT WITH ONE ANOTHER.** Let me give you a couple of simple examples. Suppose you have a yellow hosta leaf with a green edge and a green hosta leaf with a yellow edge. Suppose that the two greens and two yellows are identical. In looking at each of the leaves neither the greens nor the yellows will appear to be the same. You will appear to have four different colors rather than two. To make this a little clearer, picture a yellow rectangle of paper with a green dot in the middle. Now reverse the colors. You can probably sense that because of the amount of color interacting with that of another, that the dots and the rectangles of color will appear distinct from a situation where a single color could be isolated.

Let me end this part of the article with something very easy to visualize. In attempting to match color swatches of paint in your house consider the following. Take your swatches from the paint store and use a paper punch to cut a hole in the middle of each swatch. Now place this swatch over what you are trying to match. By containing the color that you want to match to a small circle, and then surrounding that circle with what you hope will match it, you will be able to see immediately whether or not it is a correct match. This method is so much surer than placing the swatch next to, or in a much bigger field, that it is almost laughable. The swatch is swallowed by the big field and may well interact to the detriment of making a like choice. By reversing this and using the dot, comparison is immediate and clear. I just realized I said that was going to be a simple explanation. Time will tell. Trying it is better.

I have written about this method for evaluating color because it is the method which is employed in the Royal Horticultural Society Colour Chart. It is the one which I used to evaluate the color of the hosta leaves this last summer. I guess this is more than enough for part 2 of this effort. In fact it means there will be at least 4 parts. Perhaps if I work some sex and violence into it.....

(Paragraph inserted from comments made by Glen in a robin post) Another aspect of color perception in hostas depends on the surface of the leaf. I find the surface of *H. 'Lakeside Black Satin'* to be unique in the hosta world. Setting aside the dark green coloration there is what can only be described as a tiny granular surface to the leaf of this hosta that plays a major role in our perception of its color. It reflects light in a way that I have not found in any other hosta leaf. To say it simply has a satin surface is certainly half right.

Color

If you are aware of the paintings of Claude Monet the Impressionist, you may find an excellent illustration for the perception of color, based on the time of day. Monet painted a series of haystacks at different hours during the day. In looking at this series (or any of Monet's work) it becomes apparent how critical the hour of garden viewing is. Shadows, the angle of sunlight, the atmosphere itself, and the distance between you and what you are viewing, all play a critical role in our color perception.

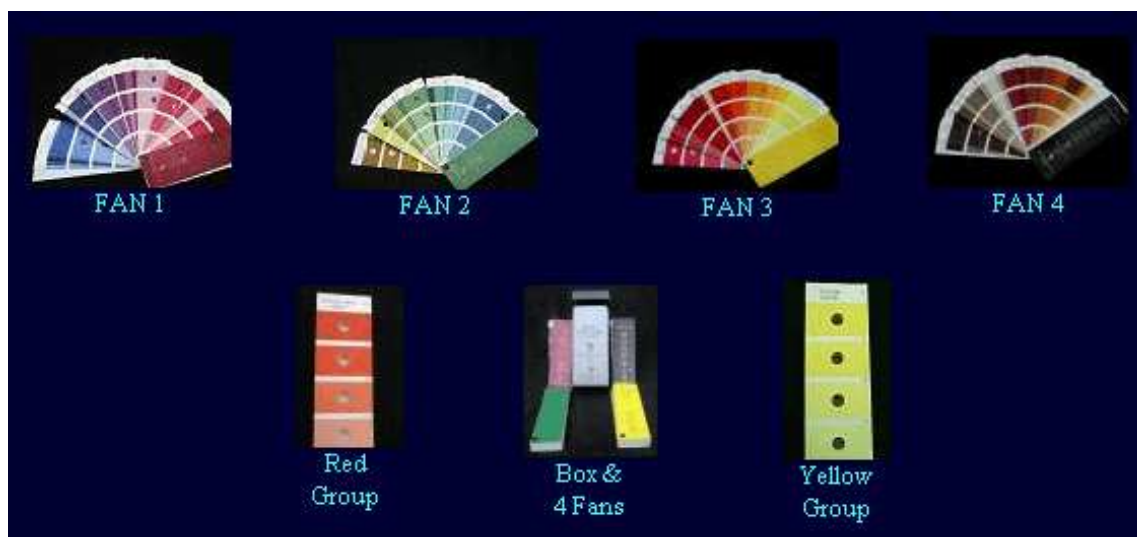
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Monet's granular or impressionistic painting technique also illustrates how our visual sense can "mix" colors at certain distances to create a blur, or an impression of a color which may not be there if examined more closely.

The famous landscape photographer Ansel Adams said that between black and white there were ten values of gray which the human eye can distinguish. In his best photographs you can see an illustration of these ten values and the photos are that much richer because of these subtle distinctions of value. This same capacity to distinguish values plays a special part in appreciating hostas and the color value change which can appear seasonally, or may result from shade/sun placement of the plant. Just think about *H. 'Gold Standard'*-- it is at least five different plants depending on where you place it. A Best Buy.

There is of course a psychological component to color as well as a cultural one. I will stay away from this territory except to suggest that it plays a major role in naming hostas and our role in responding to them.

I referred to a way of evaluating color in a prior posting. The Royal Horticultural Society publishes a color chart which is amazingly comprehensive. It was primarily designed to evaluate the colors of flowers but has a lot of potential for evaluating leaves too. The color chart consists of a set of fans. Each card in the fan has 4 light to dark values of a hue. In each of these there is a central hole. This hole is



placed over the object that you want to evaluate for color. Ideally this is done in a north window or with specific indoor lighting. Identification is difficult to the extent that there are hundreds of colors and if you don't have a basic idea of what you are looking for it could be a lengthy process. This is the method I used this last summer to start my color work.

There is a similar device which has been used by painters for a long time to help them to see isolated color. It is called a spot screen. One uses a small gray card with a hole in the middle. This is held up between your eye and the object you want to examine. You isolate the area where you need to identify the color through the small hole. You then try and match that color by mixing paints. This mixture is placed on a palette knife and held over half of the hole from behind. Once again the isolation and comparison technique allows for easy identification.

Despite the fact that I have only words to work with, I hope I can convince you that while seeing color is complex that evaluating it accurately is not necessarily an onerous task. I have asked you to visualize a lot though, when a simple picture would make it a lot easier. But there is no scanner on Santa's list.

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While learning to see color more clearly, through understanding how easily we can be deceived, is not an unreasonable goal, it is probably comparable to learning to play Malagueña on the accordion. It will not get you invited to the best parties. What has struck me, in my humble role as voyeur at the feast of botanical science, is why the color of the hosta leaf (one of its biggest draws) is left to the world of anecdotes and poetic excursions. I would posit the following:

1. Our own capacity for color deception becomes a self-fulfilling prophecy when it comes to the study of the color of hosta leaves. Too hard. Too many variables. Too many different colors. Too bad. And too many bad colored photos of hostas.
2. Because it is a leaf and not a flower we are not drawn to documentation as we are in the case of any number of precociously colored flowers.

If you have gotten this far you have my admiration. If not, you will never know. The final part will consist of some data, some speculation, and some wild-eyed suggestions which have grown from this last summer's work.

Conclusions

From June of this year through this October I recorded the color of 104 different hosta cultivars. This series of evaluations included 72 green (some with colored margins), 18 "blue", 10 gold/yellow, and six heavily variegated hostas. This had not been the original plan.

Originally I had planned to record information on only 20 different hostas in a much more thorough fashion. I was going to include soil tests, watering and fertilization programs, flower and petioles evaluation, clump maturity, shade and sunlight factors, and 4 timed evaluations through out the growing season for each of these plants. Didn't happen.

Once I started evaluating the leaves I realized I wanted to start with a large number of green leaves first until I got the hang of the color fan and the lighting circumstances. I was finding very little variation and wanted to continue to see what would happen. I stayed away from the blues and the yellow greens intentionally.

In finally evaluating the blues I was interested to see if I could get a match that would deal with the subtle quality of the bloom (wax) on the leaf. I was also interested in seeing if information on the relative blueness of Eric Smith's plants held up to the kind of evaluation that I was doing.

As I worked I discovered that removing the bloom and taking two readings made a lot more sense. Also part way through the summer I decided I should evaluate the color on the backside of the leaf too.

I did a few hostas at the original four different times to check for seasonal changes but not enough to really count. I chose not to do many highly patterned hostas as they seemed to call for a strategy which I have yet to develop. Schmid talks about color percentages on the leaf, but still....

Of all of the hostas which I evaluated for color the golds/yellows were by far the most difficult to match. But I have only done about ten so that may be premature.

Before anyone attacks my methods I do apologize. I certainly want to add major cautionary warnings about my ideas and methods as well as the limitations of my observations. Mine is only one garden in one zone. One set of eyes, built-in biases, shade and light conditions which are certainly variable, as well as its endless. But more importantly it is a start. Next year I will do a little better and will at least get 4 seasonal readings of all of the hostas I have evaluated so far. I welcome any advice or strategy. I do not mind serious criticism as long as it is directed at others.

So here goes. These are some of my very tentative thoughts which grew from this summer's work.

1. Translucency seems to be a significant factor in true hosta color.

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2. The color beneath the bloom is certainly a clear factor in true hosta color, but so is the thickness of the bloom.
3. There is really a very small true color hosta palette while the garden perception palette is very large.
4. I have found only two different greens (not getting into the yellow/greens) and these have a small range of different values of the specific hue. Both *H.* 'Sea Ebony' and *H.* 'Lakeside Black Satin' go off the chart but are included in these greens.
5. Surface texture and gloss, satin and matte surfaces play a major role in general garden perception of hosta color.
6. I feel that the existing color evaluation of Eric Smith's hostas is a matter of general perception in the garden and not based on a specific color reference point.
7. The translucent quality of the edges and interiors of some hostas makes for a very difficult color evaluation.
8. In 14 cases I found that the color of the Celadon streaking matched the same color swatch. I only did 14 which had the streaking so once again it is a limited observation, but does point in a direction.
9. Time and again matches and mismatches in ordinary garden observation proved to be unlike the color when it was evaluated according to the procedure.

This list of nine things was winnowed down from 30. Many of the others were the product of a very active imagination.

I must say that I see myself continuing this program for several years. The current data and speculation is subject to my science failings which were first acknowledged by Madeline Lillicrap, my 7th grade science teacher. Her real name I might add. Please take them as points of discussion, debate, or deletion. But not real science. Yet.

