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SEMBS

southeast michigan bromeliad society

march - april 2019


HAPPY MOTHER'S
DAY / 2019

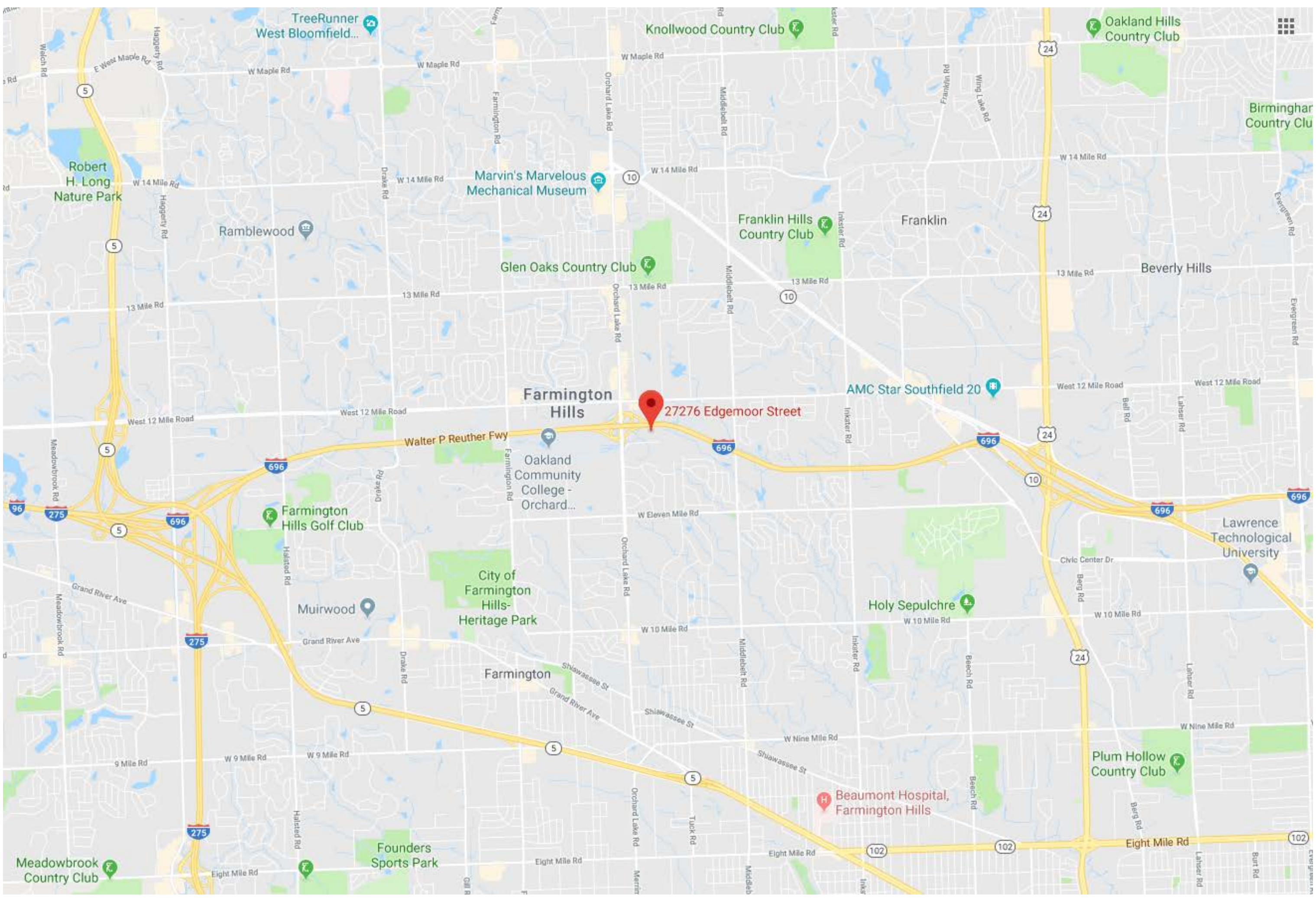
Forsooth—the MAY MEETING is upon us!

SEMBS will convene at **2 p.m. next Saturday, May 18th** at at the home of Paul and Karen Wingert.

The opportunity to peruse Paul's shadehouse affords one access to what is certainly the premier collection of bromeliads in the state. Come witness the plants' incipient seasonal vigor as they become established in their summer home, see interesting new arrivals fresh from exotic tropical climes, and learn what new hybrids are in the works in Wingert's laboratory!

...and, of course, plants from the Spring order will be distributed! **Even if you didn't place an order... plenty of Tillandsias and grower's choice plants will be available for purchase!**

27276 Edgemoor St., Farmington Hills, MI 48334



On Lighting...

Michigan growers—even those with the luxury of a greenhouse—often rely on artificial light to provide sufficient conditions for growing most tropical plants. Yet the myriad types and sizes of fixtures and bulbs can seem overwhelming: *how much light do I need? Should I look at HID or LED? What "spectrum" is best?*

Here I'll try to—apologies—shed some light on the answers to these questions. Though some discussion of electrical systems, physics and plant physiology is necessary, I will strive to keep it mercifully short...

Lighting has come along way from the first tungsten filament incandescent light bulbs. The warm, amber glow of a tungsten filament is great for, say, perusing a leather-bound volume in one's wainscoted library, as it complements nicely mahogany furniture and the acrid smell of pipe tobacco; yet it is functionally useless for growing plants, not to mention tremendously inefficient (incandescence refers to the light emitting from a hot object; in the case of an electrified filament, most of the energy is lost as heat).

Yet in striving to make an educated lighting choice that's best for a particular grower given his or her unique circumstances (space, power, budget, &c.), some metric is needed whereby different lights can be compared. In common "consumer parlance," many different variables, descriptors and measurements get inadvertently elided, conflated or misinterpreted. Without—apologies—getting too deep into the weeds, the following information has been compiled to aid the horticulturist in parsing the specifications and nomenclature of commonly available lighting.

"What does it all mean, Basil?"

Relevant metrics for light and electricity (and what they mean…)

For most other domestic applications, human perception of light is the important factor that will determine the best (or preferred) light for a given situation. When choosing the appropriate fixture and bulb(s), one wants to know: How efficient is it? How bright is it? How does it look (color cast/quality)? It is to this end that the listed specifications of wattage, lumens and color temperature are relevant, respectively.

Wattage, a measure of power used, is most useful in evaluating the operating cost (utilities charge by the kilowatt-hour, i.e. kW used per hour) and comparing bulbs of the same kind (e.g. fluorescent, incandescent, LED, &c.) against one another, though it can also be illustrative of the difference in efficiency between bulbs: LEDs, for instance, will often also be listed as "(x) watt equivalent," i.e. being approximately as bright as a fluorescent bulb of (x) watts while only using (y) watts.

Yet brightness is not in itself sufficient to consider lighting vis-à-vis optimal plant growth. Brightness is described in *lumens*, a means for quantifying the visible amount of light emitting from a source (the bulb, in this case). The operative word here is visible; just because a light appears brighter to the human eye does not mean it is better for plant growth.

“On the spectrum”

I suspect the very mention of the word *frequencies* (measured in nanometers/second) is enough to give the physics- and math-averse a tinge of panic; yet it need not. We’re all familiar with infrared (think night-vision, heat-sensitive cameras) and ultraviolet light (think tanning beds); these constitute the lower and upper bounds of the visible light spectrum, respectively. Just on the “visible side” of these frequencies are red and blue light, which are the primary spectra used by chlorophyll to photosynthesize. This means that they absorb these wavelengths (light at these frequencies) and reflect the rest, i.e. absorb most red and blue light, and reflect green (and is indeed why most plants appear primarily green).

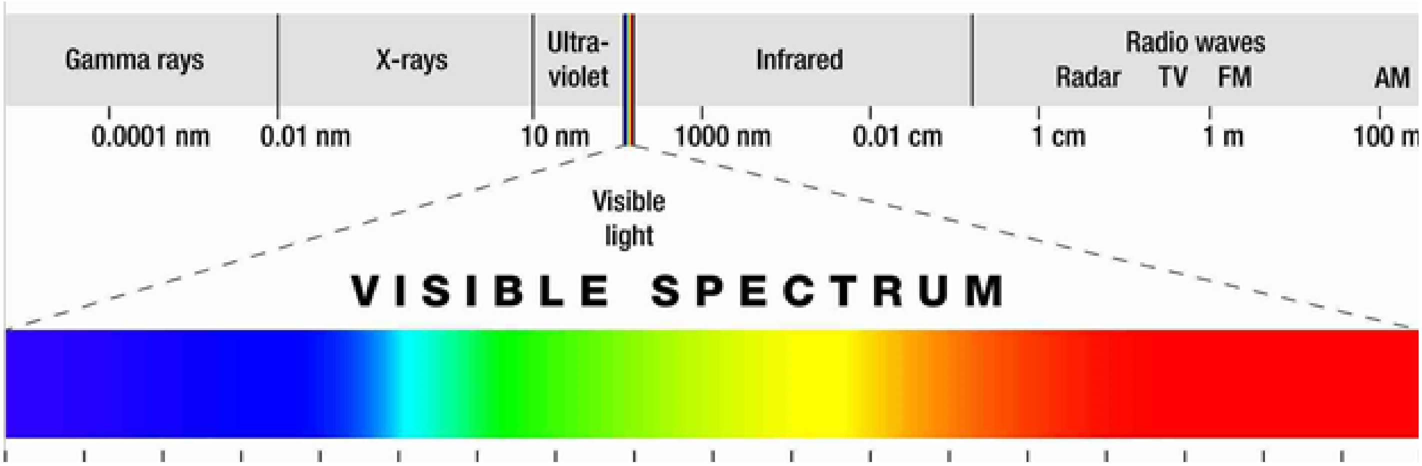
As it happens, human vision is strongly “green-biased,” i.e. peak sensitivity is in the middle of the visible spectrum (around 550nm, or what appears bright green--see graphic on following page). As such, much is made of the fact that lights designed to illuminate our homes, offices, streets, etc. are producing mostly light that is “of no use” to plants; this is in a sense not inaccurate, but crucially omits a host of other considerations.

“Go on with the Bore-ophyll”

Some sciencey stuff about light, electricity and plant physiology

Most people know that different photosynthetic pigments in plants (chlorophylls A and B being the most salient) use light to create food. Yet not any “light” will do; each can only use certain frequencies of spectral radiation—certain colors of light, say—as an input to do this.

Plants contain a host of other pigments that can also photosynthesize; anthocyanin, for instance, uses primarily green light—read: radiation from the middle of the visible spectrum—to produce energy. As such, it absorbs green light and reflects the rest, and thus appears blue, red, pink, or purple. Its presence is especially evident in many bromeliads we grow primarily for their vibrant foliage. We can infer that the lighting requirements of these plants might differ substantially from those with green foliage, and thus may benefit from the use of “highly green” lights (and indeed be negatively affected by its systematic exclusion with red and blue LEDs, for instance).



Conclusions…

So if not Lux, Lumens, Watts—what should we use? In Part II, we'll look at Photosynthetically Available Radiation, or PAR—what it means, why it's useful, and how it can be understood in the context of the measurements discussed earlier to facilitate selection of the best light to meet one's particular criteria as a grower…