

Hershey D.R. 2002. Plant blindness: "we have met the enemy and he is us". *Plant Science Bulletin* 48(3): 78-85. Disponível em: <<http://www.botany.org/bsa/psb/2002/psb48-3.html>>. Acesso em 21.03.2011.

The article on "Plant Blindness" by Wandersee and Schussler in volume 47 (1) of *Plant Science Bulletin* struck a chord with many readers. I continue to receive positive comments about the article and it was frequently mentioned at the Education Forum that preceded the Botany 2002 meeting in Madison. Although the article was directed primarily to those of us who teach, it also had wider interest and applicability. One could speculate, for instance, on the degree to which plant blindness afflicts our elected representatives and decision makers at funding agencies. To my eyes we clearly have a problem!

In this issue's lead article, David Hershey provides some additional insight into the problem of "seeing" plants. David suggests that some additional related factors may be at least as important as "Plant Blindness" and makes some suggestions for things we can do as individuals to address the problem. More importantly, he has several suggestions for Society activities that could make a dramatic and positive impact on the public - Executive committee take note! Wouldn't it be fun, for instance, to periodically see Michael Christensen on the Jay Leno show "talking plants" with an exotic plant or two to show the audience or to hear Karl Niklas "talking plants" as a regular feature on "All Things Considered?" David may be correct in paraphrasing Pogo - - "We have met the enemy and he is us." However, we are also the ones that can do something about it. Lets get started!

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editor

Plant Blindness: "We Have Met the Enemy and He is Us"

Wandersee and Schussler (1999, 2001) coined the term "plant blindness" to describe the widespread lack of awareness of plants and neglect of plants both in biology education and in the general population. This seems a very useful term to focus attention on those problems. It is well established that "plants are the most important, least understood, and most taken-for-granted of all living things" (Wilkins 1988).

However, Wandersee and Schussler (2001) have also hypothesized that plant blindness can also be taken almost literally as a human "default condition" due to limitations in human visual perception of plants. To avoid confusion, I will use the first definition of plant blindness in this article. Wandersee and Schussler (2001) make many interesting points in their discussion of visual principles relating to plant blindness, however, they do not eliminate plant neglect and zoochauvinism as causes of plant blindness.

Case for Visual Perception Causing Plant Blindness

The literature cited by Wandersee and Schussler (2001) on the limits to human visual perception apparently contains no specific experiments on human perception of plants. Zoochauvinism, plant neglect, and other causes of plant blindness have substantial concrete evidence to support them. Wandersee and Schussler (2001) present a very circumstantial case for a visual perception limitation as the main cause of plant blindness. Much of their evidence could also be used to support zoochauvinism and plant neglect as important reasons for plant blindness.

While the conclusion that people typically know less about plants than animals seems reasonable, it could be caused solely by plant neglect and zoochauvinism. It is not necessarily related to the figure that under 2.5% of the U.S. population is directly involved in raising farm crops. The percentage of

the population involved in raising farm animals is probably not that far from 2.5%. The 2.5% figure may be misleading because it probably does not include people who process and sell farm crops; those who produce and sell flowers, turfgrass, nursery plants, bulbs, forest tree seedlings and gardening supplies; those who build and maintain landscapes, parks, arboreta, botanic gardens and golf courses; those who garden outdoors or indoors, those who make and sell fertilizers, pesticides, and other plant chemicals, etc.

Has there ever been a nationwide survey or test comparing student knowledge of plants versus animals? I have frequently heard of national tests of student knowledge in math, science, geography and history. Those reports usually seem to conclude that the majority of students are sadly deficient in the particular subject examined. It would be interesting to test the botanical literacy of biology teachers as well as students.

The argument that plants are nondescript when not in bloom ignores the fact that plants change dramatically with the seasons, more dramatically than animals in most cases. In the northern U.S., there is a nearly continuous change with the seasons starting with a burst of new plant growth in spring which is noticeable because of the new leaves on deciduous trees and the light green or sometimes red-tinted new leaves on evergreens. New leaf growth is accompanied and followed by a succession of blooming and fruiting from bulbs, trees, shrubs, vines, herbaceous perennials, bedding plants, weeds and wildflowers until frost. Then there are spectacular fall leaf colors followed in winter with deciduous tree and shrub branch silhouettes, colorful "berries" or intriguingly-shaped fruits, and textured or colored barks. Plant breeders have achieved nearly continuous blooming of many bedding plants so there is much less of a problem of plants being nondescript when out of bloom. Unlike animals, plants often possess pleasant fragrances.

The argument that people who have had few meaningful experiences with plants may pay little attention to plants seems reasonable but it could just be caused by plant neglect or zoochauvinism because the person never had a plant mentor.

The observation that although people see a lot of pennies during their lifetimes they cannot draw an accurate picture of a penny is not directly relevant to the situation with plants. To determine if students have a default visual limitation that prevents them from accurately drawing plants, but not animals, would require experimentation. For example, students could be given a lesson which focused equally on a plant and an animal, such as a bird nesting in a saguaro cactus or an ant and its myrmecophyte. Students would then be asked after the lesson to draw the plant and the animal. If they could accurately draw the animal but not the plant, then that might be evidence of a visual limitation specific to plants.

Preference Versus Interest in Plants

There are a few limited studies that indicate a majority of students prefer to study plants rather than animals. The largest study appears to be Wandersee and Schussler's unpublished survey of 274 grade four to seven students in one city which indicated that students preferred to study animals compared to plants by a "nearly" 2:1 margin (Wandersee and Schussler 2001). Considering how plants are virtually absent or in the background on most children's TV shows, cartoons, movies, books, and toys, having only two-thirds of students preferring to study animals over plants is surprisingly low.

One weakness of such surveys is that there has apparently been no attempt to determine if a preference for animals over plants is a default condition or a learned condition due to zoochauvinism or plant neglect in the school curriculum and media. Were any of the

teachers of the surveyed students good plant mentors or were they too suffering from plant blindness?

Another important consideration is that a student preference for animals does not necessarily mean they have no interest in plants, nor do student preferences even seem that important in biology teaching. Biology curricula should not be determined by the preferences of the students but by what is important for students to know about biology. Many students object to animal dissections and teaching of evolution but biology teachers have strongly opposed changes in those areas. Thus, how significant to the case for plant blindness are surveys that say students tend to prefer animals over plants as objects of study?

In contrast to the student preference surveys is substantial evidence that many people are interested in plants. Plant curricula on Wisconsin Fast Plants, C-Fern, and gardening have proven popular with students. Gardening has often been named the top leisure activity in Gallup polls, and gardening is a huge, tens-of-billions of dollars per year business. There are thousands of gardening books in print. Cut flowers, flowering container plants, and other plant materials are standard gifts, symbols, and decorations for almost all occasions including holidays, birthdays, weddings, and funerals. There are hundreds of arboreta and botanical gardens, and many are popular tourist attractions. Each spring there are major flower and garden shows that draw large crowds. There are hundreds of gardening and plant-specific organizations plus thousands of local gardening clubs. The most visited exhibit at Walt Disney's EPCOT Center has often been the hydroponics display in The Land Pavilion. The flowering of the Washington, D.C. cherry trees is a major cultural event, as are similar festivals for blossoms of apple, peach, azalea, tulip, etc. in other areas. The fabulous flower-covered floats in the annual Rose Parade attract tens-of-millions of viewers each year. Excursions to see fall leaf colors are very popular. Wildflowers and other plants, such as redwoods and giant sequoia are big draws in parks. Each state celebrates Arbor Day, and trees are often planted as memorials. Every state has a state flower and state tree. There is a national flower and a campaign for a national tree. There is significant interest in champion trees (Jorgenson 1992), heritage trees (Meyer 2001) and exceptionally old trees (Lewington and Parker 1999). Plants are important elements in art, architecture, fashion and interior design. Two of the world's most expensive paintings are van Gogh's "Irises" and "Sunflowers." Plants are one of the most common themes on postage stamps.

Plant Mentors

It does seem very reasonable that having a plant mentor may be a key factor in preventing or overcoming plant blindness by nurturing an interest in plants (Wandersee and Schussler 2001). However, the effectiveness of plant mentors is not direct evidence for a visual perception limitation causing plant blindness. Plant mentors could simply spark an interest in plants, thereby overcoming plant neglect or zoochauvinism.

I can personally add to the anecdotal evidence to support the value of plant mentors. When I was a child my mother and aunt encouraged me to grow plants on the windowsill. I still have a now forty year old grapefruit tree grown from a seed when I was a child. I remember being fascinated by the common philodendron my aunt grew in clear glass jars filled just with colorful glass marbles and water. Other positive experiences I remember were growing cotton and a sweet potato vine indoors, backyard gardening, making a weed collection in a high school biology class, and visiting Longwood Gardens. I remember being impressed by some of the plant activities described by Chesnow (1987). I also remember how boring a high school assignment on photosynthesis was because it involved no experimentation, but just looking up the answers to questions in the library.

Some examples of good plant mentoring would include the Wisconsin Fast Plants (Williams 1989) and C-fern (Renzaglia et al. 1995) curricula, Wandersee and Schussler's (2001) plant blindness poster, and "The Plant Lady", who visits 3rd and 4th grade classes to teach about plants (Rohrbaugh 1997). Other innovative examples of plant mentoring are Winterthur Gardens "Enchanted Woods" children's garden (www.winterthur.org/Enchanted/enchanted.description.htm) in Winterthur, Delaware and the May 11, 2002, Mini Page "A Kid's Guide to Flowers" which appeared in many of the nation's newspapers.

A unique example of plant mentoring is found at Bonfante Gardens (www.bonfantegardens.com), a plant-themed amusement park in Gilroy, California which includes 25 of the world famous grafted "circus trees" created by Axel Erlandson beginning in the 1920s. The park opened on June 2001 and features gardens, a large greenhouse, educational exhibits and plant-themed rides, such as Garlic Twirl, Banana Split, Strawberry Sundae and Artichoke Dip.

Proven Causes of Plant Blindness

In contrast to the lack of specific evidence for a visual perception limitation as the cause for plant blindness, there is substantial concrete evidence that zoochauvinism and plant neglect are major causes of plant blindness. Zoochauvinism or animal chauvinism is the widespread tendency of biologists to consider it more important to study and teach about animals than about plants (Bozniak 1994, Darley 1990, Greenfield 1955, Hershey 1996). Speaking for biology teachers, Maura Flannery, longtime *American Biology Teacher* columnist, has more than once stated the zoochauvinist attitude. "I have to admit I don't give enough attention to plants ... in biology courses. ...I'm afraid this is a problem I share with many biology teachers. ... We are all more interested in animals: They react, they move, they even think. We can relate to them more easily because they are more like us." (Flannery 1991). "I am not alone in my prejudice; to many, botany is synonymous with what is dry, complicated, and uninteresting in biology" (Flannery 1987).

The high school biology text by Biggs et al. (1991) even had an anti-botany quotation by James Thurber, "I passed all the other courses that I took at my University, but I could never pass botany ..." Math teachers created a national outcry when the talking Barbie doll said that "Math class is tough" (Schroeder 1992) but biologists didn't make a peep when botany was maligned in the same way in a biology textbook. In sharp contrast, the quotation for the Human Biology unit of Biggs et al. (1991) was by Shakespeare, "What a piece of work is a man!" and the quotation for the Vertebrate unit was from "The Eagle" by Alfred Lord Tennyson,

He clasps the crag with crooked hands,
Close to the sun in lonely lands,
Ringed with the azure world he stands.
The wrinkled sea beneath him crawls;
He watches from his mountain walls,
And like a thunderbolt he falls.

Zoochauvinism, which results in plant neglect in biology courses, is an extremely important problem in biology education because it distorts the reality of biology. "Our knowledge about the world around us is incomplete if we do not include plants in our discoveries, and it is distorted if we do not place sufficient emphasis on plant life" (National Research Council 1992). It is almost unbelievable that so many biology educators are apparently largely ignorant about and often biased against plants, which are such an essential component of life on Earth. However, they were taught that way by their biology teachers, and they will likely pass that ignorance of plants and bias against plants along to their students unless botanists work to break the cycle.

Contrary to Wandersee and Schussler (1999) who dismissed zoochauvinism as a cause of plant blindness by calling it a "bugbear of zoological conspiracy", zoochauvinism seems all too real. I have never heard zoochauvinism characterized as a conspiracy. Nichols (1919) described how zoologists were the primary instigators in combining separate zoology and botany courses into biology courses, presumably with the best of intentions. However, the more numerous zoologists wrote most of the biology textbooks and taught most of the biology courses. Therefore, it is not surprising that biology courses tended to ignore botany and overemphasize zoology. This "plant-lite" vision of biology in biology courses has apparently established great inertia over time. Botanists and botanical organizations have failed to mount a serious and sustained effort to reverse the situation and assure that biology courses give plants the attention they deserve. This has contributed to a downward spiral in plant biology research and education (National Research Council 1992).

Plant neglect is often the result of zoochauvinism by biology educators but even botanists have sometimes been unwilling to do their share in teaching introductory biology courses (Greenfield 1955). Eliminating botany classes and replacing them with biology classes is an old and apparently chronic problem. Nichols (1919) described how botany course elimination resulted in "biology taught by a zoologist." In the late 1980s or early 1990s, the University of Maryland eliminated their introductory botany course, and the Horticulture Department had to establish a new introductory horticulture course to teach the basic botany that Horticulture majors needed for later courses. There has been a recent precipitous drop in introductory botany textbook sales attributed to the same type of replacement of introductory botany courses with introductory biology courses (Uno 2001).

Plant neglect is widespread in biology curricula at all levels (Flannery 1991, Honey 1987, Kurtz 1958, Stern 1991, Taylor 1965, Uno 1994, Walch 1975). Plant neglect is evident in many biology textbooks and many biology courses which have minimal plant coverage relative to animal coverage (Uno 1994). Plant neglect is evident in the course offerings of many college biology programs which offer few or no botany courses or offer botany courses much less frequently than zoology courses. Biology programs sometimes do not require biology majors to take any botany classes, yet typically do require one or more zoology courses. Few, if any, botany courses exist that are designed to fill the needs of education majors, so how can botanists expect precollege teachers to teach students much about plants or be good plant mentors?

Plant Neglect Outside Schools

There are many examples of plant neglect beyond schools and colleges but the Kew Mural (www.ibiblio.org/herbmed/pictures/misc/kew-mural.jpg) discussed by Wandersee and Schussler (2001) is not one of them as the Kew brochure on the After the Storm Trail explains (Kew 1994). The mural was not commissioned by Kew Gardens but was a gift from a then 16 year-old Robert Games, who was impressed by the 1987 storm's destruction of Kew's trees. Games explained that he was inspired by a turkey oak that had fallen on Kew's two stone lions without damaging them. Wandersee and Schussler (2001) are incorrect that about two-thirds of the mural was covered by animals being displaced by the storm. Nearly two-thirds of the mural is the violent storm depicted as dark clouds and a giant man plus the two large stone lions that stood at the entrance to Kew gardens and figuratively defended it from the storm. There are a squirrel, rabbit and bird fleeing the storm but also a greenhouse and over ten trees or shrubs depicted. Games spent 1,000 hours making the mural and went to the trouble of using different types of wood from trees felled in the storm. It stands at the entrance to the After the Storm Trail which takes two hours to walk and visits thirteen of the tree species whose wood was used in the mural (Kew 1994). The spectacular Kew Mural is not an example of plant neglect but actually a good example of plant mentoring because it commemorates the sudden loss of a thousand trees at Kew and promotes an appreciation of trees.

Plant neglect is prevalent in science reporting. The June 6, 2002, demise of America's oldest white oak, the Wye Oak, was not intensely reported yet the April 26, 2002, rescue of a dog from a sinking ship was. May 2, 2002, was an unusual day for plant reporting because there were two botany stories on the internet wire services. The Associated Press reported on the discovery of the oldest angiosperm fossil, *Archaeofructus sinensis*, and Reuters reported on the blooming of *Amorphophallus titanum* at Kew Gardens (www.kew.org/titan/). Often, weeks or months go by without a single botany story appearing. There are certainly enough botanical discoveries that at least one or two plant stories should appear each week on the wire services.

A major aspect of plant neglect is the near total lack of plant characters in cartoons, movies, books, toys and games, which are filled with thousands of anthropomorphic animal characters. Mr. Potato Head is one of the few well-known plant characters. If there were some well-known plant characters on Sesame Street, at Disney studios, and in the newspaper comic pages, plants might be more popular with children. The VeggieTales video series is an example of how effective computer-animated plant characters can be in education. VeggieTales uses plants such as Tom the tomato, Larry the cucumber, Frankencelery, and Junior asparagus, to tell Biblical stories. The 19 VeggieTales videos have sold over 28 million copies and will soon spawn a movie, a book, a video game and other products (Luscombe 2002). It seems likely that animated plant characters would be effective in teaching children about botany too.

Animals are the main focus on all of the many natural history TV series, such as *Wild Kingdom*, *Wild America*, *Animal Adventures*, *Zoboomafoo*, and *Crocodile Hunter*. Animal biology is a prime focus of the Animal Planet network and a major topic on the Discovery channel. The Home and Garden network focuses on gardening but not the scientific aspects of plants. There has apparently never been a long running TV series that featured plant science. The six-episode mini-series, *The Private Life of Plants*, is about the closest to a botany TV series. Only occasionally are there plant episodes on the PBS series, *Nature*, such as "Deathtrap", "Obsession With Orchids", "The Seedy Side of Plants" and "Sexual Encounters of the Floral Kind". The series, *Bill Nye the Science Guy*, had a memorable photosynthesis episode where Nye drove an old car covered with living lawn. There seems to be no good reason why an entertaining natural history or science TV series on plants would not be successful.

Zoos frequently get tremendous publicity from the birth of animals or acquisition of new specimens such as pandas or polar bears. However, botanical gardens and arboreta rarely seem to be in the news. Perhaps they could be if they had more unusual exhibitions, e.g. titum arums, parasitic plants, or Linnaeus' flower clock. Another marketing technique might use more of the fascinating stories behind many of their existing specimens, such as ginkgo, dawn redwood, handkerchief tree and carnivorous plants. It is unfortunate that more publicity has not been obtained for the recent discoveries of two new conifer species, Wollemi pine (*Wollemia nobilis*) in 1994 and golden Vietnamese cypress (*Xanthocyparis vietnamensis*) in 2001.

Plant Neglect by Botanists and Biologists

Hoekstra (2000) identified the main culprit behind plant blindness, i.e. "Botanists work very hard to make their science second-rate in the eyes of the public." Or perhaps most botanists and botanical societies simply don't work much to promote botany or botany education (Hershey 1989, Mathes 1983). Hence, the title of this article, Plant Blindness: "We Have Met the Enemy and He is Us". The quote is by Walt Kelly from his famous Pogo cartoon for Earth Day 1971.

A dramatic example of plant neglect can be seen in the color covers of *American Biology Teacher*. Of the last 100 covers that featured nonhuman animals or plants, just 21 featured a plant while seven identified an animal and a plant. The remaining 72 featured animals. Several of the 72 animal

covers also had a plant in the background, often occupying a greater area than the animal, but the plant was not identified.

American Biology Teacher columnist Maura Flannery (1999) asked "Why deprive ourselves of the joy of learning about organisms [plants] that have come up with so many fascinating strategies to deal with the challenge of life on Earth." However, in over twenty years and over 160 *Biology Today* columns (through May, 2002), Flannery has had only ten columns devoted mainly to plants. A couple dozen other columns briefly mentioned plants so all told around ten percent of *Biology Today* has dealt with plants. That is too low a percentage to be considered anything but plant neglect. By comparison, Uno (1994) found high school biology textbooks devoted a meager 14% of their chapters and 20% of their lab exercises to plants and botanical topics, including algae, biomes and photosynthesis. It is rather ironic that over three years and 28 issues have passed since *Biology Today* was last devoted to plants (Flannery 1999), a column that discussed the problem of plant blindness.

The many plant errors in the biology teaching literature is another sign of plant neglect. Too few college-trained botanists write precollege botany books so many are written by botanically-illiterate authors. It should not be surprising that precollege botany books often contain many serious errors. For example, Bonnet and Keen (1989) has at least a couple dozens errors such as saying that xylem transports waste, that phloem transports starch, that chlorophyll is a catalyst, that celery is a monocot, that plants can exhibit hydrogen deficiency symptoms, and that iodine is an essential element for plants.

The National Gardening Association's Growlab elementary grade gardening curriculum (Cohen and Pranis 1990, Pranis and Hale 1988) has serious errors such as stating that plants only respire at night, that every seed is either a monocot or dicot, that a cotyledon is attached to the stem above a true leaf, and that the carbon dioxide level in the atmosphere was less than 50 ppm in 1850. The Life Lab curriculum (Jaffe and Appel 1990) also teaches elementary science through gardening but reinforces the long outdated view that plants eat soil in the song, *Dirt Made My Lunch*. Even a teacher who I had never met expressed her dismay at that song when it was sung at the National Science Teachers' Association national meeting. It certainly seems to be plant neglect by plant science societies when National Science Foundation funding for plant science curriculum development goes to nonscience organizations, such as the National Gardening Association, rather than to actual plant science societies.

The botany inaccuracy problem even extends to the refereed biology teaching literature apparently because too few botanists write or review teaching articles. A 1999 article on "Supermarket Botany" in *American Biology Teacher* (Avery and Smith 1999) was authored by a Ph.D. herpetologist and a Ph.D. ornithologist and generated four letters-to-the-editor complaining of the numerous errors. Ironically, the "Supermarket Botany" article appeared in the same issue as Wandersee and Schussler (1999). A recent article by a Ph.D. animal physiologist (DeGolier 2002) contained several errors such as saying that all cold hardy plants thermoregulate. In truth, thermoregulation is a rarity in the plant kingdom, and only a few flowers, such as skunk cabbage, thermoregulate (Seymour 1997).

What to do to fight plant blindness?

If botanists want to overcome plant blindness then undergraduate and precollege education must be made a priority by professional plant science societies. The prevalence of "research chauvinism" in the scientific societies and universities also needs to be overcome (Hershey 1996). It seems logical that a lot of the education effort has to be aimed at precollege teachers, particularly elementary school teachers, who can act as plant mentors before students are turned off to plant study for life.

Plant science societies could become important in the fight against plant blindness by having hands-on botany exercises and current information useful to precollege teachers. Currently, these websites have very little of use to precollege teachers, especially the 100,000-plus elementary school teachers. Plant science societies could fight plant blindness in the following ways:

1. Develop a curriculum for a service college course designed specifically for precollege teachers, especially elementary school teachers, which gives them experiences with innovative hands-on plant activities and curriculum materials about plants that they can use in their teaching. Assist college botanists to establish such courses nationwide.
2. Make sure that introductory biology textbooks at all levels have adequate and accurate plant coverage and place online model biology textbook chapters for plants. Biology textbooks with accurate and adequate plant coverage could be given some kind of a botanical society seal of approval.
3. Make the main page of every botanical society website a tool to fight plant blindness. It should visually and intellectually promote an interest in plants for nonbotanists. It should support precollege teachers and college biology teachers who are nonbotanists by providing the following:
 - a. Interesting, educational features that keep the website fresh, such as a daily birthday bio of a famous botanist in history, a daily botany quotation, botany question of the week, a weekly plant profile, weekly plant misconception, and plant-themed activities or games for children.
 - b. Simple, inexpensive, and fast hands-on plant exercises for class labs for all levels pre-K to college (Uno 1994).
 - c. Lists of plant examples for general biological concepts (Uno 1994).
 - d. An online glossary of botanical terms to help standardize botanical terminology and provide a ready reference for teachers and students.
 - e. Frequent teacher updates online for traditional plant teaching topics, such as photosynthesis, tropisms, fall leaf coloration, transpiration, and plant taxonomy and newer topics of great importance, such as phytoremediation, bioengineered plants, and ecosystem destruction by introduced plants.
 - f. Recognition of innovative and dedicated botany teachers and their innovative plant biology teaching methods.
 - g. Bibliography of botanically accurate teaching materials.
4. Publish plant teaching articles in the society's refereed paper journals or in an online teaching journal to show that botanical societies genuinely value teaching scholarship and to encourage more such scholarship.
5. Fund a special plant issue of *American Biology Teacher*.
6. Sponsor a plant science exhibit at major flower shows.
7. Have a botanist periodically appear on TV talk shows, such as *The Tonight Show with Jay Leno*, to show fascinating plants. Leno's show frequently features exotic animals.

8. Issue at least one plain English press release per month on a recent botanical discovery. Seasonal press releases should also be issued on seasonal topics such as pollen allergies, blooming of the Washington D.C. cherry trees, Arbor Day, fall leaf coloration, Christmas trees and poisonous holiday plants. Press releases on plant topics in the news should also be made available so that the public has some plant experts to rely on for situations such as the infamous *60 Minutes* Alar scare.

9. Offer annual awards for an excellent plant teaching article or website.

10. Reach out to instructors of introductory college biology courses who are not botanists to encourage them to include an appropriate amount of botanical coverage so that "The first year course, then, should make a bright young student feel that this is the golden age in which to be a biologist and the golden age in which to be a botanist" (Steward 1967).

Conclusions

Plant blindness seems to be a useful and catchy term for widespread botanical illiteracy and neglect of plants in biology teaching but there is no concrete evidence that plant blindness is caused by a limitation in human visual perception of plants. In contrast, there is much solid evidence that zoochauvinism and plant neglect are widespread and are important causes of plant blindness. Therefore, to improve the state of botanical education, the most productive approach would be to work to reduce zoochauvinism and plant neglect. Greenfield (1955) provided good advice on these issues, "The wisdom of experience dictates ... a calm and realistic acceptance of any situation, however bad, with dedicated resolution to work towards solving the problems and improving conditions."

David

R.

Hershey

dh321z@yahoo.com

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