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Citation Classics in Plant Sciences and Their Impact on Current Research

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In a delightful book called *Garden Facts and Fancies*, Alfred C. Hottes, former associate editor of *Better Homes and Gardens*, notes that "plants stand so patiently in the fields that we are accustomed to think that they are calm and immovable, whereas there is a feverish activity going on at all times."[1] I believe that the same can be said of plant-sciences research. As noted in our last plant-sciences analyses in 1975[2] and 1980,[3] plant studies often receive less recognition and have less visibility than the other life sciences, perhaps because they are not perceived as having a direct bearing on human health. And whereas plant researchers often use relevant data and methodology from the life, physical, and chemical sciences, the reverse situation is less often the case.

Plant sciences, and particularly botany, are often thought to be rather static, or "calm and immovable,"[1] areas of study. But our past citation studies have shown that plant sciences are very dynamic. To explore the "feverish activity going on at all times,"[1] we have updated our citation data using information compiled in the 1955-1986 *Science Citation Index*® (*SCI*®).

Modern plant-sciences research encompasses a variety of fields. Its foundations were laid during the seventeenth and eighteenth centuries when scientists were beginning to employ experimental methods, which emphasize objectivity. The first research disciplines in plant sciences were the descriptive sciences of taxonomy and morphology, but as a result of advances in other scientific fields, botany began to branch out. For example, the development of the microscope stimulated the study of plant anatomy; and after the basic principles of physics and chemistry were established, the field of plant physiology flourished.

Leonard J. Greenfield, Rio Palenque Research Corporation, Miami, Florida, noted in the foreword to *Contemporary Classics in Plant, Animal, and Environmental Sciences* that the same themes so prevalent in plant studies are also found in a textbook of general biology.

> Some of these [themes] include: cell structures, how they are built, and how they function; the structure and function of tissues and extracellular supports; the nature of internal secretions and how such controls are influenced by an organism's environment; nutrition; the relation between biotic and abiotic milieu and the resultant systems; and, in broad terms, the mechanism and specific direction of evolution.[4]

Methodology

To highlight the various fields outlined by Greenfield as they pertain to plant sciences, we identified 92 journals from the *SCI* devoted to plant sciences. In our 1980 study, the journal list contained only 69 journals.[3] These journals have 1986 impact factors ranging from 16.4 to 0.09, calculated by dividing the number of 1986 citations to 1984 and 1985 articles in the journal by the number of articles published in the journal in that two-year period.

We identified articles from these journals that have been cited 50 or more times between 1955 and 1986. We then weeded out those highlighted in earlier plant-sciences studies. The result is a fresh list of 25 papers cited at least 274 times, listed in Bibliography 1. These are *Citation Classics®* by any reasonable standard.

As with the literature in most biomedical fields, important articles related to plant sciences are often found in multidisciplinary journals as well as those journals devoted solely to plant sciences. To learn which papers the plant-sciences researchers cite most often, we created a mini citation index to develop Bibliography 2. From this we obtained a ranked list of 80 published papers cited more than 20 times in 1985 by articles from the plant-sciences core journals. This list includes articles published in any journal, not just the core plant-sciences journals. For Bibliography 2 we selected those 29 articles that do not appear in Bibliography 1 or in a previous plant-sciences study. (For a bibliography of the papers excluded, please contact my office at ISI®.)

Sixty percent of the papers in Bibliography 2 deal directly with topics in plant sciences, while the others are widely used methodology papers. For example, the paper by Marion M. Bradford, Department of Biochemistry, University of Georgia, Athens, describes a technique for identifying minute concentrations of protein. This paper has been cited over 15,800 times since it was published in 1976, and it is ranked seventh of all the articles covered in the *SCI*.

Table 1 lists the journals that published the articles listed in Bibliography 1, and Table 2 lists those that published the articles in Bibliography 2. The *Annual Review of Plant Physiology* (*ARPP*) published approximately 38 percent of all articles in the two lists, with 12 in Bibliography 1 and 9 in Bibliography 2. In our 1980 study of botany journals, we listed 50 journals that were most cited by botany journals. The *ARPP* was only the 13th most-cited journal in this list, and its 1978 impact factor was 9.98.[3] The 1986 impact factor for *ARPP*, shown in Tables 1 and 2, is 16.4. In the years since our 1980 study, *ARPP* has increasingly attracted many more papers that have become *Citation Classics*. Rudolph Schmid, Department of Botany, University of California, Berkeley, notes that the higher impact for *ARPP* may be caused in part by the increased specialization of plant sciences. This in turn makes review articles indispensable tools for researchers.[5]

It is interesting to note the number of non-plant-sciences journals that are listed in Table 2, such as *Analytical Biochemistry* and the *Journal of Molecular Biology*. Of the 29 articles in Bibliography 2, 16 are from non-plant-sciences journals and 13 of these are methodology papers. This is perhaps another illustration of how botanists make heavy use of information produced by scientists in other fields.

Author Information

Forty-three unique authors affiliated with institutions from 10 countries are listed in Bibliography 1. Bibliography 2 has 54 unique authors affiliated with institutions from nine countries. Twenty percent of the authors from Bibliography 2 are affiliated with the Australian National University (ANU) or the Commonwealth Scientific and Industrial Research Organization (CSIRO), both in Canberra. Four of the six papers authored by scientists affiliated with these Australian institutions deal with photosynthesis.

A total of 45 institutions are affiliated with the 54 papers from Bibliographies 1 and 2. Twenty-five percent of the authors from both lists are affiliated with three institutions: four campuses of the University of California (Davis, Los Angeles [UCLA], Berkeley, and Riverside), ANU, and the Carnegie Institution of Washington, Stanford, California. The University of California is the affiliation of 25 percent of the authors from Bibliography 1. In our recent enology essay, we found that the University of California, Davis, also plays a leading role in wine research.[6]

Jacob Levitt, Division of Biological Sciences, University of Missouri, Columbia, notes that one reason for the high number of papers from ANU and the University of California is that these institutions "are located in the most comfortable of climates and near some of those most fascinating to

Table 1: Journals publishing the papers listed in Bibliography 1. The 1986 impact factor from the *Journal Citation Reports*® for each journal appears in parentheses. (The 1986 impact factor equals the average number of 1986 citations received by 1984-1985 articles published in a journal.)

Journal	Number of Papers from Bibliography 1
Annu. Rev. Plant Physiol. (16.40)	12
Plant Physiol. (3.01)	4
Planta (2.86)	3
Advan. Botan. Res. (3.00)	1
Amer. J. Bot. (1.25)	1
Ann. Sci. Natur.—Bot. Biol. Veg. (0.22)	1
Annu. Rev. Phytopathol. (1.95)	1
Trans. Brit. Mycol. Soc. (0.55)	1
Weed Res. (0.47)	1

Table 2: Journals publishing the papers listed in Bibliography 2. The 1986 impact factor from the *Journal Citation Reports*® for each journal appears in parentheses. (The 1986 impact factor equals the average number of 1986 citations received by 1984-1985 articles published in a journal.)

Journal	Number of Papers from Bibliography 2
Annu. Rev. Plant Physiol. (16.40)	9
Planta (2.86)	2
Anal. Biochem. (2.46)	2
J. Mol. Biol. (6.60)	2
Proc. Nat. Acad. Sci. USA (9.17)	2
Anal. Chim. Acta (1.96)	1
Biochim. Biophys. Acta (2.74)	1
BioScience (1.51)	1
Carbohyd. Res. (1.46)	1
Crop Sci. (0.66)	1
Eur. J. Biochem. (3.66)	1
J. Biochem. Tokyo (1.92)	1
J. Biol. Chem. (6.32)	1
J. Gen. Virol. (2.33)	1
Phytochemistry (1.37)	1
Stain Technol. (0.74)	1
Theor. Appl. Genet. (1.25)	1

the botanist—i.e., desert and coastal climates. Therefore, they attract plant scientists from other laboratories."[7]

Winslow R. Briggs, editor, *ARPP*, concurs, noting that there is a strong collaboration between plant scientists from ANU and the Carnegie Institution of Washington.[8] Levitt adds that

> any breakthrough in methods or concepts will lead to a sudden proliferation of publications and citations. It will also attract the brightest young students. In the 1920s, Daniel R. Hoagland, working in California, was one of the first to propose and prove the existence of active ion transport, against the opposition of others. He attracted many talented young scientists.... These students of his branched out into other fields...and discovered other basic phenomena. In fact some of this work was of Nobel Prize caliber (e.g., Daniel I. Arnon's discovery of photophosphorylation).[7]

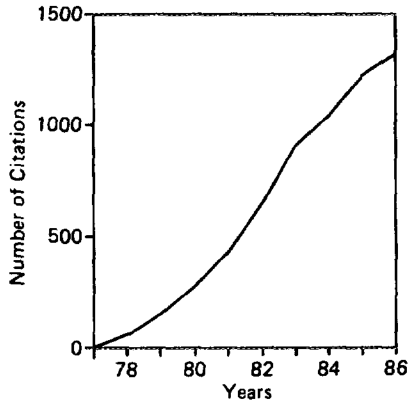
A number of Nobel Prizes have been awarded for research in plant-related sciences. For example, in 1915 Richard M. Willstätter, Munich University, Germany, won the chemistry prize for his research on plant pigments, including chlorophyll. Sir Robert Robinson, Oxford University, UK, was awarded the 1947 Nobel for his studies of biologically important plant products, such as alkaloids. Melvin Calvin, University of California, Berkeley, won the 1961 Nobel Prize for his research on carbon dioxide assimilation in plants. However, none of these Nobelists appears in either table.

Biochemist Paul Berg, Stanford University School of Medicine, California, won the 1980 Nobel Prize in chemistry along with Walter Gilbert and Frederick Sanger. The 1977 paper Berg coauthored with Peter W.J. Rigby in Bibliography 2 is a widely cited work on labeling DNA. Its citation record for 10 years is shown in Figure 1.

Other Nobel-class prizes are awarded specifically for plant-sciences research. For instance, the American Phytopathological Society annually awards the Ruth Allen Award in recognition of an innovative research contribution that has changed or has the potential to change the direction of work in plant pathology. The American Society of Plant Physiologists sponsors the Charles F. Kettering Awards for Excellence in Photosynthesis.

Twelve articles from Bibliography 1 and six from Bibliography 2 have already been featured in *Citation Classics* commentaries, indicated by asterisks in the tables. Seven of these commentaries appear in *Contemporary Classics in Plant, Animal, and Environmental Sciences*.[9] Authors who have not

Figure 1: Year-by-year distribution of citations to the article from Bibliography 2 by Peter W.J. Rigby et al., which was coauthored by Paul Berg in *J. Mol. Biol.* 113:237-51, 1977. The article received 6,089 cites in the *SCI®*, 1977-1986.



yet written commentaries will be invited to do so in the near future.

Research Fronts

Table 3 lists the 1986 research fronts that include papers from Bibliography 1 as core documents. These fronts represent current research topics from a variety of fields, from nutrition to tissue culture methods. The most active front concerns "Chlorophyll-protein complexes in photosynthetic membranes of the thylakoids of chloroplasts" (#86-0853). Chloroplasts are the plant organelles where photosynthesis occurs. Inside the chloroplasts are series of membranes arranged in flattened, stacked sacs called thylakoids. Embedded in these thylakoid membranes are the light-trapping photosynthetic pigments, including chlorophyll.

A 1975 paper from Bibliography 1 by J. Philip Thornber, Department of Biology and Molecular Biology Institute, UCLA, is core to this front. Thornber's paper was instrumental in establishing that it is proteins, not lipids, that organize the photosynthetic pigments in the position that best enables them to perform their light-harvesting and photochemical functions effectively.

Table 4 lists the 1986 fronts that include papers from Bibliography 2 as core documents. Only two fronts overlap in Tables 3 and 4: "The effect of salinity on plant growth" (#86-0043) and "Responses of various plants to low temperatures and chilling injury" (#86-0193).

The front on "Relations of photosynthesis and photorespiration to variations in humidity, light, and carbon uptake" (#86-1873) is very active, with 348 published (citing) papers and 32 core papers. Three papers from Bibliography 2, coauthored by G.D.

Table 3: The 1986 *SCI®* research fronts that include at least one of the papers listed in Bibliography 1 as a core document. A=total number of core documents. B=number of 1986 citing documents.

Number	Name	A	B
86-0043	The effect of salinity on plant growth	37	293
86-0193	Responses of various plants to low temperatures and chilling injury	23	217
86-0598	Isolation, characterization, and growth of cyanobacterium and its effects	3	87
86-0853	Chlorophyll-protein complexes in photosynthetic membranes of the thylakoids of chloroplasts	40	532
86-1168	Fusion of lipid bilayer membranes and protoplasts by electric fields	14	190
86-1517	Effects on and functions of plant mitochondria including alternative oxidase and cyanide-resistant respiration	10	77
86-2628	Photosynthetic membrane complexes, chloroplast ultrastructure, and the effects of light quality on plant leaves	2	74
86-4063	Discrimination of stable carbon isotopes in sedimentological studies of plant and other residues	11	87
86-5863	Determination and control of vesicular arbuscular mycorrhizal fungi spore populations and effects on plant growth and yield	2	26
86-5864	Soil nutrients and plant response to vesicular arbuscular mycorrhizal fungi	14	170
86-6473	Tissue culture methods for *in vitro* plant regeneration from protoplasts	2	21
86-6884	The role of ribulose diphosphate carboxylase oxygenase in photosynthesis and plant growth	7	145

Table 4: The 1986 *SCI*® research fronts that include at least one of the papers listed in Bibliography 2 as a core document. A = total number of core documents. B = number of 1986 citing documents.

Number	Name	A	B
86-0043	The effect of salinity on plant growth	37	293
86-0193	Responses of various plants to low temperatures and chilling injury	23	217
86-0448	Production of phytoalexins in response to fungal elicitors and the structure and function of plant cell walls	17	306
86-0682	Effects of herbicides, pest-management systems, and various other conditions on soybean yield	6	80
86-1382	Isolation, characterization, expression, and cloning of DNA and RNA nucleotide sequences	36	7,995
86-1724	Detection of plant viruses with enzyme-linked immunosorbent assay	10	145
86-1873	Relations of photosynthesis and photorespiration to variations in humidity, light, and carbon uptake	32	348
86-2035	Genetic variation during tissue culture, growth, and regeneration of plants	12	134
86-2264	Proton pump activity and ion transport in plasma membranes of plant and animal cells	8	144
86-2631	Synthesis, isolation, and characterization of polysaccharides and other carbohydrates in plants	7	257
86-2889	Identification, characterization, and synthesis of proteins and glycoproteins	2	817
86-3212	Weather and other effects on nitrogen relations, growth, and yield of winter wheat cultivars, potatoes, and other vegetation	11	78
86-5545	Effects of polyamine biosynthesis on growth and senescence of plants and modulation of arginine decarboxylase activity	4	43
86-5621	Aluminum toxicity and effects of heavy metals on photosynthesis and biochemical processes in plants	2	64
86-6423	Isolation and characterization of proteins and antigens via monoclonal antibodies and other methods	3	8,512
86-6450	Synthesis and utilization of starch and sucrose in chloroplasts and plant cells in varying conditions	6	66

Farquhar, Department of Environmental Biology, ANU, are the most-cited core documents from this study included in this front. Farquhar's 1980 paper, written with S. von Caemmerer, also of ANU, and J.A. Berry, Department of Plant Biology, Carnegie Institution of Washington; his 1982 paper, written with Thomas D. Sharkey, ANU; and his 1981 paper, coauthored with von Caemmerer, all deal with the gas exchange process in leaves.

Distribution of Publication Dates

Fifty-six percent of the research articles in Bibliography 1 were published between 1970 and 1974, as shown in the frequency distribution of publication dates in Table 5. If we include in the distribution those articles we excluded from this study because they appeared in earlier plant-sciences essays, over 30 percent were published between 1970 and 1974. The average for the *SCI* file shows that 16.4 percent of all cited articles were published between 1970 and 1974. Our study results indicate that a fairly large number of older plant-sciences papers continue to rank among the highly cited papers in plant sciences. Perhaps this means that the field of plant sciences moves somewhat slowly. It is also possible that our less extensive coverage of botany journals between 1955 and 1964 (we covered 24) may be affecting the results seen in Table 5.

Seventy-six percent of the papers from Bibliography 2 were published between 1975 and 1984, as shown in Table 6. If the excluded articles are included in the distribution, 47 percent were published during this time period. The average for the *SCI* file shows that 30.6 percent were published between 1975 and 1984. The method of selection for Bibliography 2 may explain the dominance of recent years in Table 6.

Cited Half-Life

Another explanation for the large percentage of older articles in Bibliography 1 might be found by looking at the cited half-life of

Table 5: Chronologic distribution of publication dates for the papers appearing in Bibliography 1, which lists the articles from plant-sciences journals that were most frequently cited in the *SCI*®, 1955-1986.

Publication Dates	Number of Papers from Bibliography 1	Percent of Total
1945-1949	1	4
1950-1954	1	4
1955-1959	1	4
1960-1964	0	0
1965-1969	3	12
1970-1974	14	56
1975-1979	5	20

Table 6: Chronologic distribution of publication dates for the papers appearing in Bibliography 2, which lists the articles most frequently cited in 1985 by plant-sciences journals indexed in the *SCI*®.

Publication Dates	Number of Papers from Bibliography 2	Percent of Total
1960-1964	2	6.8
1965-1969	2	6.8
1970-1974	3	10.5
1975-1979	10	34.5
1980-1984	12	41.4

journals. The cited half-life is the median age of the cited articles in a journal. The average cited half-life for all the journals covered in the 1986 *SCI* is 6.8 years. This means that half of the 1986 citations from *SCI* journals were to articles published over the past 6.8 years.

The average cited half-life for plant-sciences journals in 1986 is also 6.8 years. The average age of articles cited in plant-sciences journals thus coincides with the average age of articles cited in all journals in the *SCI*. However, articles cited in plant-sciences journals are generally older than those cited in other fields in the life sciences. For example, the cited half-life for immunology journals is 4.3 years. That is, half of the 1986 citations to immunology journals were to articles that have been published since 1981. Therefore, the cited articles in plant-sciences journals are, on the average, 2.5 years older than those cited in immunology journals. The cited half-life of journals in cancer research is 4.8 and that of biochemistry and molecular biology journals is 5.4. The cited articles in journals in these two areas are also more recent than those cited in plant-sciences journals.

Noteworthy Articles

The oldest article from Bibliography 1 is a 1947 paper published in the *American Journal of Botany* by Mogens Westergaard and Herschel K. Mitchell, Laboratory of Genetics, Agricultural College, Copenhagen, Denmark. The paper describes a then new synthetic medium that promotes the sexual cycle of the mold *Neurospora*. In a *Citation Classic* commentary, Mitchell wrote that

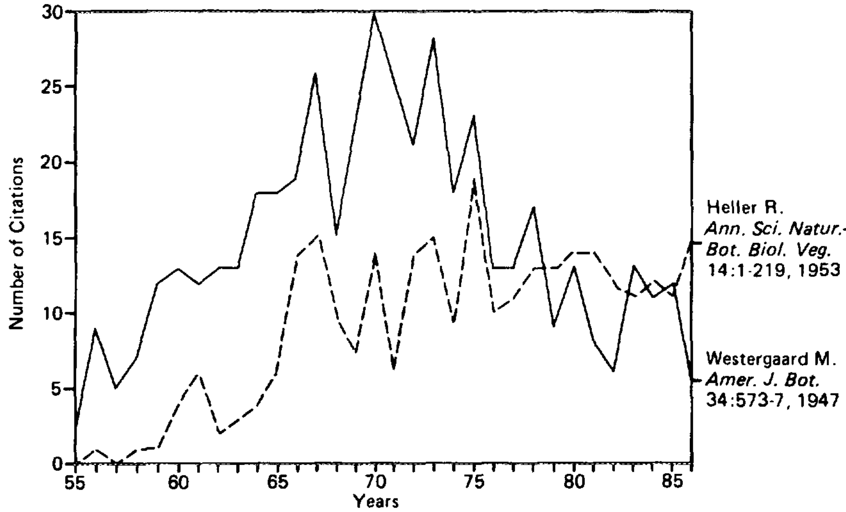
> the medium we devised worked well for genetics. Improvements were not really necessary so the original has been referenced for quite some time now. It is simple and it still works, thus accounting for the article's frequent citation.[10]

A 1953 article in Bibliography 1 by René Heller, University of Paris, discusses new mineral solutions that provide a 14 to 144 percent growth increase of various plant tissues. This article, written in French, is the only one in the study that is not in English. It is core to the research front on "Tissue culture methods for *in vitro* plant regeneration from protoplasts" (#86-6473).

To study the citation patterns for these two articles, their year-by-year citation data are plotted in Figure 2. The graph shows that citations to these two papers peaked 20 to 35 years after publication. We won't know the impact of this 1947 paper between 1947 and 1954 until we complete the *SCI* for this period, sometime in 1988.

The oldest article in Bibliography 2 is a 1962 article by J. Murphy and J.P. Riley, Department of Oceanography, University of Liverpool, UK. The paper describes an improved method for determining the presence of phosphorus. A newly developed reagent reacts rapidly with phosphate to yield a blue-purple compound, which indicates the presence of phosphorus. Phosphorus is a necessary plant nutrient that is a component of nucleic acids, ATP, and phospholipids.

Figure 2: Year-by-year distribution of citations from the *SCI*®, 1955-1986, for the two oldest articles in Bibliography 1, which lists the most-cited articles from plant-sciences journals.



The most recent article in Bibliography 1 is a 1979 article by E. Marrè, Institute of Plant Sciences, University of Milan, Italy, on fusicoccin (FC), a toxin produced by a fungus that attacks peaches and almond trees. Marrè wrote in a *Citation Classic* commentary that

> the high number of citations to this paper presumably depends not only on its intrinsic interest but also on our liberality in supplying FC to many colleagues.... Thus, citing our papers was a simple and much appreciated way to express one's thanks![11]

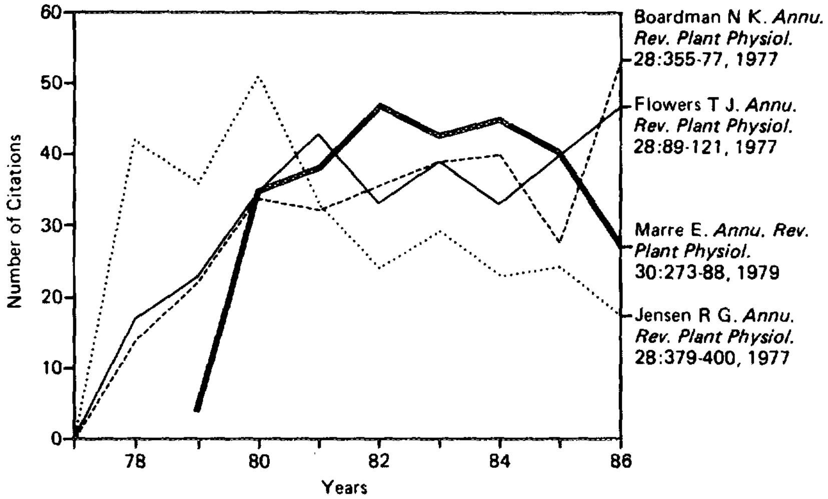
Figure 3 shows a year-by-year citation-frequency distribution of the four most recent articles in Bibliography 1. Marrè's paper as well as the 1977 paper by Richard G. Jensen, Departments of Chemistry and Plant Sciences, University of Arizona, Tucson, and J.T. Bahr, Mobil Chemical Company, Edison, New Jersey, became highly cited very soon after publication and peaked within five years, after which citations began to slowly decline.

The graph shows that the paper by N.K. Boardman, Division of Plant Industry, CSIRO, comparing the photosynthetic activity of sun and shade plants has had a remarkable increase in citation activity between 1985 and 1986. Briggs notes that this citation activity may be caused by the increased interest in gene regulation relating to chloroplast proteins in recent years. Boardman's paper has become a standard reference for studies in this area.[8]

In Bibliography 2 the most recent article is a 1984 paper by Ferdinand Bohlmann and Christa Zdero, Institute for Organic Chemistry, Technical University of Berlin, Federal Republic of Germany, and Robert M. King and Harold Robinson, Department of Botany, Smithsonian Institution, Washington, DC. The paper describes the spectroscopic methods employed to study the aerial parts of two species of the wildflower *Gaillardia*.

Nitrogen fixation is the reduction of gaseous nitrogen from the air to form ammonia, which is assimilated by plants. This is a vital process since all plants need nitrogen to synthesize amino acids for their proteins. In Bibliography 1 a highly cited 1955 paper by M.B. Allen and Arnon, Department of Plant Nutrition, University of California, Berkeley, discusses the physical conditions of the environment that best promote the growth of nitrogen-fixing blue-green algae,

Figure 3: Year-by-year distribution of citations from the *SCI®*, 1977-1986, for the four most recent articles in Bibliography 1, which lists the most-cited articles from plant-sciences journals.



also known as the cyanobacteria. This article is core to the research front in Table 3 on "Isolation, characterization, and growth of cyanobacterium and its effects" (#86-0598).

As we mentioned earlier, methodology papers are highly cited by botany researchers. A 1967 paper by Peter Albersheim and colleagues, Department of Chemistry, University of Colorado, Boulder, listed in Bibliography 2, describes an accurate method to determine the neutral sugar compositions of complex carbohydrates using gas-liquid chromatography. Albersheim wrote in a 1979 *Citation Classic* that

> we spent considerable time developing an efficient chromatography column material, went to great lengths to make the method useful for multiple samples, and presented sufficient data to demonstrate the accuracy of the method. Actually, the manuscript was not well received by the editors of the journal. We were forced to delete about half of our data, which I feel was a serious mistake.[12]

Conclusion

Plant-physiology articles are prominently featured in this study, as they were in our past plant-sciences studies. The high number of methodology papers included in this study reinforces what we noted in our earlier studies—plant-sciences researchers apply methodology developed in biochemistry and molecular biology fields to problems with a plant-sciences focus.

In reviewing this essay, Briggs commented that "the area of plant molecular biology has exploded in the last six to eight years, yet there is only a whisper of a suggestion of this growing field in this study."[8] Briggs predicted that in a future plant-sciences study the nature of the articles would change dramatically, reflecting more plant molecular biology studies.[8]

* * * * *

My thanks to Lisa Holland and Janet Robertson for their help in the preparation of this essay.

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12. **Albersheim P.** Citation Classic. Commentary on *Carbohyd. Res.* 5:340-5, 1967. (Thackray A, comp.) *Contemporary classics in physical, chemical, and earth sciences.* Philadelphia: ISI Press, 1986. p. 225. (Reprinted from: *Current Contents/Physical, Chemical & Earth Sciences* 19(50):10, 10 December 1979.)

Bibliography 1: Highly cited articles from plant-sciences journals indexed in the *SCI*®, 1955-1986. Articles are listed alphabetically by first author. Numbers following entries indicate 1986 *SCI/SSCI*® research-front specialties for which these are core papers. Asterisks (*) indicate articles with *Citation Classic*® commentaries. The issue number, year, and edition of *Current Contents*® in which these commentaries appeared are in parentheses.

Number of 1955-1986 *SCI* Citations	Bibliographic Data
564	**Allen M B & Arnon D I.** Studies on nitrogen-fixing blue-green algae. I. Growth and nitrogen fixation by *Anabaena cylindrica* Lemm. *Plant Physiol.* 30:366-72, 1955. 86-0598
297	**Boardman N K.** Comparative photosynthesis of sun and shade plants. *Annu. Rev. Plant Physiol.* 28:355-77, 1977. 86-2628
274	**Cleland R.** Cell wall extension. *Annu. Rev. Plant Physiol.* 22:197-222, 1971.
311	**Flowers T J, Troke P F & Yeo A R.** The mechanism of salt tolerance in halophytes. *Annu. Rev. Plant Physiol.* 28:89-121, 1977. 86-0043
287	**Heller R.** Recherches sur la nutrition minerale des tissus vegetaux cultives *in vitro* (Mineral nutrition of plant tissue cultured *in vitro*). *Ann. Sci. Natur.—Bot. Biol. Veg.* 14:1-219, 1953. 86-6473
296	***Hepler P K & Palevitz B A.** Microtubules and microfilaments. *Annu. Rev. Plant Physiol.* 25:309-62, 1974. (32/86/AB&ES)
281	**Jensen R G & Bahr J T.** Ribulose 1,5-bisphosphate carboxylase-oxygenase. *Annu. Rev. Plant Physiol.* 28:379-400, 1977. 86-6884
398	***Kanemasu E T, Thurtell G W & Tanner C B.** Design, calibration and field use of a stomatal diffusion porometer. *Plant Physiol.* 44:881-5, 1969. (41/79/AB&ES)
351	***Kao K N & Michayluk M R.** A method for high-frequency intergeneric fusion of plant protoplasts. *Planta* 115:355-67, 1974. (46/80/AB&ES) 86-1168
289	**Kawashima N & Wildman S G.** Fraction I protein. *Annu. Rev. Plant Physiol.* 21:325-58, 1970.
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372	**Lyons J M.** Chilling injury in plants. *Annu. Rev. Plant Physiol.* 24:445-66, 1973. 86-0193
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337	***Mosse B.** Advances in the study of vesicular-arbuscular mycorrhiza. *Annu. Rev. Phytopathol.* 11:171-96, 1973. (49/84/AB&ES) 86-5863

Number of 1955-1986 *SCI* Citations	Bibliographic Data
374	***Murashige T.** Plant propagation through tissue cultures. *Annu. Rev. Plant Physiol.* 25:135-66, 1974. (50/85/AB&ES)
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Clarification Notice

The recent essay on the 1986 recipients of the Nobel Prizes in economics and literature described Nigerian poet and playwright Wole Soyinka as "the first black African to win a Nobel Prize."[1] Unfortunately, it was not made clear that the statement is true only with regard to the prize for literature. The Nobel Prize for peace was awarded in 1960 to Zulu chief Albert Lutuli and in 1984 to Anglican Bishop (now Archbishop) Desmond Tutu. Many thanks to the readers who pointed out this *lapsus calami*.

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