

Orchid Research Newsletter No. 60

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Evolution versus Creationism. Part Two: The Birth of Fundamentalism and Anti-evolution Attitudes in the U.S.

Continuing the series from issue 58 of the Orchid Research Newsletter, this installment addresses the rise of fundamentalism in the United States and its most famous legal battle with evolutionary theory. A more complete and fully illustrated account appeared in the April 2012 issue of Orchid Digest.

In 1890 there had been 200,000 students in high schools in the United States. By 1920 that number had jumped to 2 million, in part because of Progressive-era school attendance laws that forced more teenagers to go to school and in part because more public high schools had been built (Larson, 1997). Darwin's (1859) theory of natural selection was at least mentioned in high school textbooks, such as George Hunter's (1914) *A Civic Biology*, the most popular biology book in the country and the one required for use in many states, including Tennessee.

On a Sunday afternoon in August 1909, A. C. Dixon gave a Revival sermon at the Temple Auditorium in Los Angeles. In the audience was the President of Union Oil Company, Lyman Stewart, who donated \$300,000 (equivalent to \$7,500,000 or £5,000,000 today) to produce a series of paperback books written by the most conservative Bible scholars in the world to combat the liberal theology creeping into major church denominations (Lienesch, 2007). A set of 12 volumes of 100 articles appeared from 1910 to 1915, collectively titled *The Fundamentals*. Three million copies were distributed free of charge (or almost free) during that period (Larson, 2003). As a result, Protestants who wanted a return to Biblical fundamentals in church and culture, the traditionalists, came to call themselves fundamentalists. In later volumes, "evolutionists" were defined as enemies of religion and society. Still, there was as yet no call to remove the study of evolution from the schools.

William Jennings Bryan (1860-1925) helped to demonize evolution on a nationwide scale, giving as many as 200 talks a year on the subject. He was a three-time Democratic candidate for President who crusaded against trusts, imperialism, and big business. In the 1920s he was hearing from parents that their children were returning home from colleges without their faith, and so he made evolution the ultimate cause of all evils, including heresy, immorality, and war.

The Tennessee legislature passed a bill in 1925 written by State Representative John Butler -- with heavy lobbying from William Jennings Bryan -- that made it unlawful for any teacher in state public schools to teach any theory that denies the story of the divine creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals. A teacher found guilty of violating this act was to be fined from \$100 to \$500 for each offense. Taking inflation into account, that would be about \$1250 to \$6200 (£800-£3970) in today's money.

The Conspiracy

In 1925, Dayton, Tennessee, was a quiet town about 40 miles from Chattanooga with beautiful homes, two banks, nine churches, a hosiery mill, and a canning factory. Among the leading businesses were Robinson's Drugstore, the Aqua Hotel, and (believe it or not) J. R. Darwin's Everything to Wear Store. Farmers in the surrounding fields of Rhea County grew soybeans, wheat, tobacco, strawberries -- and corn, most of which went into bootleg corn whiskey in those days of Prohibition. Dayton's population had shrunk from 3,000 in the 1890s to 1,800 by 1925 mostly because a blast furnace that had employed nearly a thousand men shut down in 1913, and families left town looking for jobs elsewhere.

On 4 May 1925, George Rappalyea, a 31-year-old New Yorker who managed 400 men in six coal and iron mines in Rhea County, hurried to Robinson's Drugstore with a copy of the *Chattanooga Times* containing an American Civil Liberties Union announcement that it was willing to offer its services to anyone challenging the Butler Act (Ginger, 1958). Listening to Rappalyea, the others -- School Superintendent Walter White and school board chairman Frank Robinson -- became convinced that publicity generated by a controversial trial might help their struggling town economically.

The next day the conspirators sent for John Scopes, a 24-year-old part-time science teacher and part-time football coach at the new high school. As Scopes (Scopes and Presley, 1967) later described the meeting, Rappalyea said, "John, we've been arguing, and I said nobody could teach biology without teaching evolution." "That's right," Scopes said, and Frank Robinson pulled a copy of Hunter's *A Civic Biology* — the state-approved textbook—off one of the shelves. "You been teachin' 'em this book?" Rappalyea asked. Scopes replied that while filling in for the regular biology teacher during an illness, he had assigned readings on evolution from the book for review purposes. He showed them the evolutionary tree and the explanation of evolution. "Then you've been violating the law," Rappalyea concluded. "Would you be willing to stand for a test case?" Robinson asked. "Would you be willing to let your name be used?" Scopes agreed and allowed himself to be arrested, and then went back to his tennis game.

Frank Robinson, as Chairman of the School Board, called the *Chattanooga Times* and reported that they had arrested a man for teaching evolution. The Associated Press picked it up, and it was front-page news nationally until the trial was over. John Scopes became an overnight sensation, either reviled or respected depending on which side of the evolutionary fence you occupied.

The Players

Local attorneys, who were also friends of Scopes, agreed to prosecute. Tom Stewart, Attorney-General of the 18th judicial district of Tennessee, became lead prosecutor because Dayton was in his jurisdiction. William Jennings Bryan gladly accepted an invitation from the World's Christian Fundamentals Association to serve as special prosecutor at the trial.

Rappelyea wired the ACLU and secured its promise to assist in the defense. Soon thereafter local attorneys for the defense received a telegram signed by Dudley Field Malone and Clarence Darrow offering their services free of charge. Malone, an Irish Catholic who worked as a high-class international divorce lawyer, had once served as Bryan's assistant at the State Department.

Clarence Darrow was the most famous (or infamous) trial lawyer in America. He was a Chicago attorney in the 1890s, champion of labor and other liberal causes, and proud agnostic. Knowing that Bryan had signed on, Darrow volunteered his services in what promised to be the courtroom battle of his life.

Henry Louis Mencken, America's most famous jazz-age journalist and social commentator for the Baltimore *Evening Sun*, made arrangements to cover the trial for the *Sun*. He rolled into town by rail from Chattanooga with all that he said he needed to prepare wire reports -- four bottles of scotch and a typewriter (Larson, 1997).

At the center of it all was a graduate of the University of Kentucky, a modest high school teacher and coach originally from Paducah, Kentucky, who could have no way of knowing what lay ahead. All John Scopes knew was that he had to stand up against the abridgment of freedom that the Butler Act represented.

The plan worked out by the defense team was to have the judge dismiss the case on the grounds that the law was unconstitutional, or else have their client found guilty so that the verdict could be appealed to a higher court. Why? John Thomas Scopes was not really the one on trial in Dayton. It was the Butler Act.

As news of the trial spread, Dayton's normally quiet streets morphed into a circus with lemonade and hotdog stands, banners and monkey pennants, hawkers of religious tracts and biology texts, Holy Rollers and evangelists, and hundreds of members of the press. Mountaineers trotted into town toting squirrel rifles. Entrepreneur J. R. Darwin capitalized on his surname and erected a banner above his shop with a finger pointing toward the front door with the provocative slogan "DARWIN IS RIGHT." Just below, in smaller type, was the word "INSIDE." Monkey dolls and Simian Sodas were offered for sale at Robinson's Drugstore. Stores sold pins that read "Your Old Man's a Monkey." For a fee anyone could pose with Joe Mendi, a chimpanzee nattily dressed in a three-piece suit. Understandably, Mencken renamed Dayton "Monkey Town."

Judge John Raulston was a conservative Christian and lay Methodist minister who craved publicity and reveled in the limelight (Larson, 1997). He was standing for re-election the following year. After Scopes was indicted by a grand jury, Raulston scheduled the trial to begin on 10 July 1925 in the three-story Rhea County Courthouse with a courtroom that could seat 700.

The Trial of the Century

On the first day of the trial, all 700 seats were taken, and 300 people were standing. About 200 reporters covered the trial for papers as far away as London. Press photographers and newsreel crews were everywhere. WGN radio from Chicago was there for the first live radio broadcast of a trial heard across the nation.



**Rhea County Courthouse in Dayton, Tennessee, site of the famous Scopes trial.
Photo: Alec Pridgeon.**

According to the trial transcript (second reprint edition, 1990), Raulston gavelled the session to order, followed by a long prayer by a fundamentalist minister aimed at the defense. Raulston read the first 31 verses of Genesis, followed by the text of the Butler Act. Prosecutor Stewart then read the indictment, whereupon defense counsel John Neal moved to quash the Butler Act because it violated six clauses of the Tennessee Constitution and also the 14th Amendment to the U.S. Constitution, which prohibits state and local governments from depriving persons of life, liberty, or property without due process. Raulston's first job, then, was to mull over whether the law was unconstitutional. If he ruled that it was, the trial would be over.

After lunch, 100 veniremen, all white males, appeared for jury selection. They all wanted to serve, mainly so that they would have a front-row seat. After two hours the attorneys had selected six Baptists, four Methodists, one Disciple of Christ, and one without a church affiliation. None of the jurors realized at the time that they would be excused by Raulston for all but about a few hours over the course of the trial.

Darrow's opening salvo on July 13th argued that the Butler Act was indeed unconstitutional. It lasted over two hours and is one of the most famous in U.S. legal history. Mencken (1925, reprinted in Tompkins, 1965) wrote that "it rose like the wind and ended like a flourish of bugles." Even Ben McKenzie on the prosecution team told Darrow in a voice choked with emotion that it was the greatest speech he had ever heard on the subject (Ginger, 1958; Larson, 1997).

On the fourth day of the trial, after three days of deliberation, Judge Raulston announced his decision. He would uphold the law as constitutional, affirm legislative control over public education, and try John Scopes for teaching evolution.

That day the prosecution called only four witnesses – Superintendent White and Frank Robinson, who testified that Scopes had admitted to teaching evolution in their presence. Two students testified that Scopes had discussed evolution in class. Stewart

rested the prosecution's case by reading the first two chapters of Genesis into the record.

The defense had brought in leading scientists to testify on behalf of Scopes and to enlighten America. All of them were purposely selected because they were church members also. Maynard Metcalf, a zoologist from Johns Hopkins University and Oberlin College and also a Sunday School teacher, was the only one allowed to testify about evolutionary biology in court and with the jury excused. The prosecution claimed that scientific testimony was immaterial and that these foreigners had come down to Tennessee with the express purpose of opening a college in the courtroom.

The next day Raulston refused to admit the testimony of the scientists because, he said, evidence of experts would shed no light on the issues. Strict national court rules discouraged expert testimony because expert witnesses could testify only about their own opinions on issues beyond normal understanding (Larson, 2003). But he was also under pressure from state leaders that such testimony would embarrass the state of Tennessee and its law even more (Larson, 1997). And, of course, he was also up for re-election the following year. He did, however, allow their written testimony to become part of the record. The jury heard none of it.

With the inadmissibility of testimony from the scientists, everyone thought the trial was over. Journalists went home, including Mencken, who said that "all that remains is the formal business of bumping off the defendant" (Mencken, 1925, reprinted in Tompkins, 1965). It was their loss, because Darrow then pulled one of the most famous, unorthodox legal maneuvers in history. Arthur Garfield Hayes of the defense team had been chosen to call an expert on the Bible to testify -- William Jennings Bryan. Bedlam erupted. Over the strong objections of the other prosecutors, Bryan insisted on taking the stand.

Raulston decided to move the proceedings outside on a platform on the courthouse lawn under the pin-oak and maple trees where it was cooler. It didn't take long for news of the imminent encounter to spread. The crowd swelled to an estimated 3,000 onlookers, most of them standing on the lawn in the heat (Scopes and Presley, 1967; Larson, 1997). The jury was again excused from the proceedings.

Darrow then began a series of questions designed to undermine a literalist interpretation of the Bible. Bryan was asked about the whale swallowing Jonah; Joshua making the sun stand still in order to lengthen the day (as if the sun revolved around the earth); the date of the great flood and the ark; and the creation according to Genesis. Bryan could not explain from where Cain found his wife, saying that he left the agnostics to hunt for her. Nor could he explain how the serpent in the Garden of Eden moved before the Lord condemned it to crawl upon its belly. Darrow: "Do you know whether he walked on his tail or not?" Darrow finally forced Bryan to admit that the days of creation might not have been 24-hour days but periods, six days or six years or 6,000,000 years or 600,000,000 years, and that the creation might have continued for millions of years.

On the morning of the eighth and final day of the trial (21 July 1925), Raulston ruled that Bryan's testimony the previous day should be stricken from evidence because it

would not help a higher court in determining whether or not the defendant taught that man descended from a lower order of animals. Darrow then asked the jury to return a verdict of guilty. He waived his right to a closing speech and thereby deprived Bryan of delivering his own closing speech that he had labored over for weeks so that it might be carried live over WGN radio across the nation (Larson, 1997).

The jury, who had been in the courtroom for a total of less than two hours over the course of the trial, complied with Darrow's request and a few minutes later returned a guilty verdict. The judge then fined Scopes \$100. Both the ACLU and Bryan offered to pay the fine, but Mencken and the Baltimore *Evening Sun* had offered first (Scopes, 1965).

In the last installment in this series, appearing in the next issue of the *Orchid Research Newsletter*, I will discuss the aftermath of the Scopes trial and its sequel (*Epperson v. Arkansas*) as well as subsequent and more recent court cases dealing with creationism and intelligent design.

Acknowledgments

Pulitzer-Prize winner Edward Larson and Jerry Tompkins (who knew John Scopes well) graciously shared some unpublished information with me.

Alec Pridgeon

References

- Darwin, C. 1859. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. John Murray, London.
- Ginger, R. 1958. *Six Days or Forever? Tennessee v. John Thomas Scopes*. Beacon Press, Boston, Massachusetts.
- Hunter, G. W. 1914. *A Civic Biology*. American Book Company, New York.
- Larson, E. J. 1997. *Summer for the Gods: The Scopes Trial and America's Continuing Debate over Science and Religion*. Harvard University Press, Cambridge, Massachusetts.
- Larson, E. J. 2003. *Trial and Error: The American Controversy Over Creation and Evolution*. Oxford University Press, Oxford.
- Lienesch, M. 2007. *In the Beginning: Fundamentalism, the Scopes Trial, and the Making of the Antievolution Movement*. University of North Carolina Press, Chapel Hill, North Carolina.
- Scopes, J. T. 1965. Reflections—forty years after. In *D-Days at Dayton* (ed. J. R. Tompkins), pp. 17-31. Louisiana State University Press, Baton Rouge, Louisiana.
- Scopes, J. T. and J. Presley. 1967. *Center of the Storm: Memoirs of John T. Scopes*. Holt, Rinehart and Winston, New York.
- Transcript: *The World's Most Famous Court Trial: Tennessee Evolution Case*. Second reprint edition, 1990. Bryan College, Dayton, Tennessee.

News from Correspondents

Please submit any news about newly completed research, future research plans and needs, change of address, upcoming or recent fieldwork, etc. to Alec Pridgeon (a.pridgeon@kew.org). Graduate students are especially encouraged to share the subjects of their thesis or dissertation with the international community. We will print submissions in the format below. Many thanks to those who have contributed.

Juan F. Silva Armas (Instituto de Ciencias Ambientales y Ecológicas ICAE, Facultad de Ciencias, ULA, Mérida, Venezuela; e-mail: : jsilva@ula.ve) and his colleagues have published a book entitled *Botánica y Ecología de las Monocotiledóneas de los Páramos en Venezuela* in two volumes and edited by Professors Gilberto Morillo, Benito Briceño, and Juan F. Silva. The book is written in Spanish. A total of 22 families, 141 genera, and 597 species (including 226 orchids) are described and illustrated with drawings and photographs. Each species includes a botanical description, world and national distribution (including paramo sites), elevational limits, ecology, phenology, anatomy, and ethnobotany. The price of the two volumes is USD 90.00 plus shipping. For further information, you may contact Juan F. Silva and/or see their website at <http://www.ciencias.ula.ve/icae/>.

Upcoming Conferences

We welcome any news about future conferences for promotion here. Please send details to Alec Pridgeon (a.pridgeon@kew.org) as far in advance of the event as possible, remembering that the *Orchid Research Newsletter* is published only in January and July of each year.

19th Australian Orchid Conference & Show, 11-16 September 2012

Eighteen speakers from several countries will fill out the large lecture programme in Perth, surely one of the most beautiful cities in Australia and home to Kings Park and Botanic Garden. You should not miss the five-day post-Conference tour to the South West with its rich terrestrial orchid flora that has been the subject of many nature specials on television. For more information, go to http://www.waorchids.iinet.net.au/19th_AOC_Conference.htm.

Fourth Scientific Conference on Andean Orchids, 31 October-4 November 2012

After three highly successful Conferences, the Fourth Scientific Conference on Andean Orchids will be held 31 October- 4 November 2012 in Guayaquil, Ecuador. There will be three days of simultaneously translated talks at the fabulous Guayaquil Convention Center, which will be the venue for the 22nd World Orchid Conference in 2017. One day each will be devoted to topics related to systematics, ecology, and conservation science. Keynote speakers for the three days will be Mark Chase, James Ackerman, and Michael Fay, respectively. Poster sessions in all three areas of investigation will supplement the lecture series. The Conference will also be associated with a major orchid show. There will be local tours and multiple-day, pre-conference tours for registrants on a first-come, first-served basis. Now is your best chance to experience the orchids of the Ecuadorian Andes and/or visit the world-famous Galápagos Islands. Registration and tour details are available on the Internet at www.ecuadororchidconference2012.com/. Additional publicity appeared in *The Orchid Review* in March 2012, *Orchids* magazine (AOS) in May 2012, and *Orchid Digest* in July 2012.

Recent Orchid Nomenclature

New orchid names may now be accessed on the IPNI website:

(www.ipni.org/ipni/plantsearch?request_type=search&output_format=query&ret_defaults=on)

Click on "Show additional search terms" on the right-hand side of the screen. After the search page appears, type in **Orchidaceae** under family name and (for example) **2010-11-30** under "Record date" and "Added since." This will pull up a list of all names added to the IPNI database since 30 November 2010.

Recent Literature

We consult a variety of other sources for recent literature, and you will find a more extensive range of journals from more disciplines than ever before. If you are aware of any recent citations not listed here and henceforth, please send them – in the exact style below – to Alec Pridgeon (a.pridgeon@kew.org) for publication in the following issue (January or July). Write "ORN references" in the subject line of the e-mail.

Book citations should include author(s), date of publication, title, publisher, and place of publication (in that order).

Anatomy and morphology

Bertolucci, S. K. 2012. Anatomical variations of *Laelia purpurata* var. *carnea* in vitro cultured under different intensities and spectral quality of light. *Ciencia Rural* 42: 480-486.

Dugarte, B. A. C. and Luque, R. A. 2012. Morfoanatomia en Cranichideae (Orchidaceae) de la Estacion Loma Redonda del Parque Nacional "Sierra Nevada", Merida, Venezuela. *Lankesteriana* 12: 61-75.

Lee, Y.-I. and Yeung, E. C. 2012. Embryology of the lady's slipper orchid, *Paphiopedilum delenatii*: ovule development. *Botanical Studies* 53: 97-104.

Conservation biology

Ballantyne, M. and Pickering, C. 2012. Ecotourism as a threatening process for wild orchids. *Journal of Ecotourism* 11: 34-47.

Cribb, P. 2011. Orchids in a changing climate. *Lankesteriana* 11: 233-238.

Hirtz, A. 2011. What will be left of the primary forests in Ecuador? *Lankesteriana* 11: 265-268.

Light, M. H. S. and MacConaill, M. 2011. The role of common orchids in appreciating the complexity of biodiversity conservation. *Lankesteriana* 11: 293-300.

Mirenda, T. J. 2011. Botanic gardens, education, and orchid conservation strategies: the need for a coordinated approach. *Lankesteriana* 11: 301-305.

Seaton, P. T. and Pritchard, H. W. 2011. Orchid seed stores for sustainable use: a model for future seed-banking activities. *Lankesteriana* 11: 349-353.

Sinu, P. A., Kuriakose, G., Chandrashekara, K. 2011. Epiphytic orchid diversity in farmer-managed *Soppinabetta* forests of Western Ghats: implications for conservation. *Current Science* 101: 1337-1346.

Zeng, S., Wu, K., da Silva, J. A. T., Zhang, J., Chen, Z., Xia, N., and Duan, J. 2012. Asymbiotic seed germination, seedling development and reintroduction of *Paphiopedilum wardii* Summerh., an endangered terrestrial orchid. *Scientia Horticulturae* 138: 198-209.

Zimmermann, Y., Schorkopf, D. L. P., Moritz, R. F. A., Pemberton, R. W., Quezada-Euan, J. J. G., and Eltz, T. 2011. Population genetic structure of orchid bees (Euglossini) in anthropogenically altered landscapes. *Conservation Genetics* 12: 1183-1194.

Ecology

Ackerman, J. 2012. Orchids gone wild. *Orchids* 81: 88-93.

Chen, L-L. and Gao, J-Y. 2011. Reproductive ecology of *Bulbophyllum ambrosia* (Orchidaceae). *Chinese Journal of Plant Ecology* 35: 1202-1208.

Crain, B. J. 2012. On the relationship between bryophyte cover and the distribution of *Lepanthes* spp. *Lankesteriana* 12: 13-18.

Gerlach, G. 2011. The genus *Coryanthes*: a paradigm in ecology. *Lankesteriana* 11: 253-264.

Gijbels, P., Adriaens, D., and Honnay, O. 2012. An orchid colonization credit in restored calcareous grasslands. *Ecoscience* 19: 21-28.

Hamrick, J. L. and Trapnell, D. W. 2011. Using population genetic analyses to understand seed dispersal patterns. *Acta Oecologica-International Journal of Ecology* 37: 641-649.

Harder, L. D., Hobbhahn, N., and Richards, S. A. 2012. How depressed? Estimates of inbreeding effects during seed development depend on reproductive conditions. *Evolution* 66: 1375-1386.

Kindlmann, P. and Vergara, C. A. C. 2011. How uniform is species diversity in tropical forests? *Lankesteriana* 11: 269-274.

Kirby, S. H. 2011. Active mountain building and the distribution of “core” Maxillariinae species in tropical Mexico and Central America. *Lankesteriana* 11: 275-291.

Lamont, B. B. and Downes, K. S. 2011. Fire-stimulated flowering among resprouters

and geophytes in Australia and South Africa. *Plant Ecology* 212: 2111-2125.

Laroche, V., Pellerin, S., and Brouillet, L. 2012. White fringed orchid as indicator of *Sphagnum* bog integrity. *Ecological Indicators* 14: 50-55.

McCormick, M. K., Taylor, D. L., Juhaszova, K., Burnett, R. K. Jr., Whigham, D. F., and O'Neill, J. P. 2012. Limitations on orchid recruitment: not a simple picture. *Molecular Ecology* 21: 1511-1523.

Olaya-Arenas, P., Melendez-Ackerman, E. J., Perez, M. E., and Tremblay, R. L. 2011. Demographic response by a small epiphytic orchid. *American Journal of Botany* 98: 2040-2048.

Rech, A. R., Chaim Jardim Rosa, Y. B., and Rosa-Junior, E. J. 2011. Inventory and ecologic features of Orchidaceae in the Rio Dourados riparian forest, Dourados-Ms. *Revista Arvore* 35: 717-724.

Toledo-Aceves, T., Garcia-Franco, J. G., Hernandez-Rojas, A., and MacMillan, K. 2012. Recolonization of vascular epiphytes in a shaded coffee agroecosystem. *Applied Vegetation Science* 15: 99-107.

Tremblay, R. L. 2011. Fitness landscapes in orchids: parametric and non-parametric approaches. *Lankesteriana* 11: 355-362.

Wagner, M. R. 2012. Ecological details matter in island biogeography: a case study on the Samoan orchids. *American Midland Naturalist* 167: 1-12.

Yanoviak, S. P., Berghoff, S. M., Linsenmair, K. E., and Zotz, G. 2011. Effects of an epiphytic orchid on arboreal ant community structure in Panama. *Biotropica* 43: 731-737.

Zitari, A., Scopece, G., Helal, A. N., Widmer, A., and Cozzolino, S. 2012. Is floral divergence sufficient to maintain species boundaries upon secondary contact in Mediterranean food-deceptive orchids? *Heredity* 108: 219-228.

Ethnobotany/Ethnopharmacology

Chinsamy, M., Finnie, J. F., and Van Staden, J. 2012. Medicinal orchid research - a South African perspective. *South African Journal of Botany* 79: 180.

Georgiadis, N., Ritzoulis, C., Charchari, E., Koukiotis, C., Tsiopstias, C., and Vasiliadou, C. 2012. Isolation, characterization and emulsion stabilizing properties of polysaccharides from orchid roots (salep). *Food Hydrocolloids* 28: 68-74.

Morales-Sanchez, V., Salazar, G., and Mata, R. 2012. Development of quality control parameters for the medicinal orchids *Cyrtopodium macrobulbon* and *Scaphyglottis fasciculata*. *Pharmaceutical Biology* 50: 561.

History

Cameron, K. M. 2011. A look at 'The Orchid Book' in celebration of Charles Darwin's 200th birthday. *Lankesteriana* 11: 223-231.

Selosse, M-A., Boullard, B., and Richardson, D. 2011. Noel Bernard (1874-1911): orchids to symbiosis in a dozen years, one century ago. *Symbiosis* 54: 61-68.

Micropropagation/seed germination

Aggarwal, S. and Nirmala, C. 2012. Utilization of coir fibers as an eco-friendly substitute for costly gelling agents for *in vitro* orchid seed germination. *Scientia Horticulturae* 133: 89-92.

Antony, J. J. J., Keng, C. L., Rathinam, X., Marimuthu, S., and Subramaniam, S. 2011. Effect of preculture and PVS2 incubation conditions followed by histological analysis in the cryopreserved PLBs of *Dendrobium* Bobby Messina orchid. *Australian Journal of Crop Science* 5: 1557-1564.

Antony, J. J. J., Sinniah, U. R., Keng, C. L., Pobathy, R., Khoddamzadeh, A. A., and Subramaniam, S. 2011. Selected potential encapsulation-dehydration parameters on *Dendrobium* Bobby Messina protocorm-like bodies using TTC analysis. *Australian Journal of Crop Science* 5: 1817-1822.

Chen, J. -T. and Hong, P. -I. 2012. Cellular origin and development of secondary somatic embryos in *Oncidium* leaf cultures. *Biologia Plantarum* 56: 215-220.

da Silva, A. B., Schneedorf Ferreira da Silva, J. M., dos Santos da Silva, J. A., and Togoro, A. H. 2011. Foliar anatomy and *in vitro* growth of *Cattleya* at different concentrations of kefir, Knudson medium, and sucrose. *Bioscience Journal* 27: 896-901.

da Silva, J. A. T., Chin, D. P., Pham Thanh Van, and Mii, M. 2011. Transgenic orchids. *Scientia Horticulturae* 130: 673-680.

Das, Meera C., Kumaria, S., and Tandon, P. 2011. Storage and high conversion frequency of encapsulated protocorm-like bodies of *Cymbidium devonianum* (orchid). *Journal of Horticultural Science and Biotechnology* 86: 611-615.

Dorneles, L. T. and Trevelin, V. 2011. Acclimatization and reintroduction of *Cattleya intermedia* Graham ex Hook. (Orchidaceae) from *in vitro* propagation. *Heringia Serie Botanica* 66: 167-173.

Flachsland, E., Terada, G., Mourazos Fernandez, J., Medina, R., Schinini, A., Rey, H., and Mroginski, L. 2011. Plant regeneration from root-tip culture of *Cyrtopodium brandonianum* Barb. Rodr. (Orchidaceae). *Propagation of Ornamental Plants* 11: 184-188.

Giri, L., Dhyani, P., Rawat, S., Bhatt, I. D., Nandi, S. K., Rawal, R. S., and Pande, V. 2012. *In vitro* production of phenolic compounds and antioxidant activity in callus

suspension cultures of *Habenaria edgeworthii*: a rare Himalayan medicinal orchid. *Industrial Crops and Products* 39: 1-6.

Grosso, V., Nardi, L., Farina, A., Aracri, B., Pashkoulov, D., Debora, G., and Lucretti, S. 2011. Flow cytometric analysis of polyploidy induction in orchid *in vitro* cultures. *Cytometry Part A* 79A: 1039.

Hosomi, S. T., Custodio, C. C., Seaton, P. T., Marks, T. R., and Machado-Neto, N. B. 2012. Improved assessment of viability and germination of *Cattleya* (Orchidaceae) seeds following storage. *In Vitro Cellular and Developmental Biology-Plant* 48: 127-136.

Hsiang E-H., Tsai W-T., Hsieh T-F., Matsumoto, T., Niino, T., Hsiang, E. H., Tsai, W. T., and Hsieh, T. F. 2011. Effects of drying treatment and cryopreservation on seed viability of *Phalaenopsis amabilis* and *Phalaenopsis aphrodite*. *Journal of Taiwan Agricultural Research* 60: 309-317.

Huehne, P. S. and Bhinija, K. 2012. Application of cryoprotectants to improve low temperature storage survival of orchid seeds. *Scientia Horticulturae* 135: 186-193.

Kanchanapoon, K., Nakkaew, A., Kanchanapoom, K., and Phongdara, A. 2012. Efficient biolistic transformation and regeneration capacity of an EgTCTP transgene in protocorm-like bodies of *Phalaenopsis* orchid. *Notulae Botanicae, HortoAgrobotanici, Cluj-Napoca* 40: 58-64.

Kaur, S. and Bhutani, K. K. 2012. Organic growth supplement stimulants for *in vitro* multiplication of *Cymbidium pendulum* (Roxb.) Sw. *Horticultural Science* 39: 47-52.

Khoddamzadeh, A. A., Sinniah, U. R., Kadir, M. A., Kadzimin, S. B., Mahmood, M., and Sreeramanan, S. 2011. *In vitro* induction and proliferation of protocorm-like bodies (PLBs) from leaf segments of *Phalaenopsis bellina* (Rchb.f.) Christenson. *Plant Growth Regulation* 65: 381-387.

Khoddamzadeh, A. A., Sinniah, U. R., Lynch, P., Kadir, M. A., Bin Kadzimin, S., and Mahmood, M. 2011. Cryopreservation of protocorm-like bodies (PLBs) of *Phalaenopsis bellina* (Rchb.f.) Christenson by encapsulation-dehydration. *Plant Cell Tissue and Organ Culture* 107: 471-481.

Lalit, G., Praveen, D., SandeRawat, Bhatt, I. D., Nandi, S. K., Rawal, R. S., and Veena, P. 2012. *In vitro* production of phenolic compounds and antioxidant activity in callus suspension cultures of *Habenaria edgeworthii*: a rare Himalayan medicinal orchid. *Industrial Crops and Products* 39: 1-6.

Lesar, H., Ceranic, N., Kastelec, D., and Luthar, Z. 2012. Asymbiotic seed germination of *Phalaenopsis* Blume orchids after hand pollination. *Acta Agriculturae Slovenica* 99: 5-11.

Liao, Y-J., Tsai, Y-C., Sun, Y-W., Lin, R-S., and Wu, F-S. 2011. *In vitro* shoot induction and plant regeneration from flower buds in *Paphiopedilum* orchids. *In Vitro*

Cellular and Developmental Biology-Plant 47: 702-709.

Liu, Z-J., Zhang, Y-T., Wang, Y., Huang, Q-H., Chen, S-C., and Chen, L-J. 2011. Recent developments in the study of rapid propagation of *Dendrobium catenatum* Lindl. with a discussion on its scientific and Chinese names. *Plant Science Journal* 29: 763-772.

Mahendran, G. and Bai, V. N. 2012. Direct somatic embryogenesis and plant regeneration from seed derived protocorms of *Cymbidium bicolor* Lindl. *Scientia Horticulturae* 135: 40-44.

Maziah, M., Bee, O-B., Tengku, M., and Sreeramanan, S. 2011. The growth and biochemical responses on *in vitro* cultures of *Oncidium* taka orchid to electromagnetic field. *Australian Journal of Crop Science* 5: 1577-1587.

Mohanty, P., Das, M. C., Kumaria, S., and Tandon, P. 2012. High-efficiency cryopreservation of the medicinal orchid *Dendrobium nobile* Lindl. *Plant Cell, Tissue and Organ Culture* 109: 297-305.

Nagananda, G. S., Satishchandra, N., and Rajath, S. 2011. Regeneration of encapsulated protocorm-like bodies of medicinally important vulnerable orchid *Flickingeria nodosa* (Dalz.) Seidenf. *International Journal of Botany* 7: 310-313.

Niknejad, A., Kadir, M. A., and Kadzimin, S. B. 2011. *In vitro* plant regeneration from protocorm-like bodies (PLBs) and callus of *Phalaenopsis gigantea* (Epidendroideae: Orchidaceae). *African Journal of Biotechnology* 10: 11808-11816.

Pant, B. and Shrestha, S. 2011. *In vitro* mass propagation of a ground orchid - *Phaius tancarvilleae* (l'Her.) Blume through shoot tip culture. [editor's note: correct name *Phaius tankervilleae* (Banks) Blume]. *Plant Tissue Culture and Biotechnology* 21: 181-188.

Pereira, M. C., Torres, D. P., Rodrigues Guimaraes, F. A., Pereira, O. L., and Megumi Kasuya, M. C. 2011. Seed germination and protocorm development of *Epidendrum secundum* Jacq. (Orchidaceae) in association with *Epulorhiza* mycorrhizal fungi. *Acta Botanica Brasilica* 25: 534-541.

Prasertsirivatna, S. and Koolpluksee, M. 2011. The study on optimization of growth conditions for *Dendrobium friedericksianum* Rchb.f. seedlings in aseptic culture. *International Journal of Agricultural Technology* 7: 739-749.

Ranjetta, P., Nor'Ain, A. H., Advina, L. J., and Sreeramanan, S. 2012. Vitrification and histological analyses of protocorm-like bodies of *Vanda* Kaseem's Delight Orchid. *Australian Journal of Crop Science* 6: 219-224.

Righeto, M. V. L., Almeida, L. V. de, Brondani, G. E., Amaral, A. F. de C., and Almeida, M. de. 2012. Morfofisiologia de plantulas de *Cattleya labiata* Lindley e *Cattleya eldorado* Linden cultivadas *in vitro* sob influencia de paclobutrazol. *Revista Brasileira de Biociencias* 10: 20-25.

Rizwan, R., Balquees, F., Salman, M., Iqbal, M. S., Misbah, R., Muhammad, A., and Syed, Zia-ul-Hasan. 2012. Effect of indole-3-butyric acid (IBA) on *in vitro* root induction in *Dendrobium* orchid (*Dendrobium sabin* H.). *African Journal of Biotechnology* 11: 4673-4675.

Rodrigues, D. T., Novais, R. F., Alvarez, V. V. H., Dias, J. M. M., Otoni, W. C., and Villani, E. M. de A. 2012. Cultivo *in vitro* de plantulas de orquidea em meios com diferentes concentracoes de fertilizante mineral. *Revista Ceres* 59: 9-15.

Rodrigues, D. T., Novais, R. F., Alvarez, V. V. H., Dias, J. M. M., and Villani, E. M. de A. 2012. Concentracoes e composicoes quimicas do meio nutritivo para o cultivo *in vitro* de orquidea. *Revista Ceres* 59: 1-8.

Roura, A., Proano, K., and Jadan, M. 2011. Aplicacion de la tecnica de encapsulacion—deshidratacion para la crioconservacion de semillas y protocorms de *Oncidium stenotis* (Orchidaceae). *Lankesteriana* 11: 365.

Sherif, N. A., Benjamin, J. H. F., Muthukrishnan, S., Kumar, T. S., and Rao, M. V. 2012. Regeneration of plantlets from nodal and shoot tip explants of *Anoectochilus elatus* Lindley, an endangered terrestrial orchid. *African Journal of Biotechnology* 11: 7549-7553.

Soares, J. D. R., Pasqual, M., Rodrigues, F. A., Villa, F., Carvalho, J. G. de, Araujo, A. G. de, de Carvalho, J. G., and de Araujo, A. G. 2011. Propagacao *in vitro* de orquidea: iodeto de potassio e cloreto de cobalto em meio de cultura Knudson C. [Orchids *in vitro* propagation: potassium iodide and cobalt chloride in Knudson C culture medium.] *Revista Ceres* 58: 273-277.

Tao, J., Yu, L., Kong, F., and Zhao, D. 2011. Effects of plant growth regulators on *in vitro* propagation of *Cymbidium faberi* Rolfe. *African Journal of Biotechnology* 10: 15639-15646,

Tavares, A. R., Young, J. L. M., Ori, S. S., Kanashiro, S., Lima, Giuseppina P. P., Chu, E. P., and Suzuki, R. M. 2012. Orchid *in vitro* growth as affected by nitrogen levels in the culture medium. *Horticultura Brasileira* 30: 119-124.

Uma, T. and Nitin, D. 2012. Artificial pollination and *in vitro* asymbiotic seed germination in garden orchid *Spathoglottis plicata* Blume (Orchidaceae). *Recent Research in Science and Technology* 4: 13-18.

Wu, K., Zeng, S., da Silva, J. A. T., Chen, Z., Zhang, J., Yang, Y., and Duan, J. 2012. Efficient regeneration of *Renanthera* Tom Thumb 'Qilin' from leaf explants. *Scientia Horticulturae* 135: 194-201.

Yamamoto, M., Miyoshi, K., Ichihashi, S., and Mii, M. 2012. Ionic compositions play an important role on *in vitro* propagation of PLBs of spring-flowering *Calanthe*. *Plant Biotechnology* 29: 71-76.

Zainuddin, M., Julkifle, A. L., Pobathy, R., Sinniah, U. R., Khoddamzadeh, A., Antony, J. J. J., Pavallekoodi, and Subramaniam, S. 2011. Preliminary analysis of cryopreservation of *Dendrobium* Bobby Messina orchid using an encapsulation-dehydration technique with Evans blue assay. *African Journal of Biotechnology* 10: 11870-11878.

Molecular biology

Aceto, S. and Gaudio, L. 2011. The MADS and the beauty: genes involved in the development of orchid flowers. *Current Genomics* 12: 342-356.

Chen, M-K., Lee, P-F., and Yang, C-H. 2011. Delay of flower senescence and abscission in *Arabidopsis* transformed with an FOREVER YOUNG FLOWER homolog from *Oncidium* orchid. *Plant Signaling and Behavior* 6: 1841-1843.

Chen, M-K., Lee, P-F., Yang, C-H., Chen, M. K., Lee, P. F., and Yang, C. H. 2011. Delay of flower senescence and abscission in *Arabidopsis* transformed with a FOREVER YOUNG FLOWER homolog from *Oncidium* orchid. *Plant Signaling and Behavior* 6: 1841-1843.

Cueva, A., Concia, L., and Cella, R. 2012. Molecular characterization of a *Cyrtocilum loxense* somatic embryogenesis receptor-like kinase (SERK) gene expressed during somatic embryogenesis. *Plant Cell Reports* 31: 1129-1139.

Junka, N., Kanlayanarat, S., Buanong, M., Wongchaochant, S., Wongs-Aree, C. 2011. Analysis of anthocyanins and the expression patterns of genes involved in biosynthesis in two *Vanda* hybrids. *International Journal of Agriculture and Biology* 13: 873-880.

Junka, N., Kanlayanarat, S., Buanong, M., and Wongs-Aree, C. 2012. Genetic alignment of anthocyanin biosynthetic genes cloned from *Vanda* hybrid-pale mauve (*V. teres* x *V. hookeriana*). *Acta Horticulturae* 943: 123-130.

Junka, N., Kanlayanarat, S., Buanong, M., Wongchaochant, S., and Wongs-Aree, C. 2012. Semiquantitative expression of anthocyanin biosynthetic genes in a *Vanda* hybrid-pale mauve (*V. teres* x *V. hookeriana*). *Acta Horticulturae* 943: 131-136.

Lu, H-C., Hsieh, M-H., Chen, C-E., Chen, H-H., Wang, H-I., and Yeh, H-H. 2012. A high-throughput virus-induced gene-silencing vector for screening transcription factors in virus-induced plant defense response in orchid. *Molecular Plant-Microbe Interactions* 25: 738-746.

Salemme, M., Sica, M., Gaudio, L., and Aceto, S. 2011. Expression pattern of two paralogs of the PI/GLO-like locus during *Orchis italica* (Orchidaceae, Orchidinae) flower development. *Development Genes and Evolution* 221: 241-246.

Wu, Y-Y., Tian, L., Zhu, Y-P., and He, F-M. 2012. Construction of SSH cDNA library and the corresponding EST analysis in petals and labellum of *Cymbidium* lianpan. *Bulletin of Botanical Research* 32: 222-226.

Xu, X. Y., Tian, M., Wang, C. X., and Long, M. H. 2011. Cloning and expression analysis of a flowering-related gene, OAP 3, in *Oncidium*. *Journal of Zhejiang A&F University* 28: 900-906.

Yoon, J-Y., Chung, B-N., Choi, G-S., and Choi, S-K. 2012. Genetic variability in the coat protein genes of *Cymbidium* mosaic virus isolates from orchids. *Virus Genes* 44: 323-328.

Zheng, Q., Zheng, Y., Wang, G., Guo, W., and Zhang, Z. 2011. Sonication assisted *Agrobacterium*-mediated transformation of chalcone synthase (CHS) gene to spring *Dendrobium* cultivar 'Sanya'. *African Journal of Biotechnology* 10: 11832-11838.

Zhu, Y-P., Yang, D. Yang, X-H., Guan, W-L., Wu, H-Z., and He, F-M. 2011. Screening specific expression genes of multiple labellum of peloria flower and analysis in *Cymbidium sinense*. *Xibei Zhiwu Xuebao* 31: 2165-2171.

Mycorrhiza

Akhmetzhanova, A. A., Soudzilovskaia, N. A., Onipchenko, V. G., Cornwell, W. K., Agafonov, V. A., Selivanov, I. A., and Cornelissen, J. H. C. 2012. A rediscovered treasure: mycorrhizal intensity database for 3000 vascular plant species across the former Soviet Union. *Ecology* 93: 689-690.

Basiewicz, M., Weiss, M., Kogel, K. H., Langen, G., Zorn, H., and Zuccaro, A. 2012. Molecular and phenotypic characterization of *Sebacina vermifera* strains associated with orchids, and the description of *Piriformospora williamsii* sp. nov. *Fungal Biology* 116: 204-213.

Chen, J., Wang, H., and Guo, S-X. 2012. Isolation and identification of endophytic and mycorrhizal fungi from seeds and roots of *Dendrobium* (Orchidaceae). *Mycorrhiza* 22: 297-307.

Chutima, R. and Lumyong, S. 2012. Production of indole-3-acetic acid by Thai native orchid-associated fungi. *Symbiosis* 56: 35-44.

Dan, Y. Yu, X-M., Guo, S-X., and Meng, Z-X. 2012. Effects of forty-two strains of orchid mycorrhizal fungi on growth of plantlets of *Anoectochilus roxburghii*. *African Journal of Microbiology Research* 6: 1411-1416.

da Silva, M. and Pereira, O. L. 2011. *Pseudocercospora epidendri* sp. nov. on the Neotropical orchid, *Epidendrum secundum* from Brazil. *Mycotaxon* 118: 95-101.

Garibay-Orijel, R., Oyama, K., and Avila-Diaz, I. 2011. Hongos endofitos de la orquidea epifita *Laelia speciosa*. *Lankesteriana* 11: 367.

Graham, R. R. and Dearnaley, J. D. W. 2012. The rare Australian epiphytic orchid *Sarcochilus weinthalii* associates with a single species of *Ceratobasidium*. *Fungal Diversity* 54: 31-37.

- Li, B., Tang, M-J., Tang, K., Zhao, L-F., and Guo, S-X. 2012. Screening for differentially expressed genes in *Anoectochilus roxburghii* (Orchidaceae) during symbiosis with the mycorrhizal fungus *Epulorhiza* sp. *Science China-Life Sciences* 55: 164-171.
- Madren, C. 2012. Picky Eaters Club: fungi that orchids need to grow are just as finicky as the exotic flowers themselves. *Scientific American* 306: 16.
- Tan, X-M., Chen, X-M., Wang, C.-L., Jin, X-H., Cui, J-L., Chen, J., Guo, S-X., and Zhao, L-F. 2012. Isolation and identification of endophytic fungi in roots of nine *Holcoglossum* plants (Orchidaceae) collected from Yunnan, Guangxi, and Hainan Provinces of China. *Current Microbiology* 64: 140-147.
- Tao, G., Liu, Z-Y., Sun, B-D., Zhu, Y., Cai, L., and Liu, X-Z. 2012. Occurrence and diversity of endophytic fungi in *Bletilla ochracea* (Orchidaceae) in Guizhou, China. *African Journal of Microbiology Research* 6: 2859-2868.
- Tondello, A., Vendramin, E., Villani, M., Baldan, B., and Squartini, A. 2012. Fungi associated with the southern Eurasian orchid *Spiranthes spiralis* (L.) Chevall. *Fungal Biology* 116: 543-549.
- Valadares, R. B., Pereira, M. C., Otero, J. T., and Cardoso, E. J. 2012. Narrow fungal mycorrhizal diversity in a population of the orchid *Coppensia doniana* [ed. note: *Coppensia* is a synonym of *Gomesa*]. *Biotropica* 44: 114-122.
- Wu, H-F., Song, X-Q., Yang, F-S., and Wang, J. 2011. Effects of symbiotic fungi on the physiological characteristics of *Dendrobium catenatum* Lindley (Orchidaceae), *Plant Science Journal* 29: 738-742.
- Wu, P-H., Huang, D-D., and Chang, D. C. N. 2011. Mycorrhizal symbiosis enhances *Phalaenopsis* orchid's growth and resistance to *Erwinia chrysanthemi*. *African Journal of Biotechnology* 10:10095-10100.
- Yagame, T., Orihara, T., Selosse, M-A., Yamato, M., and Iwase, K. 2012. Mixotrophy of *Platanthera minor*, an orchid associated with ectomycorrhiza-forming Ceratobasidiaceae fungi. *New Phytologist* 193: 178-187.
- Zhang, L., Chen, J., Lv, Y., Gao, C., and Guo, S. 2012. *Mycena* sp., a mycorrhizal fungus of the orchid *Dendrobium officinale*. *Mycological Progress* 11: 395-401.
- Zhang, P., Song, X-Q., Zhang, P., and Song, X. Q. 2012. Advances in diversity and promotion mechanism of endophytic bacteria associated with orchids. *Journal of Tropical and Subtropical Botany* 20: 92-98.

Pathology

- Cating, R. A., Hoy, M. A., and Palmateer, A. J. 2012. A comparison of standard and high-fidelity PCR: evaluating quantification and detection of pathogen DNA in the presence of orchid host tissue. *Plant Disease* 96: 480-485.

Physiology/Phytochemistry

Cardoso, J. C., Ono, E. O., and Rodrigues, J. D. 2012. Gibberellic acid in vegetative and reproductive development of *Phalaenopsis* orchid hybrid genus. *Horticultura Brasileira* 30: 71-74.

Huda, M. K. and Wilcock, C. C. 2012. Rapid floral senescence following male function and breeding systems of some tropical orchids. *Plant Biology* 14: 278-284.

Johnson, T. R. and Kane, M. E. 2012. Effects of temperature and light on germination and early seedling development of the pine pink orchid (*Bletia purpurea*). *Plant Species Biology* 27: 174-179.

Kim, Y. J., Lee, H. J., and Kim, K. S. 2011. Night interruption promotes vegetative growth and flowering of *Cymbidium*. *Scientia Horticulturae* 130: 887-893.

Lin, M., Starman, T. W., Wang, Y-T., Niu, G., and Cothren, J. T. 2011. Deferring flowering of nobile *Dendrobium* hybrids by holding plants under low temperature after vernalization. *Scientia Horticulturae* 130: 869-873.

Nisha, N., Siang, T-C., Maziah, M., and Siang, T. C. 2012. Effect of 6-benzylaminopurine on flowering of a *Dendrobium* orchid. *Australian Journal of Crop Science* 6: 225-231.

Qin, Q., Kaas, Q., Zhang, C., Zhou, L., Luo, X., Zhou, M., Sun, X., Zhang, L., Paek, K-Y., and Cui, Y. 2012. The cold awakening of *Doritaenopsis* 'Tinny Tender' orchid flowers: the role of leaves in cold-induced bud dormancy release. *Journal of Plant Growth Regulation* 31: 139-155.

Wu, P-H. and Chang, D. C. N. 2012. Cytokinin treatment and flower quality in *Phalaenopsis* orchids: comparing N-6-benzyladenine, kinetin and 2-isopentenyl adenine. *African Journal of Biotechnology* 11: 1592-1596.

Pollination

Abrahamczyk, S., Gottleuber, P., and Kessler, M. 2012. Seasonal changes in odour preferences by male euglossine bees (Hymenoptera: Apidae) and their ecological implications. *Apidologie* 43: 212-217.

Abrahamczyk, S., Gottleuber, P., Matauschek, C., and Kessler, M. 2011. Diversity and community composition of euglossine bee assemblages (Hymenoptera: Apidae) in western Amazonia. *Biodiversity and Conservation* 20: 2981-3001.

Aguiar, J. M. R. B. V., Pansarin, L. M., Ackerman, J. D., and Pansarin, E. R. 2012. Biotic versus abiotic pollination in *Oeceoclades maculata* (Lindl.) Lindl. (Orchidaceae). *Plant Species Biology* 27: 86-95.

Aguiar, W. M. and Gaglianone, M. C. 2011. Euglossine bees (Hymenoptera Apidae

Euglossina) on an inselberg in the Atlantic Forest domain of southeastern Brazil. *Tropical Zoology* 24: 107-125.

Bohman, B., Jeffares, L., Flematti, G., Phillips, R. D., Dixon, K. W., Peakall, R., and Barrow, R. A. 2012. The discovery of 2-hydroxymethyl-3-(3-methylbutyl)-5-methylpyrazine: a semiochemical in orchid pollination. *Organic Letters* 14: 2576-2578.

Camacho-Dominguez, E. and Avila-Diaz, I. 2011. Mating system and female reproductive success of the endemic, epiphytic *Prosthechea* aff. *karwinskii* (Orchidaceae). *Lankesteriana* 11: 366.

Crall, J. D. and Combes, S. A. 2012. Flying high: body size, flight performance, and vertical stratification of orchid bee communities in tropical rainforests. *Integrative and Comparative Biology* 52: E232.

Ferreira, M. G., de Pinho, O. C., Balestieri, J. B. P., and Faccenda, O. 2011. Fauna and stratification of male orchid bees (Hymenoptera: Apidae) and their preference for odor baits in a forest fragment. *Neotropical Entomology* 40: 639-646.

Goegler, J., Twele, R., Francke, W., and Ayasse, M. 2011. Two phylogenetically distinct species of sexually deceptive orchids mimic the sex pheromone of their single common pollinator, the cuckoo bumblebee *Bombus vestalis*. *Chemoecology* 21: 243-252.

Grajales-Conesa, J., Melendez-Ramirez, V., and Cruz-Lopez, L. 2011. Floral scents and their interaction with insect pollinators. *Revista Mexicana de Biodiversidad* 82: 1356-1367.

Hinojosa-Diaz, I. A., and Engel, M. S. 2011. Revision of the orchid bee subgenus *Euglossella* (Hymenoptera, Apidae), Part I, The *decorata* species group. *ZooKeys* 140: 27-69.

Hobbhahn, N., Bytebier, B., Johnson, S. D., and Harder, L. D. 2012. The role of resource limitation in the occurrence and persistence of rewardless pollination systems in *Disa* (Orchidaceae). *South African Journal of Botany* 79: 189-190.

Internicola, A. I. and Harder, L. D. 2012. Bumble-bee learning selects for both early and long flowering in food-deceptive plants. *Proceedings Of The Royal Society B-Biological Sciences* 279: 1538-1543.

Iwata, T., Nagasaki, O., Ishii, H. S., and Ushimaru, A. 2012. Inflorescence architecture affects pollinator behaviour and mating success in *Spiranthes sinensis* (Orchidaceae). *New Phytologist* 193: 196-203.

Johnson, S. D. 2012. Using model and manipulated flowers to study pollinator-mediated selection. *South African Journal of Botany* 79: 191.

Martos, F., Pailler, T., Bytebier, B., and Johnson, S. D. 2012. Fly pollination in the

achlorophyllous orchid *Gastrodia similis*: does *Gastrodia* provide a breeding site for its insect pollinator? *South African Journal of Botany* 79: 197.

Nakase, Y. and Kato, M. 2012. A nocturnal *Provespa* wasp species as the probable pollinator of epiphytic orchid *Coelogyne fimbriata*. *Entomological Science* 15: 253-256.

Nemesio, A. 2011. Rediscovered after forty-two years: the rare orchid bee *Eufriesea brasilianorum* (Hymenoptera: Apidae) of eastern Brazil. *North-Western Journal of Zoology* 7: 356-359.

Newman, E., Anderson, B., and Johnson, S. D. 2012. Flower colour adaptation in a mimetic orchid. *Proceedings of the Royal Society B-Biological Sciences* 279:2309-2313.

Pauw, A. Bond, W. J. 2011. Mutualisms matter: pollination rate limits the distribution of oil-secreting orchids. *Oikos* 120: 1531-1538.

Ribeiro Faria, L. R. and da Silveira, F. A. 2011. The orchid bee fauna (Hymenoptera, Apidae) of a core area of the Cerrado, Brazil: the role of riparian forests as corridors for forest-associated bees. *Biota Neotropica* 11: 87-94.

Schiestl, F. P. and Glaser, F. 2012. Specific ant-pollination in an alpine orchid and the role of floral scent in attracting pollinating ants. *Alpine Botany* 122: 1-9.

Schorkopf, D. L. P., Mitko, L., and Eltz, T. 2011. Enantioselective preference and high antennal sensitivity for (-)-ipsdienol in scent-collecting male orchid bees, *Euglossa cyanura*. *Journal of Chemical Ecology* 37: 953-960.

Shuttleworth, A. and Johnson, S. D. 2012. The Hemipepsis wasp-pollination system in South Africa: a comparative analysis of trait convergence in a highly specialized plant guild. *Botanical Journal of the Linnean Society* 168: 278-299.

Sletvold, N. and Agren, J. 2011. Nonadditive effects of floral display and spur length on reproductive success in a deceptive orchid. *Ecology* 92: 2167-2174.

Suni, S. S. and Brosi, B. J. 2012. Population genetics of orchid bees in a fragmented tropical landscape. *Conservation Genetics* 13: 323-332.

Zhou, X., Lin, H., Fan, X-L., and Gao, J-Y., 2012. Autonomous self-pollination and insect visitation in a saprophytic orchid, *Epipogium roseum* (D. Don) Lindl. *Australian Journal of Botany* 60: 154-159.

Systematics and distribution

Ackerman, J. D., Morales, M., and Tremblay, R. 2011. Darwin's orchids: their variation, plasticity, and natural selection. *Lankesteriana* 11: 179-184.

Baider, C., Florens, F. B. V., and Pailler, T. 2012. *Jumellea recurva* (Orchidaceae):

not a rediscovery in Mauritius. *Phytotaxa* 40: 31-32.

Baider, C., Florens, F. B. V., Rakotoarivelo, F., Bosser, J., and Paillet, T. 2012. Two new records of *Jumellea* (Orchidaceae) for Mauritius (Mascarene Islands) and their conservation status. *Phytotaxa* 52: 21-28.

Bastos, C. A., van den Berg, C., and Meneguzzo, T. E. C. 2012. *Encyclia fimbriata* (Orchidaceae: Laeliinae), a new large-flowered species from Bahia, Brazil. *Phytotaxa* 40: 26-30.

Bitea, N. D., Madosa, E., Ciulca, S., Popescu, S., Lazar, A., Avadanei, C., and Velicevici, G. 2011. Studies regarding the morphological variability of some orchid species from Anina Mountains. *Journal of Horticulture, Forestry and Biotechnology* 15: 43-47.

Blinova, I. V. 2012. Intra- and interspecific morphological variation of some European terrestrial orchids along a latitudinal gradient. *Russian Journal of Ecology* 43: 111-116.

Bogarin, D. 2011. How many orchid species in Costa Rica? A review of the latest discoveries. *Lankesteriana* 11: 185-205.

Borba, E. L., Barbosa, A. R., de Melo, M. C., Loureiro-Gontijo, S., and de Oliveira, H. O. 2011. Mating systems in the Pleurothallidinae (Orchidaceae): evolutionary and systematic implications. *Lankesteriana* 11: 207-221.

Buzatto, C. R., Davies, K. L., Singer, R. B., dos Santos, R. P., and van den Berg, C. 2012. A comparative survey of floral characters in *Capanemia* Barb. Rodr. (Orchidaceae: Oncidiinae). *Annals of Botany* 109: 135-144.

Castaneda-Zarate, M., Viccon-Esquivel, J., Ramos-Castro, S. E., and Solano-Gomez, R. 2012. New records of Orchidaceae for Veracruz, Mexico. *Revista Mexicana de Biodiversidad* 83: 281-284.

Castro Neto, V. P., Motte, D., and Dubuisson, J-Y. 2012. *Cattleya x itabapoanaensis* (Orchidaceae), a new natural hybrid from Rio Janeiro State (Brazil). *Phytotaxa* 50: 64-68.

Chemisquy, M. A. and Morrone, O. 2012. Molecular phylogeny of *Gavilea* (Chloraeinae: Orchidaceae) using plastid and nuclear markers. *Molecular Phylogenetics and Evolution* 62: 889-897.

Chen, Y-Y., Bao, Z-X., and Li, Z-Z. 2011. High allozymic diversity in natural populations of mycoheterotrophic orchid *Gastrodia elata*, an endangered medicinal plant in China. *Biochemical Systematics and Ecology* 39: 526-535.

Cheng, X-F., Li, S-Y., Hu, H., and Wu, T-G. 2011. Leaf traits of orchids in relation to life form in karst area of southwestern China. *Plant Diversity and Resources* 33: 595-604.

- Chiron, G. R., Guiard, J., and van den Berg, C. 2012. Phylogenetic relationships in Brazilian *Pleurothallis sensu lato* (Pleurothallidinae, Orchidaceae): evidence from nuclear ITS rDNA sequences. *Phytotaxa* 46: 34-58.
- Chung, M. Y. and Chung, M. G. 2012. A review of the use of genetic markers in orchid systematics with emphasis on allozymes. *Biochemical Systematics and Ecology* 41: 62-73.
- Chung, M. Y., Nason, J. D., and Chung, M. G. 2011. Significant demographic and fine-scale genetic structure in expanding and senescing populations of the terrestrial orchid *Cymbidium goeringii* (Orchidaceae). *American Journal of Botany* 98: 2027-2039.
- Cisternas, M. A., Salazar, G. A., Verdugo, G., Novoa, P., Calderon, X., and Negritto, M. A. 2012. Phylogenetic analysis of Chloraeinae (Orchidaceae) based on plastid and nuclear DNA sequences. *Botanical Journal of the Linnean Society* 168: 258-277.
- Dalstrom, S. 2012. New combinations in *Odontoglossum* (Orchidaceae: Oncidiinae) and a solution to a taxonomic conundrum. *Lankesteriana* 12: 53-60.
- Datar, M. N. and Ghate, V. S. 2012. Extended distribution of *Smithsonia straminea* C.J. Saldanha, an endemic orchid in Maharashtra, India. *Journal of Threatened Taxa* 4: 2406-2408.
- De Azevedo, C. O. and van den Berg, C. 2012. *Prescottia ecuadorensis*: a new species of *Prescottia* (Cranichidinae, Orchidaceae) from Ecuador. *Phytotaxa* 40: 60-64.
- Doucette, A. 2012. A new *Masdevallia* (Orchidaceae: Pleurothallidinae) from Colombia. *Phytotaxa* 48: 34-38.
- Dressler, R. L. 2011. Las sobralias se pueden clasificar? – El complejo de *Sobralia warszewiczii*. *Lankesteriana* 11: 239-243.
- Duttke, S., Zoulias, N., and Kim, M. 2012. Mutant flower morphologies in the wind orchid, a novel orchid model species. *Plant Physiology* 158: 1542-1547.
- Endara, L. A., Williams, N. H., and Whitten, W. M. 2011. Filogenia molecular preliminar de *Scaphosepalum* (Orchidaceae: Pleurothallidinae). *Lankesteriana* 11: 245-252.
- Eum, S. M., Gale, S., Yukawa, T., and Lee, N. S. 2011. Phylogenetic and conservation status of the endangered terrestrial orchid *Nervilia nipponica* (Orchidaceae) in Korea. *Biochemical Systematics and Ecology* 39: 635-642.
- Garcia-Gonzalez, A. and Perez M., R. 2011. La comunidad orquideologica en la Reserva de la Biosfera Sierra del Rosario, Cuba. [The orchid community in the Biosphere Reserve Sierra del Rosario, Cuba]. *Revista de Biología Tropical* 59: 1805-1812.

- Gigant, R., Brugel, A., De Bruyn, A., Risterucci, A. M., Guiot, V., Viscardi, G., Humeau, L., Grisoni, M., and Besse, P. 2012. Nineteen polymorphic microsatellite markers from two African *Vanilla* species: across-species transferability and diversity in a wild population of *V. humblotii* from Mayotte. *Conservation Genetics Resources* 4: 121-125.
- Hedren, M., Nordstrom, S., and Stahlberg, D. 2012. Geographical variation and systematics of the tetraploid marsh orchid *Dactylorhiza majalis* subsp. *sphagnicola* (Orchidaceae) and closely related taxa. *Botanical Journal of the Linnean Society* 168: 174-193.
- Huda, M. K. and Wilcock, C. C. 2011. Colonisation and diversity of epiphytic orchids on trees in disturbed and undisturbed forests in the Asian tropics. *Gardens' Bulletin (Singapore)* 63: 341-356.
- Hyun, Y. S., Kim, J., and Chung, K. W. 2012. Development of polymorphic microsatellite markers for *Cymbidium goeringii* (Orchidaceae). *American Journal of Botany* 99: E193-E198.
- Jacquemyn, H. Brys, R., Honnay, O., Roldan-Ruiz, I., Lievens, B., and Wiegand, T. 2012. Nonrandom spatial structuring of orchids in a hybrid zone of three *Orchis* species. *New Phytologist* 193: 454-464.
- Jheng, C-F., Chen, T-C., Lin, J-Y., Chen, T-C., Wu, W-L., and Chang, C-C. 2012. The comparative chloroplast genomic analysis of photosynthetic orchids and developing DNA markers to distinguish *Phalaenopsis* orchids. *Plant Science* 190: 62-73.
- Juarez, L., Montana, C., and Ferrer, M. M. 2011. Genetic structure at patch level of the terrestrial orchid *Cyclopogon luteoalbus* (Orchidaceae) in a fragmented cloud forest. *Plant Systematics and Evolution* 297: 237-251.
- Karremans, A. P., Bogarin, D., Fernandez, M., Smith, C. M., and Blanco, M. 2012. New species and records of Orchidaceae from Costa Rica. II. *Lankesteriana* 12: 19-51.
- Khew, S. W. G. and Chia, T. F. 2011. Parentage determination of *Vanda* Miss Joaquim (Orchidaceae) through two chloroplast genes *rbcL* and *matK*. *AoB Plants* 2011: plr018.
- Kloetzli, F. 2011. Zum spontanen Massenaufreten von Orchideen Ein Zufallsfund – ein Zufallsjahr? [Mass development of orchids: just a chance in day or location?] *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zuerich* 156: 13-21.
- Kolanowska, M. and Perez, O. A. E. 2012. A new species of *Lockhartia* (Orchidaceae) from Colombia. *Systematic Botany* 37: 347-351.

- Kolanowska, M., Perez, O. A. E., and Parra, E. S. 2012. A new species of *Campylocentrum* (Orchidaceae: Angraecinae) from Colombia. *Lankesteriana* 12: 9-11.
- Kolanowska, M. and Szlachetko, D. L. 2012. A new species of *Psilochilus* (Triphoreae, Orchidaceae) from Colombia. *Systematic Botany* 37: 352-355.
- Lin, T-P. and Lin, W-M. 2011. Newly discovered native orchids of Taiwan (IV). *Taiwania* 56: 315-322.
- Liu, Q., Yin, S-h., and Lan, Q-Y. 2011. Numeric dynamics of *ex situ* *Dendrobium fimbriatum* population. *Shengtaixue Zazhi* 30: 2770-2775.
- Logacheva, M. D., Schelkunov, M. I., and Penin, A. A. 2011. Sequencing and analysis of plastid genome in mycoheterotrophic orchid *Neottia nidus-avis*. *Genome Biology and Evolution* 3: 1296-1303.
- Lopez-Roberts, M. C., Almeida, P. R. M., Oliveira, E. J. F., and van den Berg, C. 2012. Microsatellite marker development for the threatened orchid *Masdevallia solomonii* (Orchidaceae). *American Journal of Botany* 99: e66-e68.
- Machado Neto, N. B. and Esteves Vieira, L. G. 2011. Assessment of genetic diversity in *Cattleya intermedia* Lindl. (Orchidaceae). *Brazilian Archives of Biology and Technology* 54: 939-946.
- Mallet, B., Humeau, L., Blambert, L., Rakotoarivelo, F., Baider, C., and Pailler, T. 2012. Morphological differences and identification of *Jumellea rossii* and *Jumellea fragrans* (Orchidaceae) in Reunion Island: implications for conservation. *Revue D Ecologie-La Terre Et La Vie* 73: 83 (11).
- Mejia R., H. and Pino B., N. 2010. Diversidad de orquideas epifitas en un bosque humedo tropical (bh-t) del Departamento del Choco, Colombia .[Diversity of orchid epiphytes in a tropical rain forest (Bh-T) of Departament Choco, Colombia.] *Acta Biologica Colombiana* 15:37-45.
- Miria, A., Khan, A. B., and Rao, B. R. P. 2012. Orchids of Talakona sacred grove, Andhra Pradesh, India. *American-Eurasian Journal of Agricultural and Environmental Sciences* 12: 469-471.
- Moe, K. T. and Park, Y-J. 2012. Analysis of population structure revealed apparent genetic disturbance in Korea *Cymbidium* collection. *Scientia Horticulturae* 134: 157-162.
- Molnar, A. V., Takacs, A., Horvath, O., Vojtko, A. E., Kiraly, G., Sonkoly, J., Sulyok, J., and Sramko, G. 2012. Herbarium database of Hungarian orchids I. Methodology, dataset, historical aspects and taxa. *Biologia* 67: 79-86.
- Neubig, K. M., Whitten, W. M., Blanco, M. A., Endara, L., Williams, N. H., and Koehler, S. 2011. Preliminary molecular phylogenetics of *Sobralia* and relatives (Orchidaceae: Sobralieae). *Lankesteriana* 11: 307-317.

- Neubig, K. M., Whitten, W. M., Williams, N. H., Blanco, M. A., Endara, L., Burleigh, J. G., Silvera, K., Cushman, J. C., and Chase, M. W. 2012. Generic recircumscriptions of Oncidiinae (Orchidaceae: Cymbidieae) based on maximum likelihood analysis of combined DNA datasets. *Botanical Journal of the Linnean Society* 168: 117-146.
- Pan, I-C., Liao, D-C., Wu, F-H., Daniell, H., Singh, N. D., Chang, C., Shih, M-C., Chan, M-T., and Lin, C-S. 2012. Complete chloroplast genome sequence of an orchid model plant candidate: *Erycina pusilla* apply [sic] in tropical *Oncidium* breeding. *PloS one* 7 (4).
- Paun, O. and Chase, M. W. 2011. Epigenetic information—unexplored source of natural variation. *Lankesteriana* 11: 319-324.
- Pavarese, G., Tranchida-Lombardo, V., Cogoni, A., Cristaudo, A., and Cozzolino, S. 2011. Where do Sardinian orchids come from: a putative African origin for the insular population of *Platanthera bifolia* var. *kuenkelei*? *Botanical Journal of the Linnean Society* 167: 466-475.
- Peraza-Flores, L. N., Carnevali, G. F-C., and Romero-Gonzalez, G. A. 2011. Taxonomic notes in American *Polystachya* (Orchidaceae): the identity of *P. foliosa* (Hook.) Rchb.f. and the reestablishment of *P. caracasana* Rchb.f. *Journal of the Torrey Botanical Society* 138: 366-380.
- Perez-Garcia, E. A. and Hagsater, E. 2012. *Encyclia* × *nizanburyi* (Orchidaceae), un nuevo híbrido natural del istmo de Tehuantepec, Mexico. *Lankesteriana* 12: 1-8.
- Pessoa, E. M. and Alves, M. 2011. Orchidaceae Juss. in Serra de Itabaiana, Sergipe, Brazil. *Revista Caatinga* 24: 102-114.
- Pupulin, F. and Bogarin, D. 2011. Of greenish *Encyclia*: natural variation, taxonomy, cleistogamy, and a comment on DNA barcoding. *Lankesteriana* 11: 325-336.
- Pupulin, F. and Bogarin, D. 2012. A new *Oncidium* from Costa Rica: a showy species in the Oncidiinae (Orchidaceae). *Orchids* 81: 176-179.
- Rajendra Y., Lama, D., Bhujel, R. B., and Samuel, R. 2012. Genetic diversity and distribution of *Pleione* D. Don. orchid species in Darjeeling Himalaya of West Bengal, India. *Environment and Ecology* 30: 340-342.
- Rajendra, Y., Lama, D., Bhujel, R. B., and Samuel, R. 2012. Orchid species diversity of Darjeeling Himalaya of India. *International Journal of Pharmacy and Life Sciences (IJPLS)* 3: 1533-1550.
- Rajendra Y., Lama, D., Bhujel, R. B., Khyanjeet, G., and Samuel, R. 2012. Taxonomic assessment on the reported orchid species of Darjeeling district from flora of Bhutan, the Orchids of Bhutan - a review. *International Journal of Pharmacy and Life Sciences* 3: 1590-1606.

- Rajendra, Y., Samuel, R., Lama, D., and Bhujel, R. B. 2012. Diversity and distribution of *Habenaria* Willd. orchid species in Sikkim and Darjeeling Himalayas of India. *Environment and Ecology* 30: 303-305.
- Raskoti, B. B. and Ale, R. 2011. A new species of *Sunipia* (Orchidaceae) from Nepal. *Phytotaxa* 31: 55-58.
- Renner, M. A. M. and Beadel, S. M. 2011. *Taeniophyllum norfolkianum*: a second genus of Vandaeae (Orchidaceae) indigenous to New Zealand. *New Zealand Journal of Botany* 49: 435-439.
- Sadle, J. 2012. *Bletia patula*: a not-so-new orchid for Everglades National Park. *Orchids* 81: 246-247.
- Salazar, G. A. and Dressler, R. L. 2011. The leaves got it right again: DNA phylogenetics supports a sister-group relationship between *Eurystyles* and *Lankesterella* (Orchidaceae: Spiranthinae). *Lankesteriana* 11: 337-347.
- Schuiteman, A. 2011. *Dendrobium* (Orchidaceae): to split or not to split? *Gardens' Bulletin (Singapore)* 63: 245-257.
- Segota, V. and Alegro, A. 2011. First record of the rare myco-heterotrophic orchid *Epipogium aphyllum* Swartz on Mt. Velebit (Croatia). *Natura Croatica* 20: 437-441.
- Sevathian, J. C. 2011. The rediscovery of *Jumellea recurva* (Orchidaceae) in native forests of Bel Ombre, Mauritius. *Phytotaxa* 29: 56-60.
- Sharma, S. K., Dkhar, J., Kumaria, S., Tandon, P., and Rao, S. R. 2012. Assessment of phylogenetic inter-relationships in the genus *Cymbidium* (Orchidaceae) based on internal transcribed spacer region of rDNA. *Gene* 495: 10-15.
- Sheyko, E. A. and Musatenko, L. I. 2011. The variability of morphometric indices of generative and vegetative organs of some orchid species. *Fiziologiya i Biokhimiya Kulturnykh Rastenii* 43: 478-483.
- Simo, M., Stevart, T., Sonke, B., Lowry, P. P., II, and Droissart, V. 2012. Little-known angraecums. Part II: The genus in central Africa with a focus on sections *Conchoglossum*, *Angraecoides* and *Arachnangraecum*. *Orchids* 81: 111-116.
- Siripiyasing, P., Kaenratana, K., Mookamul, P., Tanee, T., Sudmoon, R., Chaveerach, A., Pornarong, S., Kobsukh, K., Piya, M., Tawatchai, T., Runglawan, S., and Arunrat, C. 2012. DNA barcoding of the *Cymbidium* species (Orchidaceae) in Thailand. *African Journal of Agricultural Research* 7: 393-404.
- Solano, R. G. 2011. Three new species of *Stelis* (Orchidaceae) from Mexico. *Brittonia* 63: 325-333.
- Steudel, B. 2011. A new species of *Stelis* (Pleurothallidinae, Orchidaceae) from South Yungas, Bolivia. *Phytotaxa* 38: 49-52.

Szlachetko, D. L., Mytnik-Ejsmont, J., Dudek, M., and Gorniak, M. 2011. Three new species of the genus *Takulumena* (Orchidaceae, Epidendrinae) from Ecuador and Peru. *Willdenowia* 41: 295-299.

Tang, M., Zeng, C-X., Bi, Y-F., and Yang, J-B. 2012. Microsatellite markers for the Chinese endangered and endemic orchid *Cymbidium tortisepalum* (Orchidaceae). *American Journal of Botany* 99: e11-13.

Vale, A. and Rojas, D. 2012. *Encyclia navarroi* (Orchidaceae), a new species from Cuba. *Annales Botanici Fennici* 49: 83-86.

Warghat, A. R., Bajpai, P. K., Murkute, A. A., Hemant, S., Chaurasia, O. P., and Srivastava, R. B. 2012. Genetic diversity and population structure of *Dactylorhiza hatagirea* (Orchidaceae) in cold desert Ladakh region of India. *Journal of Medicinal Plants Research* 6: 2388-2395.

Wilson, M. 2011. Barcoding the species of *Pleurothallis* subsection *Macrophyllae-Fasciculatae*. *Lankesteriana* 11: 371.

Wilson, M., Belle, C., Dang, A., Hannan, P., Kenyon, C., Low, H., Stayton, T., and Woolley, M. 2011. A phylogenetic analysis of the genus *Pleurothallis*, with emphasis on *Pleurothallis* subsection *Macrophyllae-Fasciculatae*, using nuclear ITS and chloroplast DNA sequencing. *Lankesteriana* 11: 369.

Wilson, M. and Jost, L. 2011. Phylogenetic analysis of the Andean genus *Brachycladium* Luer (syn. *Oreophilus* Higgins & Archila) and closely related genera based on nuclear ITS sequencing. *Lankesteriana* 11: 370.

Xiang, X-G., Li, D-Z., Jin, W-T., Zhou, H-L., Li, J-W., and Jin, X-H. 2012. Phylogenetic placement of the enigmatic orchid genera *Thaia* and *Tangtsinia*: evidence from molecular and morphological characters. *Taxon* 61: 45-54.

Ye, D-P., Li, L., and Xing, F-W. 2012. Two newly recorded mycotrophic species of Orchidaceae from China. *Journal of Tropical and Subtropical Botany* 20: 63-65.

Zettler, L. W., Oppenheimer, H., and Nui, M. 2012. Hawaii's native orchids: a closer look at the trio. *Orchids* 81: 100-101.

Book Review

Lavarack, P. S. 2011. Expeditions to Cape York Peninsula, North Queensland, Australia 1976-1989. Australian Orchid Research 6: 2-180. 3 figs, 68 colour plates, 11 maps. Australian Orchid Foundation, P. O. Box 322, Essendon North, Victoria 34041 (www.australianorchidfoundation.org.au). ISBN 978-0-9595384-9-6. Paperback. Price: Aus\$40.

This is the sixth volume in the occasional series published by the Australian Orchid Foundation. However, it is the first to concentrate on orchids as a conservation tool.

In the introduction, Bill Lavarack discusses the history of the series of expeditions led by him for the Queensland National Parks and Wildlife Service during the 1970s and 1980s, which resulted in the establishment of a series of large national parks spanning the length of the east coast and coastal ranges of northern Queensland. From 1976 until 1989 they were funded by the Australian Orchid Foundation, a magnificent charity which has done so much to encourage and fund Australian orchid research over many years.

Orchid exploration in Cape York began with Joseph Banks, who collected *Dendrobium canaliculatum* and *D. discolor* when Captain Cook's *HMS Endeavour* was beached for repairs caused by running onto the Great Barrier Reef. Little more was achieved until the Archbold Expedition of 1948 when the botanist Len Brass collected 15 more orchid species there. Apart from a few collections by L. Wassell and Mal Brown in the 1950s and 1960s, the Cape remained almost virgin territory for botanical exploration. Bill Lavarack's passion for orchids changed that by leading a series of expeditions with noted orchid specialists such as David Jones, Bruce Gray, and Ben Wallace. He raised the number of orchids reported from Cape York to 128 species. Although notable in itself, the real achievement of Lavarack and his team's reports was to set the agenda for the raising of national parks to cover all the richest habitats in the Cape.

The accounts cover seven expeditions conducted between 1976 and 1989, often under duress. The area is difficult to work in because much of the forest grows on rock pile, a treacherous terrain. The rivers that would allow easy access are the home of large estuarine crocodiles, which have to be treated with considerable care. Poisonous snakes are also an ever-present hazard. Altogether it is difficult country to negotiate and even survive. Several expedition members suffered illnesses, the worst of which was leptospirosis, and one expedition had to be abandoned as a result.

I must confess that I have a vested interest in these accounts of Cape York, an area I was fortunate to visit with Bill's 1983 expedition to the Pascoe River. It was a trip that I thoroughly enjoyed, the highlight for me being the discovery of a new species of *Habenaria*, now named as *H. macraithii*. The low-point occurred almost simultaneously when I walked into a stinging tree, the effects of which were dramatically painful and lasted for six months.

This record of an exciting series of expeditions, and their gratifying outcome is well written and illustrated. Significantly, it demonstrates how important orchid studies can be for conservation. I can recommend this well-produced volume without reservation.

Phillip Cribb

Liltved, W. R. and Johnson, S. D. 2012. *The Cape Orchids*. Hardcover, 2 vols., xix + 1022 pp. Sandstone Editions, P.O. Box 372, Noordhoek 7979, Cape Town, South Africa. ISBN-978-0-9870197-0-7 (Standard edition). ISBN 978-0-9870197-3-8 (Collectors' edition). Pricing,

payment, and postage option details will appear on *The Cape Orchids* website (www.capeorchids.co.za) in August 2012 (enquiries to capeorchids@gmail.com).



The Cape Floristic Region (CFR) comprises 90,000 sq. km and includes about 9100 plant species, 70-80% of which are endemic, making it just about the hottest of biodiversity hotspots. Orchidaceae comprise the 10th largest plant family in the CFR with 24 genera and 241 species, two-thirds of which are

endemic. All have been treated in previous modern floras (e.g. Stewart *et al.*, 1982; Linder and Kurzweil, 1999) from the angle of systematics with artificial keys to the taxa. *The Cape Orchids* focuses instead on natural history -- what the authors call a holistic approach -- to understand that unique orchid flora. Bound in two volumes with a four-color slipcase, this title represents over 20 years of fieldwork and photography, supplemented by invited essays from 23 contributors. It includes more than 2000 color photographs and reproductions of both historical and modern paintings of the species printed on 128 gsm (about 80 lb) matte art paper. As a result, the set is heavy, weighing 6 kilograms, hardly a convenient field guide that can be tossed into a stuffed backpack at the last minute.

But neither is it meant to be consigned to the coffee table. This is a masterwork that provides such an overwhelming amount of data that it can only be considered encyclopedic. The Introduction thoroughly covers the biomes and vegetation of the CFR as well as its geology, fossil plants and past climates, ethnobotany, habitat loss, and conservation status of South African orchids. That fascinating commentary is followed by authoritative chapters on the history of botanical exploration in the CFR from 1652 to the present with emphasis on the life and work of Harry Bolus (1834-1911), orchid morphology, fire ecology, pollination and natural hybridization, and cultivation and artificial hybridization.

Most of the two-volume set is devoted to species accounts, first the terrestrials and then the relatively few epiphytes. The systematic account of tribe Diseae in *The Cape Orchids* is in general accord with that of Kurzweil and Linder (2001) in volume 2 of *Genera Orchidacearum*, although some updating has been necessary in light of more recent molecular studies by Bellstedt *et al.* (2001), Van der Niet *et al.* (2005), Bytebier *et al.* (2008), and Waterman *et al.* (2009). For each species the authors include derivation of the specific epithet, common names, description, flowering period, history and relationships, distribution, field notes and biology, and references. Illustrating the habitats and key characters are high-definition photographs (principally by the authors), historical watercolors from *Edwards's Botanical Register*, *Curtis's Botanical Magazine*, and Bolus's *Orchids of South Africa* (among

others), and modern watercolors by Fay Anderson, which are often juxtaposed with photographs to reveal features not otherwise shown. A fire in Ms. Anderson's home in 1996 destroyed many of her paintings, but some could be salvaged and repainted for publication here.

Many species accounts are supplemented with well-written, short essays on the collector or eponym of the species. One of the most interesting in this respect is *Holothrix burchellii* (Lindl.) Rchb.f., commemorating William John Burchell, who was trained as an apprentice at the Royal Botanic Gardens, Kew, and became a Fellow of the Linnean Society at the age of 21. He traveled throughout the Cape from November 1810 to October 1812 and described and illustrated his fieldwork in *Travels in the Interior of Southern Africa*. Burchell returned to England with over 40,000 plant specimens and 120 skins of 95 quadrupeds and 265 bird taxa. He described the white rhinoceros (*Ceratotherium simum* Burchell) and discovered Burchell's zebra (*Equus burchellii* Gray) as well as the orchid genus *Pachites*. Disabled and depressed, Burchell committed suicide at the age of 81. Essays on other well-known eponyms include Swedish botanists Carl Peter Thunberg and Olaf Peter Swartz, British astronomer Sir John Herschel, and British botanists John Lindley and Francis Masson. Masson's specimen of the cycad *Encephalartos altensteinii* Lehm. (collected as *E. longifolius* (Jacq.) Lehm. in the Eastern Cape in the 1770s) is still thriving in the Palm House at the Royal Botanic Gardens, Kew, making it one of the oldest pot-plants in the world.

Volume 2 begins with a 350-page account of the 180 species of *Disa*, arranged in 18 sections (17 occurring in the CFR), and ends with coverage of the five genera of epiphytes found there – *Polystachya*, *Angraecum*, *Cyrtorchis*, *Mystacidium*, and *Tridactyle*. The work closes with recent Cape orchid photographs, references to Cape orchids in Bolus's published works, a glossary of botanical terms, vignettes of the authors and contributors, glossary, and index.

A trivial criticism is that a given species account is difficult to find without consulting the index, and so the reader is forced to juggle the volumes for those taxa treated in volume 1. A quick locator list of the taxa by page number on the endpapers of each volume with corresponding page numbers would have been useful. In the Table of Contents, those few genera outside of tribe Diseae are listed without any systematic context; inclusion of at least their subfamily name in parentheses could have added significant systematic information (complementing Table 1 on page 15) with little loss of space.

The wealth of data and treasury of superb illustrations make this one of the best regional monographs (regardless of plant family) in recent memory. I recommend *The Cape Orchids* to botanists in all disciplines and to institutional libraries, as it is a valuable work that will not soon become obsolete – barring extinctions, of course.

Literature Cited

Bellstedt, D. U., Linder, H. P., and Harley, E. H. 2001. Phylogenetic relationships in *Disa* based on non-coding *trnL-trnF* chloroplast sequences: evidence of numerous repeat regions. *American Journal of Botany* 88: 2088-2100.

- Bytebier, B., Bellstedt, D. U., and Linder, H. P. 2008. A new phylogeny-based sectional classification for the large African orchid genus *Disa*. *Taxon* 57: 1233-1251.
- Kurzweil, H. and Linder, H. P. 2001. Tribe Diseae. In *Genera Orchidacearum. Volume 2. Orchidoideae (Part One)* (ed. A. M. Pridgeon, P. J. Cribb. M. W. Chase, and F. N. Rasmussen), pp. 11-58. Oxford University Press, Oxford, United Kingdom.
- Linder, H. P. and Kurzweil, H. 1999. *Orchids of Southern Africa*. A.A. Balkema, Rotterdam, Netherlands.
- Stewart, J., Linder, H. P., Schelpe, E. A., and Hall, A. V. 1982. *Wild Orchids of Southern Africa*. Macmillan South Africa, Johannesburg.
- Van Der Niet, T., Linder, H. P., Bytebier, B., and Bellstedt, D. U. 2005. Molecular markers reject monophyly of the subgenera of *Satyrium*. *Systematic Botany* 30: 263-274.
- Waterman. R. J., Pauw, A., Barraclough, T. G. and Savolainen, V. 2009. Pollinators underestimated: a molecular phylogeny reveals widespread floral convergence in oil-secreting orchids (sub-tribe [sic] Coryciinae) of the Cape of South Africa. *Molecular Phylogenetics and Evolution* 51: 100-110.

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