A little sorrow and some notable joys of the year

Ichirou Karahara

Department of Biology, Graduate School of Science and Engineering, University of Toyama, 3190 Gofuku, Toyama 930-8555, Japan. E-mail: karahara@sci.u-toyama.ac.jp, Fax: + 81-76-445-6549

Received on January 6, 2015; Accepted on March 13, 2015

Looking back on 2014, the scientific communities in Japan experienced both moments of sadness and joy. Let me begin with the less appreciated tidings. After the controversy surrounding the so-called STAP (stimulus-triggered acquisition of pluripotency) phenomenon, RIKEN's committee investigating the papers of STAP cell finally concluded that it was highly probable that the STAP phenomenon was the result of a combination of contamination by embryonic stem (ES) cells and research misconduct (RIKEN, 2014).

This problem raised the issue of spreading ethical awareness among members of research and scientific communities in Japan to avoid research misconduct. The members of our community who work in the field of education (including myself) might now experience a greater need for educating students about ethics in conducting scientific research. Recently, I undertook the web-based training course provided by the Collaborative Institutional Training Initiative (CITI) of Japan. Honestly, I was compelled to do so because it is mandatory for researchers receiving governmental research grants in Japan. Though I had initially made excuses on account of my busy schedule, I found this program to be a really useful learning experience once I decided to participate. As members of the editorial board of *Plant Root*, we occasionally come across instances of potentially unethical actions such as redundant publications, meaning publishing a paper that overlaps with an already published one; in this context, I hope that such programs become known worldwide to help avoid such instances. Careful attention is required even when reusing our own works. Improper citations may cause such instances of reusing to be considered as self-plagiarism. The recommendations provided by the International Committee of Medical Journal Editors (ICMJE) are useful in avoiding such problems as well (ICMJE, 2014).

Moving on to more cheerful topics of discussion, three Japan-born scientists have been awarded the Nobel Prize in Physics for 2014 for their invention of a new energy-efficient and environment-friendly light source—the blue light emitting diode (LED). As nearly one-fourth of world electricity consumption is used for light (Nobelprize.org., 2014), the LED definitely contributes towards saving Earth's energy sources and minimizing global warming.

As for global warming, I recently updated my knowledge since my previous mention of the topic in research (Karahara, 2013). The complete Fifth Assessment Report (AR5) was released by the Intergovernmental Panel on Climate Change (IPCC). Here, I mention some of the important sentences and relevant data of this vast report, along with citations to their sources, for the readers of *Plant Root*. Discussing crop production, the report by Working Group II (WG II) summarized: "For the major crops (wheat, rice, and maize) in tropical and temperate regions, climate change without adaptation is projected to negatively impact production for local temperature increases of 2 °C or more above late-20th-century levels, although individual locations may benefit (medium confidence)." It also stated, "Based on projected decreases in regional crop yields and water availability, risks of unevenly distributed impacts are high for additional warming above 2 °C (medium confidence)" (IPCC, 2014a). This is a section of the manuscript titled “Summary for Policymakers, and details are available in Chapter 7 of the full report by WG II (Porter et al., 2014).

Further, this report states the following about human security, "Climate change over the 21st century is projected to increase displacement of people (medium evidence, high agreement)" (IPCC, 2014a). It also states that although "there are no robust global estimates of future displacement as a result of climate change" (Adger et al., 2014), "hundreds of millions of people will be affected by coastal flooding and will be displaced due to land loss by year 2100" without any adaptation; "the majority of those affected are from East, Southeast, and South Asia (high confidence)" (Wong et al., 2014). Specifically, the forced displacement is estimated to be up to 187 million people over the century (up to 2.4 % of global population) with a 2.0

Karahara I 2015 A little sorrow and some notable joys of the year. Plant Root 9:1-4. doi:10.3117/plantroot.9.1

m sea level change in a "beyond 4 °C world" (i.e., in case a temperature rise up to 4 °C or more) (Nicholls et al., 2011).

The target for temperature rise should then clearly be below 2 °C. This target temperature rise of 2 °C is defined as the change in temperature from the period of the Industrial Revolution until the end of this century. However, the report by Working Group I (WG I) stated, "The globally averaged combined land and ocean surface temperature data as calculated by a linear trend, show a warming of 0.85 [0.65 to 1.06] °C, over the period 1880 to 2012, when multiple independently produced datasets exist" (IPCC, 2013). This means that we only have a margin of 1.15 °C remaining to stay within the target. To achieve this goal, the report by Working Group III (WG III) requires that we aim for "scenarios reaching atmospheric concentration levels of about 450 ppm CO_2-equivalent by 2100." It also states that "Scenarios reaching these concentrations by 2100 are characterized by lower global GHG (green house gas) emissions in 2050 than in 2010, 40 % to 70 % lower globally, and emissions levels near zero Gt CO_2-equivalent or below in 2100" (IPCC, 2014b). The report mentions, "Without additional efforts to reduce GHG emissions beyond those in place today, emissions growth is expected to persist driven by growth in global population and economic activities. Baseline scenarios, those without additional mitigation, result in global mean surface temperature increases in 2100 from 3.7 °C to 4.8 °C compared to pre-industrial levels (high confidence)" (IPCC, 2014b). Estimated global GHG emissions levels in 2020 based on the Cancún Pledges (result of COP16) are already considered inadequate to fulfill this goal according to the WGIII report (IPCC, 2014b). According to the Emissions Gap Report 2014, released by the United Nations Environment Programme (UNEP), the "total GHG emissions should be at approximately 42 Gt CO_2-equivalent in 2030." With current emission levels already at 54 Gt CO_2-equivalent, UNEP calls for "substantial reductions" and declares that even if the Cancún Pledges for 2020 extrapolated through 2030 reduce emissions by 9 Gt CO_2-equivalent, a gap of 14-17 Gt CO_2-equivalent will continue to remain annually (UNEP, 2014).

The question arises as to what policymakers should do in these circumstances. Last December, the 20th session of the Conference of the Parties of United Nations Framework Convention on Climate Change (UNFCCC) (COP20) was held in Lima. It was said that this new agreement on climate change "that will harness action by all nations, took a further important step forward in Lima following two weeks of negotiations by over 190 countries"(UNFCCC, 2014). I find it noteworthy that the Lima Call includes the words "all nations." The next task for each country is to set targets to reduce its GHG emissions. In the case of Japan, the government has not yet stated when to show the target. The government has to decide the electricity policy for a composition of energy source before showing the reduction target. And the timing of the decision is expected to be after the nationwide local elections scheduled in coming April due to a political consideration (The Nikkei article, August 20, 2014). It should be noted that Japan is ranked 53 out of 61 in a country-wise ranking of efforts to reduce GHG emissions and to avoid global warming, according to the Climate Change Performance Index 2014 calculated by NGOs German-watch and Climate Action Network Europe (Burck et al., 2014).

Though I may have dwelled on global warming slightly too long, I cannot conclude this preface without referring to a potential milestone research article in 2014 in root research. Pfister et al. (2014) examined an arabidopsis mutant deleting a gene that encodes a receptor-like kinase protein called SCHENGEN3 and demonstrated that the Casparian strip formation was specifically interrupted. Very interestingly, the level of potassium was much lower in the mutant, indicating that plants cannot accumulate potassium, an important fertilizer element, without an intact Casparian strip (Pfister et al., 2014). I deem this paper to be very important, as it has provided direct evidence for a physiological function of the Casparian strip.

As for *Plant Root*, we have published nine original papers in 2014. Currently, we are handling manuscripts for a special issue for the 6th International Symposium on Physiological Processes in Roots of Woody Plants that was held in Nagoya from September 8-13, 2014. These papers will be published this year. Finally, I wish to express my sincere gratitude to all the authors for their contributions; and to the researchers who have submitted manuscripts to this journal; I also extend my heartfelt appreciation for our managing editors, subject editors, and reviewers.

Ichirou Karahara
Editor-in-Chief, Plant Root

References

Adger WN, Pulhin JM, Barnett J, Dabelko GD, Hovelsrud GK, Levy M, Ú. Oswald S, Vogel CH 2014 Human security. In:

Field CB, Barros VR, Dokken DJ, Mach KJ, Mastrandrea MD, Bilir TE, Chatterjee M, Ebi KL, Estrada YO, Genova RC, Girma B, Kissel ES, Levy AN, MacCracken S, Mastrandrea PR, White LL, Eds, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel of Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 755-791.

Burck J, Marten F, Bals C 2014 The Climate Change Performance Index Results 2015. http://germanwatch.org/en/9472 (retrieved: January 6, 2015)

ICMJE 2014 Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. http://www.icmje.org (retrieved: January 6, 2015)

IPCC 2013 Summary for Policymakers. In: Stocker TF, Qin D, Plattner G-K, Tignor M, Allen SK, Boschung J, Nauels A, Y. Xia, Bex V, Midgley PM, Eds, Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA.

IPCC 2014a Summary for Policymakers. In: Field CB, Barros VR, Dokken DJ, Mach KJ, Mastrandrea MD, Bilir TE, Chatterjee M, Ebi KL, Estrada YO, Genova RC, Girma B, Kissel ES, Levy AN, MacCracken S, Mastrandrea PR, White LL, Eds, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA, pp. 1-32.

IPCC 2014b Summary for Policymakers. In: Edenhofer O, Pichs-Madruga R, Sokona Y, Farahani E, Kadner S, Seyboth K, Adler A, Baum I, Brunner S, Eickemeier P, Kriemann B, Savolainen J, Schlömer S, Stechow Cv, Zwickel T, Minx JC, Eds, Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA.

Karahara I 2013 Earthquake and plant root researches II. Plant Root 7: 1-4.

Nicholls RJ, Marinova N, Lowe JA, Brown S, Vellinga P, De Gusmao D, Hinkel J, Tol RSJ 2011 Sea-level rise and its possible impacts given a 'beyond 4°C world' in the twenty-first century. Phil. Trans. R. Soc. A 369: 161-181.

Nobelprize.org. NMA 2014 The 2014 Nobel Prize in Physics - Press Release. http://www.nobelprize.org/nobel_prizes/physics/laureates/2014/press.html (retrieved: January 5, 2015)

Pfister A, Barberon M, Alassimone J, Kalmbach L, Lee Y, Vermeer JEM, Yamazaki M, Li G, Maurel C, Takano J, Kamiya T, Salt DE, Roppolo D, Geldner N 2014 A receptor-like kinase mutant with absent endodermal diffusion barrier displays selective nutrient homeostasis defects. eLife 3: e03115.

Porter JR, Xie L, Challinor AJ, Cochrane K, Howden SM, Iqbal MM, Lobell DB, Travasso MI 2014 Food security and food production systems. In: Field CB, Barros VR, Dokken DJ, Mach KJ, Mastrandrea MD, Bilir TE, Chatterjee M, Ebi KL, Estrada YO, Genova RC, Girma B, Kissel ES, Levy AN, MacCracken S, Mastrandrea PR, White LL, Eds, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel of Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 485-533.

RIKEN 2014 Report from committee investigating STAP papers. http://www.riken.jp/en/pr/topics/2014/20141226_1/ (retrieved: January 5, 2015)

UNEP 2014 The Emissions Gap Report 2014: A UNEP Synthesis Report. http://www.uncclearn.org/emissions_gap_report_2014_unep_synthesis_report (retrieved: January 6, 2015)

UNFCCC 2014 United Nations Framework Convention on Climate Change, Lima Call for Climate Action Puts World on Track to Paris 2015. http://newsroom.unfccc.int/lima/lima-call-for-climate-action-puts-world-on-track-to-paris-2015/ - downloads (retrieved: January 6, 2015)

Wong PP, Losada IJ, Gattuso JP, Hinkel J, Khattabi A, McInnes KL, Saito Y, Sallenger A 2014 Coastal systems and low-lying areas. In: Field CB, Barros VR, Dokken DJ, Mach KJ, Mastrandrea MD, Bilir TE, Chatterjee M, Ebi KL, Estrada YO, Genova RC, Girma B, Kissel ES, Levy AN, MacCracken S, Mastrandrea PR, White LL, Eds, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel of Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 361-409.

I. Karahara at the Botanical Garden of the V. L. Komarov Botanical Institute in St. Petersburg founded by Peter I in 1714

Editorial Board

January 2014– December 2015 (As of January, 2015)

Publisher
Japanese Society for Root Research
President (2014-2015): Dr. Jun Abe