



Photographic Journey in the Lab of Soil Science and Plant Nutrition: An Editorial Call



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SOIL science is an important discipline, in which all topics related to soil can be studied, including characterization, physical, chemical and biological attributes, genesis, morphology, its fertility and plant nutrition. Soil is the second lung for the humanity after the plant, where the universe cannot survive without both cultivated plants and soil. The forming of soil may need hundreds of years, so the conservation of soil is a global crucial issue. Thus, the monitoring and continuous analyses of soil are needed to solve any problem, promote its productivity, prevent any harmful agent on soil, and save it. Therefore, the Lab is the main place, in which we could carry out some experiments, diagnosis the soil, know the nutritional status, determine the suitability for cultivating different crops, the microbial, biochemical, physical, and biological characterization of soil. This editorial call for more concern about the soil through submission articles that discuss all topics related to the soil science and its security. In this editorial work the photos are the main component which will present the most important thing in nay Lab “the instruments”. The Lab and its facilities are necessary for the quality of any scientific research.

Keywords: Soil chemistry, Microbiology, Soil biology, Soil morphology, Instruments.

1. The Lab and its potential

It is well known that, there are many classifications of experiments such as open field (*in vivo*), under control in the greenhouse, growth chamber, or the Lab (*in vitro*). Thus, several studies could be carried out only in the Lab, not in the open field, when the studied factor(s) must be investigated under control like temperature, humidity, lighting or other factors as in the field of plant tissue culture. Any Lab should include the essential apparatus or instruments for analyses of soil, water, and plant. Based on the facilities in the Lab (i.e., the existence of the needed instruments and accepted methodology according to the global or

international standardization). It is worth to mention that, all instruments in the Lab should be calibrated, and the used methodology should be approved on the global level, as well as the Lab should be accredited. The internal and external quality assurance systems should be applied depending on the measuring soil or plant or water parameter like soil pH, EC, total N, etc.

The Lab Scope can promote scientific research to provide the latest equipment and scientific techniques, as well as training courses to raise the efficiency of researchers and contribute to solving the problems of the local community through applied studies of environmental problems.

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Concerning the most accepted methodology in the soil science and plant nutrition, there are several common methods in all branches of soil science, which include soil physics (e.g., soil density, structure, texture, hydraulic conductivity, infiltration rate, moisture content, etc.), soil chemistry (soil pH, salinity or EC, CEC, etc.), soil microbiology (soil enzymes, and microbial counts), mineralogy (soil minerals, their structure, and characterization), soil fertility and plant nutrition (soil nutrient contents, plant enzymes, and their nutrients, chlorophyll content, etc.), and more. The most important book for soil analysis is “Methods of Soil Analysis”, three Parts including Chemical Methods (Sparks *et al.* 2020), Physical Methods (Dane and Topp 2020), and Microbiological and Biochemical (Bottomley *et al.* 2020). In general, soil studies can be carried out under controlled (Fageria 2005), or field conditions (Fageria 2007), or under greenhouse or under plant tissue culture in

the Lab, hydroponics/soilless culture experiments, and micro-farm experiments (El-Ramady *et al.* 2014).

2. The Journey of photos

This section includes more photos and fewer words, and these photos for different required instruments in the Lab of soil science and plant nutrition, which were extracted from visiting the Labs and/or attending the international conferences of societies of soil science mainly in Hungary, Italy, Germany and the USA. These photos include photos of many equipment or instruments, which many companies presented them during the conferences of these societies beside some instrument in some laboratories. This journey to give a fast Glick to confirm that the Lab is the important part when we need to publish our workies.



Some instruments of some companies are presented during the annual Meeting of ASSS in 2014 in Long Beach (the USA), and many tools in soil physical and hydrological analyses



Some presented instruments during the annual Meeting of ASSS in 2014 in Long Beach (the USA), many tools in soil physical and hydrological analyses



Photos for some meteorological parameters, soil sensors



Instrument to follow the sap flow of plants



Lysimeter as a model can be used in Lab



General overview for many products in the field of soil and water



Several tools for soil sampling like augers



Many augers for soil sampling



More augers



More tools for soil sampling to get the natural soil samples



The instrument of “elementar” for measuring N, S, H, O, C in plant samples



Some kinds of lysimeters



Some kinds of lysimeters



More tools for measuring soil physical parameters



Hydraulic conductivity and moisture release curves



Soil monitoring set



This is a contribution of American universities in the conference to present itself



More tools for precision farming



The books are very important guest in the conferences



More and more books



Many tools for plant biology, photosynthesis, etc.



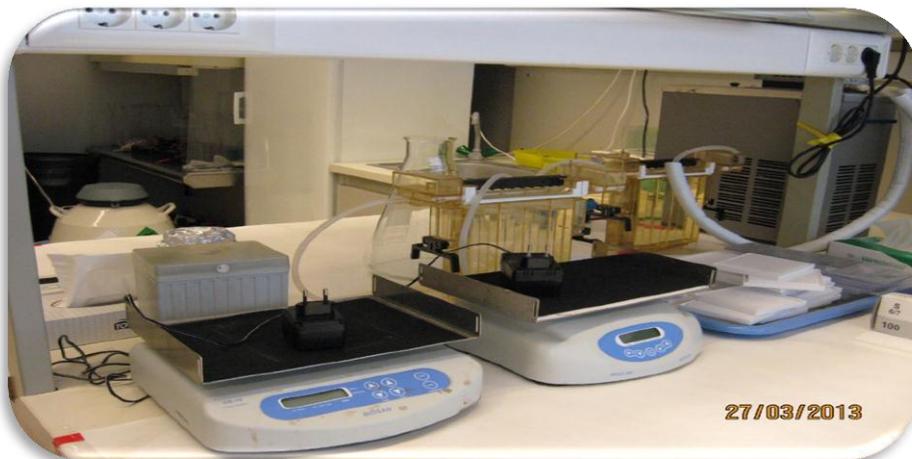
Many tools for plant biology, photosynthesis, etc.



Soil gas flux system



Soil gas flux system



Electrophoresis device for molecular measurements (proteins or DNA),



Lyophilizer is a device for plant draying under freezing



The microwave equipment for digestion soil and plant samples



Atomic absorption for measuring the content of elements in soil, plant and water samples

Fig. 1. list of many instruments even in the Lab which presented in the exhibition during the German or American Conferences of soil science. All photos by El-Ramady.

3. Quality assurance

The world has seen in recent years growing interest in the issue of quality from all angles because protection of product represents a kind of protecting the human right of safe life, man is both extremely develop therefore must harness the possibilities of consent and satisfy their wishes and requirements. Top management is totally committed to produce the highest quality level related to tests services and to continuously improve the effectiveness of the quality manual system (QMS) of the laboratory. All

the used equipment was calibrated and uncertainties were calculated. Internal and external quality assurance systems were applied in the laboratory. In all measurements, blanks, triplicate measurements of metals in extracts, and analysis of certified reference materials for each test were routinely included for quality control. Depending on the studied, recovery was between 95 and 105%. Additionally, in a most instances, the standard deviation of the measurements was under 5%.

4. A call for submitting articles

This year, the strategy of Environment, Biodiversity and Soil Security (EBSS) journal is to encourage publishing new MSs on different topics in the field of soil, environment and biodiversity. The editorial board planned for more calls including more new hot topics, which already started a call for smart farming for developing sustainable agriculture (Fawzy and El-Ramady 2022), smart irrigation (Fawzy et al. 2022c), then move to a call on Soil-Water-Plant-Human Nexus (Brevik et al. 2022). At the same time, more calls for submission of photographic reviews or mini-reviews such as Global Soil Science Education (Korriem et al. 2022), Management of Salt-Affected Soils (El-Ramady et al. 2022a), Soil-Water-Plant-Human Nexus (Brevik et al. 2022), Grafting of Vegetable Crops (Bayoumi et al. 2022), Sustainable Applications of Mushrooms in Soil Science (Fawzy et al. 2022b), and on Nano-Farming of Vegetables (Fawzy et al. 2022a). This is a new call for more publications on the photographic reviews or mini-reviews to focus on the soil security and its biodiversity and the environment. More submission of articles is most welcome. We have more different photographic call for the Egyptian Journal of Soil Science like a call on Sustainable Applications of Mushrooms (Fawzy et al. 2022d), and on Soil and Humans (El-Ramady et al. 2022b). Based on the Lab is an essential component in any scientific institution and any sound publication should start from the Lab and its efficiency. So, this is a photographic editorial work to highlight the Lab and its potential.

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5. References

- Bayoumi Y, Shalaby TA, Fawzy ZF, Shedeed SI, Taha N, El-Ramady H, Prokisch J (2022). Grafting of Vegetable Crops in the Era of Nanotechnology: A photographic Mini Review. *Env. Biodiv. Soil Security*, 6, 133–148. DOI: 10.21608/JENVBS.2022.147280.1181.
- Bottomley PJ, Angle JS, Weaver RW (2020). *Methods of Soil Analysis, Part 2: Microbiological and Biochemical Properties*. Soil Science Society of America Book Series Published by Soil Science Society of America, Inc. American Society of Agronomy, Inc. Madison, Wisconsin, USA, ACSESS publisher.
- Brevik EC, Omara AED, Elsakhawy T, Amer M, Fawzy ZF, El-Ramady H, Prokisch J (2022). The Soil-Water-Plant-Human Nexus: A Call for Photographic Review Articles. *Env. Biodiv. Soil Security*, 6, 117 – 131. DOI: 10.21608/JENVBS.2022.145425.1178.
- Dane JH, Topp CG (2020). *Methods of Soil Analysis, Part 4: Physical Methods*. Soil Science Society of America Book Series Published by Soil Science Society of America, Inc. American Society of Agronomy, Inc. Madison, Wisconsin, USA, ACSESS publisher
- El-Ramady H, Brevik EC, Elsakhawy T, Omara AED, Amer M, Abowaly M, El-Henawy A, Prokisch J (2022b). Soil and Humans: A Comparative and A Pictorial Mini-Review. *Egypt. J. Soil Sci. Vol. 62, No. 2*, 101–122. DOI: 10.21608/EJSS.2022.144794.1508.
- El-Ramady H, Faizy SED, Amer MM, Elsakhawy T, Omara AED, Eid Y, Brevik EC (2022a). Management of Salt-Affected Soils: A Photographic Mini-Review. *Env. Biodiv. Soil Security*, 6, 61 – 79.
- El-Ramady HR, Alshaal TA, Shehata SA, Domokos-Szabolcsy E, Elhawat N, Prokisch J, Fári M, Marton L (2014). Plant Nutrition: In: H. Ozier-Lafontaine and M. Lesueur-Jannoyer (eds.), *From Liquid Medium to Micro-farm. Sustainable Agriculture Reviews 14: Agroecology and Global Change, Sustainable Agriculture Reviews 14*, DOI 10.1007/978-3-319-06016-3_12, Springer International Publishing Switzerland, pp: 449 – 508.

- Fageria NK (2005) Soil Fertility and Plant Nutrition Research Under Controlled Conditions: Basic Principles and Methodology. *Journal of Plant Nutrition*, 28:11, 1975-1999. DOI: 10.1080/01904160500311037.
- Fageria NK (2007). Soil Fertility and Plant Nutrition Research Under Field Conditions: Basic Principles and Methodology, *Journal of Plant Nutrition*, 30, 2, 203-223, DOI: 10.1080/01904160601117887
- Fawzy ZF, El-Ramady H (2022). Applications and Challenges of Smart Farming for Developing Sustainable Agriculture. *Env. Biodiv. Soil Security*, 6, 81 – 90. DOI: 10.21608/JENVBS.2022.135889.1175.
- Fawzy ZF, El-Ramady H, Abd El-Fattah DA, Prokisch J (2022b). Sustainable Applications of Mushrooms in Soil Science: A Call for Pictorial Articles. *Egypt. J. Soil Sci.* 62 (2), 101-115. DOI: 10.21608/EJSS.2022.148638.1514.
- Fawzy ZF, El-Ramady H, Abd El-Fattah DA, Prokisch J (2022d). Sustainable Applications of Mushrooms in Soil Science: A Call for Pictorial and Drawn Articles. *Egypt. J. Soil Sci.* Vol. 62 (2), 155 – 167. DOI: 10.21608/EJSS.2022.148638.1514
- Fawzy ZF, El-Ramady H, Omara AED, Elsakhawy T, Bayoumi Y, Shalaby TA, Prokisch J (2022a). From Farm-to-Fork: A pictorial Mini Review on Nano-Farming of Vegetables. *Env. Biodiv. Soil Security*, 6, 149 – 163. DOI: 10.21608/JENVBS.2022.145977.1180.
- Fawzy ZF, El-Sawy SM, El-Bassiony AM, Zhaojun S, Okasha AM, Bayoumi Y, El-Ramady H, Prokisch J (2022c). Is the Smart Irrigation the Right Strategy under the Global Water Crisis? A Call for Photographical and Drawn Articles. *Env. Biodiv. Soil Security*, 6, (in press)
- Koriem MA, Gaheen SA, El-Ramady H, Prokisch J, Brevik EC (2022). Global Soil Science Education to Address the Soil – Water – Climate Change Nexus. *Env. Biodiv. Soil Security* 6, 27-39. DOI :10.21608/jenvbs.2022.117119.1160
- Sparks DL, Page AL, Helmke PA, Loeppert RH (2020). *Methods of Soil Analysis Part 3: Chemical Methods*. Soil Science Society of America Book Series, Published by Soil Science Society of America, Inc. American Society of Agronomy, Inc. Madison, Wisconsin, USA, ACSESS publisher.