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State-of- the art insight of current research on environmental issues: the September 2019 issue of JEB

Environmental problems have drawn increasing interest globally as it is becoming clearer and without any doubt that they are directly related to human and animal health as well as ecosystem stability. The United Nations General Assembly has identified 17 Sustainable Developments Goals (SDGs), as a blueprint for a better and more sustainable future for people and the planet (UN, 2019). It is noteworthy that soil protection has been directly included in one of the SDGs (SDG 15 and in specific 15.3, UN 2019a) but, nevertheless, the soil is indirectly related to many other SDGs as being a base resource for food production, flora and soil fauna survival. The September 2019 issue of the Journal of Environmental Biology provides a state of the art insight of the progress of current research on major environmental issues ranging from soil pollutants biodegradation to new DNA mapping techniques. The present issue of JEB (Vol 40, Issue 5, 2019), contains 19 articles, covering both basic and applied aspects of Environmental Biology.

One of the challenges that humans have to face and deal with, is soil contamination. It has been identified as one of the major eight threats the EU soil face (CEC 2006, Perez at 2018, FAO and ITPS, 2015). Heavy metal is one form of soil contamination with the scientific community making significant efforts and progress to confront this problem under an ecological and economical framework. Sha'arani *et al.* (DOI : <http://doi.org/10.22438/jeb/40/5/MRN-803>), have explored the screening and determination of copper maximum tolerance level and copper bioremediation capability using phenol-degrading bacteria along with their characterization. Based on the results, selected phenol-degrading bacterial strains can be used as potential bioremediation agents for Cu removal from the environment. Similarly, Rehmat *et al.* (DOI : <http://doi.org/10.22438/jeb/40/5/MRN-1057>) managed to remove Cd²⁺ from contaminated water using wheat straw biochar, with attapulgite clay and rice straw biochar showing removal ability, but to a lower percentage. Plants show different tolerance to soil contaminants. For example, Konaka *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-1052>) observed that *Jatropha curcas* was able to grow in an acidic and Cu/Ni-rich soil in contrast to *Acacia burkei* that showed poor performance, rendering *Jatropha* as a promising plant for acid and Cu/Ni contaminated soils.

Soil salinization is another threat EU soils face (CEC 2006), a possible result of climate change worst-case scenarios correlated to sea level rise. Sea level relative change will depend on many local factors but will directly and indirectly impact agriculture caused by saline water intrusion into more inland areas (Balasubramanian and Nikhil, 2015) providing an ideal environment for vector mosquito habitats. Balasubramanian *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-950>) alert that vector mosquitoes have the ability to oviposit and breed in brackish water, pinpointing the health risks associated with their developing and frequency of abundance in brackish water, particularly in the context of rising sea levels due to global warming. An ecological smart solution to face soil salinity and sodicity would be the use of halophytic plants. This is an open challenge to research and results such as the ones provided by Lata *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-1089>) who proposed two different salinity and sodicity tolerant species are mostly needed.

Combating desertification has been one of the major goals of Sustainable Development Goal 15 (UN 2019a). Over-cultivation and poor irrigation practices are mentioned as some of the human causal factors (UNCCD 2019). With climate change, it is expected that irrigation will be a crucial issue to be taken into account for water economy. Modern irrigation systems are employed for water supply management optimization while allowing more area for cultivation. Pomegranate (*Prunica granatum* L.) is an important tree that contributes to local stakeholders income by providing multiple products. Marathe *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-1982>) suggest that basin irrigation is the most efficient system for maximum production in areas of sufficient water supply whereas drip irrigation guarantees higher water use efficiency for arid and semi-arid tropical climate.

Based on the World Health Organization (2019), air pollution and climate change are identified as one of the ten threats to global health in 2019. Farmers burn agricultural residues adding air pollutants to the environment. Biogas production from agricultural byproducts stands on the sustainable side of natural resources use. Pretreatment of paddy straw with a lignocellulosic-degrader bacteria can be used to enhance biogas production (Kaur *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-1012>). Water bodies contamination by agricultural runoff water containing chemicals pose a serious threat to ecosystem health and a challenge to the research community. Pitchika *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-1050>), documented the spermatotoxicity effect of a certain concentration of cypermethrin to zebrafish while it interferes to zfERα signaling.

DNA research had astonishing progress since its presentation by Watson and Crick (1953) in Nature. Genetic research in agriculture has provided scientists with miraculous tools in their pallet to combat diseases and provide solutions to numerous problems. Kalia *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-953>) succeeded to reveal the existence of more variability within populations rather than among populations. Henna producers can enhance their income while formulating efficient conservation strategies by identifying and maintaining superior lawsone (the natural dye produced by henna) producing cultivars. On the other hand, extreme parental genetic divergence does not ensure a high extent of heterosis for maize whist, moderate level of genetic divergence with high *per se* performance of inbreds, appears as a good criterion (Punya *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-988>). Concerning sunflower (*Helianthus annuus* L.), although genetic distance is a poor predictor of heterosis, dependence of oil content on genetic distance among parental lines may be used for designing an effective breeding program for sunflower (Kaur *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-953>).

Bioengineering reveals its potential in another article of this issue, with a medicinal plant holding the leading role in one example (Groach *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-1008>). Modern nano-biotechnological techniques, such as biosynthesis of AgNPs using root extract from *Saussurea lappa* (Decne.), come forward as tools to serve biology, electronics and pharmaceutical sciences while the parallel use of this endangered species may be the onset for their conservation (Groach *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-1008>). Another case where bioengineering comes forward to serve natural resources sustainability is the isolation of urease from *Proteus mirabilis* and immobilization on alginate beads, to be used in biotechnological and industrial application (Tetiker and Ertan, <http://doi.org/10.22438/jeb/40/5/PRN-118>). The increasing demand of industries for amylase represents a motivation for more research on better and more economic processes to obtain it such as the one proposed by Mohan *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-1062>), through optimization of extraction conditions. In another case, onion seeds storability and subsequent performance can be improved by the application of spermine (Yalamalle *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-1047>). Lovastatin is another high demanded substance by industry and innovative procedures such as the one proposed by Senthamarai and Kannan (<http://doi.org/10.22438/jeb/40/5/MRN-1016>) by cheese byproduct (whey) is highly valuable. Plants never cease to impress us with their miraculous properties such as *Rauwolfia serpentina* root extract that may ameliorate and improve the ability of *Channa punctatus* to withstand carbofuran toxicity (Tiwarl *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-1075>).

Pastoralism has always been interrelated to human existence covering essential needs by providing food (meet and dairy products) as well as clothing (wool and leather). Wool treatment results to a lower quality waste portion that may represent another soil amendment option, friendly to the environment. Choudhary *et al.* (<http://doi.org/10.22438/jeb/40/5/MRN-937>) reported wool waste as an excellent nutrient source for agricultural crops, in specific for cabbage production. The optimum results can be achieved by combining wool waste, farm manure and inorganic fertilizer (Choudhary *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-937>). Tillage has been often accused to affect soil biota such as earthworms. Application of agroforestry traditional practice of shifting cultivation adversely affected the density and diversity but not the spatial distribution of earthworms, even though a rapid population increase was observed after the onset of rainy season (Zodinpuui *et al.*, <http://doi.org/10.22438/jeb/40/5/MRN-1113>).

Here we stand before the amazing progress of science that only some decades ago would appear as miracles. The path of science is long, full of wonders and not always easy. This issue of the Journal Environmental Biology represents a starting point and a challenge for scientists to move further and explore new wonders. Enjoy the reading!

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