



Darwin's contribution to Soil Biology

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One of Charles Darwin's scientific contributions was the study of the earthworms. Darwin proved that earthworms were turning the soil and making it more fertile. Six months before his death, he published "*The Formation of Vegetable Mould, Through the Action of Worms, with Observations on Their Habits*" (Darwin, 1881). This book was the result of several decades of detailed observations and measurements, since Darwin began his work on earthworms as a young man, using his own yard as an experimental field. Although not many people know that Darwin spent quite a bit of time studying earthworms, increased attention had been paid to this work in the last decade (e.g. Feller et al., 2003; Brevik and Hartemink, 2010). Darwin considered himself a geologist during a decade after the voyage of the *Beagle*. He was heavily influenced by Lyell, who developed uniformitarianism theory and focused on how worms transform the surface of the earth through their constant, everyday activities. Moreover, one of the aims of Darwin was to explain how material spread on top of soil could be under the surface just a few years later. This was a real problem because, at that time, nearly everyone thought that soil had been on Earth for ever and had been formed when the Earth formed. The main topic of interest for Darwin was the role of earthworms in reworking the soil through their intestines, turning it over and over (bioturbation), which enhances soil fertility and plant growth. However, various other topics are covered by his book: erosion-sedimentation processes, biological weathering and activity on the physical debris of rocks, soil formation by horizon differentiation and the complex interrelations between the lithosphere, hydrosphere, atmosphere and biosphere. Some examples of learning outcomes from Darwin's work are: i) describe how observations can be used to develop a hypothesis, ii) investigate and discuss the historical importance of the new ideas for Soil Biology and iii) design new experiments and start new observations.

References

Brevik, E. C. and Hartemink, A. E. 2010. Early knowledge and the birth and development of soil science. *Catena*, 83: 23-33.

Darwin, Ch., 1881. *The formation of vegetable mould through the action of worms with some observations on their habits*. John Murray. London.

Feller, C., Brown, G. G., Blanchart, E., Deleporte, P., Chernyanski, S. S., 2003. Charles Darwin, earthworms and the natural sciences: various lessons from past to future. *Agriculture, Ecosystems and Environment*, 99: 29-29.