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The WormEx I Experiment: Results on the interaction between earthworms activity, meteorological conditions and soil hydrological properties

Dario Pezzotti, Marco Peli, Roberto Ranzi, and Stefano Barontini
Università di Brescia, DICATAM, Italy (d.pezzotti001@unibs.it)

On 9 March 2016 the WormEx I Experiment was launched, aiming at contributing to understand how the soil–fauna digging activity affects soil–water flow. Particularly the experiment investigates the presence of earthworms castings in different meteorological conditions and the effect of earthworms holes on the soil–water constitutive laws.

Two meadows on shallow anthropogenic soils were selected as experimental fields in the Oglio river basin (Central Italian Alps), at Cividate Camuno ($274\,\mathrm{m\,a.s.l.}$, surveys began on 9 March 2016) and at Cimbergo ($935\,\mathrm{m\,a.s.l.}$, 20 March 2017). Six experimental plots of $1\,\mathrm{m}^2$ were selected, four ones at Cividate Camuno and two at Cimbergo, respectively. At Cividate Camuno, two soil plots were improved with calcium carbonate ($\mathrm{Ca\,CO_3}$) in order to locally stimulate the earthworms digging activity. In both the experimental fields the number of the earthworms castings was monitored. The soil hydraulic conductivity was measured by means of tension infiltrometer and single–ring infiltrometer in the Cividate Camuno field, in different conditions of castings concentration.

As first results of the experiment, we verified that: (i) the castings number and their size increase after rainfall and after snow–melting, when earthworms activity is not inhibited by cold temperature; (ii) the earthworms activity, measured as the number of observed new castings, decreases as the soil dries; (iii) the calcium carbonate effectively stimulated the earthworms activity; (iv) the earthworms activity contributes to increase the soil hydraulic conductivity both in saturated and nearly–saturated conditions.