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Fast to compact, slow to recover

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Preparation for installation of soil-embedded sensors used for continuous in situ measurements of state variables. Photo courtesy of Agroscope.

Compaction adversely impacts soil functions, hampering water infiltration and reducing crop productivity for decades. Modern trends towards larger and heavier farm machinery and intensification of agriculture add to the pressure on soil resources, and passage of an agricultural vehicle can cause compaction in seconds. Disentangling the mechanisms and rates of soil recovery after compaction remains difficult, but this information is critical for assessing the real agronomical and ecological costs of soil compaction.

A long-term soil structure observatory (SSO) established near Zürich, Switzerland is the site of a unique field experiment, published in the *Soil Science Society of America Journal*, monitoring how fast soil structure recovers following different compaction levels and surface cover (bare soil and ley). Two years after compaction, soil physical properties had not fully recovered. Soil air and water permeability were drastically reduced by compaction but improved over time due to new soil macropores created by earthworms and roots. In contrast, total soil porosity remained unchanged, suggesting lack of actual decompaction.

The study suggests that recovery proceeds from the soil surface downward and from biopores into compacted soil volumes. It demonstrates that soil structure recovery following compaction is a slow process.

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Keller, T., Colombi, T., Ruiz, S., Schymanski, S.J., Weisskopf, P., Koestel, J., … & Or, D. (2021). Soil structure recovery following compaction: Short-term evolution of soil physical properties in a loamy soil. *Soil Science Society of America Journal*.

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