Visual Exploration of Pore Structure in Sandy Soil

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Fig. 1

Fig. 2

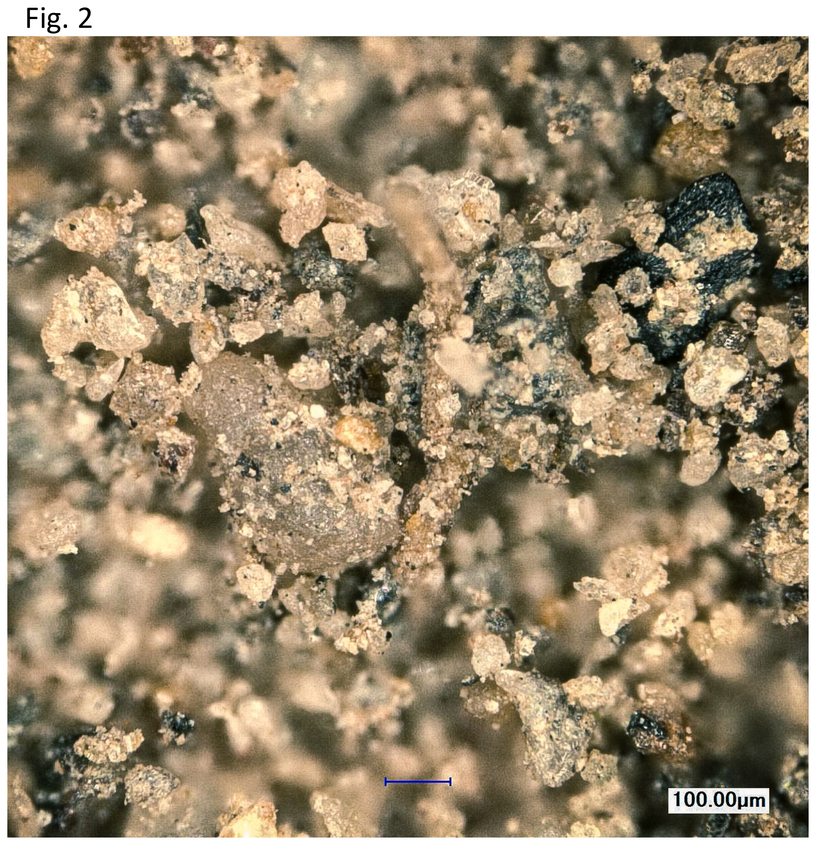
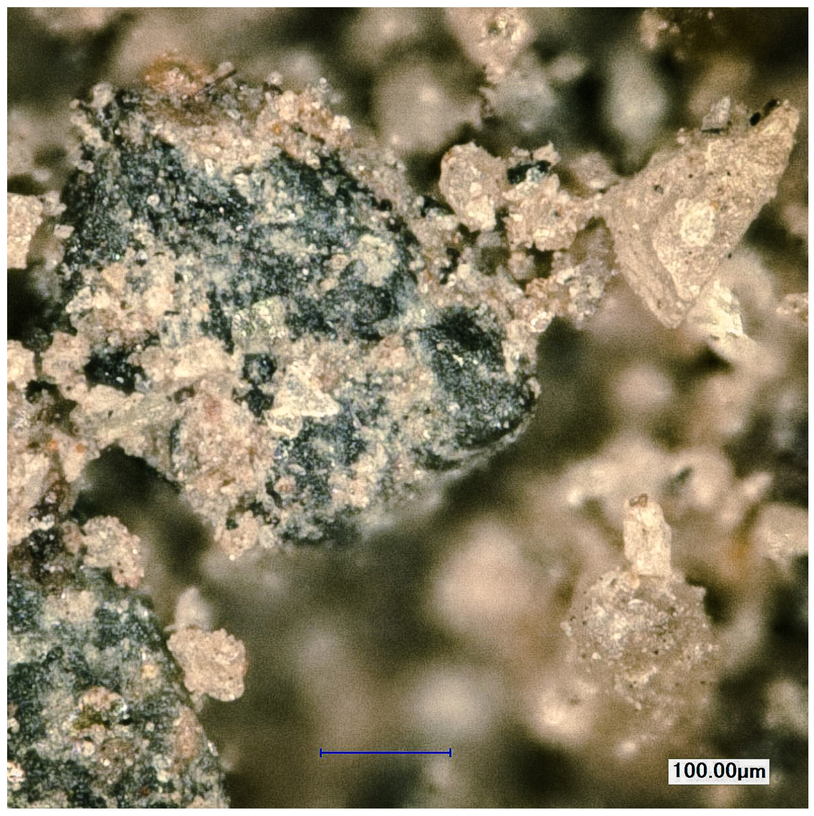


Fig. 3



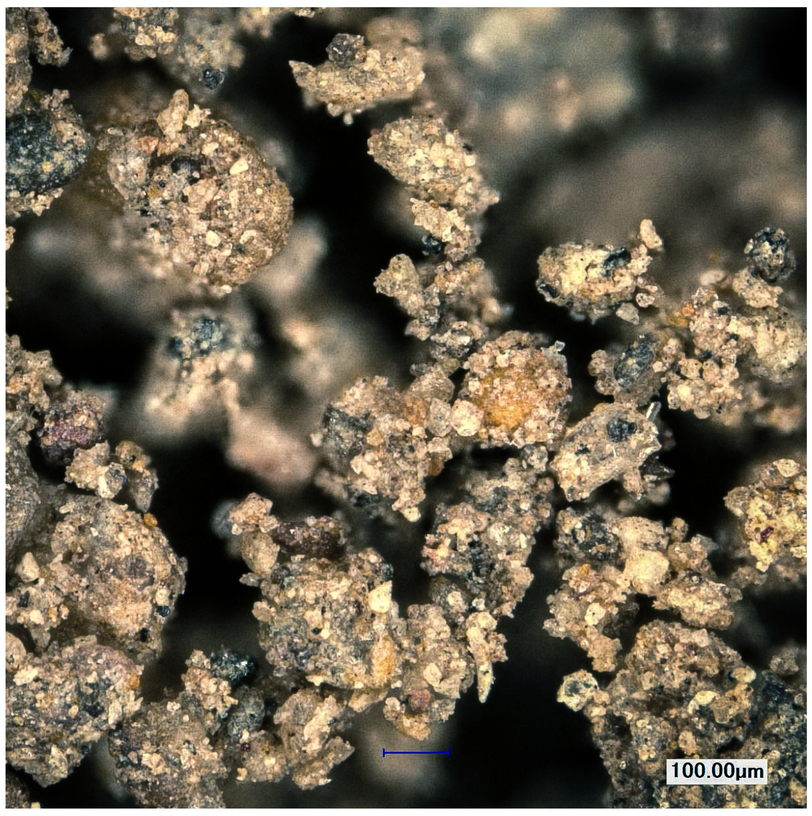


Fig. 4

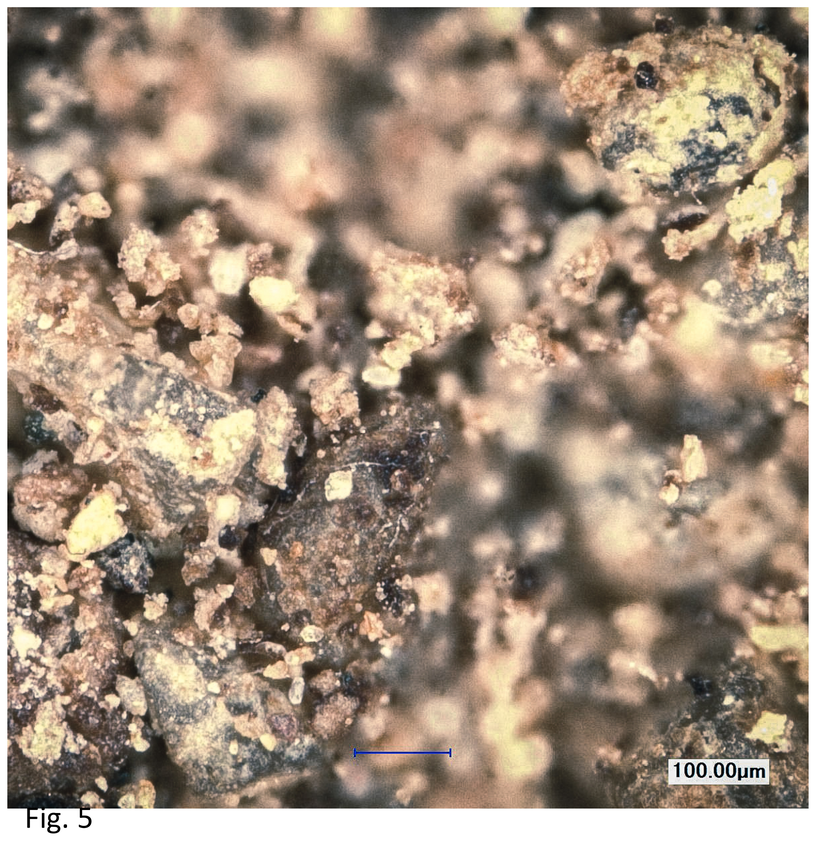


Fig. 5

Fig. 6

Observations

- ‘Soil-Bridging’ is the formation of microstructures by the cohesion of smaller and larger soil particles by organic matter.
- Figs. 1-3 show Quincy soil with organic matter intact, forming seen soil-bridging microstructure.
- Fig. 4 is Chehalis soil and Fig. 5 is a Coastal sandy soil, both showing similar bridging phenomenon.
- Fig. 6 shows Quincy with the organic matter removed. ‘Bridging” structure is not present in samples where the OM is removed and range of smaller and larger particles are loose/ dispersed.

Interpretation and Hypothesis for Further Testing

- The physical and chemical interactions between the solid phase of the soil system (represented by organic and inorganic colloid constituents) give rise to a well defined pore space system that is responsible for the fundamental physical properties of the soil such as structure, stability, water storage capacity, and permeability, and hydraulic properties of soil and are related to micropore or particle size distribution of soils (Aringhieri, 2006).

- Stabilization of organic matter by sorption forms multiple strong bonds between mineral surfaces and organic molecules, though the degree of oxidation will affect the wettability of a surface.
- Sorption of fine grained minerals is recognized as an important factor in the preservation of OM in sediments and of soils.
- Presence of Fe and Al oxides <2nm may contribute to the stabilization of OM between mineral fractions (Kaiser and Guggenberger. 2007).
- Bridging phenomenon in soils may contribute to a microstructure that creates larger pore spaces within sandy soils, affecting both hydraulic conductivity and matric potential which depend on interactions between soil water, soils surfaces, and their geometry.

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