Is there a better soil health test than a shovel?

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Some commercially available soil health tests:

Haney test

- CO_2 burst test + "soft" nutrient extractions
- Used to calculate a soil health score
- The Haney Soil Health tool estimates N credits

Cornell soil health assessment (soilhealth.cals.cornell.edu)

- 3 tiers of test packages, or a la carte tests
- Fertility + soil health

Phospholipid Fatty Acid (PLFA) analysis (producers.wardlab.com)

- Abundance (biomass estimate) of different microbial groups in soil

AGVISE soil health package

- Active carbon
- Soil protein index
- Aggregate stability

Some observations about these tests:

Haney test/score

- The properties used in the Haney test are very dynamic and depend on conditions at the sampling time and sample handling
- The nitrogen recommendations are very low
- The score seems to respond to crop rotation, but is too variable to differentiate between treatments
- I'm still looking for the practical implications of this test

Cornell test

- The extractants used in the fertility tests are not appropriate for our soils, so stick with our local standard fertility panels
- Ignore the scoring functions from Cornell. If you use any of these tests, pay attention to the "raw" values and track those over time, rather than the scores.

PLFA

- Requires many replicates (12-15 individual samples per field)
- No practical use for this test

AGVISE

- Recommended set of tests
- The active C and protein can help you track "food sources" for microbes, which tends to increase as soil health increases.

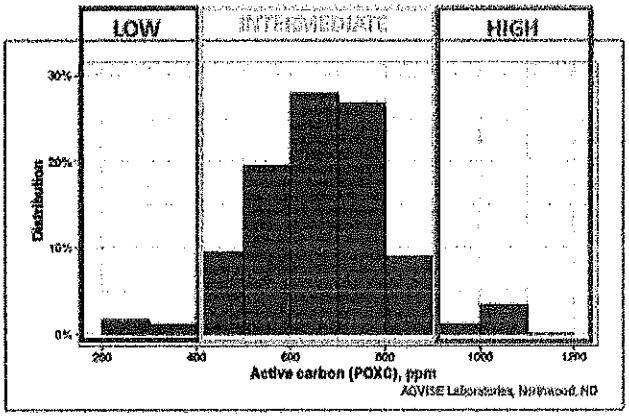


Figure 3. Active carbon (POXC) distribution among agricultural soils of the upper Midwest and northern Great Plains (AGVISE, 2019).

- Aggregate stability is a good property that integrates many factors in soil that represent erosion prevention, aeration & drainage, and biological activity (including roots)

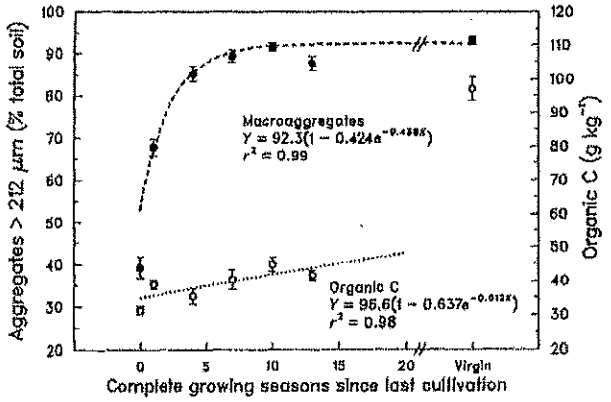
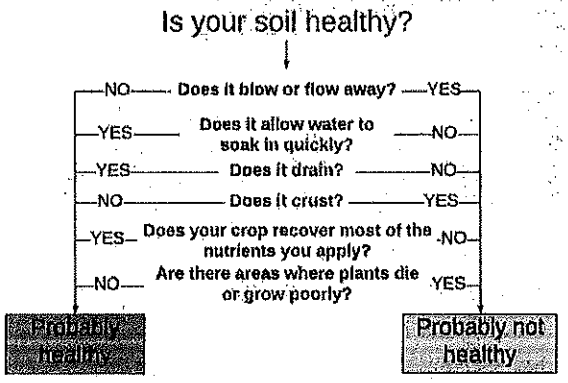


Fig. 1. Changes in percentage of macroaggregates and accumulation of whole-soil organic C with time since cultivation. Error bars indicate standard errors (n = 10).

(Jastrow, 1996, Soil Biology & Biochemistry 28: 665)

Final thoughts:
Soil health testing is not necessary every year. Soil takes time to respond.
Keep your soil health goals in mind and don't forget the big picture



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