

## BIOLOGIC SOIL TESTING

Presently, soil biology has become increasingly recognized for its role in crop productivity. For this reason, you may no longer wish to only test for inorganic nutrients in soil. An increased number of labs and crop consultants see the need for including some measure of soil biology which helps predict yield potential. Soil biology testing is experimental but potentially viable for anyone growing food, seeking to improve the sustainability of their living soil, commercial farming operations concerned with economic viability, or landscaping firms with an eye toward plant health and aesthetics.

If opting for biologic soil testing at a commercial laboratory, the emphasis of soil testing should be on the production of baseline data for later comparison. Then, at a later time, run the same tests at the same accredited laboratory again to evaluate whether a given soil improvement plan (such as raising organic matter levels, rebalancing certain microbial populations, or conversion to a system of conservation agriculture) has been effective. See Advanced Soil Testing (C225) for further discussion.

At this date, Spokane County Master Gardeners are familiar with three reportedly quantitative biology soil tests: Haney test, Solvita tests and Earthfort lab tests. We have opted not to specifically refer to any other type of quantitative or qualitative soil biology tests by name until more science-based research is available.

### Haney Test

The Haney test (developed by Dr. Rick Haney, USDA-ARS, TX) uses measured nitrate, measured ammoniacal N (ammonium in the soil – either from fertilizer sources or soil organic matter – that hasn't yet converted to nitrate), plus an estimate of N to be released from water-soluble organic N during the season. This nitrogen release is calculated based on a 24-hr CO<sub>2</sub>-burst test to measure soil respiration, water-soluble organic N, and the water-soluble C:N ratio.

Unfortunately, the Haney test has very little calibration. Or at least not adequately calibrated over the immense geography where it is attempted to be used. The Haney test is used primarily in the Midwest and not thought applicable to western soils due to lack of calibration in our area.

### Solvita Tests

Solvita offers a range of tests, of which the Field Test and Burst Test measures the CO<sub>2</sub> which living microbes (e.g., bacteria, fungi) respire as they consume organic matter detritus.

The Solvita® CO<sub>2</sub> Burst test quantifies the amount of respired CO<sub>2</sub> after rewetting a dry soil sample, employing a pre-calibrated CO<sub>2</sub>-absorbent gel. The amount of CO<sub>2</sub> measured over a 24-hour period represents "active carbon" or "respirable carbon" that was acted upon by the microbes and may also be used to estimate potential mineralizable nitrogen and phosphorus from the soil organic matter. Several Master Gardeners have expressed reservations whether samples sent through the mail and without refrigeration can offer an accurate snapshot of the biological activity in your living soil.

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The Solvita® Field CO<sub>2</sub> Field Test provides insight into actual field (“basal”) microbial activity undisturbed by drying and grinding. This Do-it-Yourself test kit is available online.

The following labs offer Solvita® testing:

<p>AgSource Laboratories 323 Sixth Street, P.O. Box 1350 Umatilla, OR 97882 541 922-4894 <a href="https://www.agsourcelaboratories.com/">https://www.agsourcelaboratories.com/</a></p>	<p>Best Test Analytical Services 3394 Bell Road NE Moses Lake, WA 98837 877 950-2378 <a href="http://www.besttestlabs.com/">http://www.besttestlabs.com/</a></p>
<p>Soil Test Farm Consultants, Inc.* 2925 Driggs Dr. Moses Lake, Wa 98837 (509) 765-1622 <a href="http://www.soiltestlab.com/">http://www.soiltestlab.com/</a> *Solvita and carbon sequestration testing</p>	<p>Kuo Testing Labs 337 1<sup>st</sup> Ave S Othello, WA 99344 509 488-0112 <a href="http://www.kuotestinglabs.com/">http://www.kuotestinglabs.com/</a></p>

### **Earthfort Lab**

Only a handful of commercial laboratories anywhere in the nation claim to count and classify abundance of microbial life in soil, the most notable in our region being Earthfort. Earthfort’s quantitative soil food web testing attempts to evaluate relative populations of fungi, bacteria, protozoa, and nematodes. Earthfort also notes pathogenic microbes such as coliform bacteria.

Several Master Gardeners have expressed reservations whether samples sent through the mail and without refrigeration can offer an accurate snapshot of the biological activity in your living soil. Our pilot study comparing results of this type of testing was inconclusive. Further scientific research is needed regarding this approach.