

Subsoil Injection of Concentrated Organic Pellets

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Subsoil compaction is a growing environmental concern in mining, forestry, agriculture, and other industrial operations. Heavy traffic and activities such as topsoil removal, admixing, and soil reconstruction result in persistent (and often permanent) subsoil compaction problems. This problem impedes plant root growth, reduces aeration, water infiltration, and availability of nutrients. So far there was no technology for mitigation of this problem in a sustainable manner. Paragon Soil and Environmental Consulting Inc. has developed and tested a technique that couples deep subsoiling with organic pellet injection. The technology initiates the following sets of processes. The subsoiling operation breaks the compacted subsoil layer. The deep injection of organic matter (nutrients) force plant roots to penetrate deeper in search of nutrients and moisture. And finally, the macropores created by the roots and the organic matter from the root biomass will permanently alleviate the compaction problem.

In spring of 2009, Paragon Soil and its research partners have initiated field trials to demonstrate the technology and a newly developed pellet injection system that simultaneously loosens subsoil while adding concentrated organic matter and nutrients in pellet form. The organic matter pellets are produced by EarthRenew from organic wastes such as manure, municipal biosolids, and green wastes, through a drying process where temperatures reach far higher than what composting or other drying processes could achieve. This 'flash' vaporization instantly breaks down and destroys pathogens, weed seeds, and chemicals including pesticide and herbicide residues. The final product is formed into a dry, easy to use and safe to handle pellet which replenishes soil organic matter, promotes healthy deep root growth, and alleviates soil compaction.

The Paragon technology is intended to reduce the time to meet the standards by improving soil quality leading to faster land reclamation while reducing the cost from repeat treatments. Results of field trials on 3x5 m micro-plots in 2008 were very promising with yield increases of at least 30 to 50% in cereals and canola and even higher in forage crops. This presentation will focus on 2009 growing season results conducted on farmland, pipeline rights of way, and wellsites, with attention to improvements in soil root zone quality, rooting patterns, and crop productivity. The Project is being conducted by a consortium with Paragon as the lead; Prairie Agricultural Machinery Institute Saskatchewan; EarthRenew Corporation; University of Saskatchewan; Canadian Natural Resources Ltd.; and TransCanada Pipelines Ltd. Significant funding and oversight is provided by Sustainable Development Technology Canada.

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Leonard is a senior soil consultant with over 30 years experience in Canada and abroad. His expertise extends into several fields of specialty that include: agriculture, environment and forestry. During the past decade, he has been instrumental in developing land capability assessment systems for reclaimed agricultural and forest lands in Alberta.

In the Oil Sands region, he has conducted numerous soil surveys; developed reclamation plans; assessed reclaimed soils; conducted field research, and participated in multidisciplinary working groups on various projects.

Since 1993, he has taught the wellsite criteria course for Enform. In 2007 and 2008 he was the Instructor for Soils 420: Soil Formation and Landscape Processes, at the University of Alberta.