

# Precision Variable Rate Planting VariPlant™ with ESP™ Sensing



## Soil Doctor® Systems



**Farm like you mean business -- With  
Precise Seeding through On-the-Go Soil Analysis**

**The Precision Dilemma.** You want to farm more "Precisely", more Efficiently, starting Right Now; but many insist: "Wait! First collect Years of yield data and don't do anything different. . . it might bias your data. After five years you will know how to start making more money."

Their advice ignores the fact that you already farm "precisely" field-to-field, based on fundamentals you learned long ago. You know that your better soils deserve higher investments and that crops need certain ranges of nutrients. All you need is that detailed foot-to-foot field information and a system that automatically Does What you Want, Based on That Data, At That Location -- **TRUE PRECISION.**

**You need the Soil Doctor® System to farm "precisely" foot-to-foot, STILL the only application system in the world with On-the-Go Soil Sensing.**

**Precision Planting.** You already make the precision planting decisions you can. You buy the hybrids you want (while you can) and plant according to a field's average capacity. You're mostly dependent on weather and your land, and have even tried manual methods of changing rates. But when you switched rates at the precise place --something always interfered with precisely adjusting it again, to a setting appropriate to the current area. You end up planting corn in the best ground at the low rates, which you only wanted on the hill tops.

**Soil Doctor® Technology is your Complete Solution.** It even responds to mapped overrides from additional data sources, like identified poor drainage zones.

**Rawson AccuPlant  
Planter Drive with  
the Soil Doctor System**



**The Soil Doctor®Solution.** Think of Soil Doctor®VariPlant™ Control as **Cruise Control** for your planter or drill. You specify what you want to happen ahead of time, and VariPlant commands your planter drive to deliver the rate you selected -- without having to map or soil sample ahead of time. Simply connect your Soil Doctor system to your planter controller's external serial port and run. If you already own a hydraulic planter drive, you have the experience to add **Cruise Control.** If you don't, you'll welcome the Easiest, and yet Most Accurate, way to implement Precision Farming today.

Soil Productive capacity is variable, finely variable. Crop yield is similarly variable. **Seeding precisely, on a scale as fine as the individual plant's root zone, optimizes your profits.** Even if your field changes from thin topsoil to deep, high organic silty clay loam, changing rates is automatic and effortless. Soil Doctor® VariPlant™ Controllers command your planter or drill to vary seeding rates, *not according to anyone's best guess as to how your soils might vary --zone to zone--*, but by your soil's important production characteristics

**foot-to-foot, as you plant.**

Soil Doctor, On-the-Go, **Rolling Electrode Soil Sensor** systems examine Soil Type, Organic Matter, Cation Exchange Capacity (CEC), Topsoil Depth, and Soil Moisture to arrive at the best seeding rate --by the square Foot.

**It is common to find that over 50% of the variability present within 2-1/2 acres is already present in a few square yards.**

*--Agricultural Research Service, USDA*

VariPlant "complex resistivity" sensing determines which areas of the field can supply greater amounts of water to the crop by measuring these properties. It increases the seeding rate accordingly. When the system encounters the poorest soil in the field, seeding rate drops to the minimum, which You have Preselected.

**Rolling  
Electrode™  
Soil Sensors**

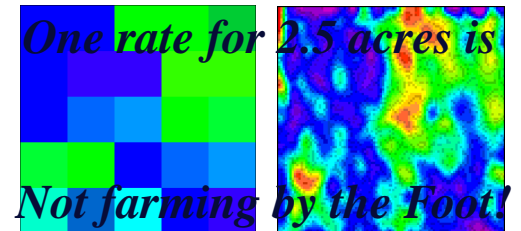


Further, a manual override is always at your fingertips. With a Soil Doctor® VariPlant Controller, there is no need to get bogged down with data collection, to hassle with GPS, to go over the same ground twice, or to map before you begin planting, if you don't want to.

**Add ESP™ Sensing and a Solo™ PC™ Dual product applicator and you can plant and spoon feed each plant N, P, and K on-the-go to its exact needs.**

**But I've Been Told that Grid Sampling and USDA Soil Maps Are the Keys to Precision Planting!**

Today, when writing about variable rate technologies--some call grid sampling by plots as large as 2-1/2 Acres as "farming by the foot". It makes grid sampling methods *sound* as precise as the Soil Doctor system. But we all know:



The Soil Quality (CEC and topsoil depth) map on the left shows 25 composited sample grids of 2-1/2 acres each. The map on the right shows 7,250 samples/acre--from one simple trip through the field with a Soil Doctor system. Like above, grid sampling can miss all **high productivity areas**, and most of the **low productivity areas**, while still eating up time and money. It provides only five levels of data, while Soil Doctor technology reveals fifty times more field variability, as it **precisely plants** in ONE convenient TRIP. High sampling intensity, TrueVue™ soil maps from Soil Doctor® data are more detailed than sporadic hand-sample estimates obtained by USDA soil surveys. TrueVue™ smart maps are key in reducing P, K sample costs and increasing floater application accuracy.



**TEST Soil Type, CEC,  
Organic Matter, Soil Moisture,  
Topsoil Depth, Nitrogen,  
pH, P and K. Extra Sensory  
Perception (ESP™)**

**Crop Technology, Inc.**

**(877) S Dr-Crop Toll-Free**

**The Only System World-Wide that Actually  
Does Farm-by-the-Foot**

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**Many May Promise ....**

**.... Soil Doctor®**

**Applicators Deliver™**



## Rolling Electrode Soil Sensors



**Soil sampling at random is not Precision Farming.** For precision, Soil Doctor VariPlant controllers constantly, accurately assess local soil conditions - through the rolling electrodes-, and command seeding rates at 5 times a second (about once every foot of travel) -according to your plans- and permit independent control of multiple hydraulic motors.

Using a large grid for soil sampling is no better than sampling at random.

-Purdue University

**Some experts say: Variable Rate Planting provides no economic benefits. "Stick with one high seeding rate."** Examine how many of the current Variable Rate (VR) planting studies are being conducted. They fall into two categories: those which do not alter fertility as they alter population, and those which are VR studies in name only.

Some studies don't actually vary rates based on the full spectrum of soil characteristics. Fields are merely divided into arbitrary zones, and a rate suitable for an "average" soil (which does not necessarily dominate that zone) is seeded throughout. Consequently, soils are still not being planted based on true production capacity. Logically, economic benefits will not accrue in such tests. Other studies do not reduce populations on the poorer soils which aren't capable of supporting the higher populations. Dry years and high population means ears won't set.

Still, others do not insure adequate local fertility as the local population is increased. **Would you trust any of those folks to care for your livestock?**

Many seed companies recommend planting at high populations everywhere. So find out who is sponsoring a production study --before you accept its results as proof positive. If you haven't noticed already, some of the best studies in Precision Agriculture, the ones with the repeatable findings, are those performed by individuals (mostly growers) who want to obtain the simple Truth. As any grower knows, in agriculture you can make anything "not work". All you have to do is "not try". A sponsor, or silent partner, might best explain the results of any study which produces illogical "findings".

**To make Precision VR planting work its best for you,** CTI recommends matching an accurate variable rate seeding program to an equally accurate fertility program.

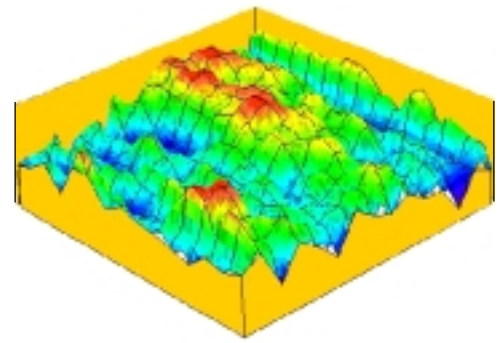


### High Speed Applicator Kit

To get the highest efficiency from your fields, don't stop with taking advantage of your varying soil types and water holding capacity. Select a coordinated hardware option and apply variable rates of starter -matched to VariPlant™ variable rate population-- for your planter or strip-till system.



**An Optional Strategy for Beans Built In.** For beans, higher nutrient potential in the bottom ground supports intensive growth of individual plant canopies --at lower populations. Higher populations on the hilltops (with lower nutrient potential) are required to create a comparably dense canopy, for the best level of weed control.

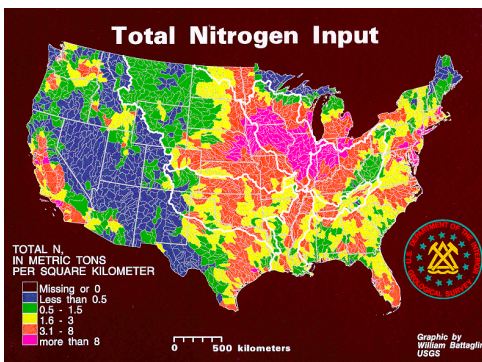


The corn field shown above was planted with the Soil Doctor® VariPlant Control. The Soil Doctor® System's VariPlant Control uses CTI's patented on-the-go CEC and topsoil depth soil sensors, in conjunction with Rawson's AccuPlant hydraulic control to achieve a controlled variable plant population. The grower, George Holsapple (Jewett, Illinois) specified a lower limit of 18,000 and an upper limit of 35,000 seeds/acre.

Both the smaller red area to the lower left and the red, two part area to the right of center are high productivity areas, known by George from prior years experience. He confirmed these areas at the screen of his VariPlant™ cab unit (Field Manager unit) as he planted. George already knew the field and the reason for the high productivity areas (e.g., the larger one is the outflow of richer soil from an adjoining higher field). Although mapping facilitates --through pictures-- post-planting studies; **GPS/DGPS and mapping are Not Required to variably, simultaneously control plant population and starter fertilizer rates. Precision Agriculture was always meant to be this easy and this Accurate!**

**"In replicated tests with Asgrow's assistance, my fields produced a Yield Increase of An average 17 bushels/acre over 27 seed varieties, with increased population. All other cooperators saw a yield loss. My Soil Doctor system Made all the difference."**

-George Holsapple, Jewett, Illinois



Nitrate and phosphorous, moving in very wet years from fields--through watersheds--to the Mississippi River, have contributed to the generation of a Hypoxia region (a zone of low oxygen concentration) in the Gulf of Mexico. Presently, this depleted area is about the size of New Jersey. Federal legislators reside near the discharge from Pennsylvania's Susquehanna River valley, where heavy N and P losses from Dairy manure have been blamed for the decline of the Chesapeake Bay. If fertilizer and manure were voluntarily applied in a more efficient manner, then there would be no need for federal legislation to restrict N & P application.

**Soil Doctor® Soil Sensing Technology is a scientific advancement to the exploratory, basic research conducted over the last fifty years by the United States Department of Agriculture for irrigated western states production. After CTI introduced its technology to domestic midwest agriculture in 1987, USDA and DOE initiated several major programs in Iowa, Missouri, Illinois, California, Nebraska, Texas and Idaho whose research has produced findings proving and supporting scientific principles underlying CTI technology.**

**CTI technology is protected by patents issued and pending, both domestic and foreign, including U.S. Patents 6,138,590 (in Review) and Patent 6,484,652. CTI patents cover on-the-go soil sensing technology, incorporating electrochemistry, complex resistivity, and conductivity --serving immediate application, post traverse GIS analyses for assay of soil properties, soil fertility & chemical levels; and enable real-time application or certified, post-survey treatments that rely on sensed soil data.**



*Many May Promise .....*

*..... Soil Doctor® Applicators Deliver™*