



Sensible Solutions

News & Information For On The Go Sensing

GreenSeeker
Variable Rate Application and Mapping Systems

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Welcome

Welcome to the first edition of *Sensible Solutions*. Redball LLC, the United States distributor of GreenSeeker technology publishes this newsletter as a free service. *Sensible Solutions* is designed to support current GreenSeeker users and to inform interested parties about the growing field of optical sensing. GreenSeeker has quickly become the major force in delivering high quality imagery and variable rate technology to producers and service providers throughout the world. Because so much is happening in this exciting field, this newsletter has become a sheer necessity in order to keep our customers and prospects up to date. We trust you will find this newsletter to be both relevant and thought provoking, and in the end, useful in providing *sensible solutions* to your operation.

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Variable Rate Application

One of the most popular reasons to purchase a GreenSeeker RT200 system is to be more efficient in the management of crop inputs. In most cases, a flat rate approach to crop input management results in either over application or under application. Both of these conditions cost you money. Over application wastes expensive inputs and can be hard on the environment, and under application limits yield and often results in additional passes. GreenSeeker technology offers a simple alternative to this approach. Whether you are using a university prescription, or a custom prescription specific to your field, timely variable rate capabili-

ties are at your disposal. GreenSeeker sensors take 1000's of optical readings per second. These readings are instantly run through the selected crop input algorithm, producing a new target rate of application every second. Plus when you are finished, the GreenSeeker RT200 system produces 3 maps to document performance, including: NDVI, Target Rate and As-Applied Rate.

To find an authorized GreenSeeker dealer near you, call Redball at 877.332.2551 or request information from the Redball website @ www.redballproducts.com.

What does "real time" mean?

One of the unique features that GreenSeeker technology offers is real time variable rate application capabilities. "Real time" technology refers to the ability to instantly respond to an input variable. In the case of GreenSeeker, NDVI is the input variable by which we can instantly respond with prescribed rate of application. The benefit to GreenSeeker users is that information gathering and application can all happen at once, eliminating extra passes and expensive delays.



GreenSeeker RT200 on the go sensor reading wheat vigor.

GreenStar™ 2 Compatibility

After successful completion of compatibility trials in the 2007 growing season, the John Deere GreenStar™ 2 (GS2) interface is being made available to GreenSeeker users for 2008. This means operators of John Deere 4700, 4800 and 4900 series sprayers will be able to enjoy all the benefits of GreenSeeker technology through a direct serial interface with the GreenSeeker hardware. To activate the GreenSeeker menu on the GS2 monitor, operators will need to call John Deere's Stellar Support phone number to receive their unique activation code. To find out more about this exciting development, contact your authorized GreenSeeker dealer or your local John Deere AMS representative.

Nitrogen Saving Opportunities

No crop input has received more attention lately than nitrogen. Price inflation, physical supply limitations, record demand and nitrogen's critical importance in crop production have all contributed to this interest. These factors along with serious concerns about nitrogen runoff have forced producers to consider improved nitrogen management strategies. In numerous cases GreenSeeker sensors and the related nitrogen prescription have delivered the highest grain yield per unit of nitrogen. This nitrogen use efficiency is a result of a unique approach to N management including:

- Incorporation of a N calibration strip, which allows sensors to "read" true yield potential for each field and each season.
- N rate is calculated from crop canopy based yield potential, not speculative pre-season yield goals.
- Real time variable rate response to opportunity spots in the field.
- Recognition of residual nitrogen from preceding crops.
- Recognition of mineralized nitrogen from organic matter.

Cotton Inc. encourages continued optical sensor usage



Dr. Ed Barnes, director of ag research at Cotton Incorporated, says that the primary focus of research for 2008 will be in the area of on-the-go sensor technology. Barnes reports that several of Cotton Inc.'s State Support Programs have expressed a high level of interest in producing more research at the local level. According to Barnes, "the technology now is pretty mature in that we have good interface between some of the sensors and the controllers." Barnes

calls PGR's and defoliants the low hanging fruit for cotton sensor technology. Barnes says the technology is ready for adoption in the areas of PGR's and defoliants, but now sights are being set on the bigger issue of nitrogen management. To get at this issue, sensor research is progressing at major universities in Missouri, Mississippi, Tennessee, Georgia, North Carolina, South Carolina, Arizona, New Mexico, Oklahoma and Texas.



GreenSeeker Mapping Capabilities

While much attention has been focused on GreenSeeker's remarkable real time variable rate capabilities, we should not overlook the mapping features available from this technology. GreenSeeker differs from satellite and aerial imagery in many ways. First, you own the tool, and as a result, images can be produced as many times as you like with out typical *per acre* imagery costs. Second, image capture is not delayed through the ordering process, by uncooperative weather conditions or lack of daylight. The technology is

well tested and capable of producing high quality field vigor (NDVI) maps. Custom applicators may choose to provide maps as an additional service offering to their customers. These maps are very useful for directing field scouting activity as they clearly reflect varying crop health across a field. These maps can also be used to write variable rate prescriptions for a variety of applications, as another layer in the creation of management zones, or used in developing variable rate planting prescriptions.

A RT220 upgrade kit is



available for those who are seeking exceptionally high NDVI resolution maps. The RT220 allows GreenSeeker users to map vigor scores from each individual geo-referenced sensor, as opposed to averaging sensor values, as is the case with the base RT200 platform. The result of this upgrade is a particularly high quality vigor map useful in identifying even the smallest field variability.

What is NDVI?

NDVI is an acronym for Normalized Difference Vegetative Index. It is a common unit of measurement in the field of optical sensing. In the case of GreenSeeker, it is the difference in reflectance values between red light and Near Infra-red light. Because NDVI is a ratio, the scale of NDVI values range from 0 to 1. From a practical standpoint, NDVI measure two things; plant biomass and leaf tissue chlorophyll content. When NDVI values are assigned with specific GPS coordinates, you can produce a very accurate vigor map for any given crop.

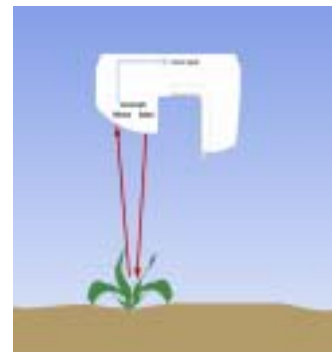
New Rx's

Universities and researchers continue to step up efforts on developing new prescriptions for variable rate application of inputs based on optical sensor values. This research is now happening at an unprecedented rate at over 25 universities all across the US, and in many research institutions around the world. Because of its ever-increasing cost and importance to the environment, nitrogen management remains a primary target of this research, but numerous other input studies continue. For 2008, several new prescriptions will be added to the already long list of prescriptions available on the GreenSeeker RT200 system, including

- Virginia Poly Technical Institute: Corn
- Oklahoma State University: Corn (updated)
- Agriculture and Agri Foods—Canada: Spring Wheat, Canola,
- Updates to many other existing prescriptions.

Prescription updates and instructions for prescription use can be downloaded from the "Support" section of the Ntech Industries website: www.ntechindustries.com.

Visit us on our website www.redballproducts.com





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Dealer Inquiries Welcome



GreenSeeker Financing

Parties interested in buying GreenSeeker can now take advantage of GreenSeeker's 0, 0, 12 Financing Program. This is a very attractive financing program featuring 0% interest, and \$0 down, for the first 12 months. The amortization period is 5 years with annual payments, fixed interest rates and a \$100 application fee. With this program, even farmers with relatively low acres can expect to quickly benefit from using GreenSeeker technology. See your authorized GreenSeeker Dealer to learn more about this program.

What are GreenSeeker users saying about on the go sensing?

"Farmers are too used to doing things the way they're used to doing them--I learned a lot just by putting in Nitrogen rich strips." Iowa corn producer

"If you're presently buying imagery for cotton production, the GreenSeeker is a no-brainer. It is more efficient, there are no in-field holdups (waiting for prescriptions to arrive) and you have better timing of application overall. Compared to aerial imagery you will be well pleased." Tennessee cotton producer

"We were a little conservative with GreenSeeker the first year. We used it on 4,000 acres and reduced nitrogen application about 20 pounds an acre on average. We didn't lose any yield... So I paid for the cost of GreenSeeker the first year." Illinois corn producer

Go to www.redballproducts.com to read more testimonial comments.