



# IHARF

INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

## Greenseeker™ Technology: Optimizing Nitrogen Fertilization with Optical Sensing

### Greenseeker™ Background Information

Greenseeker™ is a new technology that is designed to provide superior control of nitrogen levels in fields by integrating optical sensing and variable rate technology. The Greenseeker™ sensor emits light in the near-infrared and red bands and measures how much of this light is reflected from the crop canopy.

Once the sensor measures the reflectance off of the crop's surface, it calculates the Normalized Difference Vegetation Index (NDVI), which is a measure of the crop's biomass and can be used to estimate the yield potential of the crop.

These values are then compared with NDVI values collected from a non-nitrogen limited reference strip to determine whether or not the crop will benefit from additional nitrogen inputs.

The Greenseeker™ sensor was primarily developed by researchers at Oklahoma State University's Stillwater campus. The university is promoting the technology throughout the agriculture industry and has been generous enough to distribute several handheld sensors to various agricultural organizations, including IHARF.



*A sprayer with Greenseeker™ technology*

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### Greenseeker™ Technology Facts

- √ Unlike most satellite mounted sensors, neither clouds nor the time of day will interfere with the sensor's ability to function properly.
  - √ Greenseeker™ technology ensures that nitrogen is only applied to areas where there is a nitrogen deficiency.
  - √ The Greenseeker™ should result in higher economic returns by maintaining yields with less nitrogen.
  - √ Handheld Greenseeker™ sensors can be used to determine the optimum nitrogen topdressing rate for each field and the Greenseeker™ RT200 variable rate application system addresses spatial variability within the field.
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*Did you know...*

*The Greenseeker™  
is more flexible than  
satellite imagery.*

*This project is made possible through the generous support of:*

**Platinum**

*- Agriculture and Agri-Food Canada - ETAA Program*

**Gold**

*- Pattison Liquid Systems  
- Saskatchewan Canola Development Commision*

**Silver**

*- Oklahoma State University  
- Raven Industries  
- Accutrak Systems Ltd.*

**Bronze**

*- Saskatchewan Wheat Pool*

## Research In Progress

Currently, staff members are focusing on two areas of research with the Greenseeker™ technology. The first is led by Dr. Guy Lafond of the Indian Head Research Farm. Research sites are located in Brandon, Ottawa, Indian Head and Swift Current. The goal is to develop algorithms capable of determining the optimal nitrogen top-dressing rates for spring wheat and canola that are adapted to Canadian growing conditions.



Research in the field is as important as that done in a lab

Lafond and the research team will also measure the impact of top-dressing liquid UAN on nitrous oxide and ammonia emissions to better understand the volatile losses that can be expected. Using the RT200 to apply variable rates of nitrogen currently requires producers to apply liquid UAN as a surface dribble band.

The second area will focus on evaluating the newly developed algorithms on a field scale. Trials are being undertaken at various locations in Saskatchewan with the cooperation of the producers and Pattison Liquid Systems Inc., who are located at Lemburg, SK. This component will be managed by Research Associate, Chris Holzapfel.

*For information about the Greenseeker™ technology contact either Chris Holzapfel 695-4200 or Dr. Guy Lafond at (306) 695-5220*

*For information about IHARF either contact Judy McKell at (306) 695-4200 or visit [www.iharf.ca](http://www.iharf.ca).*