The goal of this monthly newsletter is to serve the best interests of Idaho crop producers. Correspondence and inquiries should be addressed to: Olga Walsh, Cropping Systems Extension Specialist, Southwest Research and Extension Center, 29603 U of I Lane, Parma, ID 83660, Phone: (208)722-6701 (ext. 218), Fax: (208)722-6708, Email: owalsh@uidaho.edu

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University of Idaho Extension improves people’s lives by engaging the University and our communities through research-based education. Our areas of expertise are Agriculture, Community Development, Family and Consumer Sciences, Natural Resources, and Youth Development.

To enrich education through diversity the University of Idaho is an equal opportunity/affirmative action employer and educational institution.
WHAT’S NEW?

My 1-year UI Anniversary

It’s hard to believe that it has been one year since I accepted the Cropping Systems Agronomy position at University of Idaho, Parma research & Extension Center!

Fun at the Capital City Market, June 2015.

It has been a very busy, exciting and eventful year; and I am so happy with the direction my program is going and the progress we have made already.

I was hired in September of 2014 as a Cropping Systems Agronomist and Extension Specialist. My responsibilities include conducting research and developing and delivering relevant educational programs in sustainable cropping systems using best management practices for important crops grown in southwest Idaho. My research and extension interests and focus is on Soil Fertility, Nutrient Management and Precision Agriculture.

Here is a quick re-cap of some of the fun things I was involved in for the past several months:

✓ Travelled to Saskatoon, Saskatchewan, Canada, to deliver a seminar on Precision Agriculture at the Western Canadian Crop Production Show
✓ Organized a Precision Agriculture conference in Boise, ID, with focus on plant nutrition and water use.
✓ Spoke at the Direct-Seed Workshop, Idaho Falls, ID.
✓ Organized Cereal Field Day at Parma R&E Center
✓ Spoke at LimaGrain/UI Field Day, Aberdeen, ID.
✓ Presented 4 projects at Western Nutrient management Conference, Reno, NV
✓ Co-wrote and published a manuscript on how wheat varietal differences may affect crop sensor measurements and what implications it may have for nitrogen fertilizer recommendations.
✓ Published an extension publication (BUL 896) that aims to improve growers’ knowledge and understanding of how crop canopy sensors and in-field reference strips can be utilized for effective nitrogen management.
✓ Published an extension article on precision nitrogen management for Idaho Grain Magazine.
✓ Published 8 monthly Idaho Crops & Soils Newsletters.
✓ Published 2 educational articles in the Crops/Soils/Agronomy News: one on the importance of building an effective support team, and the other - on how to publish a manuscript in a ASA/CSSA/SSSA journals.
✓ Initiated and maintained Idaho Crops & Soils Blog; we've had visitors and followers from 33 countries
✓ Initiated and maintained Cropping Systems Twitter account: @IDCrops; we've had 111 posts and 183 followers so far.
✓ Secured over $495,000 in extramural funding, with several exciting project proposals pending funding.
✓ Elected as 2015-16 Chair-Elect, ASA/CSSA/SSSA Early Career Members Committee.
✓ Continued to serve as a Secretary/Treasurer, Western Crop Science Society of America.
✓ My research and extension efforts have been featured in Capital Press, and Top Crop Manager West.
✓ I was involved in student mentoring and education by advising and co-advising 2 graduate students and judging student oral and poster presentations at professional meetings.
✓ I participated in Supervisory Excellence Program by University of Idaho Professional Development and Learning.
✓ Kelli Belmont has joined my Cropping Systems program in June as a Research Technician - thank you, Kelli, for all you do! Jordan McClintick has been a great addition to the team as well - thank you, Jordan, for your hard work!
✓ We have 18 projects in wheat, barley, beans, mustard, peas, alfalfa and other crops planned for the next growing season. Thank you to all UI faculty, staff and students that made my first year in Idaho a blast!

Non-Traditional Foods

As an agricultural professional working on developing efficient crop production practices, I am contributing to the global efforts of closing the gap between rapidly growing population and food production.

I am always interested in innovative food research and product development conducted worldwide. Here is a quick update on the most unusual non-traditional food production practices currently being developed around the world by research institutions and industry.

✓ Vegan cheese cultured in the lab, contains proteins virtually identical to animal proteins. Developed by Counter Culture Labs, Oakland CA.
✓ 3-D Printed Foods, created in Cornell Creative Machines Lab, Ithaca, NY.
✓ Cultured meat developed through tissue engineering technology. Maastricht University, Netherlands.
✓ Allergy-free peanuts, developed Aranex Biotech.

Also, here are some new intriguing vegetables recently:

✓ Kalettes, developed by Tozer Seeds through traditional, non-GMO breeding methods by crossing kale and Brussels sprouts. (Photo credit: http://modernfarmer.com). Grows like a 3-foot-tall Brussels sprout plant, but instead of producing tight balls all along the stem, it produces open,
flower-like clusters of baby green-and-purple kale leaves. The flavor is sweet and nutty; the vegetable is full of antioxidants and fiber.

For detailed information and recipes, please go to: **Petite Snap-Greens**, the first introduction from a line of being dubbed "Calvin's Peas," novel varieties developed by Idaho pea breeder Dr. Calvin Lamborn of Magic Seed, Twin Falls, ID. The vines of this one grow 3 feet tall and need little to no support. Produce a uniform, dark green, with sturdy stems but a very tender texture and sweet, essence-of-pea taste. The frilly tendrils are unique and eye catching, and hold up well to stir-frying or tossing into salads. Photo credit: [www.johnnyseeds.com](http://www.johnnyseeds.com).

- **Roundup-Ready Crops**

  Photo credit: [www.bloomberg.com](http://www.bloomberg.com).

  Roundup-Ready Crops are genetically modified to be tolerant to the herbicide Roundup. Roundup is the brand-name of a herbicide marketed by Monsanto beginning 1990’s.

  Glyphosate, the key active ingredient of Roundup, has been patented since 1970’s. Glyphosate kills plants by blocking an enzyme involved in the biosynthesis of amino acids, vitamins and secondary plant metabolites. The crops were modified to help crop producers to fight weeds in a simple, effective way.

  The first Roundup-Ready Crop developed in 1996 was soybeans. Other crops include corn, canola, alfalfa,
cotton, and sorghum. Roundup-Ready wheat program initiated by Monsanto in 1997; it was terminated in 2005 due to growing concerns about consumer acceptance and potential loss of significant export markets.

**Advantages of utilizing herbicide-tolerant crops:**

- Excellent weed control
- Flexibility due to late-season application
- Reduced chemical and fuel use and minimized soil compaction - due to reduced numbers of applications
- The ability to use no-till or conservation-till systems.

Herbicide-tolerant crops go hand-in-hand with herbicide-resistant weeds. Herbicide-tolerant weeds is not a new phenomenon - the first report of weeds resistant to herbicides (triazines) in 1968.

**Management strategies for avoiding and managing herbicide resistant weeds (by The North Central Weed Science Society (NCWSS) Herbicide Resistance Committee):**

- **Use** herbicides only when necessary.
- **Rotate** herbicides - do not make more than two consecutive applications of herbicides with the same site of action.
- **Apply** herbicides in tank-mixed, prepackaged, or sequential mixtures that include multiple sites of action.
- **Rotate** crops, particularly those with different life cycles (e.g. winter annuals such as winter wheat, perennials such as alfalfa, summer annuals such as corn or soybeans).
- **Combine**, where feasible, mechanical weed control practices such as rotary hoeing and cultivation with herbicide treatments.

- **Scout** fields regularly and identify weeds present.
- **Clean** tillage and harvest equipment before moving from fields infested with resistant weeds to those that are not.

For up-to-date detailed information of adoption of genetically modified, and specifically - herbicide-tolerant - crops in U.S. - please go to:

-- **GIS Software**

A geographic information system (GIS) is a system intended to capture, store, manipulate, analyze, manage, and present spatial and geographical data. The GIS provides the platform to express data in a visual way. It enables us to combine field data for more informed management decisions. Color-coded maps indicate differences in various characteristics from soil type and fertility to insect and disease pressure and crop yield potential. GIS often confirms and enhances growers’ knowledge, and sometimes reveals issues that can’t be identified with the naked eye.
Ultimately, GIS is a computer software that can display many different types of data on one map. This enables decision makers to more easily see, analyze, and understand patterns and relationships.

**Typically, GIS system includes 5 steps:**

1. **Ask** - Identifying the problem to solve or analyze.
2. **Acquire** - Determine where to obtain useful data.
3. **Examine** - Determine what specific data is most applicable.
4. **Analyze** - Conduct data analysis and make recommendations.
5. **Act** - Make specific plans based on results of data analysis.

No agricultural field is the same, due to spatial (within field, and among fields) and temporal (within a season, and across seasons) variability. GIS-based technology enables growers to closely monitor the health of individual crops and adapt to differences in soil types, sunlight availability, slope and other factors. In combination with other precision agriculture tools such as crop and environmental sensors, GIS helps to accurately estimate variable yield potential and maximize crop production.

Various types of data can be used as inputs for GIS system including: farm records of cropping practices, soil survey maps, historical characteristics of crops, aerial and satellite imagery.

Most current automated farm machines are operated with the help of Navigation Geographic Information Systems (NGIS). These systems combine Global Positioning Systems (GPS) and GIS. The NGIS systems are routinely used for: creating and displaying field maps, planning paths, navigation control, sensor system analysis, precision positioning, and data communication.

These technologies enable producers to understand site-specific needs of their farms. By obtaining comprehensive information, farmers are capable of formulating and implementing crop management strategies to ensure the optimal use of inputs and to maximize their output and profits.

- **Irrigation Control**

  Photo credit: [www.rainbird.com](http://www.rainbird.com).

Remote control based irrigation systems have been around for many years. Recently, with rapid advances in wireless technologies, more sophisticated, effective, and accurate systems are being developed and utilized. Taking into account common irrigation water shortages due to persistent drought and water quality concerns, smart irrigation area of agriculture is expanding worldwide.

**Typical features of smart irrigation technologies** (adapted from [Gotcher et al., 2014](#))

- **New controllers:**
  - Climate based controllers
    - (evapotranspiration (ET) controllers use local weather...
data to adjust irrigation schedules)
- **Soil Moisture sensor controllers** (utilize a soil moisture sensor placed belowground in the root zone)
- **Add-on Sensors:**
  - **Soil Moisture sensors** (measure the soil moisture content in the root zone before a scheduled irrigation event and bypasses the cycle if the soil moisture is above a specific threshold)
  - **Rain/freeze sensors** (interrupt the irrigation cycle during a rain or freeze event when irrigation is unnecessary)
  - **Wind sensors** (interrupt the irrigation cycle if wind speed exceeds a specific threshold)

Below, are selected points from the latest IPNI’s Stewardship Specifics:

**“Fertilizers to Enhance Water Productivity”.”**

- Sound crop management aims to maximize water productivity (WP). The WP is the amount of product gained from each specific quantity of water.
- As part of agronomic best management practice (BMP), supplying adequate amounts of nutrients can help ensure efficient water use.
- The BMPs entail utilizing the 4R Nutrient Stewardship approach: the application of the right nutrient source, at the right rate, time, and place.
- In cropping systems, water is consumed through:
  - productive plant transpiration, and
  - non-productive soil evaporation.

- **Transpiration** is closely tied with photosynthesis: as a plant is transpiring, its stomata are open, which allows active gas exchange between the leaves and the atmosphere. This is how the carbon dioxide utilized in the photosynthesis enters the plant leaves. Coupled with sunlight energy, and water, carbon dioxide is used to produce sugars that plants utilize for growth and development.
- **Evaporation** from the soil leads to wasteful loss of water that otherwise could be used for plant growth. Evaporation is minimized, leaving more water available for plant transpiration, when the soil surface is shaded due to well-developed healthy crop canopy.

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**GUEST CONTRIBUTION**

We did not receive any guest contributions this month, but I would like to share with you this information from the International **Plant Nutrition Institute (IPNI).**

As agronomists and crop producers are focusing on increasing the efficiency of inputs such as nutrients and water, here is an interesting aspect of crop nutrient management for efficient water use.
Adequate plant nutrition encourages rapid establishment of vigorous root system extended deeper into the soil. This enhances plants ability to take up both nutrients and water more effectively.

Two key mechanisms of how proper crop fertilization can help maximize WP:

- Increased plant transpiration, and
- Reduced soil evaporation.

Example of how addition of nitrogen fertilizer to crops may help to increase WP:

- Adding N fertilizer to canola in southeastern Australia has helped to increase yield by over 70%, but required only 10% more water (Norton RM, and Wachsmann NG. 2006. Differences in crop water use in southeastern Australia. Australian Journal of Agricultural Research, 57, 257-267.)

For a full listing of IPNI’s Stewardship Specifics, please go to:

For detailed information of the 4R Nutrient Stewardship approach:

GET TO KNOW ID AG

Educating ID Youth

Parma R&E Center faculty and staff welcomed the students and teachers from Sage School, Hailey, ID, on September 11, 2015. The visit was planned as part of their 2 week Fall Field Study. At Parma R&E Center, students had a fun day filled with educational events and discussions related to agricultural crop production.

Upon arrival, they were greeted by center’s superintendent Jim Barbour. Dr. Barbour and his team gave an overview of their Entomology research program in specialty crops like mint and hops.

Cropping Systems Agronomy team lead by Dr. Olga Walsh have discussed the importance of educating public on all aspects of agricultural production. Kelli Belmont has lead the discussing about common misconceptions about farming, and direct and indirect ways in which U.S. farmers are feeding the world. The team gave an overview of research and extension efforts they are involved in in various crops and novel technologies. Olga Walsh spoke about a variety of careers existing in the area of agriculture and provided the students with a list of educational institutions having ag-related programs.

Later, the students had an opportunity to tour Dr. Saad Hafez’s Nematology program facilities.

The visit concluded with a tour of Dr. Esmaeil Fallahi’s Pomology research program.

Many schools in Idaho and across the country have included agriculture-related subjects into their curriculum. This is a valuable addition to traditional science and arts courses. Knowing more about how the food is produced, what it takes to grown grain to produce one loaf of bread, or how much does it take to take care of an animal herd, puts many things in perspective.