Idaho Crops & Soils News

A newsletter for Idaho crop producers

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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

<table>
<thead>
<tr>
<th>TOPICS:</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT’S NEW?</td>
<td></td>
</tr>
<tr>
<td>First Legal Drone Flight for Ag</td>
<td>2</td>
</tr>
<tr>
<td>Fish &amp; Plants Production System - with Gary Fornshell and Jae Ruy</td>
<td>4</td>
</tr>
<tr>
<td>Cereal Leaf Beetle in Winter Wheat - with James Barbour</td>
<td>5</td>
</tr>
<tr>
<td>GUEST CONTRIBUTION</td>
<td></td>
</tr>
<tr>
<td>Frost Damage in Fruit Trees - Esmaeil Fallahi</td>
<td>7</td>
</tr>
<tr>
<td>GETTING TO KNOW ID AG</td>
<td></td>
</tr>
<tr>
<td>Bees Importance for Idaho Crop Production</td>
<td>8</td>
</tr>
</tbody>
</table>

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?
First Legal Drone Flight for Ag

On April 22, we were invited to attend the Empire Unmanned demo in the heart of the Treasure Valley.

Dozens of attendees came to learn about Idaho’s newest industry - the Unmanned Aerial Systems. Photos by Olga Walsh.

The Empire Unmanned is an Idaho company dedicated to supporting agriculture in Idaho, Oregon, and Washington. Hayden-based Empire Unmanned launched in January 2015 is a collaboration between Advanced Aviation Solutions, Star ID, and Blair Farms, Kendrick ID. Empire Unmanned is the first company in the U.S. granted permission by the Federal Aviation Association (FAA) to fly Unmanned Aerial Vehicles (UAVs) for commercial agriculture purposes. Other exemptions have been granted to companies in the motion picture, energy, surveying and real estate industries.

Empire Unmanned brings together decades of experience in aviation, UAS, and agriculture to provide timely, high resolution information so customers can make better crop management decisions. The very first Commercial Unmanned flight was over the Bitner Winery, Caldwell ID, and followed by demonstrations of the UAS and its operating software. The company’s initial business focus is the Northwest for agriculture, and other related industries such as Wildlife and Forestry Management, Construction, Mining and Fire Support will benefit from this new technology.

SenseFly eBee UAV soaring in the sky (top). Robert Blair, crop producer and co-founder of Empire Unmanned, interviewed by Sean Ellis, Capital Press (bottom). Photos by Olga Walsh.

Precision agriculture tools, such as remote sensors, allow for accurate assessment of plant health. Mounted on the UAVs, these units enable rapid screening of large areas of fields to identify crop growth habits that
contribute to crops final yield and quality in a variety of environments. The FAA allows public entities including universities to apply for a Certificate of Authorization (COA) in order to conduct agricultural research utilizing UAVs.

Visit the FAA web-site
https://www.faa.gov/uas/
for more information on the UAV use rules and regulations.

As estimated by the Association for Unmanned Vehicle Systems International (AUVSI), the economic impact of UAV systems in Idaho is estimated as $29 million during the 2 years from 2015 to 2017, and $174 million during the 10 years from 2015 to 2025, with a national impact of $82 billion. The major challenge in the adoption of UAS for agriculture is the lack of proof of concept and sound methodologies for incorporating the UAV-based data into crop management decisions. Various precision technologies have driven the farming revolution in recent years, and surveying fields from the sky will surely drive it in the future. UAVs allow capturing highly accurate images of the fields; plus hundreds of acres of land can be surveyed in a single flight.

**SenseFly eBee** is an artificially intelligent, fully autonomous drone, specifically developed for precision agriculture applications in mind.

**Hardware:**
- **Weight:** 1.56 lbs
- **Wingspan:** 36 in
- **Material:** EPP, carbon structure
- **Propulsion:** Electric pusher propeller
- **Battery:** 11.1 V

**Operation**
- **Max flight time:** 45 min
- **Speed:** 25-56 mph
- **Wind resistance:** Up to 38 mph
- **Sampling distance:** 0.79 in/pixel
- **Battery:** 11.1 V
- **Landing accuracy:** 16.4

**The 4 steps of UAV use:**
1) **Plan:** Import your base map of choice and define the area you want to assess.
2) **Simulate:** To ensure your mission’s success, run a virtual flight that simulates wind strength and direction. Then make any flight plan.
3) **Process:** Once the eBee Ag has landed, use its supplied Postflight Terra 3D software to process your flight’s photos.
4) **Analyze:** using the included software, analyze data, and calculate NDVI to assess plant health.

The most common uses include: biomass and yield estimation, plant count, and chlorophyll measurements.

Empire Unmanned YouTube Video.
Tilapia and tomatoes, trout and basil, catfish and lettuce... These are just a few of many fish and plant combinations that can be successfully co-produced in an aquaponic system. Aquaponics is a creative approach to sustainable food production; it combines hydroponics (growing plants without soil) and aquaculture (rearing of fish) in a recirculating system. The fish are grown in tanks, and the plants are grown in floating grow beds, with the roots suspended in the nourishing solution. Long before the term “aquaponics” was devised, the Aztec Indians grew plants on rafts that floated lake surfaces in approximately 1,000 AD. The vegetable crops were planted on rafts built from reeds found near lakes and covered with soil dredged from the lake’s bottom. In modern times, aquaculture was done utilizing large ponds but more recently, much research and advancement has been made in recirculating aquaculture systems. Aquaponic systems are designed to address the pressing challenges of feeding the continuously expanding human population with less available non-renewable resources like arable land, water, and nutrients. Intensified integration of fish and plant production in aquaponic systems is conserving arable land. Because the water is recirculated and recycled for both fish and plant production, it helps to conserve water. As fish produce waste, it is converted to nutrients that the growing plants utilize, which solves two critical issues: provides an efficient waste disposal system and reduces the use of fertilizers. Furthermore, as the fish byproducts are utilized by the plants, the discharge to the environment is reduced, making the aquaponic system very environmentally sound. Aquaponics has a great potential to meet the demand for wholesome food produced locally and sold directly to consumers all year around. However, questions remain unanswered as to the economic feasibility of commercial-scale aquaponics.

Bacteria play a key role in aquaponic systems by making fish waste available to plants. Nitrosomonas bacteria convert ammonia, toxic to plants, in the fish effluent to nitrite and Nitrobacter bacteria convert nitrite to nitrate - an efficient nutrient source the plants thrive on. This process of biological oxidation is facilitated by using bio-filters specifically designed to facilitate rapid growth of these beneficial bacteria. The bio-filters contain solid media that provides a large surface area to volume on which bacteria can attach and grow.
Jae Ryu, University of Idaho Water Resources Engineer, has put together a multi-disciplinary group of researchers and extension specialists to collaborate on an innovative aquaponics project. The University of Idaho team consists of Philip Watson, Agricultural Economist, Gary Fornshell, Extension Aquaculture Educator, Olga Walsh, Cropping System Agronomist. If funded, the project will focus on detailed economical assessment of combined fish (tilapia) and plant production and identifying the most efficient and profitable combinations. Several crops such as tomatoes, bell peppers, spinach, and herbs like parsley, mint and basil will be evaluated. The team will also conduct an extensive outreach program to educate producers and consumers on the design, maintenance, and sustainability of the aquaponics.

Visit USDA Aquaponics web-site for more information on aquaponic systems.

Cereal Leaf Beetle in Winter Wheat

With James Barbour, University of Idaho, Integrated Pest Management Specialist, Parma Research & Extension Center

Cereal leaf beetle infestation was identified in winter wheat experimental plots at the University of Idaho Parma Research and Extension Center as well as in surrounding grower fields in Canyon County. The typical feeding patterns, eggs and larvae have been confirmed by Dr. James Barbour, UI IPM Specialist.

The first symptoms of infestation became apparent last week. Currently, most plants have at least one leaf with obvious feeding damage. The cereal leaf beetle has a variety of hosts among cereals and grasses with preference to oat, barley, wheat, rye, timothy, fescue, grain sorghum and corn.
Substantial crop yield loss and quality decrease can be expected due to lost photosynthetic activity resulting from excessive feeding damage.

Feeding damage on winter wheat leaf resulting from cereal leaf beetle feeding, University of Idaho Parma R&E Center. Photo by Olga Walsh.

Cereal leaf beetle is a quarantined insect the U.S., which means that the presence of beetles in grain restricts exports to uninfested areas. Fumigation is required to prevent the spread of beetle infestation. Scouting of fields is vital both before and during the boot stage to assess for cereal leaf beetle presence and damage. It is recommended to scout weekly by walking through the field in a “W” pattern for best coverage. Stop at 5-10 locations depending on field size and examine 10 plants per location. Count the number of eggs and larvae per plant for smaller plants or per stem for larger plants.

In some areas, parasitic wasps that attack cereal leaf beetle eggs and larvae can provide control of this pest. However, most pesticides used to control cereal leaf beetles will reduce population of these wasps; therefore, avoiding use of insecticides whenever possible can increase the effectiveness of these biological control agents. In addition to providing untilled habitat for overwintering wasps and maintaining healthy, full stands will also promote biological control.

Treatment thresholds: 3 larvae per plant and/or 3 eggs per plant before boot stage, and 1 larva per flag leaf after boot stage.

Management-chemical control (From PNW Insect Management Handbook)

- bifenthrin (BrigadeÆ 2EC and WSB) at 6.4 fl oz/a (0.1 lb ai/a). Apply in spring if one or more eggs or larvae are detected or in late summer if beetles are defoliating seedling stands. Maximum amount allowed 12.8 fl oz/a (0.2 lb ai/a) per season but no more than once every 12 days. PHI 30 days prior to harvest for forage, hay and seed.
• cyfluthrin (Baythroid XL) at 0.013 to 0.015 lb ai/a. PHI 0 days. REI 12 hr. Maximum amount allowed per 5 day interval is 0.022 lb ai/a. Maximum amount allowed per crop season is 0.089 lb ai/a.

• lambda-cyhalothrin (Warrior) at 0.02 to 0.03 lb ai/a. PHI 0 days for grazing and forage, 7 days for straw and seed crop. REI 24 hr.

• zeta-cypermethrin (Mustang MAX) at 0.0175 to 0.025 lb ai/a. PHI 0 days forage, hay; 7 days straw and seed screenings. REI 12 hr. For forage and hay use no more than 0.10 lb ai/a per season; make subsequent applications no closer than 7 days. For straw and seed screenings use no more than 0.125 lb ai/a per season; make subsequent applications no closer than 17 days.

A great resource for cereal leaf beetle is the University of Idaho’s Current Information Series #994.

GUEST CONTRIBUTION

Cold and Frost Damage in Fruit Trees and Grapes

Fruit trees and grapes need a period of gradual decline in temperatures to acclimate to sub-freezing temperatures. During September and October of 2015, temperatures were higher than normal in most areas of the Intermountain West region, including Idaho, Washington and Oregon.

By Esmaeil Fallahi, Professor and Director of Pomology and Viticulture Program, University of Idaho, Parma Research & Extension Center.

The high temperatures continued through November 13-14, 2015. The nights of November 17 and 18, 2015, temperatures plunged down to -5 F, and killed or seriously damaged perennials throughout the regions because perennial plants were not acclimated to this degree of harsh temperature changes. Perennial ornamental plants and fruit trees were serious damaged. Thousands of old ornamental trees died and others damaged. Researchers at the University of Idaho Pomology Program examined numerous fruit trees and they found no pattern in relation to the time of harvest and tree damage. However, trees and grape vines that were located in cold pockets suffered more damage. Varieties within the same species showed different levels of damages. Granny Smith apple suffered more than other cultivars. However, there will be a good crop of apples and peaches in Idaho.
Cold damage to Riesling Wine Grape (top), Skeena Cherry, and Almond (bottom). Photos by Esmaeil Fallahi.

GETTING TO KNOW ID AG
Bees Importance for Idaho Crop Production

Surveys have shown that there are about 2.3 million honeybee colonies in operation today in the U.S., compared to over 6 million in the 1940’s. Since 1980’s, the industry had experienced a 70% decrease in the total number of beekeeping operations. Small farms are increasingly interested in sustainable alternative ways to increase production of marketable products. Since many small farms are already utilizing their acreage to the fullest for vegetable and fruit production, adding another crop to increase profits is not an option. Bee keeping offers a sound solution by utilizing already grown crops for creation of another high-value product such as honey. Apart from the obvious honey production objective, apiculture (beekeeping) has another vital role in agricultural production - pollination. Pollination - transfer of pollen grains between the male germ cell of a plant (anther) and the female reproductive system (stigma) in seed plants. Pollinators include bees, moths, flies, beetles, wasps, desert bats, hummingbirds, and butterflies. Collectively, pollinators are critical to the function of terrestrial ecosystems by enhancing plant reproduction. Honeybees provide the most efficient way to pollinate crops like almonds, cherries, plums, avocados, vegetable seed, alfalfa, clover and others. Consider this: 30% of our diet comes from bee-pollinated crops! Recently, pollinators and pollinator population decline have been one of the most discussed topics. The loss of pollinators has serious economic implications for humans and for maintaining ecosystem diversity and stability.

Bee hives being installed by alfalfa fields, near Parma, ID. Photo by Olga Walsh.

Treasure Valley Beekepers Club provides services such as bee swarm removal, honey extraction and educational events.