PLAIN VIEW

Quarterly newsletter for AWPM for Wheat

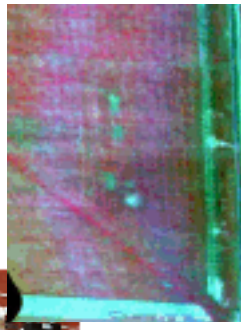
AWPM for Wheat is a pest management program for greenbugs and Russian Wheat aphids

Volume 1, Issue 4 Summer 2003

Check out our website's new look!!!

see Page Four for details

Texas A&M is looking closely from the



At the right: Texas' Cessna 172 used to take images and pictures for analysis. Larger photo: A Deaf Smith County wheat field in April. Last picture: the airborne aerial spectometer. See page 2 for a sample and a graph describing the remote sensing technology.

As part of their participation in the AWPM, the Entomology Program in Amarillo is using an airborne hyperspectral spectrometer for detecting aphid infestations. The work is conducted as part of the Precision Agriculture Initiative at Texas A&M in cooperation with Oklahoma State University and USDA-ARS.

Remote sensing is the art and science of collecting information about the earth's surface without physical contact with the objects under surveillance using some portions of the electromagnetic spectrum from ground, air, and space platforms.

It can be used to generate spatial, up-to-date information over time and space in combination with statistical tools such as GIS.

Many have aimed to estimate vegetation characteristics, such as green canopy health, and discriminate them in a spatially complete manner using remotely-sensed data.

Remote sensing also reduces some limitations of ground-based measurement techniques, such as destructive sampling, as well as cost and accessibility of collecting data. At the present time, we are using multispectral (radiometer) and hyperspectral (spectrometer) and/or imaging and nonimaging remote sensing instruments.

It, especially high resolution hyperspectral instruments, can be used to identify, discriminate, and map the noxious weeds in both agricultural and range lands. We have worked on thistle, leafy spurge, and yucca infestations using nonimaging and imaging remote sensing instruments in Texas and Colorado.

Since we are collecting intensive field samples on the ground in the AWPM project, we will be able to "ground truth" images, to determine what types of problems can be accurately distinguished using the image data.

For our project, we have been using an airborne imaging spectrometer. The last growing season we monitored

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Our project is a collaborative effort, teaming the USDA Agricultural Research Service with growers and universities in Texas, Oklahoma, Kansas, Colorado, Nebraska and Wyoming.

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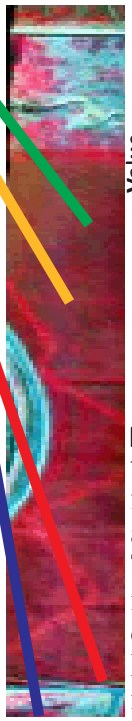
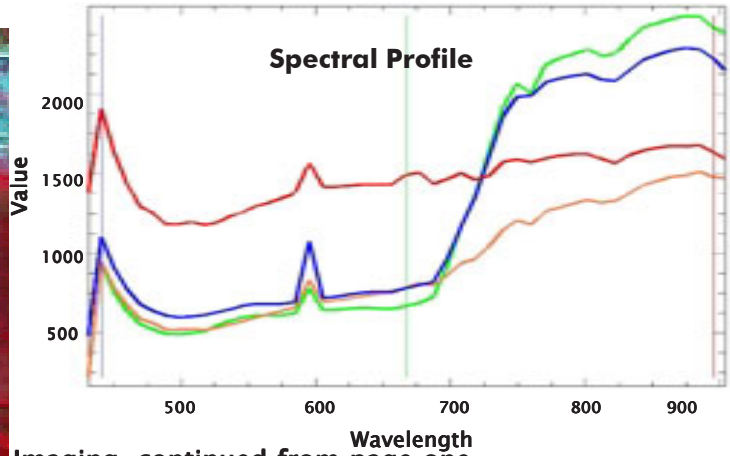
We welcome suggestions and contributions for future newsletters.

Wavelengths:
Growing Wheat
Exposed Soil
Healthy Grasses
Paved Road





Spectral signatures or reflectance of exposed soil in the wheat field, actively growing wheat, healthy and growing grasses at the bar ditch and paved road extracted from Swisher County AWPM wheat field with AISA Imagery.

Imaging, continued from page one

the two AWPM wheat fields in Deaf Smith and Swisher counties, Texas. The airborne imaging spectrometer or AISA (Spectral Imaging Ltd., Finland) is mounted in a Cessna 172 three-passenger airplane utilizing a camera port in the bottom of the aircraft.

Under typical conditions the AISA can acquire between 20 and 60 bands at a spatial resolution between 1 and 4 meters per pixel. These low special resolution imageries are excellent data sources for regional and local studies.

Airborne hyperspectral radiometry (remote sensing images taken from aircraft) is still relatively new. It was originally developed for geology, but adapted to the study of vegetation and water bodies. This proved useful for forest and watershed planning issues like grazing, fire risk assessment, water quality planning, and wildlife management. While hyperspectral imaging is still in its infancy, applications to agriculture are promising.

What's happening around

Much of AWPM's mission to demonstrate effective pest management techniques depends on sampling. An important and helpful tool for this is the Global Positioning System (GPS).

"It helps with our sampling," ARS employee Tim Johnson said.

The sample protocol – a regiment by which project members collect samples for both pests and predators – calls for several types of samples from each field. A panel of project team members developed the sample protocol.

Since it became more widely used, GPS has been used in farm equipment, in cars, hand-held computers and even tracking carrier pigeons. The GPS system began in the 1960s. Scientists determined they could track a satellite via its radiowaves. With the 1967 launch of the Timation I satellite, the GPS system improved due to the atomic clock in the satellite. Not only could we use satellites for navigation, we could place this navigation on a timeline.

Orbiting earth are 35 satellites that comprise the GPS network, Tim points out. Every team in the project uses their hand-held computers when they sample.

Team members traveled to Colby, KS earlier in the year to learn to use the system. Their training included how to use the hand-held computers for sampling.

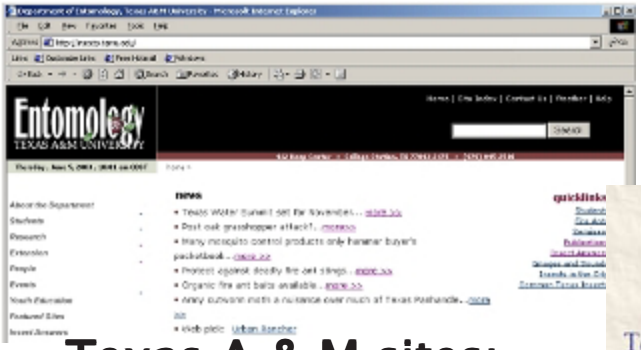
When used in projects like AWPM, the tool provides a powerful dimension. Like remote sensing, it collects information allowing project members to produce databases and visual depictions of the fields.

see GPS, Page 7

Going Global

Use of the Global Positioning system has become useful in many field, especially our demonstration sites.

Points of Interest



Texas has really good links for growers, kids and just about anybody. Below are some of the links we thought you would enjoy.

Texas A & M sites:

Insect Gallery -- This site offers a great deal to those interested in insects or have questions. The website features an insect of the week, images and sounds of insects and check out the INSECTS IN THE CITY section. @ http://insects.tamu.edu/

100 years of Entomology -- offers great information on insects in commemoration of the 100th birthday of the Department of Entomology at Texas A&M. Its features include a timeline, a photo gallery and a Hall of Honor for those who made entomology at Texas A&M what it is today.

Texas A&M Agricultural Research and Extension Center

At http://amarillo.tamu.edu, you will find information about **precision agriculture** and how it works. You will also find the **Panhandle Pest Report** under publications. Information about **CREET**, cooperative research, education, and extension triangle, is also available.

At http://amarillo2.tamu.edu, you will find more information about the programs offered. For instance, the programs page of this site offers links dealing with agricultural and animal production, agricultural engineering and economics. You will also find a link to The Impact of Agribusiness on the Texas Panhandle.

Texas IPM

This page offers links for growers and children. How is IPM integrated into schools? The School IPM site will help answer that question and more. You can also learn about the National IPM network, extension agents and IPM programs broken down by location.

@ http://insects.tamu.edu/extension/extipm.html

Texas Wheat Producers Board and Association

This offers information on uses for wheat. Among the many uses are paper: roughly 5 billion pounds of starch from wheat is used create stronger paper and adhesive products. Texas Wheat Producers, a supplement of the Farmer-Stockman, is available at this site.

@ http://www.texaswheat.org/

Feature team member, Summer 2003:

Texas A & M

Dr. Jerry Michels and Dr. Mustafa Mirik

In Texas, we are working with the Entomology Program in Amarillo. The project team leader is Jerry Michels. **Dr. Michels** is a Professor of Entomology at the Agricultural Research and Extension Center in Amarillo. His areas of expertise are in integrated pest management, biological control and remote sensing.

Dr. Mustafa Mirik was hired in 2002 as a GIS and Remote Sensing Scientist. Mustafa completed a PhD in 2001 from North Dakota State University in the field of Animal and Range Sciences. Prior to joining the AWPM project and Texas A & M University, Mustafa conducted similar remote sensing work for the Greater Yellowstone Ecosystem Project.His expertise is in GIS and remote sensing.

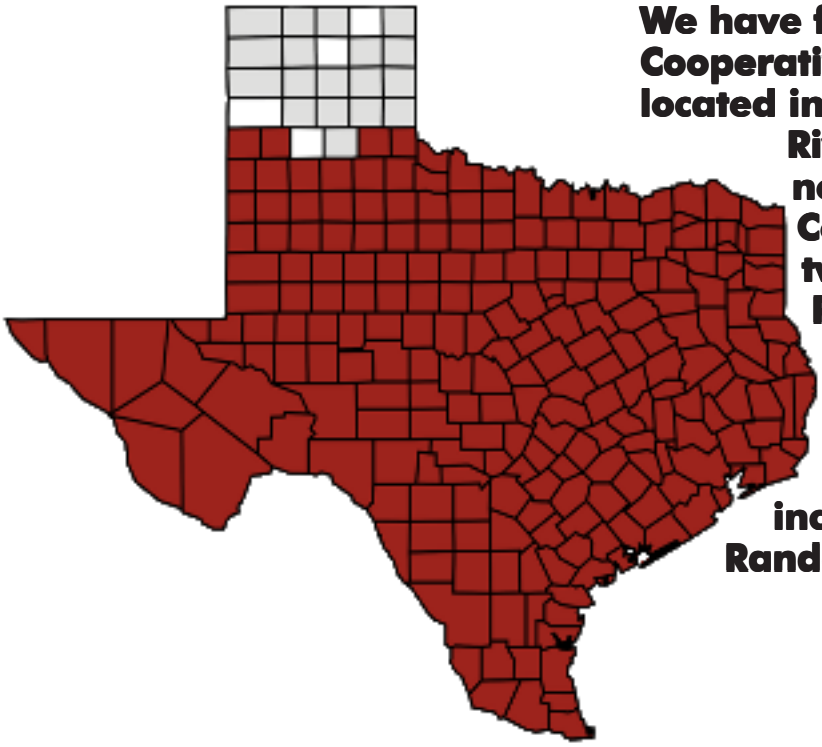
Without help, we wouldn't be here...

We held focus groups with Texas wheat producers in February in Perryton, Etter, Umbarger and Claude. Agricultural extension agents helped us by inviting growers and hosting the focus groups. Extension personnel from Texas Cooperative Extension District 1 who provided valuable assistance were:

Stephen Amosson, Professor, Economist/Management
Brent Bean, Professor, Agronomy/Weed Science
Chris Blount, Oldham County
Robert Bowling, Integrated Pest Management
Leon Church, Potter County
Michael Clawson, Swisher County
Kirk Dahl, Hartley County
Dale Dunlap, Collingsworth County
Robert Harris, Moore County
Brandon McGinty, Briscoe County
Scott Myers, Armstrong County
Dennis Newton, Deaf Smith County
Bob Robinson, District Extension Director
Scott Strawn, Ochiltree County
Robert Devin, Randall County

You will find contact information for each and links to county pages at : http://county-tx.tamu.edu/ or on the Areas page for each state at http://www. pswcrl.ars.usda.gov

Cooperation with counties in Texas...



We have four demonstration sites in Texas Cooperative Extension District 1. Two are located in counties north of the Canadian River, one in Hutchinson County, near Dumas and one in Ochiltree County near Perryton. The other two are south of the Canadian River, one in Deaf Smith County near Wildorado and one in Swisher County near Tulia. Other counties that participated in focus and economic surveys included: Moore, Oldham, Potter, Randall, and Armstrong.

A little bit about....

Texas...

Texas was the third ranked state in winter wheat production in 2001, with 108.8 million bushels, behind Kansas and Oklahoma. Texas was the second ranked state in grain sorghum production, 72.8 thousand cwt (Kansas ranked first). Most of the Texas high plains have an average annual rainfall less than 20 inches. Dry land wheat yields can vary significantly from year to year in this region. The average per acre yield in 2001 was 31 bushels, but it was only 17.8 the year before.

Irrigation is significant in the panhandle. The panhandle region had 778 thousand acres of irrigated wheat in 2001 with an average yield of 55 bushels. Texas is the leading state in value of farm real estate, $93.6 million in 2002. (California was second, $85.9 million). Texas is also the leading state in livestock numbers (13.6 million cattle and calves) and 151,000 cattle operations. This includes about 2.9 million cattle on feedlots with more than 1,000 head capacity.

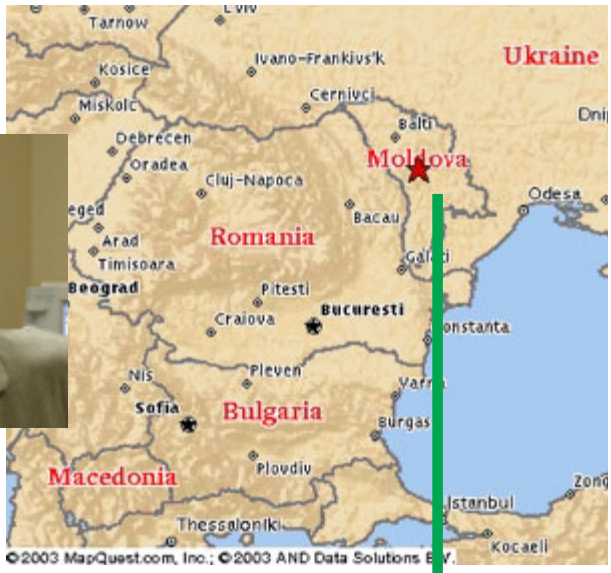
Have you been to the website lately? Check out the states section!

Vasile Catana

"I'm Vasile Catana. I'm 44, and I was born in the village of Taraclia, in the Republic of Moldova. My parents were farmers."

Vasile likes to read, especially historical books, playing chess and ping-pong, and all kinds of sport activity.

Editor's Note: The Republic of Moldova was part of the former Soviet Union.



Taraclia

The number cruncher

In order for the six states to participate in the AWPM program, the information gathered must be standardized.

Vasile Catana will be the guy to do that.

"At the beginning, we have to standardize data collection protocols of the collaborators in each state," Vasile said. "This is necessary to make (it) possible to merge the data from all the project teams into a common data base."

Essentially the database will contain information about the same biological objects in fields: pests, predators, parasitoids and weeds. The database will also contain weather and soil conditions information over a span of several years.

"This will be a powerful resource, the aim of which is to develop an IPM program for wheat, sorghum and other crops," he explained.

Vasile sees two positive focal points of AWPM. First, the program aims to reduce the cost of plant protection and the loss of harvest; that means direct benefits and interest to growers.

Secondly, he said the program aims to improve the environmental conditions reducing the pesticides.

The opportunity to work with AWPM has introduced Vasile to the use of the GPS with data collection.

"It was very exciting for me when I constructed for the first time a succession of surfaces with an animated GIF file," he said. Each surface represented the insect density on a specific date.

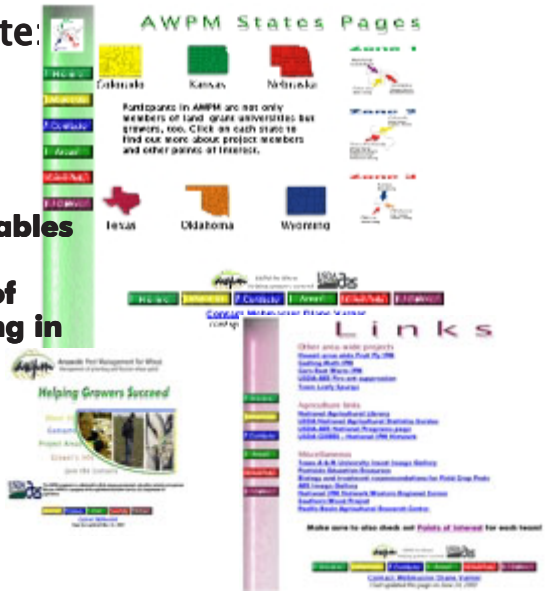
This tool allows us to study the dynamics of these insect populations across a broad geographic area, to estimate migration and to determine how the population varies across a broad region over time.

Eventually, Vasile said project members will input their data directly and would see their results online.

What you may notice on the website:

You may notice a couple of differences between the old and new site. Not only is the look new, the navigation is new as well.

No matter where you go, there you are - The main page enables a new browser window, a type of electronic bread crumb.
Each project team main page contains active links to Points of Interest, the state governments and each university participating in AWPM.
Each counties page in Areas contains active links to not only county pages but to county extension agent pages, if available.



GPS, Continued from Page 2

How GPS works for AWPM

1. Our team members use the hand-held computers to enter coordinates. Tim said he marks the boundaries of the field and then each sample.

2. The hand-held module can then hook into a desktop computer. The GPS module is located on the back of a hand-held computer like the one to the left.

3. Once the information is downloaded into the computer, our project teams can create visual depictions of fields and sample areas.

4. Once the information is loaded, team members can use a pick list comprised of various pests, from insects to weeds.

5. Once project members have compiled the information, they send it to Vasili, who can merge the information and make it usable.

The process...

This ain't no sissy bug!

Lady beetles occur in small grains throughout the United States. They prey primarily on aphids (including the greenbug). Because of the wide climatic and geographic conditions under which wheat is grown, and the complexity of predator-prey relationships, general statements about coccinellid impact on aphid infestations are difficult to make. Under favorable conditions Coccinellids are voracious predators and can drive an aphid infestation to extinction.

The Russian Wheat Aphid

The Russian wheat aphid is a relatively new arrival to Oklahoma. An adult Russian wheat aphid is about 1/16 of an inch long, lime-green in color and "spindle shaped." It has short antennae but no prominent cornicles; a projection above the "tail" gives it a "double tail appearance"when view from the side. Damage to wheat by this insect is confined to the High Plains. It is primarily a pest of wheat and barley, and will most likely be found during the spring.

Areawide Pest Management for Wheat
Management of greenbug and Russian Wheat Aphid
USDA ARS
Agricultural Research Service
1301 N. Western Road
Stillwater, OK 74075
www. pswcrl.ars.usda.gov/

Wheat's next?

Team members from Texas A&M take samples in a field located in the panhandle. Samples are taken from the same spot to assure consistency in the data.

In the Fall 2003 Newsletter: **Feature team, Colorado; The ease of Glance 'N Go; and a little about Natural Enemies!**