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The Cereal Aphid Expert System and Glance 'n Go Sampling for Greenbugs: Questions and Answers

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What is the Cereal Aphid Pest Management Expert System?

The Cereal Aphid Pest Management Expert System is a computer platform designed to help the user manage cereal aphids in winter wheat. It was developed through the cooperative efforts of the USDA Agricultural Research Service, Site Specific Technology Development Group of Stillwater (SST), and Oklahoma State University through a grant provided by the Oklahoma Center for the Advancement of Science and Technology (OCAST). The Cereal Aphid Pest Management Expert System can be accessed through the Department of Entomology and Plant Pathology website at: <http://entopl.okstate.edu/gbweb/index3.htm>. The system was recently installed into the *myFields.info* system as well. It can also be used with a smart phone by setting up a *myFields* account at: <http://myfields.info/>.

This expert system has a *Greenbug Economic Threshold Calculator* and a *Russian Wheat Aphid Economic Threshold Calculator*, which calculates treatment thresholds based on information the user provides. Treatment thresholds calculated by this expert system are precise because it uses historical weather data to predict growth rates of aphid populations as it calculates a treatment threshold. The user can then print paper *Glance 'n Go* sampling forms to sample multiple fields. If using the application through *myFields* on a smart phone, it will calculate a threshold, record the sampling information in real time and save the sampling information for individual fields.

How is a Treatment Threshold Calculated?

The **treatment threshold** is based upon:

- the potential yield loss caused by the aphid infestation
- the cost of control
- the value of the wheat crop.

The estimated yield loss calculations are based on a yield loss model developed from research conducted over several years.

Control cost is based on the price of the pesticide chosen and the application. A producer who chooses a generic pesticide and owns his/her spray application equipment or can save a trip by applying an insecticide as a tank mix with a top-dress fertilizer. This would have lower application costs compared to a producer who pays for a custom aerial application.

Crop value is simply the current price for a bushel of wheat. For example, in one year, wheat may be worth \$4 a bushel, and in another year it may be worth \$8.00 per bushel. The treatment threshold in the Cereal Aphid Expert System accounts for all of those factors and reflects their cost.

Does the Treatment Threshold Work for Wheat at Different Stages of Growth?

The short answer is YES. The treatment thresholds for Russian wheat aphid depend on whether the wheat is pre-flower or post-flower stage. For greenbugs, the thresholds are appropriate once the wheat reaches the 4-leaf stage. Since greenbugs can kill wheat seedlings, an automatic threshold is one greenbug per tiller on seedling wheat. Results showed that once the wheat plant reaches the 4-leaf stage, the amount of injury caused by greenbugs is independent of plant height or growth stage, so the Cereal Aphid Expert System does not adjust greenbug treatment thresholds based upon the size of the plant.

What is Glance 'n Go Sampling?

The *Glance 'n Go* sampling system allows a user to accurately and rapidly sample wheat for greenbug or Russian wheat aphid infestations. *Glance 'n Go* requires the field scout to keep track of the number of tillers infested with aphids instead

of counting their actual numbers. The **Glance n' Go** system is even easier to use in **myFields** because it keeps track of the number of tillers that have been sampled automatically. It is a fast, easy and proven technique for sampling insects. For an individual field, the **Glance 'n Go** sampling system can significantly reduce sampling time, yet is as reliable as directly counting the insects in the field.

Does Glance 'n Go Work for Other Cereal Aphids?

Glance 'n Go is designed for greenbug and Russian wheat aphids, which are the most damaging aphid pests of wheat in Oklahoma. Research is being conducted to determine the amount of yield loss caused by the bird cherry-oat aphid. When the research is completed, Glance 'n Go may be modified to help manage those aphids.

Does Glance 'n Go Account for Natural Enemy Activity?

Yes. **Glance 'n Go** accounts for *Lysiphlebus* wasp activity on greenbugs by noting the presence of mummies in the field. Research has shown that when there is a certain level of mummies present in the field, aphid numbers will quickly decline. Although ladybird beetles can dramatically reduce greenbug numbers in some situations, predicting their impact has proven to be more difficult, and at present, does not hold much promise for use in Oklahoma. Natural enemy activity is not accounted for with Russian wheat aphid.

How will Glance 'n Go Benefit My Wheat Production Operation?

Research shows that infestations by greenbug and Russian wheat aphid often cause economic loss long before causing visible injury to the wheat plant. **Glance 'n Go** is designed to SAVE a wheat producer TIME and MONEY. By checking a winter wheat field with this system, a grower will spend from 5 to 20 minutes in a field and be able to make control decisions based on the value of the crop and the costs needed to protect it. This system is a significant step forward for controlling greenbugs or Russian wheat aphids in winter wheat.

Is the Treatment Threshold Different for Fall and Spring?

YES! The **time of year** is important for greenbugs because research shows that greenbug distribution within the field is in a different pattern in the fall compared to the spring. This makes sense, since fall greenbug outbreaks usually develop from winged migrants flying into fields from other crops or grasses. Spring infestations typically develop from a mix of migrating

and established greenbugs that successfully overwintered in the wheat field. If using the **Glance n' Go** system for Russian wheat aphid, it is only designed for spring infestations.

Sampling the Field

The **Glance n' Go** system accurately evaluates a field for aphids if the field is correctly sampled. To ensure the field is adequately sampled, each sampling should be at least 15 paces apart, and that the sampler use a "W" or "U" shaped pattern in the field (See Figure 1). Large fields (larger than 100 acres) should be regarded as two fields and sampled separately to make a decision. Remember, this tool is only as good as the information gathered. Shortcuts will make this sampling tool much less useful!

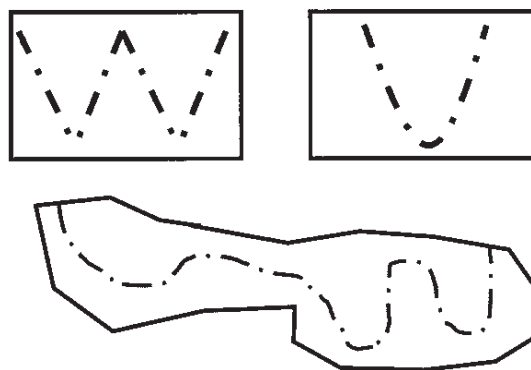


Figure 1. Sampling patterns for greenbugs.

For More Information

Contact your local county Extension office. The county Extension educators are well versed on the use of the Cereal Aphid Expert System and **Glance 'n Go**. They can access the website from their office. You may also go directly to the website <http://entopl.okstate.edu/>, select "Links to info" then select the link to "Cereal Aphids Pest Management," and follow instructions for printing a copy. If wanting to use a smart phone to sample, sign up for a **myFields** account, which has the sampling programs. Finally, you may request copies of the reusable laminated forms for greenbugs by contacting:

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