

# Additional Resources

- **Soybean aphid in Minnesota** – Ken Ostlie, University of Minnesota  
(<http://www.soybeans.umn.edu/crop/insects/aphid/aphid.htm>)
- **Soybean growth stages for pest management decisions** – from Cropping Issues in Northwest Minnesota, Vol. 6 Issue 11  
([http://blog.lib.umn.edu/efans/cropnews/2009/08/14/Soybean\\_R\\_Growth\\_Stages.pdf](http://blog.lib.umn.edu/efans/cropnews/2009/08/14/Soybean_R_Growth_Stages.pdf))
- **Soybean aphids** – Iowa State University, University Extension  
(<http://www.ent.iastate.edu/soybeanaphid/>)
- **Minnesota Crop News** – University of Minnesota Extension  
(<http://blog.lib.umn.edu/efans/cropnews/>)

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**What's inside?**  
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 • Don't make these common mistakes!

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# Focus on Ag

Dear Ag Producer,

It's that time of year again when you'll hear that favorite word from Extension: SCOUT! As I write this, soybean aphid populations are low in the region and it's still anybody's guess how the season will actually play out. Even so, I'd like to offer some tools for dealing with aphids that might come in handy.

In this edition, you'll find recommendations for managing soybean aphids that have been adopted by all universities in the upper Midwest. The recommendations are ultimately based on economic damage, where crop loss caused by aphids exceeds the cost of treatment. The economic threshold (ET) is the population level where control should be initiated. It is usually somewhat lower so that growers have a built-in grace period before economic damage occurs. The ET in the upper Midwest is a field average of 250 aphids per plant. Since populations vary widely from field to field, the only way to know if a field is approaching this threshold is to scout it. However, if you're like me, you probably don't really want to spend all of your time counting hundreds of aphids on each plant you sample.

Fortunately, several entomologists at the University of Minnesota were sympathetic to that, so they developed a SPEED scouting method. It doesn't change the economic threshold, but it does streamline how fields are scouted. This method allows you to make decisions with a high degree of reliability while saving you time. You'll find a sample worksheet inside this edition that you can copy and use.

Happy SPEED Scouting!

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# Speed Scouting for Soybean Aphid

[developed by E. Hodgson, B. McCornack, & D. Ragsdale  
University of Minnesota Entomology Dept.]

Go to [www.soybeans.umn.edu](http://www.soybeans.umn.edu)  
for FAQs and copies of the form.

For questions in Minnesota contact:  
David Ragsdale, U of M Entomology Dept.  
612-624-6771, ragsd001@umn.edu

## Directions

- Go to the first plant at random. If less than 40 aphids are on the entire plant, mark a minus [-] for that non-infested plant. If at least 40 aphids are on the plant (STOP COUNTING when you reach 40 – this is the speedy part), mark a plus [+] for that infested plant.
- Choose a direction at random and walk 30 rows or paces to the next plant.
- Repeat Step #1 until 11 plants are sampled in different areas of the field.
- Make a decision using the total number of infested plants (the total number of pluses).
- If you must 'continue sampling' (7-10 plants with a +), sample 5 more plants and use the new total number of plants (16) to make a decision.
- If no decision is reached, sample additional sets of 5 plants until 31 plants are sampled. Remember, always use the total number of plants to make a decision.
- If no decision can be made after sampling 31 plants, resample the same field in 3-4 days.
- A 'TREAT' decision must be confirmed a 2<sup>nd</sup> time 3-4 days later. If confirmed, apply insecticide in 3-4 days.

Field: \_\_\_\_\_

Date: \_\_\_\_\_

Decision: \_\_\_\_\_

Use these Notations: - = Less than 40 aphids/ plant ('non-infested') + = 40 or more aphids/ plant ('infested')	Total # of Infested plants:	DO NOT treat. Resample in 7-10 days	CONTINUE sampling 5 more plants	TREAT decision, confirm in 3-4 days
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1   2   3   4   5   6   7   8   9   10   11   ▶

12   13   14   15   16   ▶ +  

17   18   19   20   21   ▶ +  

22   23   24   25   26   ▶ +  

27   28   29   30   31   ▶ +  

Remember: When you continue sampling, add the previous # of Infested plant to the new count to make the next decision.

6 or less	7 to 10	11 or more
10 or less	11 to 14	15 or more
14 or less	15 to 18	19 or more
18 or less	19 to 22	23 or more
22 or less	23 to 26	27 or more

Plant Stage: \_\_\_\_\_

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**STOP SAMPLING!**  
Resample the same field in 3-4 days.

**CONFIRM 'TREAT' DECISION**  
Resample the same field in 3-4 days  
Apply insecticide in 3-4 days if confirmed

# Speed Scouting for Soybean Aphid

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- Repeat Step #1 until 11 plants are sampled in different areas of the field.
- Make a decision using the total number of infested plants (the total number of pluses).
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- If no decision is reached, sample additional sets of 5 plants until 31 plants are sampled. Remember, always use the total number of plants to make a decision.
- If no decision can be made after sampling 31 plants, resample the same field in 3-4 days.
- A 'TREAT' decision must be confirmed a 2<sup>nd</sup> time 3-4 days later. If confirmed, apply insecticide in 3-4 days.

Field: Anderson NE 1/4

Date: July 15

Decision: Treat, confirm in 3 d.

Use these Notations: - = Less than 40 aphids/ plant ('non-infested') + = 40 or more aphids/ plant ('infested')	Total # of Infested plants:	DO NOT treat. Resample in 7-10 days	CONTINUE sampling 5 more plants	TREAT decision, confirm in 3-4 days
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$\frac{+}{1}$   $\frac{+}{2}$   $\frac{-}{3}$   $\frac{+}{4}$   $\frac{+}{5}$   $\frac{+}{6}$   $\frac{+}{7}$   $\frac{+}{8}$   $\frac{-}{9}$   $\frac{+}{10}$   $\frac{+}{11}$   $\blacktriangleright$

$\frac{+}{12}$   $\frac{+}{13}$   $\frac{+}{14}$   $\frac{+}{15}$   $\frac{+}{16}$   $\blacktriangleright$  5 + 9  $\blacktriangleright$

$\frac{+}{17}$   $\frac{+}{18}$   $\frac{+}{19}$   $\frac{+}{20}$   $\frac{+}{21}$   $\blacktriangleright$  5 + 14  $\blacktriangleright$

$\frac{\quad}{22}$   $\frac{\quad}{23}$   $\frac{\quad}{24}$   $\frac{\quad}{25}$   $\frac{\quad}{26}$   $\blacktriangleright$      +      $\blacktriangleright$

$\frac{\quad}{27}$   $\frac{\quad}{28}$   $\frac{\quad}{29}$   $\frac{\quad}{30}$   $\frac{\quad}{31}$   $\blacktriangleright$      +      $\blacktriangleright$

Total # of Infested plants: 9  
14  
19

6 or less	7 to 10	11 or more
10 or less	11 to 14	15 or more
14 or less	15 to 18	19 or more
18 or less	19 to 22	23 or more
22 or less	23 to 26	27 or more

Remember: When you continue sampling, add the previous # of Infested plant to the new count to make the next decision.

Plant Stage: R2, full bloom

Notes: Aphid population increased from last week. Some yellowing plants. Will come back in 3 days to resample and confirm decision.

**STOP SAMPLING!**  
Resample the same field in 3-4 days.

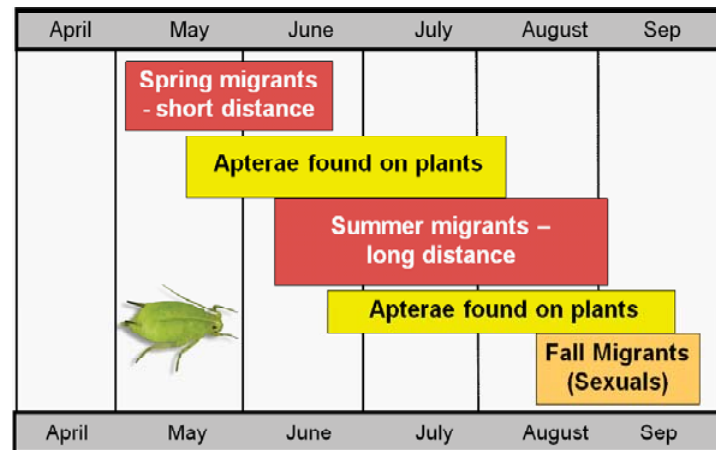
**CONFIRM 'TREAT' DECISION**  
Resample the same field in 3-4 days  
Apply insecticide in 3-4 days if confirmed

# Soybean aphid management

The goal for soybean aphid management is to keep populations under the level where they cause economic damage. Low, sustained population levels do not cause enough damage to make up for treatment costs, so treating them does not pay. When does it pay? University soybean specialists throughout the upper Midwest agree that the economic threshold (ET) is a field average of 250 aphids per plant. At this population density, the likelihood of a good response from insecticide is high and aphid control is recommended. Figure 1 illustrates damage from a severe soybean aphid infestation. A grace period is built into the ET to allow growers to both recheck fields and allow for spraying delays due to weather (total of about 7 days).

## Life cycle

The life cycle of the soybean aphid is complex, so a basic understanding will be useful (Figure 2). Aphids overwinter as eggs (not shown) on buckthorn and emerge as all females in early spring. Populations build before they migrate to their favorite summer host, soybeans. There, the females, born pregnant, continue to give birth to more females at a rate of 3 to 8 per day for 30 days. With these birth rates, populations can double in 2 to 5 days under optimal conditions. Winged forms of the aphid start to appear under crowded conditions or plant stress and these migrants then disperse to uninfested fields. In late summer and early fall, males finally appear on the scene and both sexes fly to buckthorn to mate and lay eggs.



**Figure 2.** Seasonal appearance of soybean aphid, *Aphis glycines*, migrant (winged) and unwinged forms (apterae). Source University of Minnesota.



**Figure 1.** Severe soybean aphid infestation, July, 2001. Source: University of Minnesota.

## Factors affecting population

Given the high birth rates, it's easy to see how aphid populations can explode. However, several factors influence population dynamics:

- **Natural enemies** - Predators and parasitic wasps that feed on aphids are the good guys in the battle. Predators include lady bird beetles, lacewing larvae and syrphid fly larvae. Parasitic wasps have been active if "mummies" can be seen on the leaves.
- **Fungal outbreaks** - Prolonged high humidity can increase fungal outbreaks. High humidity in combination with cooler temperatures has led to aphid population crashes in the past.
- **Heavy thunderstorms** - Strong rainstorms blast the soft-bodied aphids, especially on young plants.
- **Temperature** - Soybean aphids thrive in temperatures around 70 degrees. Survivorship drops off dramatically when the temperatures hit the 90's.
- **Local redistribution of winged aphids** - Migrants leaving for another field can significantly reduce the population and give the impression that it collapsed. Appearance of the winged aphids can be triggered by crowding, plant stress, and possibly daylength.

## Scout, scout and scout some more!

Soybean aphid populations vary widely among fields, so the only way to really know what's going on in any field is to scout it. A high population in one field does not guarantee the same in the neighboring field!

Start by checking the fields where you've had problems in the past, especially smaller fields near woodland and earlier planted fields to get an idea of population dynamics. Aphids will colonize field borders more quickly than field interiors, so look for them on the upper two leaves and new leaves on any branches in the borders. If over 70 percent of the plants are infested, it's time to scout the rest of the field to assess whether the field should be treated.

**Speed scouting**, developed by entomologists from the University of Minnesota, eliminates the tedious and time consuming need to count every single aphid on the plant. While it corresponds to the economic threshold of 250 aphids per plant, one only needs to count to 40 (the speedy part!). Sampled plants are counted as either infested (>40 aphids) or non-infested (<40). Depending on the number of infested plants counted, growers are instructed to either:

- 1) Do not treat. Resample in 7 to 10 days,
- 2) Resample the same field in 3 to 4 days, or
- 3) Treat decision, confirm decision in 3 to 4 days.

Full instructions are included on the enclosed worksheet and you'll also find an example on the back. The speed scouting method should be used through pod set (R4).

## Insecticide treatments

Results from a soybean aphid insecticide trial conducted in 2009 can be seen in Table 1. In this trial, insecticides were applied on August 5 when the aphid population was above threshold (325 aphids per plant). All of the insecticides did a good job of both maintaining yield and keeping aphid populations well below ET through the end of August, while populations in the untreated plots reached 800 aphids per plant.

## Don't make these common mistakes when managing soybean aphids

- **Assuming that seed treatments will provide season-long control of soybean aphids.** In fact, protection from the insecticide is generally gone within 40 to 50 days, so it will not control later aphid colonization from winged migrants.
- **Assuming that all fields have the same populations. Populations vary widely from field to field.** The only way to know what's going on is to scout.
- **Spraying at low aphid populations (< ET) or as an early "insurance treatment."** Populations below the economic threshold do not cause economic injury, so the money spent on insecticide is wasted. In addition, the insecticide will wipe out aphid's natural enemies. Predators and parasites can often keep low populations and particularly colonizing aphids in check, so spraying early can set the field up for needing a second application later. Finally, unnecessary applications increase the already high risk that aphids will develop insecticide resistance.
- **Tank mixing the insecticide with herbicide or fungicide.** If an insecticide is applied with herbicide, then the insecticide is being applied too early and well below the aphid levels that cause damage. Fungicide applications kill the fungi that attack soybean aphids and spider mites.
- **Walking away and assuming that everything is fine after treatment.** Fields should still be looked at 10 to 14 days after treatment. Insecticide residues generally last less than a week and there is still plenty of time for re-colonization from winged migrants. In addition, the predators will have been wiped out by the insecticide, so won't be there to greet and eat the new aphid arrivals.



**Table 1.** Yields from 2009 soybean aphid insecticide trial. Insecticides applied on August 5 when aphid population was above threshold (325 aphids/plant). Yields followed by same letter not significantly different. Condensed from Lisa Behnken.

Treatment	oz/A	Yield
Baythroid XL	5 fl oz	47.1 A
Leverage + COC 1%	3.8 fl oz	49.0 A
Lorsban	16 fl oz	49.1 A
Warrior II	1.28 fl oz	50.1 A
Baythroid XL + Lorsban	2 & 8 fl oz	48.5 A
Asana XL	9.6 fl oz	47.0 A
Asana XL + Lorsban	6 & 6 fl oz	49.7 A