

## Scouting Grasshoppers in Rangeland and Cropland

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Vigilant scouting is important during grasshopper outbreaks. Egg hatch typically begins sometime during May and can continue throughout the summer depending on the weather and species of grasshopper. Small newly hatched grasshoppers are more difficult to see due their size and require more careful attention. Grasshopper activity occurs earlier and can be concentrated on warmer south facing slopes. As grasshoppers get larger, particularly when winged adults are present, it can be more difficult to estimate their numbers. Early in the morning when its cool grasshoppers are less active and it can be easier to estimate their numbers. Later in the season, when winter wheat is planted, most of the population can be winged adults and damaging populations can fly in with little notice.

Grasshoppers tend to move into crops from surrounding grassland and damage is more pronounced on crop edges. In some cases weeds can attract grasshoppers into fallow fields before winter wheat is planted. Cropland intermixed with grassland, such as Conservation Reserve Program (CRP) areas, is at higher risk of continued invasion and damage.

The square foot method of surveying grasshoppers is used by USDA-APHIS to estimate grasshopper densities in rangeland and produce hazard maps. With practice it is considered accurate. The number of grasshoppers in a one square foot area is estimated visually and randomly repeated 18 times while walking a transect. The total number of grasshoppers is tallied and divided by two to give the number per square yard. Alternatively, since it is difficult to estimate the number of grasshoppers per square yard when population densities are high, sweep nets can be used. Four 180-degree sweeps with a 15-inch diameter sweep net is considered equivalent to the number of adult (or nymph) grasshoppers per square yard (NDSU Extension).

A total of 15-20 nymphs per square yard (correlates to about 10 adults) is considered the economic threshold for rangeland. However, the actual threshold in can depend on weather, the same number of grasshoppers can cause more damage to rangeland during a dry period. A table with estimates of forage loss for different densities of grasshoppers is provided below. Also provided below is a table with economic thresholds for spring and fall planted grains. Again, *actual damage can depend on crop stage and condition and treatments may be required at lower numbers if there are signs of economic damage.*

Treatment thresholds for grasshoppers infesting grains (source: High Plains IPM Guide, [http://wiki.bugwood.org/HPIPM:Small\\_Grains](http://wiki.bugwood.org/HPIPM:Small_Grains)).

Table 1. Spring treatment guidelines for immature and adult grasshoppers in spring wheat (modified from University of Minnesota information).

<b>Rating</b>	<b>Immatures/yd<sup>2</sup></b>		<b>Treat?</b>	<b>Adults/yd<sup>2</sup></b>		<b>Treat?</b>
	<b>Margin</b>	<b>Field</b>		<b>Margin</b>	<b>Field</b>	
Nonthreatening	<25	<15	No	<10	<3	No
Light	25-35	15-25	No	10-20	3-7	Yes, if there is potential for head clipping
Threatening	50-75	30-45	Depends on prices, crop condition	21-40	8-14	Yes, if there is potential for head clipping
Severe	>100	>60	Yes, monitor for retreatment	>41	>15	Yes, consider wider border treatments and monitor for retreatment

Table 2. Fall treatment guidelines for adult grasshoppers in winter wheat (modified from University of Minnesota information).

<b>Rating</b>	<b>Adults/yd<sup>2</sup></b>		<b>Treat?</b>
	<b>Margin</b>	<b>Field</b>	
Nonthreatening	<10	<3	No
Light	10-20	3-7	Yes
Threatening	21-40	8-14	Yes, consider wider border treatments
Severe	>41	>15	Yes, use wider border treatments and monitor for retreatment

Forage loss to grasshoppers based on:  
1 GH consuming 43 mg/day.

GH/YD	Days in season	LBS Forage Lost/Acre /30 days	Tons Forage Lost/Section/ 45 days		Days in season	LBS Forage Lost/Acre /45 days	Tons Forage Lost/Section/ 45 days		Days in Season	LBS Forage Lost/Acre /60 days	Tons Forage Lost/Section/ 60 days
1	30	13.8	4.4		45	20.7	6.6		60	27.6	8.8
2	30	27.6	8.8		45	41.4	13.2		60	55.2	17.7
3	30	41.4	13.2		45	62.1	19.9		60	82.8	26.5
4	30	55.2	17.7		45	82.8	26.5		60	110.4	35.3
<b>5</b>	<b>30</b>	<b>69.0</b>	<b>22.1</b>		<b>45</b>	<b>103.5</b>	<b>33.1</b>		<b>60</b>	<b>138.0</b>	<b>44.2</b>
6	30	82.8	26.5		45	124.2	39.7		60	165.6	53.0
7	30	96.6	30.9		45	144.9	46.4		60	193.2	61.8
8	30	110.4	35.3		45	165.6	53.0		60	220.8	70.7
9	30	124.2	39.7		45	186.3	59.6		60	248.4	79.5
<b>10</b>	<b>30</b>	<b>138.0</b>	<b>44.2</b>		<b>45</b>	<b>207.0</b>	<b>66.2</b>		<b>60</b>	<b>276.0</b>	<b>88.3</b>
11	30	151.8	48.6		45	227.7	72.9		60	303.6	97.2
12	30	165.6	53.0		45	248.4	79.5		60	331.2	106.0
13	30	179.4	57.4		45	269.1	86.1		60	358.8	114.8
14	30	193.2	61.8		45	289.8	92.7		60	386.4	123.6
<b>15</b>	<b>30</b>	<b>207.0</b>	<b>66.2</b>		<b>45</b>	<b>310.5</b>	<b>99.4</b>		<b>60</b>	<b>414.0</b>	<b>132.5</b>
16	30	220.8	70.7		45	331.2	106.0		60	441.6	141.3
17	30	234.6	75.1		45	351.9	112.6		60	469.2	150.1
18	30	248.4	79.5		45	372.6	119.2		60	496.8	159.0
19	30	262.2	83.9		45	393.3	125.9		60	524.4	167.8
<b>20</b>	<b>30</b>	<b>276.0</b>	<b>88.3</b>		<b>45</b>	<b>414.0</b>	<b>132.5</b>		<b>60</b>	<b>552.0</b>	<b>176.6</b>
21	30	289.8	92.7		45	434.7	139.1		60	579.6	185.5
22	30	303.6	97.2		45	455.4	145.7		60	607.2	194.3
23	30	317.4	101.6		45	476.1	152.4		60	634.8	203.1
24	30	331.2	106.0		45	496.8	159.0		60	662.4	212.0
<b>25</b>	<b>30</b>	<b>345.0</b>	<b>110.4</b>		<b>45</b>	<b>517.5</b>	<b>165.6</b>		<b>60</b>	<b>690.0</b>	<b>220.8</b>
26	30	358.8	114.8		45	538.2	172.2		60	717.6	229.6
27	30	372.6	119.2		45	558.9	178.8		60	745.2	238.5
28	30	386.4	123.6		45	579.6	185.5		60	772.8	247.3
29	30	400.2	128.1		45	600.3	192.1		60	800.4	256.1
<b>30</b>	<b>30</b>	<b>414.0</b>	<b>132.5</b>		<b>45</b>	<b>621.0</b>	<b>198.7</b>		<b>60</b>	<b>828.0</b>	<b>265.0</b>
31	30	427.8	136.9		45	641.7	205.3		60	855.6	273.8
32	30	441.6	141.3		45	662.4	212.0		60	883.2	282.6
33	30	455.4	145.7		45	683.1	218.6		60	910.8	291.5
34	30	469.2	150.1		45	703.8	225.2		60	938.4	300.3
<b>35</b>	<b>30</b>	<b>483.0</b>	<b>154.6</b>		<b>45</b>	<b>724.5</b>	<b>231.8</b>		<b>60</b>	<b>966.0</b>	<b>309.1</b>
36	30	496.8	159.0		45	745.2	238.5		60	993.6	318.0
37	30	510.6	163.4		45	765.9	245.1		60	1021.2	326.8
38	30	524.4	167.8		45	786.6	251.7		60	1048.8	335.6
39	30	538.2	172.2		45	807.3	258.3		60	1076.4	344.4
<b>40</b>	<b>30</b>	<b>552.0</b>	<b>176.6</b>		<b>45</b>	<b>828.0</b>	<b>265.0</b>		<b>60</b>	<b>1104.0</b>	<b>353.3</b>