Manitoba Grasshopper Survey Protocol

Purpose

- Estimates of the average grasshopper densities in an area are done in late-summer (when grasshoppers are adults and laying eggs). This, combined with other data, helps forecast the risk of grasshoppers being at problem levels the next growing season.
- Collecting annual survey data shows trends in grasshopper populations over a number of years.
- This forecast can be used to prepare seeding strategies for the following year, as well as to plan for cultural or chemical forms of control.
- Monitoring grasshopper numbers in late summer during routine field visits will indicate local areas where egg laying is likely to be highest. These areas are where grasshopper hatch will likely be heaviest the next spring, and early season populations will be concentrated.

When to do Grasshopper Counts

Locations should be sampled when the majority of grasshoppers are in the adult stage. Adult grasshoppers have fully developed wings and can fly.

To meet this requirement, sites should be surveyed between **August 1st and September 1st**. The survey is designed so that counts can be done during routine field visits if desired, and thus will not be too time consuming.

Where to do Grasshopper Counts

Only roadsides **or** sites in the field need to be sampled, wherever grasshopper populations appear to be highest. If both field and roadside are monitored, only whichever of the two has the highest counts will be used to produce the forecast. Most often, highest densities will be along the roadside, but pasture and alfalfa stands may be the reverse.

How Many Locations Should be Sampled

Sample enough locations so that you have a good representation of the grasshopper populations in your area. If possible, sample at least five locations in your region.

How to do Grasshopper Counts

1. At each location, walk approximately 50 metres and estimate the number of grasshoppers in five one-metre² areas along the 50-metre strip. Getting exact counts can be difficult, particularly if vegetation is tall or dense. When exact counts are not possible, estimates are all that are required to forecast risk in an area.
2. Adding the five counts and dividing by five will give you your average number per metre².
3. Fill out the attached form (page 5 below) completely. Remember to include a GPS location for each site.

Tips to Make Estimating Grasshopper Densities Easier

Estimating the Area to Sample. Before starting the counts, measure one metre² on the ground to fix the size of the unit to be assessed for grasshoppers in your mind. A meter stick can be carried as a visual tool to give perspective for a one-metre width, if needed. With experience, one can often visualize the necessary width and a meter stick may not be required.

Counting Grasshoppers. To estimate grasshopper density, as you begin walking the 50-metre strip, focus on an area ahead of you that is about one metre². As you walk toward the metre² area, estimate the number of grasshoppers that jump or fly from the area. If grasshopper numbers are high it will not be possible to get an exact count of the number of grasshoppers that jump or fly from the area of your count as you approach it. Estimating the approximate number, or a range (ex, 20 to 30) is sometimes all that can be done. Once at the metre², count the remaining grasshoppers in the metre². A quick and easy way to detect grasshoppers while at the metre² is to disturb the plants in the area with your feet to encourage any grasshoppers still present to jump. Repeat four more times along the 50-metre strip to get your five counts.

Estimating High Numbers of Grasshoppers. If grasshopper numbers are very high, and estimating the number of grasshoppers per metre² is difficult, try estimating numbers in a quarter of a metre², or a foot² area. If estimating numbers in a quarter metre², multiply by four to get a metre² count; if using a foot² count, multiplying by ten will give an approximate metre² count.

Caution: Do Not Bias Your Counts

The grasshopper counts are meant to be a representation of the average number of grasshoppers per metre² in the approximately 50-metre area you are surveying. This means that within the 50 metres, the five counts should be at random, not just where grasshoppers are clustered. The risk of having high counts that are not representative of the true number of grasshoppers per metre² on average is even greater when counting grasshoppers in areas smaller than one metre² and multiplying by four or ten (as described above). As an example, in an area with low grasshopper numbers, selectively looking for foot² areas with at least one or two grasshoppers in them to do a count will, after doing the math, result in counts of at least 10 to 20/metre² , which may be very unrepresentative of the average grasshopper density in the area. For this reason, estimating grasshopper numbers using count areas smaller than one metre² is only recommended when populations are very high and estimating numbers per metre² is very difficult.

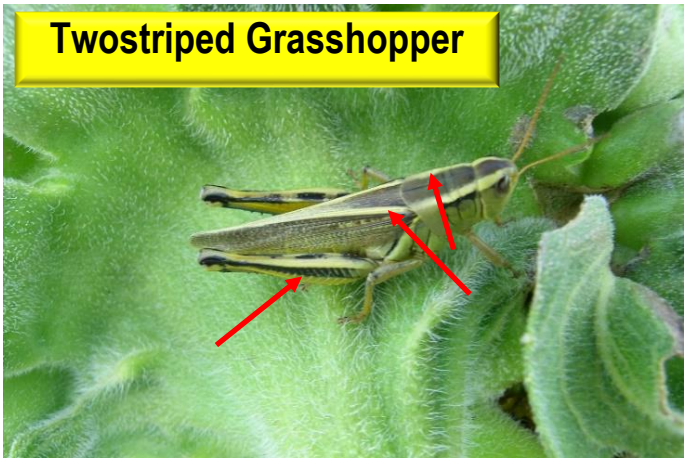
Predominant Species of Grasshopper

Not all species of our potential pest grasshoppers feed on the same crops. Knowing the dominant species in a region is helpful for knowing the potential risk for specific crops.

If you are comfortable distinguishing the different species of grasshoppers, and notice while doing the counts that a particular species of grasshopper is predominant in an area, this is useful information. A sweep net can be used to capture a sample of grasshoppers and determine the dominant species. Grasshoppers can be observed as they are released from the net, or the content of the sweep net can be put into a cage, container or clear plastic bag where they can be observed to determine species. If you are not comfortable identifying grasshoppers to species, then do the counts, and don't worry about determining dominant species, which is an optional part of the survey. Dominant species is good extra information for those who feel comfortable doing the identification. Photos or samples can also be submitted for identification of a dominant species, but this is optional.

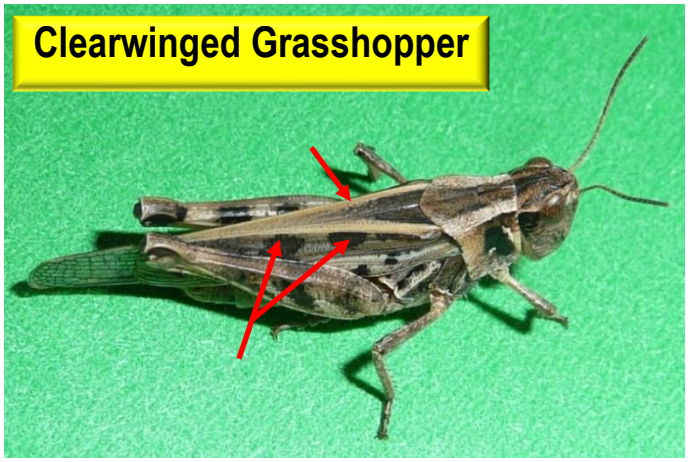
Common Crop Feeding Grasshoppers of the Canadian Prairies

Twostriped Grasshopper



- Two **pale stripes** from eyes to tip of forewings.
- Solid **black stripe** on hind legs.

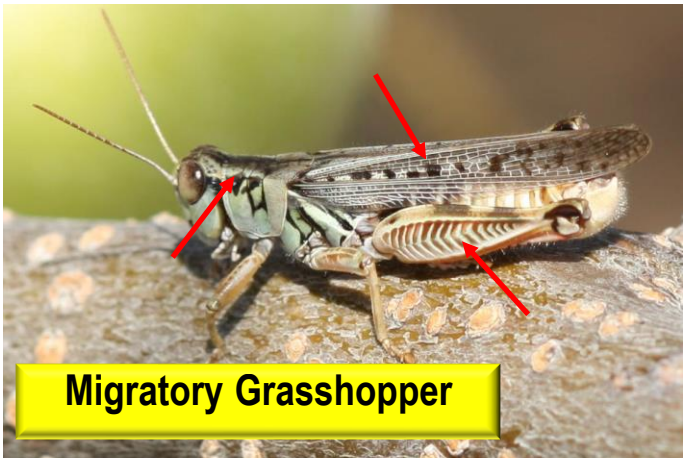
Clearwinged Grasshopper



- Two **pale stripes** from thorax to tip of forewings.
- Note the **brown blotches** on the forewings.

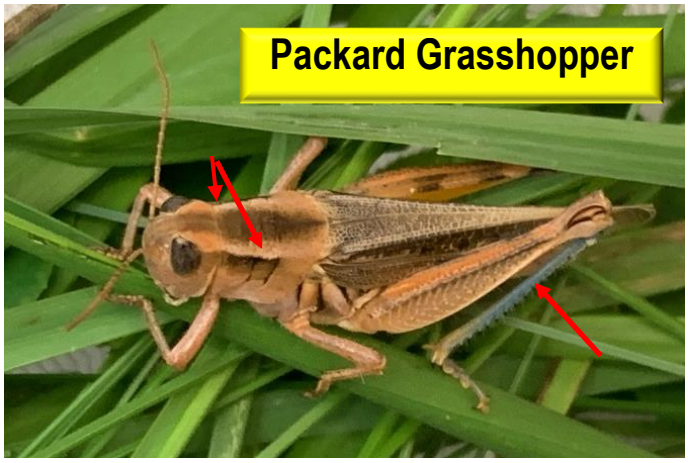
Twostriped grasshopper is bigger and does not have similar blotches on the forewings.

Migratory Grasshopper



- Note **black bands** behind eyes.
- Forewings have rows of small dark **rectangular spots** like the windows on an aircraft.
- Hind legs have series of **black bands**.

Packard Grasshopper



- Two **light-coloured stripes** from just behind eyes to back of the thorax.
- **Blue hind tibia** (long, thin lower section of leg).

Additional information to help identify potential pest species of grasshoppers can be found on the Manitoba Agriculture website at: https://www.gov.mb.ca/agriculture/crops/insects/pubs/grasshoppers-factsheet-revised-november2022.pdf

Fungal Pathogen of Grasshoppers

Dead grasshoppers clinging to the upper portion of the plant are an indication of a fungal pathogen, *Entomophagus grylli*. Note where, and the approximate density of these diseased grasshoppers if present.

Grasshopper infected with *Entomophagus grylli*.

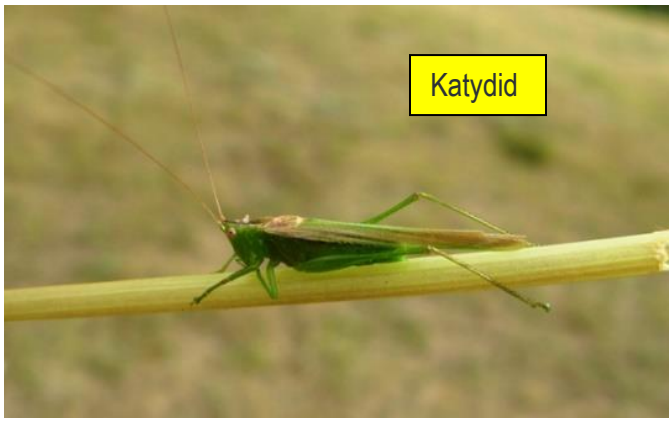
Other Observations

Other observations (such as an abundance of grasshopper predators, etc.) which may influence grasshopper populations should also be noted.

Precautions – Don't Count Katydids

Katydids are not considered potential crop pests and should not be counted in the survey, if possible.

Note that katydids have antennae that are as long as the body or longer. The potential pest species of grasshoppers belong to a family of grasshoppers known as short-horned grasshoppers, with relatively short antennae.



Katydid

What will be done with the numbers and observations you collect

The final results will be used to produce a map and grasshopper forecast for the following year for the agricultural area of Manitoba. Grasshopper counts from August will be mapped using the following categories:

0 – 4 / m^2	Very light
4 – 8 / m^2	Light
8 – 12 / m^2	Moderate
12 – 24 / m^2	Severe
> 24 / m^2	Very severe

This, and other information such as weather data and recent trends in grasshopper populations, will be used to forecast the risk for potentially economical populations of grasshoppers in an area for the following year. Interpretation of the data and observations will also be prepared.

Where to Send Data

Please enter data directly into the computer database (see data sheet), or send or email the following "grasshopper monitoring data sheet – 2025" by **September 30, 2025 to:**

John Gavloski, Manitoba Agriculture, Box 1149, 65 – 3rd Ave. NE, Carman, Manitoba R0G 0J0.
Phone: 204-750-0594

2025 Manitoba Grasshopper Monitoring Program

Complete the survey and either enter the data to the "Grasshopper Survey Data 2025" spreadsheet on the Manitoba Agriculture computer network at:
P/ D03/ Crops/ Projects/ Pest Surveillance/ Insect Monitoring and Surveys/ Insect Monitoring Data-2025
or mail or E-mail this form by September 30, 2025 to:
John Gavloski, Manitoba Agriculture, Box 1149, 65 – 3rd Ave. NE, Carman, MB, R0G 0J0.
E-mail: John.Gavloski@gov.mb.ca

Record the average number of grasshoppers per square meter.

Rural Municipality	GPS (X-coordinate)[1]	GPS (Y-coordinate)	Date surveyed	Vegetation at location monitored[2]	Number of grasshoppers /m^2	Dominant species of grasshopper	Diseased grasshoppers or predators noted

[1]If GPS location cannot be determined in the field, note the legal location.
Legal locations can be converted to an approximate GPS locations with Prairie Locator (http://prairielocator.com/).

[2]Samples should be taken either on roadsides **or** within the field, wherever grasshopper populations appear to be highest.
1=roadside (indicate predominant plant types if known)
2=annual crop (indicate crop)
3=pasture (indicate predominant plant types if known)
4=perennial forage (indicate type)

Common non-pest species

Common potential predators of grasshoppers