

# Grasshoppers

Orthoptera: Acrididae



# Plains Lubber



# Pictured grasshoppers



**Great crested  
grasshopper**



# Snakeweed grasshoppers

# Primary Pest Grasshoppers

- **Migratory grasshopper**
- **Twostriped grasshopper**
- **Differential grasshopper**
- **Redlegged grasshopper**
- **Clearwinged grasshopper**

**Two-striped Grasshopper, *Melanoplus bivittatus***



**Redlegged Grasshopper, *Melanoplus femurrubrum***



Differential Grasshopper, *Melanoplus differentialis*



UGA2511007

**Migratory Grasshopper, *Melanoplus sanguinipes***





**Clearwinged Grasshopper**  
*Camnula pellucida*

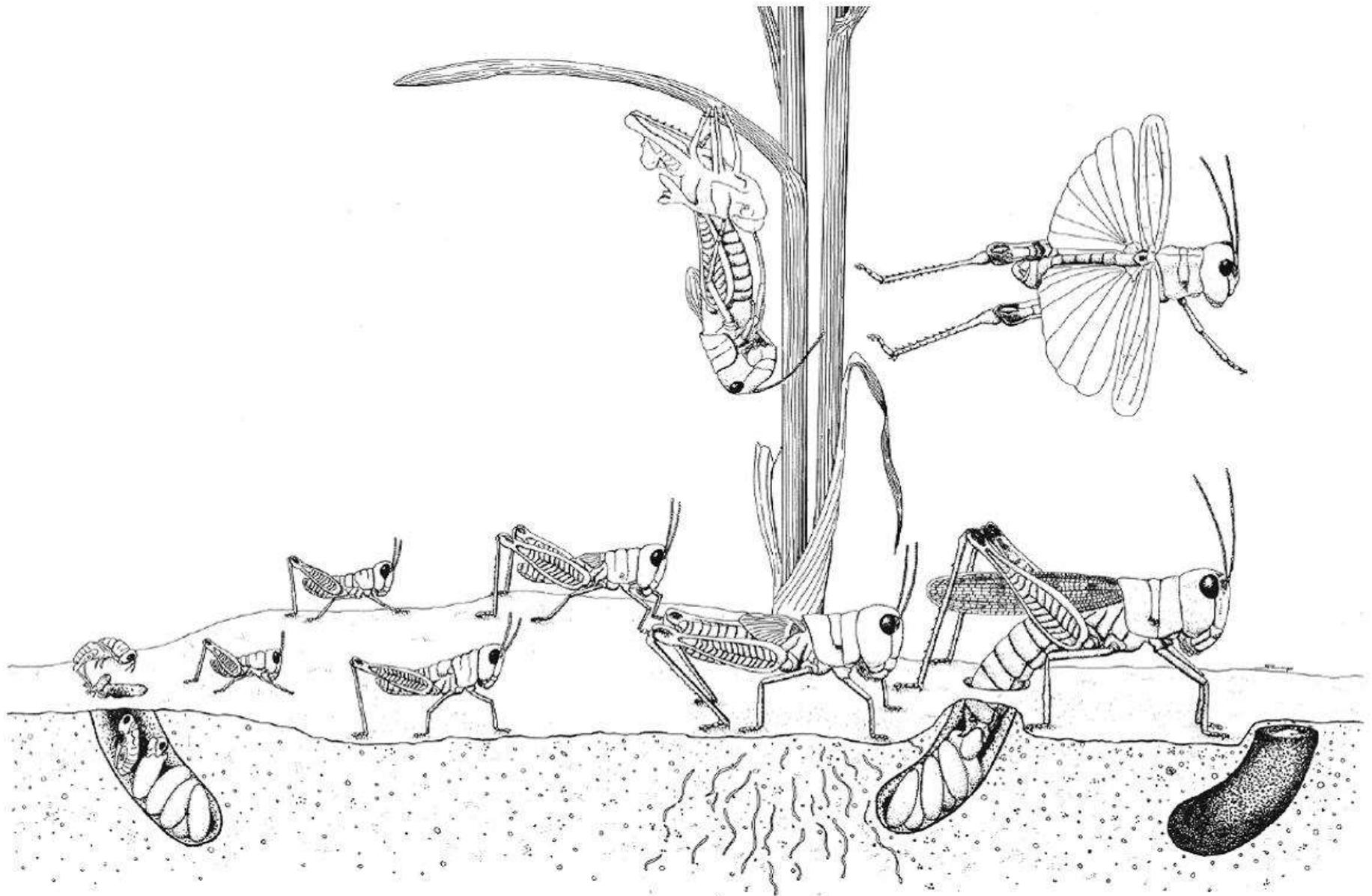
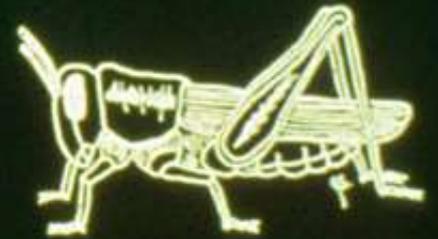


Diagram courtesy of Alexandre Latchinsky, University of Wyoming



**EGG**

**NYMPH**

**ADULT**



Photograph courtesy of Jean-Francoise Duranton, CIRAD



**Grasshoppers lay  
pods of eggs below  
ground**





# Grasshopper Egg Pods



Lined bird  
grasshopper  
molting to  
adult stage



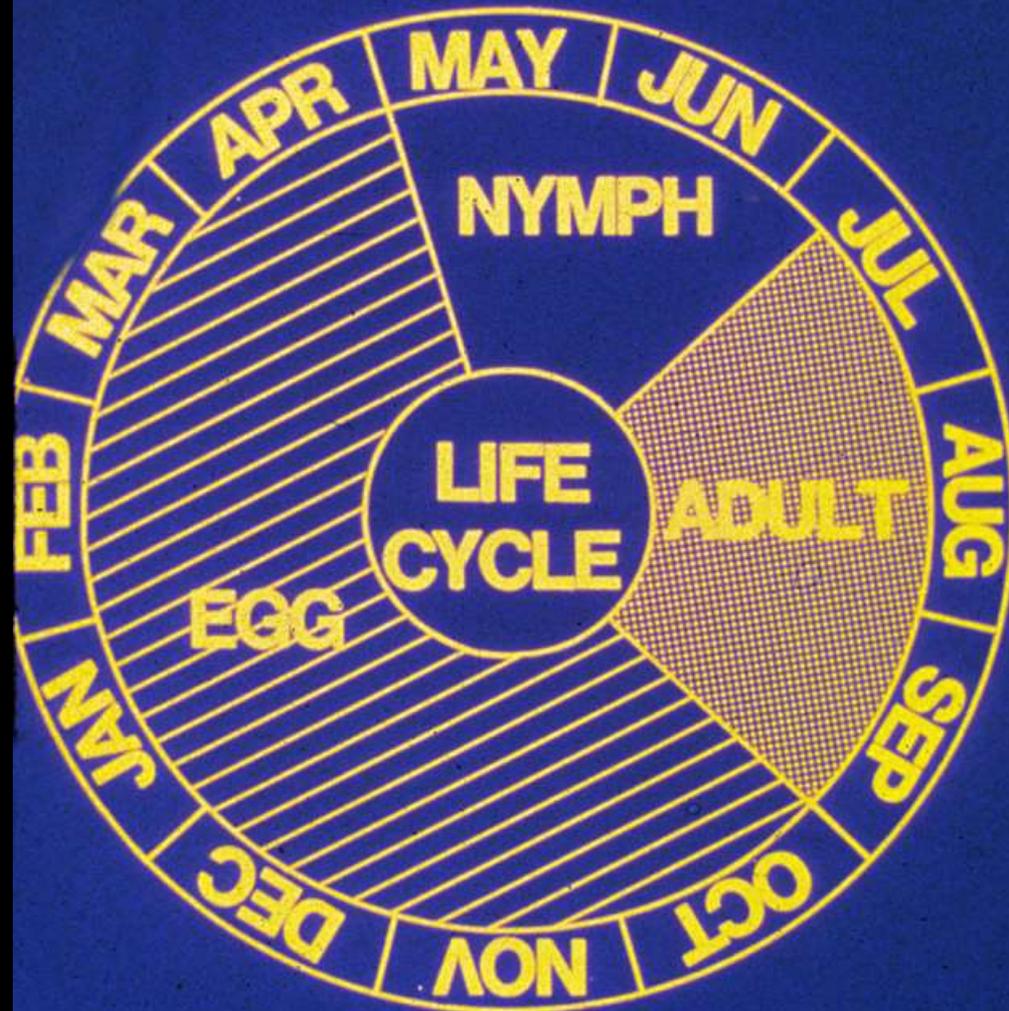
OLD INTEGUMENT  
( SKIN ) →  
RECENTLY MOLTED  
NYMPH ↓



# Grasshopper Nymphs



# TYPICAL LIFE CYCLE

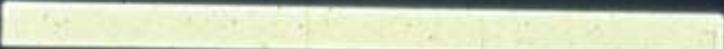


# HATCHING PERIODS

 A. CLAVATUS

 C. PELLUCIDA

 M. BIVITATTUS

 M. FEMURRUBRUM

 D. CAROLINA

 O. OBSCURA

 E. SIMPLEX

MAY

JUN

JUL

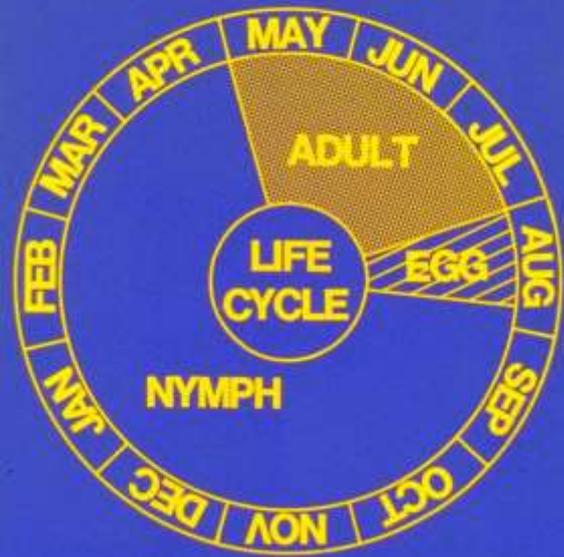
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**Some grasshoppers found in winter and early spring**



**ATYPICAL  
LIFE CYCLE**



**Velvet-striped grasshopper  
– a common spring species**



# Grasshopper Controls

- **Weather (rainfall mediated primarily)**
- **Natural enemies**
  - **Predators, diseases**
- **Treatment of breeding areas**
- **Biological controls**
- **Row covers**



**Temperature and rainfall are important mortality factors**

# Grasshoppers and Rainfall

Moisture prior to egg hatch generally aids survival

- Newly hatched young need succulent foliage

Moisture after egg hatch generally reduces problems

- Assists spread of diseases
- Allows for plenty of food, reducing competition for rangeland and crops



## Grasshopper predators





**Robber Flies**



**Larvae of many  
blister beetles  
develop on  
grasshopper egg  
pods**



# Fungus-killed Grasshoppers

Pathogen: *Entomophthora grylli*





***Mermis nigrescens*, a  
nematode parasite of  
grasshoppers**



Differential grasshopper killed by *Mermis nigriscens*





Video courtesy of Genevieve Villamizar

# The Extension Fact Sheet on this nematode – and another odd “worm”

Colorado State University  
Extension

## Weird Worms: Horsehair Worm and the Grasshopper Nematode

Fact Sheet No. 5.610

Insect Series | Home and Garden

by W. Cranshaw\*

Two unusual, very long ‘worms’ that are occasionally encountered are horsehair worms and the nematode parasite of grasshoppers, *Mermis nigrescens*. Both are harmless to humans but may attract attention and cause concern.

### The Grasshopper

living nematode in the soil, living many years. Mating occurs at this time and ultimately the egg-bearing females emerge to lay eggs on foliage to repeat the cycle.

Moist conditions are favorable to the development of this nematode and highest populations develop in relatively wet, grassy areas.



### Quick Facts

- Horsehair worms and the grasshopper nematode parasite, *Mermis nigrescens*, are both harmless to humans.
- Moist conditions are favorable to the development of *Mermis*



Many birds use grasshoppers as an important part of their diet





**Grasshoppers as  
coyote roughage**



# Grasshopper Control

Treat sites where grasshopper eggs hatch and early stages develop – egg beds/breeding sites



# Breeding sites – Dry, undisturbed areas







# Grasshopper Controls

- Target younger stages
- Sprays
  - **Dimilin, Carbaryl, Orthene, Permethrin**
  - **Addition of vegetable oil improves performance (more palatable)**
  - **Can apply to strips (1/3 to 1/2 total area)**
- Baits
  - **Insecticide on food based bait**

Colorado State University

Extension

# Grasshopper Control in Gardens and Small Acreages

Fact Sheet No. 5.536

Insect Series | Home and Garden

by W.S. Cranshaw and R. Hammon\*

Grasshoppers can be the most noticeable and damaging insects to yards and fields. They also are among those most difficult to control, since they are highly mobile. For many reasons, grasshopper populations fluctuate greatly from year to year, and may cause serious damage during periodic outbreaks. Problems tend to increase beginning in early summer and can persist until hard frosts.

late-spring, varying with soil temperatures. At egg hatch the tiny first stage nymphs move to the surface and seek tender foliage on which to feed. The first few days are critical to survival. Adverse weather or absence of suitable foods can cause high mortality. Surviving grasshoppers continue to develop over the next several weeks, usually molting through five or six stages, before ultimately reaching the adult form.



## Quick Facts

- Grasshoppers are the most difficult insect to control because they are highly mobile.
- All grasshoppers lay their eggs in soil.

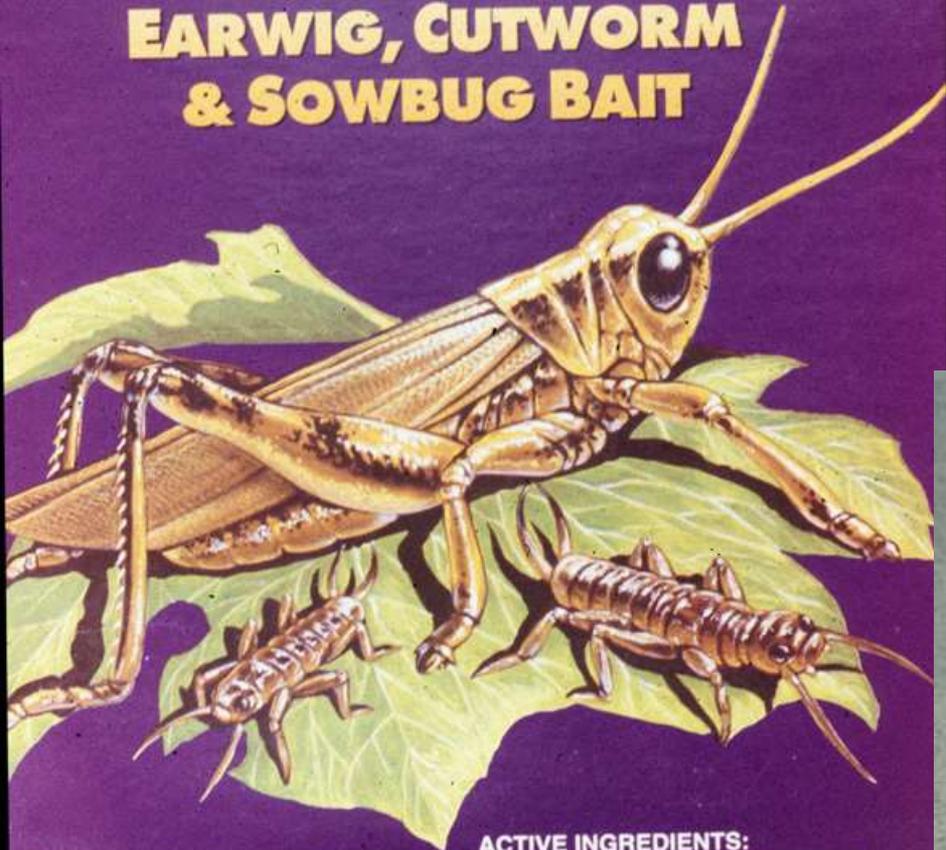
VEGETABLES  
FLOWERS

SLUGS, SNAILS  
& ANTS

**Lilly  
Miller.**

# GRASSHOPPER

## EARWIG, CUTWORM & SOWBUG BAIT



Keep out of reach of children

### CAUTION

This pesticide may be fatal to dogs or other pets if eaten.  
Keep pets out of treated area. Read and follow all directions.  
See side panel for additional precautionary statements.

**ACTIVE INGREDIENTS:**  
Metaldehyde (2,4,6,8-tetramethyl-1,3,5,7-tetraoxocyclo-octane) ..... 2.0%  
Carbaryl (1-naphthyl N-methylcarbamate)... 5.0%

**INERT INGREDIENTS** ..... 93.0%

**NET WEIGHT 2 LBS. (907 g)**

# Baits for grasshopper control





# Nosema locustae



FOR ORGANIC PRODUCTION

**NOLO BAIT**  
**BIOLOGICAL INSECTICIDE**

*Nosema locustae*  
Biological Insecticide

Manufactured in the USA by:  
M&R Durango, Inc.  
6565 Hwy. 172, Ignacio, CO 81137  
Tel: 970-259-3521

For use in suppressing grasshoppers and Mormon Crickets  
Active Ingredient: *Nosema locustae* Canning\* ..... 0.05%  
Inert Ingredients..... 99.95%  
Total:..... 100.00%

\*Contains at least one billion viable spores per 454 grams (1.0 pound)

Net contents: \_\_\_\_\_ Date Formulated: \_\_\_\_\_  
Lot# \_\_\_\_\_



**KEEP OUT OF REACH OF CHILDREN**

SEE FIRST AID AND PRECAUTIONARY STATEMENTS ON BACK PANEL

EPA Registration #46149-2  
EPA Establishment #46149-CO-001

# GRASSHOPPER SPORE



**GARDEN USE**

**100% NATURAL**

The most effective biological way to control grasshoppers.

Grasshopper spores, containing spores of the protozoan *Nosema locustae* can help you control the ravages of grasshoppers in the United States.

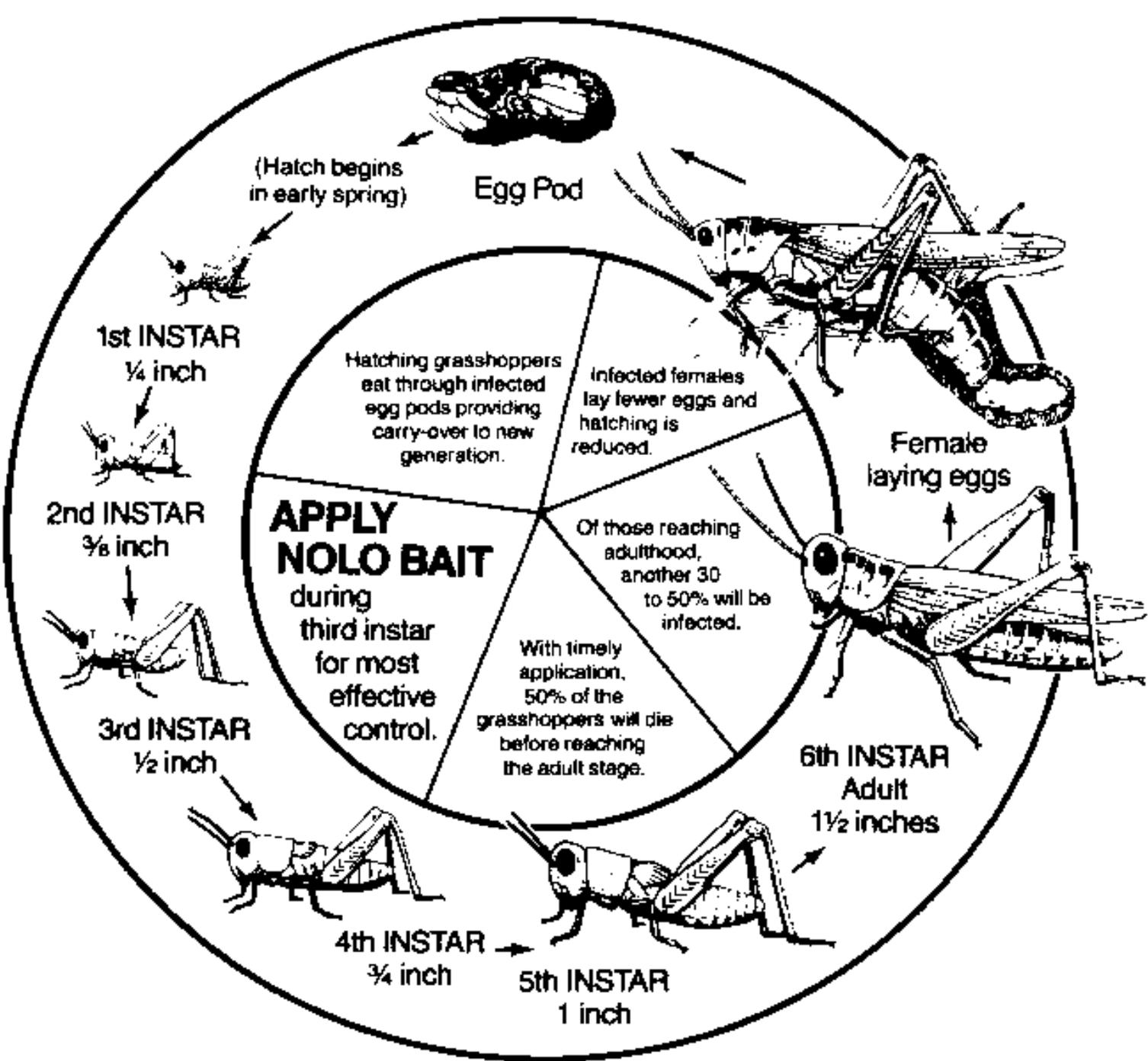
Grasshopper spores give effective protection from grasshopper damage to home gardens, small farms, and pastures. Special formulations are available for reducing repeated grazing by damaging densities of grasshopper herds.

Grasshopper spores affect all grasshoppers of the subgenus *gigas* found throughout the United States. There are no other species of grasshoppers known to be susceptible to this disease, but other species, for example, the locust.

Grasshoppers die when they ingest the spores as part of their regular food supply. The spores of the protozoan are very attractive to them. A natural pathogen for grasshoppers, the spores germinate in the body of the grasshopper, spreading infection and causing some lesions. The grasshopper becomes lethargic, feeds less, and its reproduction decreases. Eventually, the grasshopper becomes ill and dies. *Nosema locustae* has no other members of the family, spreading another way of spreading the spores that its offspring inherit.

Eggs laid by the locust are infected grasshoppers often carry quantities of *Nosema* spores with them. When they hatch, the following summer the same disease germinates in the young nymph grasshoppers, thus continuing the cycle of infection.

Case Load  
 2500 per acre (10 per acre)  
 5000 per acre (20 per acre)  
 10000 per acre (40 per acre)  
 20000 per acre (80 per acre)  
 40000 per acre (160 per acre)  
 80000 per acre (320 per acre)  
 160000 per acre (640 per acre)  
 320000 per acre (1280 per acre)  
 640000 per acre (2560 per acre)  
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# Poultry as biological controls for grasshoppers

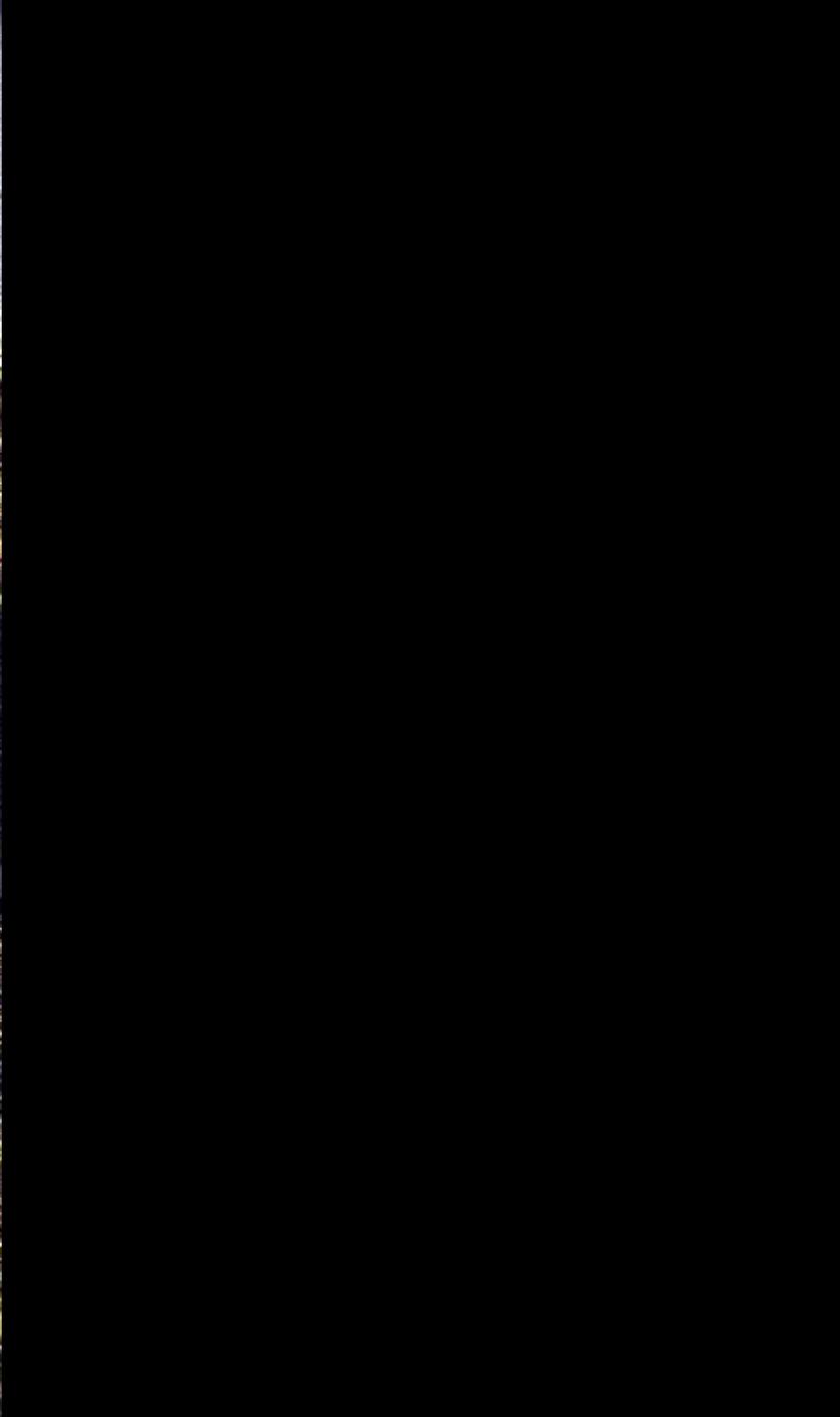


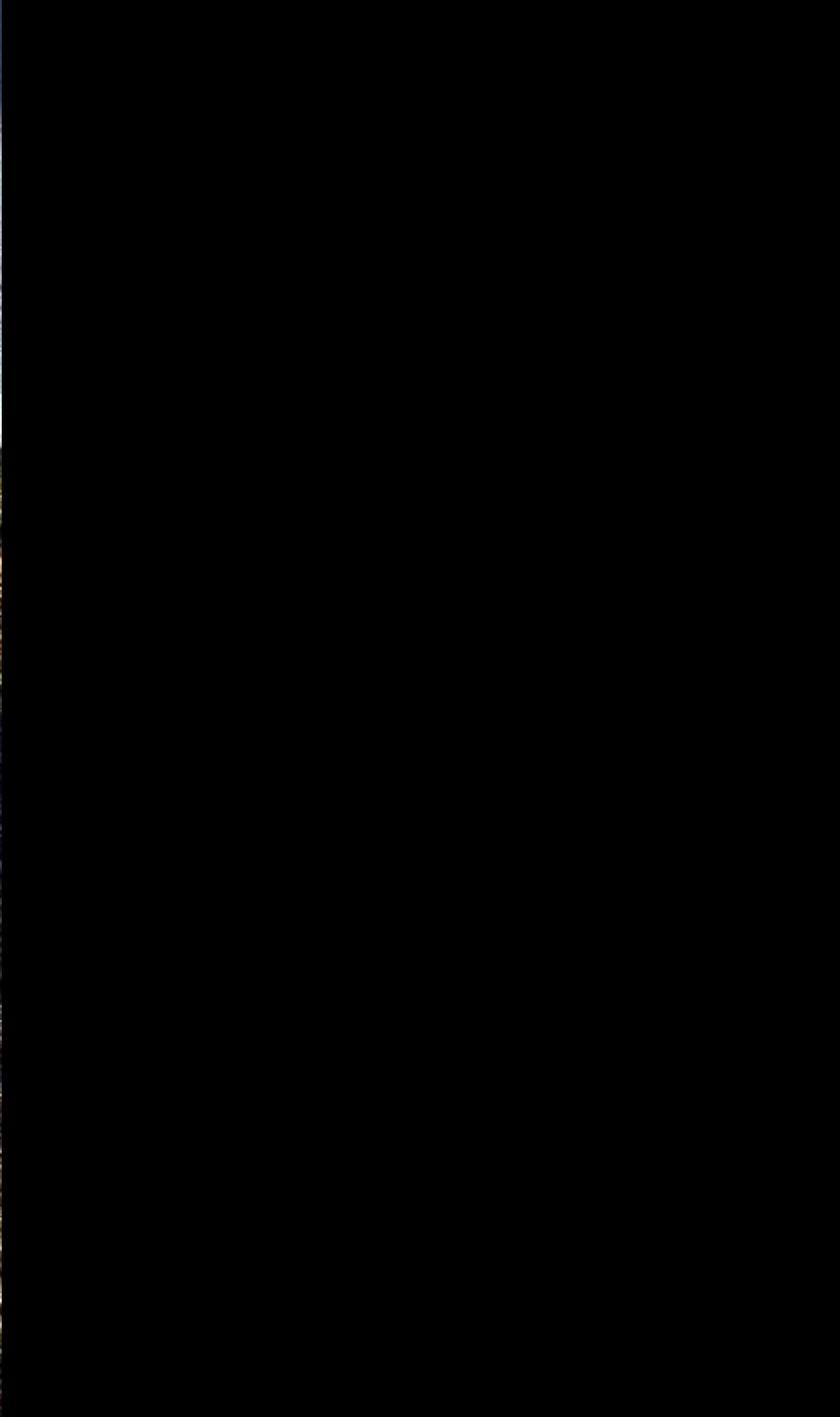


**Grasshoppers as  
coyote roughage**





















# Grasshoppers for sale in market. Oaxaca, Mexico



5369858

***Chapaulines*** – an  
appetizer served  
with guacamole



5369860

# Rocky Mountain Locust

*Melanoplus spretus*





SCHOOL SERIES  
Outline Map  
of the  
**UNITED STATES**  
With Rivers and Mountains  
Scale of Miles  
0 100 200  
MAP NO. 1361  
COPYRIGHT  
AMERICAN MAP CO., INC.

Rocky Mountain Locust, *Melanoplus spretus*

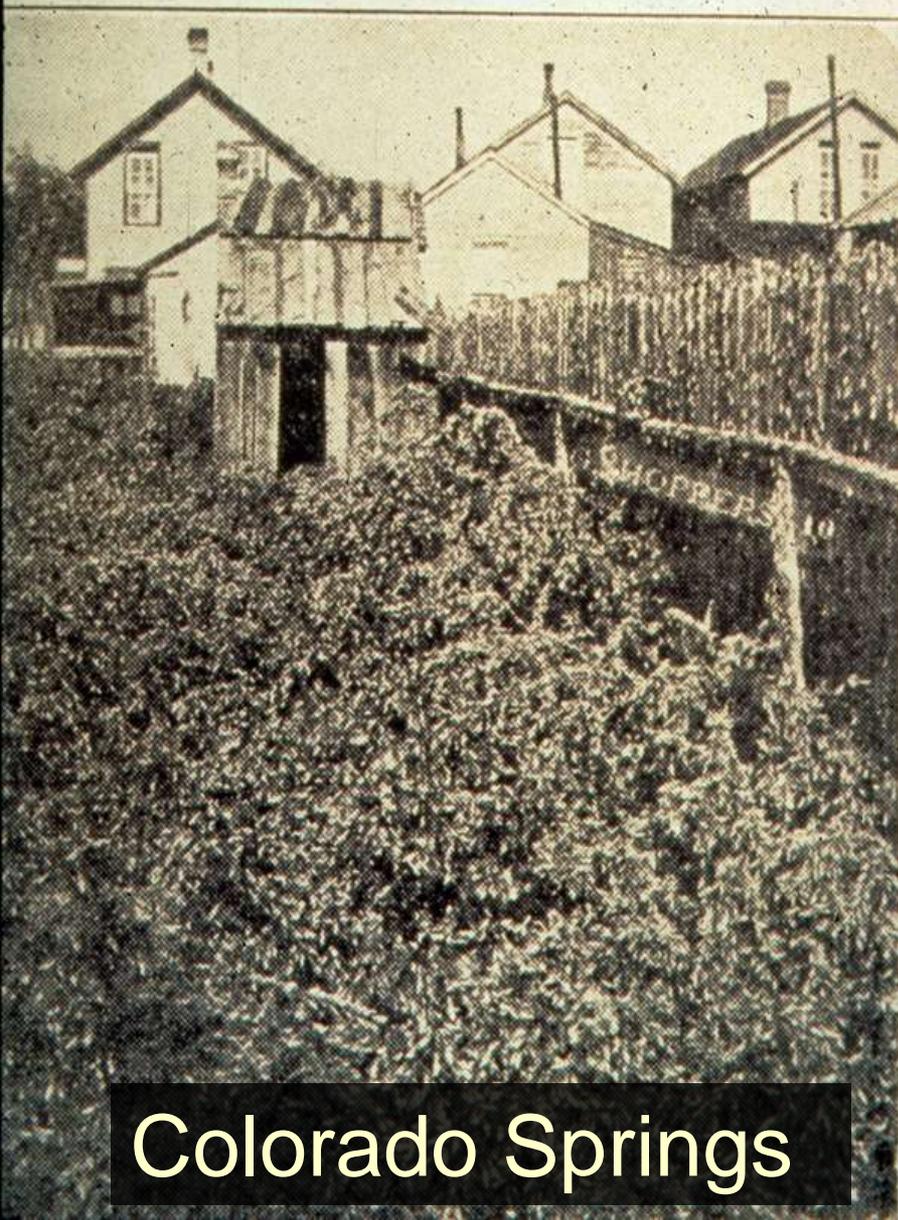


Rocky Mountain Locust

*Melanoplus spretus*

SMUS

Grasshopper Plague in  
'75 Started Water System



Colorado Springs

## Albert's Swarm - 1875

Greatest concentration  
of animals ever recorded

198,000 square miles

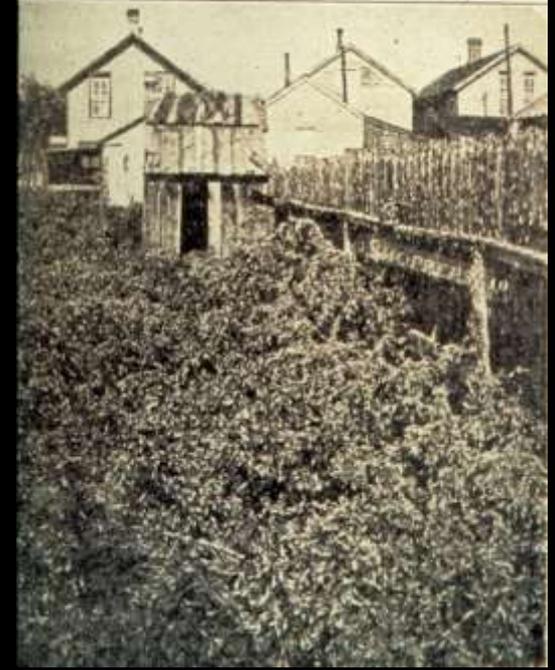
12.5 trillion insects

Biomass 27.5 million tons

Roughly equaling the combined  
area of Connecticut, Delaware,  
Maine, Maryland, Massachusetts,  
New Hampshire, New Jersey, New  
York, Pennsylvania, Rhode Island  
and Vermont.



Grasshopper Plague in  
'75 Started Water System



Downtown Colorado  
Springs, 1875

# On the 1875 Locust Plague Event in Colorado Springs

Reported in the *Gering Citizen*, by M. Timothy Nolting  
August 1, 2013

“The locusts also invaded parts of Colorado. Mr. H. McAllister of Colorado Springs recorded his own observations: “In 1875, early in August, a swarm suddenly came down.

The insects came with the wind, and alighted in a rain. The ground was literally covered two and three inches deep, and glittered “as a new dollar” with the active multitude. In alighting, they circle in myriads about you, beating against everything animate or inanimate, driving into open doors and windows, heaping about your feet and around your buildings, their jaws constantly at work biting and testing all things in seeking what they can devour.

The noise their myriad jaws make when engaged in their work of destruction can be realized by anyone who has ‘fought’ a prairie fire or heard the flames passing along before a brisk wind -the low crackling and rasping; the general effect of the two sounds is very much the same.”

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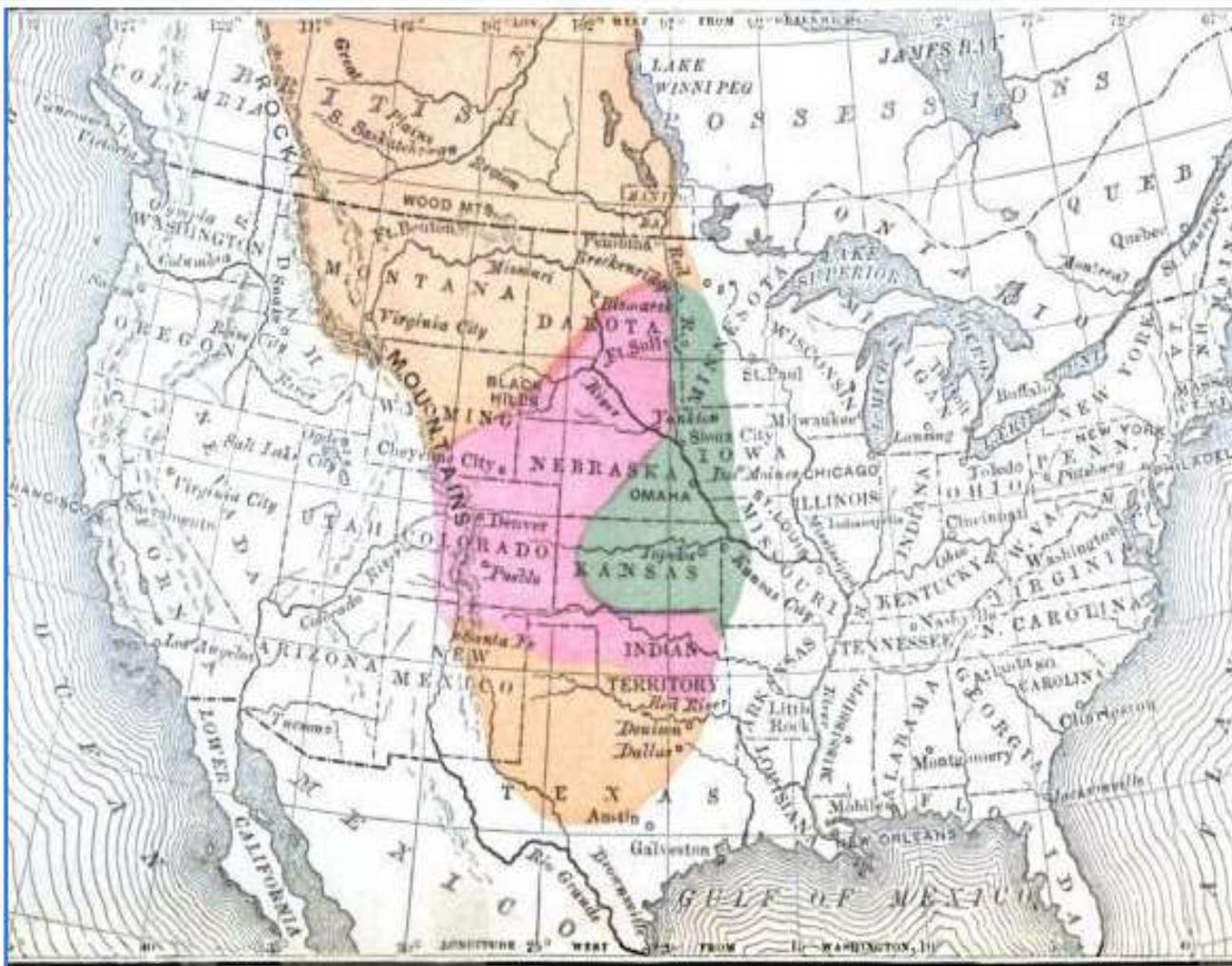
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# C.V. Riley

Appointed Chairman of the Grasshopper Commission – First Scientist hired by the US Government



1876  
*Your very truly,  
C.V. Riley.*



United States, by CV Riley, 1877. The orange color shows the full extent of infestation. The green area shows where the damage was worst, the pink where damage was less due to lower human habitation.

# Mystery of the Rocky Mountain Locust

1870's → Darkening the skies across the western United States



1902 → The last living specimen was collected

*The only pest insect in history known to have gone extinct!*

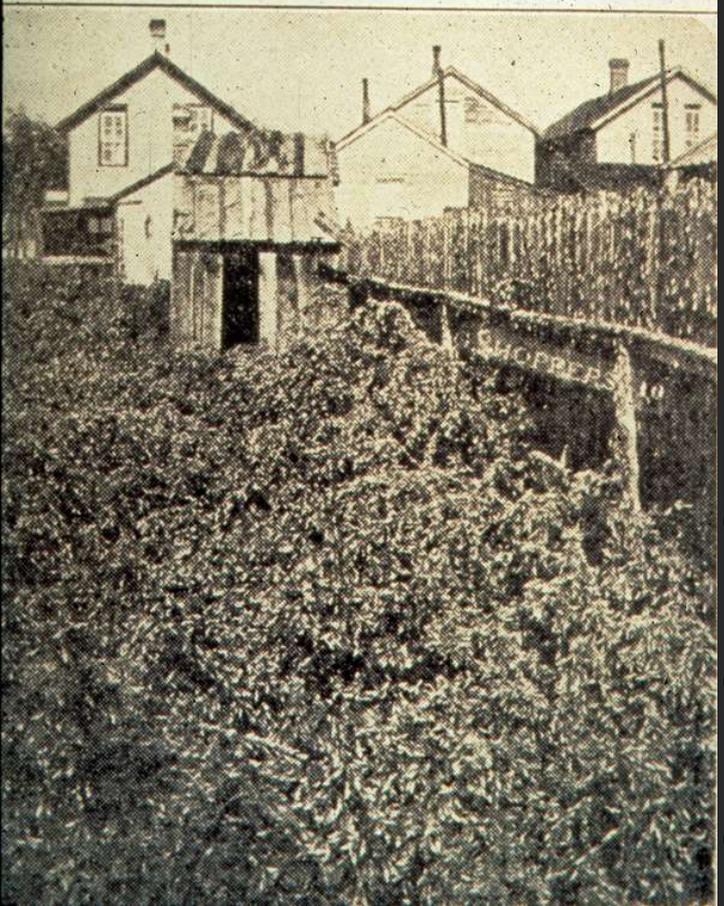
# High Plains Grasshopper

*Dissosteira longipennis*



Outbreak species during the  
1930's

Grasshopper Plague in  
'75 Started Water System



**Rocky Mountain  
Locust  
*Melanoplus spretus*  
- Status, Extinct**





High Plains  
Grasshopper  
*Dissosteira longipennis*

Status – Reverted to  
minor status

