

PROTECTING POST-HARVEST GRAINS FROM PROFIT ROBBING INSECTS



PRODUCT APPLICATION & INSECT IDENTIFICATION GUIDE





PROTECTING STORED GRAINS FROM THE MONSTER DAMAGE AND PROFIT LOSS CAUSED BY INSECTS

The Bug Free Grains Stored Product Solutions line-up from Central Life Sciences offers a variety of product solutions to prevent and control post-harvest insects.

We offer insect growth regulators, synergists, and insecticides, along with combination products, all of which are designed for use during the sanitation and post-harvest grain storage processes.

We hope that you find the following applications guide and insect identification cards a helpful tool in your operation.





APPLICATION RATES

Diacon®-D IGR Application Rates

Application

Loading grain	8-10 lbs. per 1,000 bu.
Mixing into animal feed	.33 lbs. per ton of feed
Area treatments	1.5 oz. per 1,000 sq. ft.

- Designed for water-challenged operations.
- Ready-to-use formulation.
- Interrupts listed insects' life cycles for long-term control

Labeled for all stored commodities including making barley.
CODEX approved for cereal grains.





APPLICATION RATES*

Diacon® IGR Application Rates (Per 1,000 Bushels) in Solution

Commodity	fl. oz.
Wheat	7
Corn	7
Sorghum (Milo)	7
Barley	6
Rice	6
Oats	4
Peanuts**	4
Sunflower	4

**Breaks the insects'
life cycles.**

* See label for complete product directions.

** For peanuts, use water solution only.

DILUTION RATES

Diacon® IGR Dilution Rates

Application

On-grain application with water as carrier	5 gal. of solution per 1,000 bu.
On-grain application with food grade oil as carrier***	1 gal. of solution per 1,000 bu.
Rice spray with carrier as water	10 gal. of solution per 1,000 bu.
Fogging - aerosol generators****	1 ¹ / ₁₀ fl. oz. per 10,000 cu. ft.

*** Apply at the oil manufacturer's label application rate.

**** Follow equipment manufacturer instructions for amount of diluent.

Broad-spectrum control
Labeled for all stored commodities
EPA tolerance exempt





APPLICATION RATES*

Amount of Centynal™ EC Insecticide /1,000 Bushels of Grain

Commodity	0.5 ppm	1 ppm	Gallons of Water	Food Grade Mineral Oil/ Gallon
	fl. oz.	fl. oz.	gal.	gal.
Barley	7.8	15.5	5	1
Corn	9	18	5	1
Oats	5.2	10.3	5	1
Popcorn	9	18	5	1
Rice	7.2	14.4	5	1
Rye	9	18	5	1
Sorghum (milo)	8	16	5	1
Wheat	9.6	19.2	5	1

DILUTION RATES

Centynal™ EC Insecticide Dilution Rates

Application

On-grain application with water as carrier	5 gal. solution per 1,000 bu.
On-grain application with food grade oil as carrier	1 gal. oil per 1,000 bu.
Rough rice spray	10 gal. liquid per 1,000 bu.

**Emulsifiable
concentrate
formulation**

Centynal™ EC Insecticide Tank Mix Rates

PBO-8® Synergist	1 part Centynal™ EC Insecticide + 1.5 parts PBO-8® Synergist
Diacon® IGR	4 fl. oz. in mix to do 5 gallons solution per 1,000 bu.

**Treating the
outside of bins**

Mix:

**1 fl. oz. of Centynal™ EC Insecticide
+ 1 gal. water = 1,000 sq. ft.**

Broadcast Spray:

**2-3 ft. up the bin foundation
6-10 ft. around bin perimeter**

Treatment

**Frequency:
21-28 days**



*See label for complete product directions.



APPLICATION RATES*

Amount of PBO-8® Synergist/1,000 Bushels of Grain

Commodity	Mixing with Centynal™ EC Insecticide at 0.5 ppm	Mixing with Diacon® IGR PLUS at 0.5 ppm Deltamethrin/1.25 ppm (S)-Methoprene
	fl. oz.	fl. oz.
Barley	11.6	11.6
Corn	13.5	13.5
Oats	7.7	7.7
Popcorn	13.5	13.5
Rice	10.8	10.8
Rye	13.5	13.5
Sorghum (milo)	12	12
Wheat	14.4	14.4

**Improves efficacy of insecticides
with added boost.**



Helps fight insect resistance.

* See label for complete product directions.



APPLICATION RATES*

Amount of Gravista® Insecticide/1,000 Bushels of Grain

Commodity	Treatment at 0.5 ppm Deltamethrin/ 14 ppm PBO/1.2 ppm (S)-Methoprene		Gallons of Diluent	Liters of Diluent
	fl. oz.	mL		
Barley	31	916	3-5	11.3-19
Corn	35.6	1,053	3-5	11.3-19
Oats	20.4	603	3-5	11.3-19
Popcorn	35.6	1,053	3-5	11.3-19
Rice	28.5	843	10	11.3-19
Rye	35.6	1,053	3-5	11.3-19
Sorghum (milo)	31.7	937	3-5	11.3-19
Wheat	38	1,124	3-5	11.3-19

Amount of Gravista® Insecticide/Ton of Grain

Commodity	Treatment at 0.5 ppm Deltamethrin/14 ppm PBO/ 1.2 ppm (S)-Methoprene		Ounces of Diluent	Milliliters of Diluent
	fl. oz.	mL		
Barley, Corn, Oats, Popcorn, Rice, Rye, Sorghum (milo), Wheat	1.3	38	13-21	384-630

* See label for complete product directions.

DILUTION RATES

Gravista® Dilution Rates

Application

On-grain application with water or food grade oil	3-5 gal. solution per 1,000 bu.
Rough rice spray	10 gal. of water per 1,000 bu.
Grain bins/warehouse	1-6 fl. oz. + 1 gal. water per 1,000 sq. ft.

Can be applied directly on grain streams and
as an empty-bin and warehouse treatment.

Features 3-in-1 insect
control with an adulticide,
an insect growth regulator
(IGR) and a synergist,
killing listed exposed
insects and breaking their
life cycles.





APPLICATION RATES

Gravista®-D Insecticide Application Rates

Application

Loading grain

11 lbs. per 1,000 bu. or 0.4 lbs. per ton

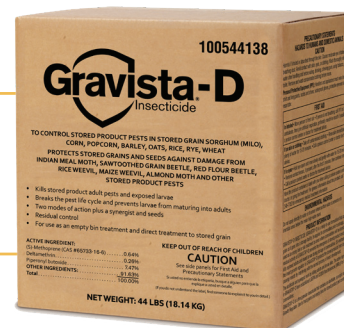
Area treatments

13 oz. per 1,000 sq. ft. of surface area

- Ideal for on-farm use
- Ready-to-use
- Non-restricted use

For use on stored grain and to treat empty bins, silos and warehouses

Combines a synergized
adulticide with an insect
growth regulator that
helps control weevils
and other labeled pests.





APPLICATION RATES*

Amount of Centynal™ Synergized Insecticide/1,000 Bushels of Grain

Commodity	Treatment at 0.5 ppm Deltamethrin/14 ppm PBO		Gallons of Diluent	Liters of Diluent
	fl. oz.	mL.		
Barley	31	916	3-5	11.3-19
Corn	35.6	1,053	3-5	11.3-19
Oats	20.4	603	3-5	11.3-19
Popcorn	35.6	1,053	3-5	11.3-19
Rice	28.5	843	10	11.3-19
Rye	35.6	1,053	3-5	11.3-19
Sorghum (milo)	31.7	937	3-5	11.3-19
Wheat	38	1,124	3-5	11.3-19

Amount of Centynal™ Synergized Insecticide/Ton of Grain

Commodity	Treatment at 0.5 ppm Deltamethrin/14 ppm PBO		Ounces of Diluent	Milliliters of Diluent
	fl. oz.	mL.		
Barley, Corn, Oats, Popcorn, Rice, Rye, Sorghum (milo), Wheat	1.3	38	13-21	384-630

* See label for complete product directions.

DILUTION RATES

Centynal™ Synergized Insecticide Dilution Rates

Application

On-grain application with water or food grade oil	3-5 gal. solution per 1,000 bu.
Rough rice spray	10 gal. of water per 1,000 bu.
Grain bins/warehouse	1-6 fl. oz. + 1 gal. water per 1,000 sq. ft.

Features an
adulticide and a
synergist, designed
to meet short-term
storage or rescue
treatment needs.





APPLICATION RATES*

Amount of Diacon® IGR PLUS/1,000 Bushels of Grain				
Commodity	0.5 ppm Deltamethrin/ 1.25 ppm (S)-Methoprene	1 ppm Deltamethrin/ 2.5 ppm (S)-Methoprene	Gallons of Water	Food Grade Mineral Oil/ Gallon
	fl. oz.	fl. oz.	gal.	gal.
Barley	7.8	15.5	5	1
Corn	9	18	5	1
Oats	5.2	10.3	5	1
Popcorn	9	18	5	1
Rice	7.2	14.4	5	1
Rye	9	18	5	1
Sorghum (milo)	8	16	5	1
Wheat	9.6	19.2	5	1

* See label for complete product directions.

DILUTION RATES

Diacon® IGR PLUS Dilution Rates

Application

On-grain application	3-5 gal. liquid per 1,000 bu.
Rough rice spray	10 gal. liquid per 1,000 bu.
Surface spray	1 fl. oz. Diacon® IGR PLUS + 1.5 fl. oz. PBO-8® Synergist + water to make 1 gal. of solution per 1,000 sq. ft.

**Combination product for
pre-bin treatments and
on-grain applications.**

**Follow the 1-1-1 Rule for
Pre-Bin Treatments:**

- 1 fl. oz. Diacon® IGR PLUS
- 1 gal. water
- 1,000 sq. ft.



APPLICATION RATES*

To kill exposed stages of the species listed below, use the indicated rate of Inselux® Fog & Mill Spray per 1,000 cu. ft.

Insect	Rate of Inselux® Fog & Mill Spray in fluid ounces:
<ul style="list-style-type: none"> House Flies, Indian Meal Moths Sawtoothed Grain Beetles Mosquitoes, Rice Weevils 	1 fl. oz.
<ul style="list-style-type: none"> Almond Moths, Angoumois Grain Moths, Boxelder Bugs, Bran Bugs Cadellles, Carpet Beetles Cheese Mites, Cheese Skippers Chocolate Moths, Cigarette Beetles Clover Mites, Crickets Confused Flour Beetles, Drugstore Beetles, Earwigs, Flour Beetles, Grain Beetles, Grain Mites, Granary Weevils Fruit Flies, Gnats, Non-Biting Ham Mites Lesser Grain Borers, Mealworms Mediterranean Flour Moths Merchant Grain Beetles Nuisance Ants** Red Flour Beetles, Rice Flour Beetles Rusty Grain Beetles, Silverfish Small Flying Moths, Spider Beetles Tobacco Moths, Warehouse Beetles Spiders*** 	2 fl. oz.

DILUTION RATES

Inselux® Fog & Mill Spray Dilution Rates

May be applied undiluted or diluted with mineral oil at a 1:1 ratio through mechanical, thermal or compressed air fogging systems, as a fogging mist or space spray.

Fogging and space spray for use in flour mills, feed mills, warehouses, barns, food handling establishments and other storage facilities.

Features an adulticide, a synergist and an insect growth regulator (IGR) to kill exposed insects and break the insects' life cycles for long-term control.



*See label for complete product directions.

**Except carpenter, fire, harvester and pharaoh ants.

***Except black widows and brown recluse spiders.

THE BUG FREE GRAINS LINEUP OF PRODUCTS HELPS CONTROL THE MOST COMMON STORED GRAIN INSECTS FOUND ON YOUR OPERATION.

Lesser Grain Borer



Red Flour Beetle



Rice Weevil



Sawtoothed Grain Beetle



Indian Meal Moth



Granary Weevil



Confused Flour Beetle



For more information, visit our Insect ID tool at bugfreegrains.com/insect-id

INDIAN MEAL MOTH

SCIENTIFIC NAME:

Plodia interpunctella

DESCRIPTION:

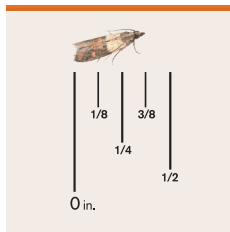
Small brownish moth, about $\frac{3}{8}$ " long, $\frac{1}{2}$ " - $\frac{3}{4}$ " wing span; distinctive rusty brown or bronze wing tips; larvae are off-white with brown heads, about $\frac{2}{3}$ " long.

LIFE CYCLE:

Minimum 42 days; adult moths do not feed, typically die within a week after laying eggs.

FEEDING HABITS:

Larvae are generally top feeders, 4 to 6 inches from some type of surface; found in many types of pantry foods as well as processing and storage facilities.



Look out for dense webbing that binds to food fragments; adults present flying in vicinity of grain bin, larvae climbing up walls inside bins.

GRANARY WEEVIL

SCIENTIFIC NAME:

Sitophilus granarius

DESCRIPTION:

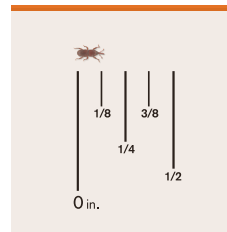
Cylindrical, shiny red-brown to black body, about $\frac{1}{13}$ " - $\frac{1}{8}$ " long; long head with distinct snout; ridged wing-covers, thorax marked with oval pits; flightless; cold tolerant.

LIFE CYCLE:

Minimum 28 days.

FEEDING HABITS:

Adults feed on whole and broken kernels; larvae grow from eggs deposited inside kernels.



Look out for damaged grain with "shot hole" appearance.

RICE WEEVIL

SCIENTIFIC NAME:

Sitophilus oryzae

DESCRIPTION:

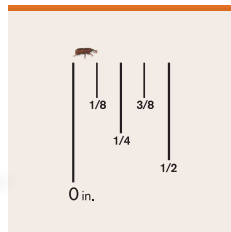
Small snout beetle about $\frac{3}{32}$ " – $\frac{1}{8}$ " long; dull red-brown to black; 4 light red to yellow markings; functional wings; densely-pitted thorax; not cold tolerant.

LIFE CYCLE:

Minimum 28 days.

FEEDING HABITS:

Adults feed on whole and broken kernels, can also infest grain in field; larvae grow from eggs deposited inside kernels.



Look out for damaged grain with "shot hole" appearance.

SAWTOOTHED GRAIN BEETLE

SCIENTIFIC NAME:

Oryzaephilus surinamensis

DESCRIPTION:

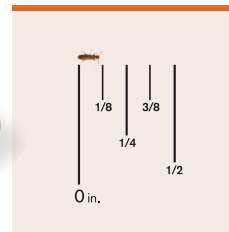
Brown flattened body $\frac{1}{10}$ " – $\frac{1}{8}$ " long; distinctive saw-tooth projections on sides of thorax; flightless; running legs much like cockroaches.

LIFE CYCLE:

Minimum 28 days.

FEEDING HABITS:

Secondary pests of oats, wheat, barley, animal feed; adults and larvae feed on grain dust, larvae prefer germ.



Look out for overheating of grain; visible population build-up.

CONFUSED FLOUR BEETLE

SCIENTIFIC NAME:

Tribolium confusum

DESCRIPTION:

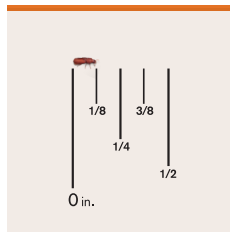
Reddish-brown body $\frac{1}{8}$ " long; antennae gradually expand toward end; flightless.

LIFE CYCLE:

Minimum 42 days; can live 18 months.

FEEDING HABITS:

Primarily feed on grain dust, broken kernels and the milled grains in flour and cereal.



Look out for foul odor and taste, shed skins and fecal matter.

RED FLOUR BEETLE

SCIENTIFIC NAME:

Tribolium castaneum

DESCRIPTION:

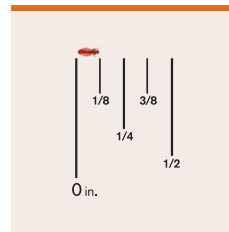
Reddish-brown body $\frac{1}{8}$ " long; last three segments of antennae as distinct club.

LIFE CYCLE:

Egg to adult within 30 days; adults can live up to 18 months.

FEEDING HABITS:

Generally classified as a scavenger, immature stages feed on broken or damaged grains. A common pest in mills and warehouses that store milled/bagged grain products.



Look out for food with pungent odor, foul taste and potentially a pink coloration.

LESSER GRAIN BORER

NOTES

SCIENTIFIC NAME:

Rhyzopertha dominica

DESCRIPTION:

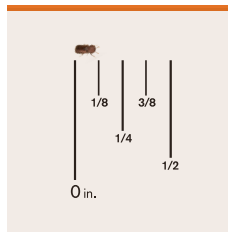
Voracious feeders, $\frac{1}{8}$ " long, brown/black cylindrical bodies; head not visible from above; strong flier capable of rapidly spreading infestations; c-shaped white larva has small dark head, three pairs of small legs.

LIFE CYCLE:

Variable based on temperature, minimum 25 days.

FEEDING HABITS:

Adults and larvae bore into grain kernels, feed on whole grain or dust.



Look out for fragmented kernels, powdery residue, or a sweet musty odor, as well as damaged grain with "shot hole" appearance.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

To learn more about the Bug Free Grains product lineup,
call 1-800-248-7763 or visit

BugFreeGrains.com



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