

# ENTOMOLOGY

Sponsored by:  
Department of Entomology and Plant Pathology  
Oklahoma State University  
Division of Agricultural Sciences and Natural Resources

## Contest Superintendent

Don Arnold, Survey Entomologist  
135 NRC  
(405) 744-9397  
don.arnold@okstate.edu

## Contest Details

**Date:** Saturday, April 25, 2009  
**Time:** 9:00 a.m.  
**Location:** Room 129, Noble Research Center, OSU

**\*\*Students with cell phones will be disqualified.**

## Contest Purpose, Objectives, Rules and Guidelines

The entomology contest will be divided into two parts. The first part will be spot identification of insects or other arthropods using the list of species on the following pages. Contestants will be expected to know the insects, their scientific order or family names, their food, and their ordinal characteristics as given in the list.

The second part of the contest will be identification using pictorial keys. The students will be graded on their ability to use the keys and are not expected to memorize them. Necessary keys will be supplied to the contestants, but each will be expected to furnish their own hand lens (preferably at least of 10 power magnification). All necessary collection information (i.e., host, location on host, etc.) will be furnished with the contest specimens for this portion of the contest. Copies of the pictorial field keys for classroom study can be obtained through the Extension Entomologist's office at Oklahoma State University. A list of field keys and other reference material is provided at the end of this guide.

- NUMBER ALLOWED TO PARTICIPATE: One team composed of three or four members may be entered by each school. If four members are entered, the three top scores will be used for the team score. Individual entries from schools not having teams or from schools that would like to enter more than four (4) contestants are welcome.

- AWARDS: Trophy to the three high teams and medals to the three high individuals.

## ENTOMOLOGY CONTEST LIST

Contestants may be required to identify any of the insects which follow and to give food habits, scientific order and family names or ordinal characteristics (characters shared by all members of the order) for any of the insects on this list. Note \* and blank indications for footnotes that apply for all test material.

*\*Indicates common names of groups of similar insects that make up only part of a family or sometimes more than one family.*

*Blanks indicate that information from that specific column is not required of the contestant.*

### Order ODONATA (Dragonflies and damselflies)

Ordinal characteristics: (1) chewing mouthparts; (2) incomplete metamorphosis; (3) two pairs of similar wings.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
-----	*Dragonfly	-----	Insects
-----	*Damselfly	-----	Insects

### Order ORTHOPTERA (Straight winged insects)

Ordinal characteristics: (1) chewing mouthparts; (2) gradual metamorphosis; (3) two pairs of wings, the first pair thickened, the second pair membranous.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
Differential grasshopper	Shorthorned grasshopper	Acrididae	Foliage
Twostriped grasshopper	Shorthorned grasshopper	Acrididae	Foliage
-----	Longhorned grasshopper	-----	Foliage
-----	*Field cricket	Gryllidae	Foliage, Insects
-----	*Tree cricket	Gryllidae	Foliage
-----	Mole cricket	-----	Foliage
-----	Walkingstick	-----	Foliage
-----	Praying mantid	-----	Insects
American cockroach	Cockroach	Blattidae	Virtually anything
Oriental cockroach	Cockroach	Blattidae	Virtually anything
German cockroach	Cockroach	Blattellidae	Virtually anything
Brownbanded cockroach	Cockroach	Blattellidae	Virtually anything

### Order HEMIPTERA (true bugs)

Ordinal characteristics: (1) sucking mouthparts; (2) gradual metamorphosis; (3) two pairs of wings, the first pair half thickened, the second pair membranous.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
Green stink bug	Stink bug	Pentatomidae	Plant sap

Brown stink bug	Stink bug	Pentatomidae	Plant sap
Harlequin bug	Stink bug	Pentatomidae	Plant sap
Spined soldier bug	Stink bug	Pentatomidae	Insects
Chinch bug	-----	Lygaeidae	Plant sap
-----	*Milkweed bug	Lygaeidae	Plant sap
Squash bug	-----	Coreidae	Plant sap
-----	*Leaffooted plant bug	Coreidae	Plant sap
Tarnished plant bug	Plant bug	Miridae	Plant sap
Wheel bug	Assassin bug	Reduviidae	Insects, blood of vertebrates
-----	Nabid	-----	Insects
-----	Backswimmer	-----	Insects, small fish
-----	Giant water bug	-----	Insects, small fish
-----	Water strider	-----	Live & dead insects

**Order HOMOPTERA** (Cicadas, leafhoppers, treehoppers, aphids, and scales)

Ordinal characteristics: (1) sucking mouthparts or none; (2) gradual metamorphosis; (3) two pairs of wings, usually membranous, or none.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
-----	Cicada	Cicadidae	Plant sap
-----	Leafhopper	Cicadellidae	Plant sap
-----	Treehopper	Membracidae	Plant sap
Greenbug	Aphid	Aphididae	Plant sap
Spotted alfalfa aphid	Aphid	Aphididae	Plant sap
Pea aphid	Aphid	Aphididae	Plant sap
San Jose scale	Armored scale	Diaspididae	Plant sap
Euonymus scale	Armored scale	Diaspididae	Plant sap
Brown elm scale	Soft scale	Coccidae	Plant sap

**Order NEUROPTERA** (Nerve winged insects)

Ordinal characteristics: (1) chewing mouthparts; (2) complete metamorphosis; (3) two pairs of wings, with many cross veins.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
-----	*Green lacewing (adult)	-----	Insects
-----	*Green lacewing (larva)	-----	Insects
-----	*Antlion (adult)	-----	Insects
-----	*Antlion (larva)	-----	Insects
Dobsonfly (adult)	-----	-----	Insects
Hellgrammite (Dobsonfly larva)	-----	-----	Insects

## Order COLEOPTERA (Beetles)

Ordinal characteristics: (1) chewing mouthparts; (2) complete metamorphosis; (3) two pairs of wings, the first pair hardened, the second pair membranous.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
-----	Ground beetle	Carabidae	Insects
Colorado potato beetle	Leaf beetle	Chrysomelidae	Foliage
Spotted cucumber beetle	Leaf beetle	Chrysomelidae	Foliage
Elm leaf beetle	Leaf beetle	Chrysomelidae	Foliage
-----	*Flea beetle	Chrysomelidae	Foliage
Green June beetle	Scarab beetle	Scarabaeidae	Foliage
-----	*May beetle (adult)	Scarabaeidae	Foliage
-----	*White grub (larva)	Scarabaeidae	Plant roots
-----	*Dung beetle	Scarabaeidae	Dung
-----	Click beetle	Elateridae	Foliage
Striped blister beetle	Blister beetle	Meloidae	Foliage
Black blister beetle	Blister beetle	Meloidae	Foliage
Gray blister beetle	Blister beetle	Meloidae	Foliage
-----	Metallic wood borer (adult)	Buprestidae	Foliage, nectar
-----	Flatheaded wood borer (larva)	Buprestidae	Wood
-----	Longhorned beetle (adult)	Cerambycidae	Foliage, nectar
-----	Roundheaded wood borer (larva)	Cerambycidae	Wood
Cottonwood borer	Longhorned beetle	Cerambycidae	Foliage, nectar
Alfalfa weevil	Weevil	Curculionidae	Foliage
Boll weevil	Weevil	Curculionidae	Fruit of plant
Pecan weevil	Weevil	Curculionidae	Fruit of plant
Plum curculio	Weevil	Curculionidae	Fruit of plant
-----	Tiger beetle	Cicindelidae	Insects
-----	Lady beetle	Coccinellidae	Insects
-----	Rove beetle	Staphylinidae	Decomposing organic matter and insects
Smaller European elm bark beetle	Bark beetle	-----	Wood
-----	Carrion beetle	-----	Carrion
-----	Whirligig beetle	-----	Insects
-----	Diving beetle	-----	Insects
-----	Water scavenger beetle	-----	Insects
-----	Firefly	-----	Insects

## Order LEPIDOPTERA (Butterflies, moths, & skippers)

Ordinal characteristics: (1) adults have sucking mouthparts, larvae have chewing mouthparts; (2) complete metamorphosis; (3) adults have two pairs of wings covered with scales, larvae none.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
Garden webworm (larva)	----	----	Foliage
Southwestern corn borer moth	----	----	Nectar/pollen
Corn earworm moth (bollworm)	----	Noctuidae	Nectar/pollen
Corn earworm (bollworm) larva)	----	Noctuidae	Fruit of plant
Whitelined sphinx moth	Sphinx moth	Sphingidae	Nectar/pollen
Tomato hornworm moth	Sphinx moth	Sphingidae	Nectar/pollen
Tomato hornworm (larva)	Sphinx moth	Sphingidae	Foliage
Tobacco hornworm (larva)	Sphinx moth	Sphingidae	Foliage
----	Tiger moth	----	Nectar/pollen
Luna moth	Giant silkworm moth	----	Nectar/pollen
Cecropia moth	Giant silkworm moth	----	Nectar/pollen
Polypheumus moth	Giant silkworm moth	----	Nectar/pollen
Mimosa webworm (larva)	----	----	Foliage
Bagworm case	----	----	Does not feed
----	Skipper	Hesperiidae	Nectar/pollen
Monarch butterfly	----	----	Nectar/pollen
Viceroy butterfly	----	----	Nectar/pollen
Red admiral butterfly	----	----	Nectar/pollen
----	Swallowtail butterfly	Papilionidae	Nectar/pollen
----	Sulphur butterfly	Pieridae	Nectar/pollen

### Order DIPTERA (Flies)

Ordinal characteristics: (1) mouthparts often piercing-sucking, sometimes sponging or lapping, sometimes not functional; (2) complete metamorphosis; (3) one pair of membranous wings.

<b>Species Common Name (for one kind of insect)</b>	<b>Family or Group (Common Name)</b>	<b>Scientific Family Name</b>	<b>Food</b>
----	Mosquito	Culicidae	Blood of animals
----	*Horse fly	Tabanidae	Blood of animals
----	*Deer fly	Tabanidae	Blood of animals
House fly	----	Muscidae	Virtually anything
Stable fly	----	Muscidae	Blood of animals
Horn fly	----	Muscidae	Blood of animals
----	Robber fly	Asilidae	Insects
----	Crane fly	----	Nectar/pollen
----	Bee fly	----	Nectar/pollen
----	Syrphid fly	----	Nectar/pollen
----	*Bluebottle fly	----	Waste, plant juices
Horse bot fly	Bot fly	----	Does not feed
Cattle grub (larva)	----	----	Internal parasite

Order HYMENOPTERA (Bees, ants & wasps)

Ordinal characteristics: (1) chewing mouthparts but the bees also suck nectar; (2) complete metamorphosis; (3) two pairs of membranous wings or none.

Species Common Name (for one kind of insect)	Family or Group (Common Name)	Scientific Family Name	Food
-----	Carpenter ant	Formicidae	Insects, sweets, plant sap
Red harvester ant	-----	Formicidae	Seeds
-----	Velvet ant	Mutillidae	Parasites of insects
Cicada killer	-----	-----	Insects
-----	*Paper wasp	-----	Insects, nectar
-----	*Mud dauber	-----	Spiders, nectar
-----	*Blue mud dauber	-----	Spiders, nectar
-----	Ichneumon wasp	-----	Parasites of insects
Honey bee	-----	Apidae	Nectar/pollen
-----	*Bumble bee	Apidae	Nectar/pollen
Carpenter bee	-----	Apidae	Nectar/pollen

Other Orders

Ordinal characteristics: Not required.

Scientific Order Name	Common Name	Food
THYSANURA	Silverfish	Starchy substances
EPHEMEROPTERA	Mayfly	Does not feed
DERMAPTERA	Earwig	Waste, plants
ISOPTERA	Termite (worker & reproductive)	Wood
PLECOPTERA	Stonefly	Does not feed
MALLOPHAGA	Chicken louse	Feathers & skin
ANOPLURA	Hog louse	Blood of animals
SIPHONAPTERA	Cat flea	Blood of animals

Other Arthropods

The following are not insects but are commonly studied by entomologists and should be recognized by students of entomology. Characteristics are not required.

Common Name	Food
Black widow spider	Insects
Brown recluse spider	Insects
Ear tick	Blood of animals
Brown dog tick	Blood of animals
American dog tick	Blood of animals

Gulf Coast tick	Blood of animals
Lone star tick	Blood of animals
Scorpion	Insects
Centipede	Insects
Millipede	Decomposing organic matter
Spider mite	Plant sap
Pillbug	Decomposing organic matter
Harvestman	Plant juices, dead insects

## **SUGGESTED STUDY MATERIALS**

- I. Insects by H. S. Zim and C. Cottam, Golden Nature Guide, Simon and Schuster, N.Y.
- II. Insect Pests by G. S. Fichter and H. S. Zim, Golden Nature Guide, Golden Press, N.Y.
- III. Butterflies and Moths by R. T. Mitchell and H. S. Zim, Golden Nature Guide, Golden Press, N.Y.
- IV. Spiders and Their Kin by H. W. Levi, L. R. Levi and H. S. Zinn, Golden Nature Guide, Golden Press, N.Y.

These four books contain color photographs which aid in the identification of insects and other arthropods; however, identification by this method often leads to error and confusion. The common names given may differ in various parts of the country; also, some of the names are given are common names for a group of similar species or even for an entire family.

- V. Destructive and Useful Insects by Metcalf, Flint and Metcalf, McGray-Hill, N.Y.

This book is aimed primarily for those interested in economic entomology. It fills this function extremely well and should be in the library if anyone is interested in practical insect controls.

- VI. How to Know the Insects by H. E. Jacques, Wm. C. Brown Co., Dubuque, Iowa.

This book is a simplified key to insect families. It serves this purpose well, although it does not include all the families of insects of North America. It also contains worthwhile information concerning the collecting and preservation of insects. The illustrations are helpful, but at times misleading. One must remember that the key is to families, not to species; therefore, the specimen you have will not always be like the species illustrated and described.

- VII. A Field Guide to the Insects by D. J. Borror and R. E. White, The Peterson Field Guide Series, Houghton Mifflin Co., Boston, Mass.

This book is rather basic, but it is excellent in that it contains a number of drawings of insects, their identification characters, and simple keys to the families.

- VIII. An Introduction to the Study of Insects by Borror, DeLong and Triplehorn, Holt, Rinehart and Winston, N.Y.

This is a very satisfactory book on general entomology. Its keys are fairly complete and the information on collecting, preserving, etc. is satisfactory. It is a little advanced for most beginners, but it should be in the library of anyone who plans serious study of insect identification.

- IX. Insects in Kansas, Kansas State University Extension Service, Manhattan, Kansas.

This book is rather basic, but it is excellent in that it contains a number of photographs of insects that also occur in Oklahoma.

- X. 4-H Entomology Members Guides (1-6) and Entomology Leaders Manual. Available through County Extension Center Offices or the Entomology Department, Oklahoma State University.

- XI. Pictorial Field Keys. Some are OSU Extension Fact Sheets and others are mimeographed sheets. Most are available through County Extension Centers or the Entomology Department, OSU. Fact Sheets that may be useful include the following:

- 7001 - Common Ticks of Oklahoma
- 7004 - External Poultry Parasite Controls
- 7005 - Sheep and Goat Insect Pest Control
- 7006 - Summer Ticks on Beef Cattle
- 7007 - Biology and Control of the Face Fly
- 7008 - Human Lice and Scabies
- 7009 - Biology and Control of Cattle Lice
- 7010 - Ticks and Fleas in Homes, Lawns and on Pets
- 7150 - Alfalfa Forage Insect Control
- 7152 - The Texas Harvester Ant
- 7153 - Identifying Oklahoma Cotton Pests
- 7154 - Worm Pests of Oklahoma Cotton
- 7156 - Field Key to Larvae in Soybeans
- 7157 - Field Key to Larvae in Sorghums
- 7158 - Field Key to Larvae in Peanuts
- 7159 - Field Key to Larvae in Alfalfa
- 7160 - Field Key to Larvae in Corn
- 7161 - Field Key to Larvae in Cotton
- 7163 - Field Key to Larvae in Pecans
- 7164 - Field Key to Beetles in Pines
- 7167 - Soybean Insect Survey and Control
- 7168 - Plant Galls Caused by Insects
- 7174 - Peanut Insect Control in Oklahoma
- 7175 - Sampling Methods for Adult Pecan Weevils
- 7176 - Insects on Small Grain and Their Control
- 7304 - Identifying the Puss Caterpillar
- 7306 - Ornamental and Lawn Pest Control
- 7312 - Household Pest Control
- 7313 - Home Garden Insect Control
- 7315 - Shade Tree Borers