

ENTOMOLOGY

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

Contest Superintendent

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Contest Details

Date: Saturday, April 26, 2008
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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|-------------|
| ----- | *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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|--------------------|
| 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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|-------------|
| 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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|-------------|
| ----- | 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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|-------------|
| ----- | *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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|---|
| ----- | 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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|----------------|
| 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.

| Species Common Name (for one kind of insect) | Family or Group (Common Name) | Scientific Family Name | Food |
|---|--|-----------------------------------|---------------------|
| ---- | 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