



# Guide to Collecting and Maintaining Live Arthropods for Classroom Display in Florida<sup>1</sup>

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## Introduction

This guide is intended for those interested in maintenance and display of insects and other arthropods for educational purposes in Florida. It can be used in conjunction with other entomology curricula and is relevant and accessible to all age groups although the amount of teacher involvement will vary accordingly. Few illustrations are more effective for the entomology classroom than live insect displays, and this document details the entire process of maintaining such displays.

## Legal Considerations: Non-native Arthropods

Florida Statute 581.083 regulates the importation or possession of exotic invertebrates in Florida. In practice, this means that importation or possession of exotic insects is regulated by the Florida Department of Agriculture and Consumer Services. As such, many large showy insects (such as Hissing Cockroaches) that are suitable for live classroom display are not legally available in Florida. This is no barrier, however, to the capture and display of native

insects and spiders. Florida has a rich insect fauna that can be found through much of the year, making it easy to collect interesting display insects. Species of conservation concern may be protected by law. For more information see *Rare and Endangered Biota of Florida Vol. IV. Invertebrates* by M. Deyrup, R. Franz.

## General Care

Proper care of captive insects and other arthropods is essential to maintain their health and appearance as well as demonstrate to children the proper care of pets or specimens. Unfortunately, many species lack proper husbandry resources because those species have never been reared. The best advice is to infer an insect's appropriate living condition from its natural situation. Was the insect found associated with a particular plant? Is it active in the day or the night? Is the family known to be predatory or have predatory species? Climbing insects such as mantids, walkingsticks, and grasshoppers do well in vertically-oriented cages with some vegetation or sticks to climb on. Ground dwelling insects appreciate a substrate where they can

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1. This document is ENY-1001 (IN759), one of a series of the Entomology & Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First published: October 2008. For more publications related to horticulture/agriculture, please visit the EDIS Website at <http://edis.ifas.ufl.edu/>.
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dig, as well as have some hiding places fashioned from cardboard or leaves.

## Food and Water

If commercial foodstuffs are provided to captive insects, a few general considerations are worth mentioning. First, food should be maintained in a fresh state unless the species is one that prefers rotting food. Uneaten food should be removed regularly. If fruits or vegetables are provided, try to use organically-grown or pesticide-free. Needless to say, pesticides can be dangerous for captive invertebrates. Water should be provided in such a manner that your insects are not able to drown in it. Water provided in a dish filled with marbles or soaked on a cotton wick is good for this purpose. Some insects appreciate droplets of water sprayed on leaves to simulate dew.

## Displaying Insects

Insects can be displayed in plastic terraria, jars, glass aquariums, and other such containers. Dangerous or chemically-defended species should be displayed in containers that are break-proof and difficult for children to open. If displaying such species, ensure that children are supervised at all times. One may think that bringing children into contact with creatures such as widow spiders is not advisable; however, if proper precautions are taken, such encounters can show kids what species they should avoid. On the other hand, be aware that children often return home and try to capture insects/spiders they have seen displayed. As such, it is important to teach children the danger of this practice and provide them safer alternatives instead.

Many children like to handle insects and other creatures, and this experience can be the highlight of any presentation. Suitable insects for handling purposes can be found in Florida, especially Ox beetles, scarabs, click beetles, buprestids, weevils, and mantids. Lubber grasshoppers are extremely large, impressive insects and can be handled gently. They are capable of producing an irritating secretion when disturbed.

Be sure to provide some interesting background information about the species you wish to display

such as life history, economic importance, behavior, conservation status and habitat. Doing so with native species will go a long way towards stimulating and sustaining interest in insects and the natural world in general.

## Species Accounts

### Horned Passalid, *Odontotaenius disjunctus*

Easily collected from beneath rotting Oak logs, these impressive beetles (Figure 1) should be maintained in the same rotted oak medium where they are found. Diet can be supplemented with fruits and vegetables. Transport the beetles in a smaller cage with less rotting wood for easier display. These beetles have large mandibles and should be handled with care.



**Figure 1.** Horned Passalid *Odontotaenius disjunctus*. This large, impressive beetle makes a fine display specimen. Credits: S. McCann, University of Florida

### Rainbow Scarab, *Phanaeus vindex*

Impressive in coloration (Figure 2), this beetle is easily collected near dung as it prepares its nest. This beetle will readily fly, so it is suitable only for caged display. Adults may be fed on fresh fruits such as banana. Males are recognized by a long horn on the head. The shape of the female's pronotum lends itself to forming dung balls and digging, while the males is suited to territorial combat.

### Ox beetles, *Strategus*

These large scarabs make great displays, and can be handled easily. They should be maintained in a woodland vivarium (an enclosed container that simulates a woodland environment) and fed fruits as adults. Males of *Strategus antaeus* (Figure 3) have three elongate horns on the pronotum, used for territorial combat with other males. They may be



**Figure 2.** Male Rainbow Scarab, *Phanaeus vindex*. This most impressive insect is sure to fascinate with its dinosaur-like appearance. Credits: S. McCann, University of Florida

found in wooded areas with sandy soils. Adults may be fed soft fruits and leaves.



**Figure 3.** *Strategus antaeus*. This large male has impressive horns. Credits: S. McCann, University of Florida

### Hercules Beetles, *Dynastes tityus*

This enormous beetle makes an impressive and hardy classroom display. They should be maintained in insect cages and fed fruit. It is uncommon in Florida, but if collected makes an impressive insect.

### Eyed Click Beetle, *Alaus oculatus*

The eyed click beetle can be found near houses, under bark etc. Unmistakable in appearance (Figure 4), adults of this species are large, impressive and gentle. The clicking mechanism is a means of defense, and allows the insect to right itself if placed on its back on a smooth surface. This makes an interesting classroom demonstration. *Alaus myops* is a smaller relative of this species that is also good for display.

Other smaller click beetles are less striking in appearance, yet if gathered in large numbers may be used for children to handle. Both species should be fed cut pieces of soft fruit.



**Figure 4.** *Alaus oculatus*. This large click beetle makes an attractive demonstration insect. Credits: S. McCann, University of Florida

### Buprestid Beetles (Metallic Wood-Boring Beetles)

Many species of buprestid (Figure 5) are suitable for in-class display or handling. They are impressive, beautiful and gentle. They may be found near damaged or dying trees on warm days, often in some abundance. Their metallic colors and sculptured texture make them ideal display insects. Try feeding them the foliage of trees, especially from trees found near where the beetles were collected.

### Citrus root weevils, *Diaprepes abbreviatus*, *Pachnaeus litus*, *Pachnaeus opalus*

These large, attractive weevils are easy to find, maintain, and make excellent display animals (Figure 6). They also are important pests of Florida citrus,





**Figure 5.** Buprestid beetle, *Chalchophora virginiensis*. This large, impressive species is often abundant around dying pine trees. Credits: S. McCann, University of Florida

and thus are excellent teaching tools to explain crop pests and introduced species problems. They can be found feeding on many tree and shrub species and are best collected in the morning by shaking vegetation vigorously over a sheet or umbrella. They may be kept in jars and fed green beans, carrots and other vegetables.



**Figure 6.** These two weevils, *Diaprepes abbreviatus* (left), and *Pachnaeus litus* (right) make easily-handled, colorful display insects. They may be kept in jars and fed green beans, carrots and other vegetables. Credits: S. McCann, University of Florida

### **Lubber Grasshoppers, *Romalea guttata* or *R. microptera***

Impressive in size and coloration, lubbers (Figure 7) make excellent display insects. Although they can be handled gently, these grasshoppers may be capable of releasing an irritating secretion. Adults can be fed vegetables and leaves supplemented with light dog kibble.

### **Mantids**

Mantids often can be collected at lights and around gardens. The Carolina Mantid (Figure 8), European mantids and others are suitable for caged display. Often they can be fed flies and will eat them for demonstration purposes. They should be housed in tall, planted cages and fed insects daily.



**Figure 7.** *Romalea guttata*. These large grasshoppers are easily collected and can make a great demonstration insect. Credits: S. McCann, University of Florida



**Figure 8.** Carolina Mantid, *Stagmomantis carolina*. Mantids are fascinating to children and adults alike, with their movable heads and large eyes. Credits: S. McCann, University of Florida

### **Cockroaches**

These fascinating insects are easy to obtain, rear, and display. Most can be maintained in simple jars with absorbent bedding, some cardboard egg crate to hide in, a water wick, and dog food to eat. They should be provided with fruits or vegetables occasionally. Cockroaches (Figure 9) should not be handled or removed from display cages, as they are fast and escape easily.

### **Palmetto Weevils, *Rhynchophorus cruentatus***

These large attractive weevils can be found near palmettos and exotic palms. They are large, gentle, and can be handled by children.

### **Caterpillars**

Large, showy caterpillars (Figure 10) can often be used to illustrate the damage that plant feeding insects cause and introduce concepts like metamorphosis. They should be maintained with fresh foliage from the plants on which they were



**Figure 9.** Australasian Cockroach, *Periplaneta australasiae*. This introduced species of cockroach is one of several that are easily maintained in captivity. Credits: S. McCann, University of Florida

found. Some caterpillars have venomous spines, and should not be handled. See SP107, for more information <http://edis.ifas.ufl.edu/IN014>.



**Figure 10.** Caterpillars of *Agraulis vanillae*, the Gulf Fritillary butterfly. This species may be found on Passionflower vines. Credits: S. McCann, University of Florida

### Giant Waterbugs, Family Belostomatidae

These large impressive insects (Figure 11) are easily gathered at lights at night during the warm months. They may be housed in aquariums with aquatic plants, and fed tadpoles and small fish. They should not be handled, as they can bite. They are quite impressive, however.

### Other Arthropods

Non-insect arthropods also make interesting and informative display animals and demonstrate to children some elementary classification principles. Children can be asked to think about what the differences are between insects, spiders, scorpions, millipedes, centipedes, etc.



**Figure 11.** Giant Waterbug, *Lethocerus* spp. These large insects make fine aquatic displays. Credits: S. McCann, University of Florida

### Spiders

Jumping spiders of the genus *Phidippus* (Figure 12, left) make excellent display animals in small cages. They are often brightly-colored and active, and can often be fed small insects to demonstrate the methods they use to hunt prey.

Other spiders worth considering are Wolf Spiders (Figure 12, center). These are nocturnal, and generally hide during the day, but are large and interesting in appearance. Female wolf spiders carry eggs and offspring around, and this point is good to emphasize to show that even “cold-blooded” animals display parental care of offspring.

Widow Spiders (genus *Latrodectus*, Figure 12, right) can be displayed in break-proof plastic jars. These can provide an important lesson in recognizing dangerous spiders. They are easily collected from beneath rocks and logs.

All of the spiders mentioned above may be housed in jars and fed insects such as crickets, termites and cockroaches. Use and teach caution when displaying spiders!



**Figure 12.** Left: *Phidippus audax*, a Jumping Spider. Center: A wolf spider with offspring on the back. Right *Latrodectus mactans*, the Black Widow Spider. Note red hourglass marking. Credits: S. McCann, University of Florida



## Centipedes

Several large centipedes (Figure 13) can be found in Florida, and make attractive display animals. They should not be handled, as they are capable of inflicting a painful bite. They should be housed in cages with tight-fitting lids with plenty of bark to hide under. When displaying centipedes, be sure to remove the bark so that they are visible. All are predaceous and may be fed on termites and small crickets.



**Figure 13.** Two types of large centipedes found in Florida. Left: Florida Blue Centipede, *Scolopendra viridis*. This species is common under the bark of fallen Oaks. Right: *Scolopocryptops* spp. These large centipedes may be found under rotting logs. Credits: S. McCann, University of Florida

### “Insects of Opportunity”

Do not neglect to take advantage of easily-collected insects prior to a demonstration or presentation. Often an hour walking around a natural area, garden or farm will yield some interesting and informative display animals. Large stalks of milkweed with aphids and monarch caterpillars make good display items. Leaves damaged by weevils (plus the culprits themselves) can illustrate economic damage. Abandoned wasp nests and the surfaces where they are attached are also good displays.

Chrysalids of butterflies, cocoons, and other interesting life stages may be collected for display. If you can arrange to have the whole life history for display, so much the better. Even a pinned adult butterfly along with a live caterpillar and the host plant is an important educational tool.

Some materials can be preserved for later display. A pinned insect collection with large and showy insects is a great static display that illustrates insect beauty, diversity, or pest status even when conditions are not suitable for collecting live insects.

For more advanced children, it can also illustrate proper curation of an insect collection, and classification, at least to order.

## Summary

Children are generally fascinated by living creatures and by “bugs” in particular. Live insect displays provide a useful and effective means of introducing a wide variety of subjects to children, and make educational presentations more memorable. Given a little effort, interesting live insects may be collected and maintained for use in classroom demonstrations.

## References

- Alaus* Click Beetles <http://edis.ifas.ufl.edu/IN242>  
 Citrus root Weevil <http://edis.ifas.ufl.edu/IN151>  
 Giant Water Bugs <http://edis.ifas.ufl.edu/IN578>  
 Insect Identification <http://bugguide.net/node/view/15740>  
 Lubber Grasshoppers <http://edis.ifas.ufl.edu/IN132>