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The Red Palm Weevil, *Rhynchophorus ferrugineus* (Olivier), and South American Palm Weevil, *R. palmarum* (L.), are the two of the most destructive of six species in *Rhynchophorus* that are known to attack palms. These weevils are well-known pests of date palms but can attack a number of other hosts. *Rhynchophorus ferrugineus* has been reported to also attack agave and sugar cane and *R. palmarum* has a wider range of reported hosts including twelve plant families, but primarily attacks *Arecaceae*. The adult palm weevils feed on a number of tropical fruits but do not cause the economic damage to the same extent as the larvae. However, larval signs can be difficult to detect, whereas the presence of adults is often obvious due to their large size.

Early signs of larval attack are visible as frass-filled holes and the presence of cocoons at the base of palm leaves, and symptoms resembling drought stress (wilting and yellowing). Severely attacked palm trees show loss of the palms and rotting of the trunk, leading to tree death. *Rhynchophorus palmarum* is a known vector of the nematode *Bursaphelenchus cocophilus* that causes red ring disease of palms. Two other weevils, *Dynamis borassi* and *Metamasius hemipterus*, have been reported as vectors of red ring disease nematodes. A subspecies of *M. hemipterus* is present in Florida (*M. hemipterus sericeus*), but *D. borassi* is not recorded from the United States.

*Rhynchophorus ferrugineus* adults range from 25-42 mm long with an elongate oval body that is red to black in color. Black and red markings on the pronotum can be extremely variable. Males have a patch of short stout setae subapically at the rostrum (Fig. 4). *Rhynchophorus palmarum* adults on average, are slightly larger in size than *R. ferrugineus*, with adults ranging from 26-45 mm long.

The only North American species that might be confused with these species during surveys is *Rhynchophorus cruentatus* (Fabricius), a native to the southeastern U.S., including Florida. However, any suspect weevils resembling *Rhynchophorus* should be submitted for professional identification following the protocol for South American palm weevil specimen forwarding (Page 6) to monitor for weevils vectoring nematodes. Basic knowledge of Coleoptera morphology is necessary to screen for *Rhynchophorus* suspects.



Fig. 1: *Rhynchophorus ferrugineus* (Photo by Hanna Royals).



Fig. 2: *Rhynchophorus ferrugineus* larval damage (Photo by Amy Roda USDA-APHIS).

*Rhynchophorus* pheromone traps should be sorted initially for the presence of weevils of the appropriate size, color, and shape. Traps that contain weevils meeting all of the following requirements should be moved to Level 1 Screening (Page 3):

- 1) Weevils are longer than 25 mm (Fig. 3).
- 2) Weevils have an overall shape that is similar to the outline depicted in Fig. 3.
- 3) Weevils have an elongated rostrum (Fig. 4).
- 4) Weevils are dark red to black with variable red coloration. (Figs. 5-7).

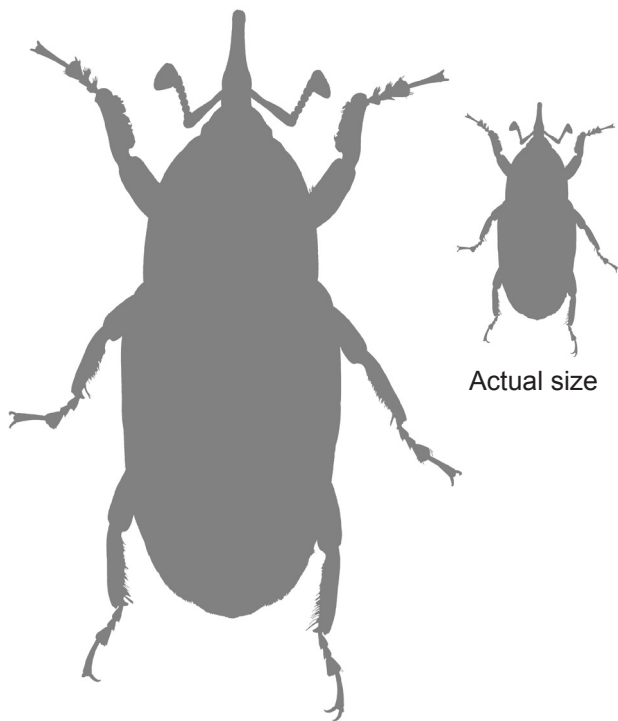


Fig. 3: Outline of an adult *Rhynchophorus ferrugineus*.



Fig. 5: Variable red and black coloration of *Rhynchophorus ferrugineus* (female) (Photo by Hanna Royals).



Fig. 6: Variable red and black coloration of *Rhynchophorus ferrugineus* (male) (Photo by Hanna Royals).



Fig. 4: Elongated rostrum. Males of *Rhynchophorus palmarum* have stout setae on the rostrum (Photo by Hanna Royals).



Fig. 7: Black coloration of *Rhynchophorus palmarum* (Photo by Hanna Royals).

Separation to family can be accomplished based on tarsal and antennal characteristics.

**Tarsus:** Dryophthoridae have flaps between tarsal claws (Fig. 8a) and Curculionidae do not (Fig. 8b):

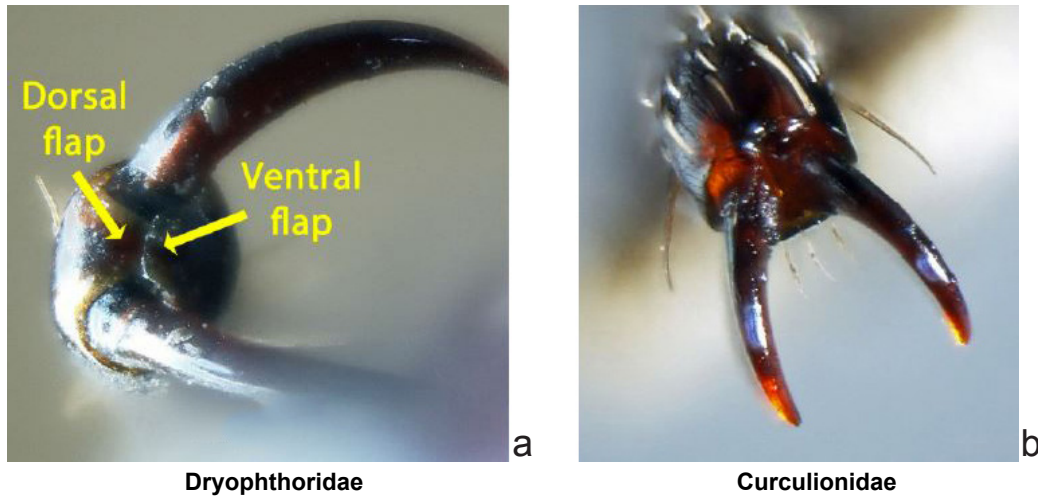


Fig. 8: a) flaps between tarsal claws present in the Dryophthoridae and b) absence of flaps in the Curculionidae

**Antenna:** Dryophthoridae have a glabrous (lacking setae) first antennal club segment (Fig. 9a) and a scape that surpasses the posterior margin of the eye (Fig. 9b). Curculionidae have a first antennal club segment that is not glabrous (Fig. 9c) and a scape that does not surpass the posterior margin of the eye (Fig. 9d):

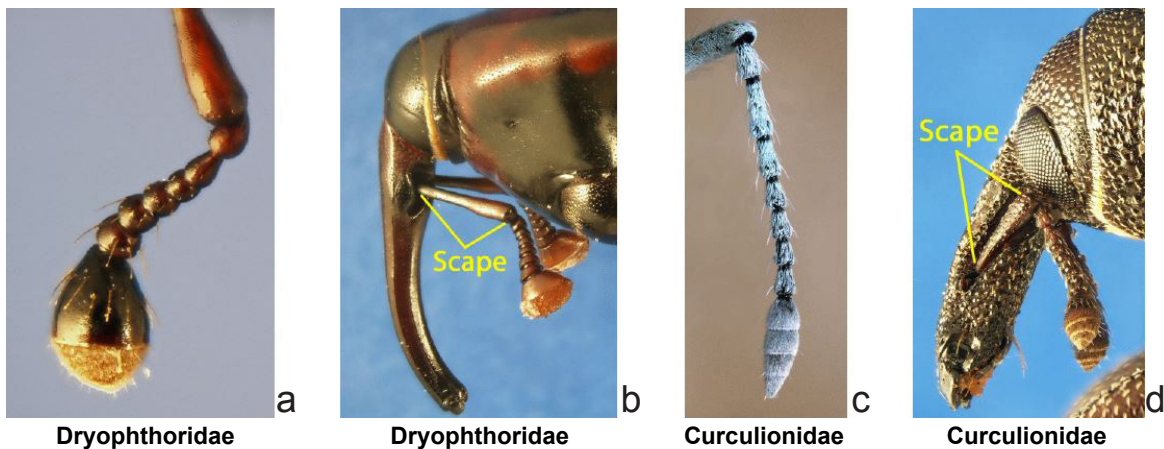


Fig. 9: Differences in antennae of Dryophthoridae and Curculionidae (Photos by Charles Brodel USDA-APHIS-PPQ)

Other *Rhynchophorus* are present in the U.S., and all are difficult to identify to species without expert knowledge. Therefore, all specimens passing Level 1 and Level 2 Screening should be submitted for identification following the protocol for nematode detection on palm weevils described on page 6.

There are a number of Nearctic genera in the Rhynchophorini that might be similar in appearance to the *Rhynchophorus* palm weevils, though none are comparable in terms of size. In addition to their large size, *Rhynchophorus* can be differentiated by their relatively broad metepisternum (Fig. 10) and distinct antennae with a transverse sub-triangular club that is wider than it is long (Fig. 11).



Fig. 10: Highlighted in magenta, a) the broad metepisternum of *Rhynchophorus*, and b) the elongate metepisternum of *Scyphophorus* (Photos by Hanna Royals)

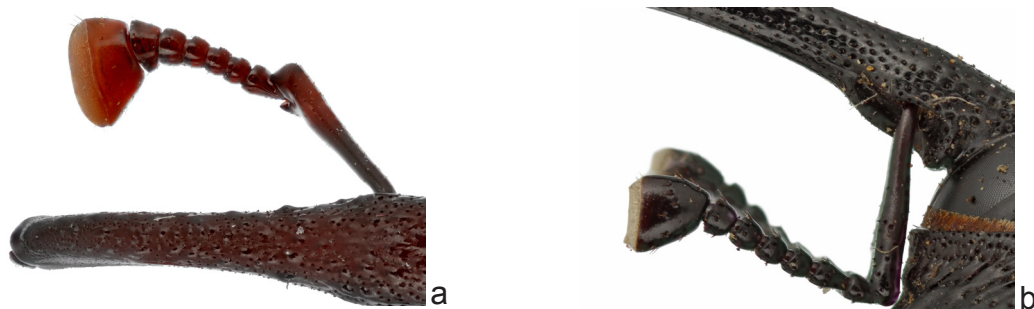


Fig. 11: Antennae, a) the wide antennal club of *Rhynchophorus*, and b) the longer antennal club of *Scyphophorus* (Photos by Hanna Royals)

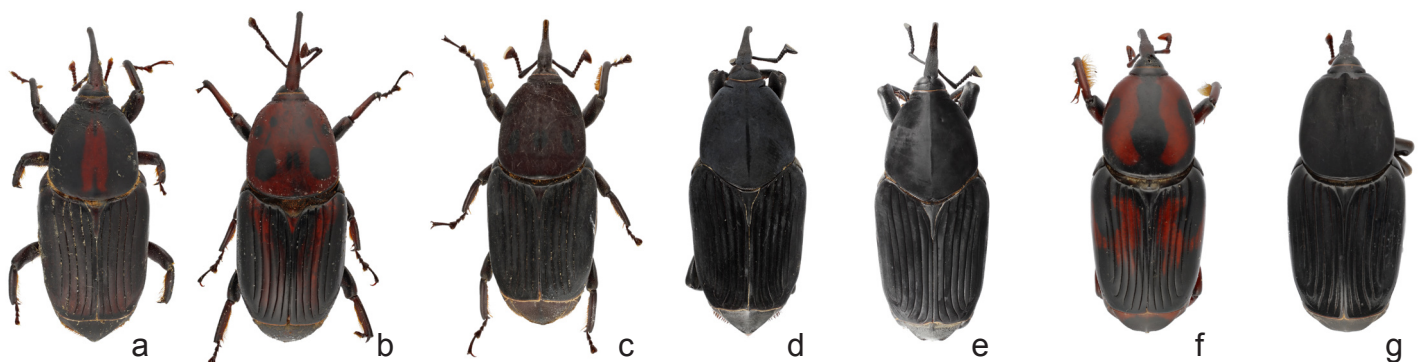


Fig. 12: Adult palm weevils, variation in coloration of *R. ferrugineus* (a-c), *R. palmarum* (d-e), and *R. cruentatus* (f-g).

The Florida native *Rhynchophorus cruentatus* can be distinguished from *R. ferrugineus* and *R. palmarum* by the shape of the pronotum. However, the differences are very subtle and species-level identification should only be done by an expert. Therefore, any specimen meeting the criteria for Level 1 and 2 Screening should be submitted for identification following the protocol for nematode detection on palm weevils described on page 6.

### Key to Sort and Screen *Rhynchophorus* spp. Suspects in the United States

1. Metepisternum broad, length more or less 2 times width (Fig. 10); antenna with club transverse, wider than long, shape sub-triangular (Fig. 11); total body length greater than 25 mm..... **Rhynchophorus suspect**
- 1'. Metepisternum narrow, length 3 or more times width; antenna with club elongate, longer than wide, shape sub-quadrate or sub-oval; total body length less than 25 mm.....Not *Rhynchophorus*

### Citation

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### References for more information on *Rhynchophorus* species and non-targets

Arnett, R. H., M. C. Thomas, P. E. Skelley, and J. H. Frank. 2002. American Beetles, Volume II: Polyphaga: Scarabaeoidea through Curculionoidea. CRC Press: Boca Raton, Florida. pp. 728-729.

Floyd, J. 2012. Protocol for Preparing and Forwarding Suspect South American Palm Weevil from Survey Traps for Confirmation and to Maximize Red Ring Nematode Detection. 2 pp.

EPPO. 2007. *Rhynchophorus ferrugineus* and *Rhynchophorus palmarum* (Diagnostics). European and Mediterranean Plant Protection Organization Bulletin 37: 571-579.

Molet, T., A. L. Roda, and L. D. Jackson. 2011. CPHST Pest Datasheet for *Rhynchophorus ferrugineus*. USDA-APHIS-PPQ-CPHST. Revised March 2014.

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## Protocol for Preparing and Forwarding Suspect South American Palm Weevil from Survey Traps for Confirmation and to Maximize Red Ring Nematode Detection

JFloyd, 6/21/2012

### Instructions for Personnel Servicing Traps:

1. When suspect palm weevils are recovered from palm weevil bucket traps, carefully remove the weevil and place it in a screw-top vial containing water. Do not rinse the surface of the weevil or put the weevil in alcohol. If the weevil is still alive, freeze it for several hours to kill it before immersing in water.
2. If possible, wrap Parafilm® around the vial screw cap to prevent leakage. Label the vial with a local collection number using a Sharpie® permanent pen.
3. From the liquid in the trap with a weevil, extract approximately 50 cc's from the:
  - a. top surface of the liquid in the trap if it is mostly propylene glycol;
  - b. bottom of the trap if it's mostly water.

Place the liquid sample in a separate container that will not leak. A pipette or glass (not plastic) turkey baster can be used for this. Be sure to rinse it thoroughly between samples if reused to prevent cross-contamination. Write the same collection number on this container.

4. Until the specimen and other container of water can be shipped for identification, place the vial in cool conditions such as an ice-chest with cool packs, but do not freeze the specimen.
5. As soon as possible, send the vial with the specimen in water cushioned in a crush-proof box by overnight carrier to a PPQ Identifier or State taxonomist in your state. Include a completed PPQ form 391 indicating it is in water, with the local collection number, and notify the taxonomist /identifier by e-mail that the specimen is being forwarded, supplying the overnight carrier tracking number. Also notify local PPQ and state program managers that the specimen is being forwarded. (Do not ship on a Friday, rather keep the specimen in a refrigerator until Monday when it can be shipped overnight without weekend delays).

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