Screening Aid

Coconut Rhinoceros Beetles

Oryctes spp.

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The coconut rhinoceros beetles are the group of scarabs that belong to the genus *Oryctes* (subfamily Dynastinae). These beetles are native to western Europe and Scandinavia, southward to the African Cape region, and east across Asia to the Pacific islands. Many of these beetles are associated with palms and, although most are not considered pests, a few species are voracious feeders and have the potential to cause high levels of damage. Dynastinae adults are characterized by robust body shapes, exposed pygidia, dark coloration, and mandibles that are generally visible from the dorsal aspect.

Fig. 1: Lateral view of *Oryctes boas* (Photo by JAH, inaturalist.org, CC-BY-NC).

Damage to agricultural crops occurs when larvae bore into the crowns of the host plant, burrowing as deep as 50 cm (19.7 in) into the host tissue, resulting in destruction of unopened leaves and even plant death. *Oryctes rhinoceros*, *O. monoceros*, and *O. boas* are the most well known species for causing large amounts of host plant damage, although damage by other species should not be ruled out. *Oryctes rhinoceros* is endemic to the coconut-growing regions of South and South-East Asia from Pakistan to the Philippines and is considered established in Hawaii. Besides palms, *O. rhinoceros* is known to attack non-palms such as the Alexandria laurel (*Calophyllum inophyllum*), banana (*Musa* spp.), breadfruit (*Artocarpus* spp.), mango (*Mangifera* spp.), pineapple (*Ananas comosus*), and sugarcane (*Saccharum* spp.)

Fig. 2: *Oryctes rhinoceros larva* (Photo by Aubrey Moore, University of Guam.)

Adults of these three *Oryctes* pests range in size from 30 mm to 67 mm in length and are generally dark reddish black with a red underside. While no major pests in *Oryctes* are present in North America, there is a large variety of scarabs, some of which could be confused with the target species.

Fig. 3: Typical V-shaped damage to coconut leaves by *Oryctes rhinoceros* (Photo by Ben Quichocho, USDA-APHIS).

This aid is designed to assist in the sorting and screening *Oryctes* suspect adults found during visual inspection or collected from traps in the United States. It covers basic sorting and first, and second level screening, based on morphological characters. Basic knowledge of Coleoptera morphology is necessary to screen for suspects. Any suspect scarab should be pinned, clearly labeled, and forwarded for professional identification.

Beetles collected during visual inspections and in traps should be sorted initially for the presence of species of the appropriate size, color, and shape. Beetles should verified as belonging to the Scarabaeidae. Traps that contain scarabs meeting all of the following requirements should be moved to Level 1 & 2 Screening (Page 3):

1) Beetles are 22–77 mm (0.86–3.03 inches) long.

2) Beetles have an overall shape that is similar to the outline depicted in Fig. 4.

3) Beetles have a black or dark reddish coloration (Fig. 5).

4) Beetles have protibia that are scalloped or toothed (Fig. 6).

5) Beetles have lamellate antennae (Fig. 7).

Note that beetles caught in traps can appear very similar in appearance as there is an abundance of scarab species. For this reason, any scarab-like beetle meeting the above criteria should be sent forward for screening.

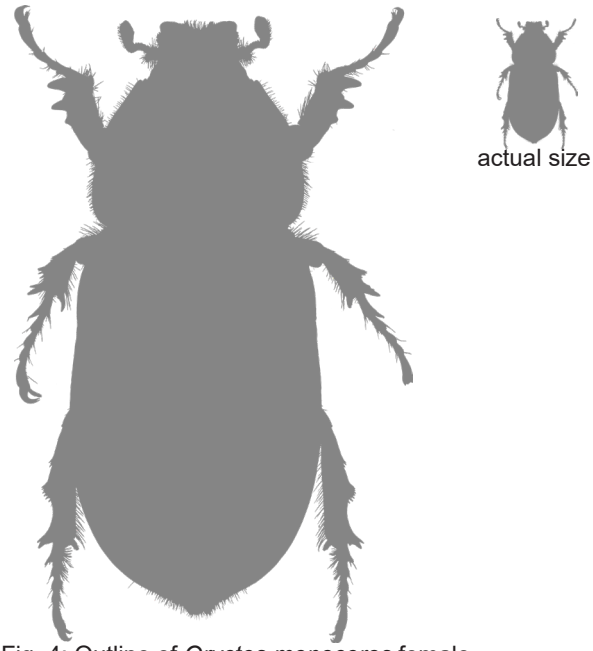

Fig. 4: Outline of *Oryctes monoceros* female.

Fig. 5: Variation in color of *Oryctes rhinoceros* adults (left = male; right = female). note - this is not sexual dimorphism.

Fig. 6: Toothed protibia of *Oryctes monoceros*

Fig. 7: Lamellate antenna of *Oryctes rhinoceros.*

Scarabs that meet the sorting requirements should be screened for suspects in the subfamily Dynastinae. Level 1 Screening is based on only a few characteristics. When in doubt distinguishing or evaluating first-level screening characters, forward specimens that have passed the sorting requirements to a trained taxonomist.

Dynastinae scarabs can be identified by the following combination of characters:

1) Robust body (Figs. 4–5).

2) Two spurs present on mesotibia (Fig. 8).

3) Pygidium exposed past apex of elytra (Fig 9).

4) Mandibles often visible dorsally (Fig. 10).

5) Claws of meso- and metatarsi simple and similar in length and shape (Fig. 11).

Beetles meeting the above criteria should be moved to Level 2 Screening. Specimens should be pinned and clearly labeled before being sent to a trained coleopterist.

Fig. 8: Two spurs present on mesotibia of *Oryctes rhinoceros* (Photo by Hanna Royals).

Fig. 9: Exposed pygidium of *Oryctes rhinoceros* (Photo by Hanna Royals).

Fig. 10: Mandibles of *Oryctes monoceros* visible from dorsal view of head (Photo by Hanna Royals).

Fig. 11: Tarsal claws (Photo by Charles F. Brodel).

Generic Characters

Scarabs in the genus *Oryctes* are somewhat uniform in color and armature. While the size of the cephalic horn varies considerably between species, horn shape is similar across species, with all males (and females in many species) having a single, unbranched (ending in one point), curved horn (Fig. 12, left). In many species, sexes can be differentiated based upon the cephalic horn, with females either lacking horns or with a reduced horn. Both males and females of most species possess a broad, sculpted depression on the pronotum (Fig. 12, left).

Fig. 12: Comparison of cephalic horn and pronotum of *Oryctes boas* (left, photo by Hanna Royals) and *Xylotrupes ulysses* (right, photo by Emmy Engasser).

Many scarabs are similar in appearance. While there are no similar species in North America that are as large as *Oryctes*, **any scarab meeting the above sorting and screening requirements should be pinned and forwarded for professional identification.** *Oryctes rhinoceros*, *O. boas*, *and O. monoceros* can be differentiated by the hornlike projections on the head and pronotum (Figs. 13–19) . Note: there can be significant variation in horn length in both sexes of *Oryctes* species.

Fig. 13: *Oryctes rhinoceros* male.

Fig. 14: *Oryctes rhinoceros* male.

Fig. 15: *Oryctes rhinoceros* female.

Fig. 16: *Oryctes monoceros* male.

Fig. 17: *Oryctes monoceros* male.

Fig. 18: *Oryctes monoceros* female.

Fig. 19: *Oryctes boas* male.

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

1. Beetles 22–77 mm long with overall shape scarab-like (Fig. 4), dark in color, with lamellate antennae and pygidium exposed (Figs. 5, 7, 9)..... 2
1'. Beetles shorter or longer than 22–77 mm long with overall shape that is not scarab-like; not dark in color; not with lamellate antennae; or pygidium hidden beneath elytra.....Not *Oryctes* spp.

2. Cephalic horn ending in a single (unbranched) point and pronotum with deep broad depression (Fig. 12, left)..... ***Oryctes* suspect**
2'. Cephalic horn ending in more than one (branched) point or pronotum without deep broad depression (Fig. 12, right).....Not *Oryctes* spp.

Citation

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References for more information on *Oryctes* spp. and non-targets

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