NUMBER 112, 42 pages 28 May 2012

BISHOP MUSEUM OCCASIONAL PAPERS

RECORDS OF THE HAWAII BIOLOGICAL SURVEY FOR 2011

PART I: ANIMALS

NEAL L. EVENHUIS
AND
LUCIUS G. ELDREDGE, EDITORS

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Cover photo: The recently introduced invasive snail *Paralaoma servilis* (Gastropoda: Punctidae) from the Wai‘anae Mountains of O‘ahu (see article on page 3).

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RECORDS OF THE HAWAII BIOLOGICAL SURVEY FOR 2011

Editors' Preface

We are pleased to present the annual compilation of *Records of the Hawaii Biological Survey,* this year for the year 2011. As was done for the last *Records*, we are splitting the traditional two volumes into plants and animals. This volume contains records pertaining to the animals. The second volume will contain the records for the plants.

The Hawaii Biological Survey, established by the Hawaii State Legislature in 1992 as a program of Bishop Museum, is an ongoing natural history inventory of the Hawaiian Archipelago. It was created to locate, identify, and evaluate all native and nonnative species of flora and fauna within the state; and by State Law to maintain the reference collections of that flora and fauna for a wide range of uses. In coordination with related activities in other federal, state, and private agencies, the Hawaii Biological Survey gathers, analyzes, and disseminates biological information necessary for the wise stewardship of Hawaii's biological resources.

An intensive and coordinated effort has been made by the Hawaii Biological Survey to make our products, including many of the databases supporting the papers published here, available to the widest user-community possible through our web server. Products currently available include taxonomic authority files (species checklists for terrestrial arthropods, flowering plants, nonmarine snails, marine invertebrates, fossil taxa, and vertebrates), bibliographic databases (vascular plants, nonmarine snails, and insects), specimen databases (fungi, fish, invertebrates, portions of the insect collection) and type specimens (entomology; botany—including algae and fungi; and vertebrates), collections data (lists of holdings for select groups of flies as well as Cicadellidae and Pentatomidae), detailed information and/or images on endangered, threatened, and extinct plants and animals; as well as our staff publication lists. Additional reference databases include: the list of insect and spider collections of the world (based on Arnett, Samuelson & Nishida, 1993, *Insect and spider collections of the world*) with links to institutional web pages where known; and the historical world Diptera taxonomists list with names of over 5,400 authors who have described flies.

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The *Records of the Hawaii Biological Survey for 2011* were compiled with the assistance of Clyde Imada (botany), Fred Kraus (zoology) and other anonymous reviewers who helped referee papers; and was partially supported by funds from the John D. and Catherine T. MacArthur Foundation. Many of the new records reported here resulted from curatorial projects and field surveys funded by the National Science Foundation, the U.S. Geological Survey Biological Resources Division, the U.S. Fish & Wildlife Service, and the Hawaii Department of Land and Natural Resources.

We encourage authors with new information concerning flora or fauna occurring in the Hawaiian Islands to submit their data to the editors listed below for consideration for publication in the next *Records.* Submission and format of papers must follow our guidelines. Information on submission of manuscripts and guidelines for contributors may be obtained on the web (via pdf format) at:

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or by mail from: Hawaii Biological Survey, Department of Natural Sciences, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i 96817-2704, USA.

——*N.L. Evenhuis &*
L.G.Eldredge, editors
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Records of the Hawaii Biological Survey for 2011. Edited by
Neal L. Evenhuis & Lucius G. Eldredge. *Bishop Museum
Occasional Papers* 112: 3–7 (2012)

First Records of *Paralaoma servilis* (Shuttleworth, 1852) (Gastropoda: Pulmonata: Punctidae) in the Hawaiian Islands[1]

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We report the establishment of another globally invasive land snail species in the Hawaiian Islands.

Punctidae

***Paralaoma servilis* (Shuttleworth, 1852)** **New state record**

Cowie *et al*. (1995) and Cowie (1997) reported the occurrence on the Island of Hawai'i of an unidentified land snail tentatively assigned to the genus *Striatura* (Family Zonitidae). We now identify this species as *Paralaoma servilis* (Shuttleworth, 1852) (Family Punctidae) and report its occurrence also on the Island of O'ahu (Fig. 1). The

Figure 1. Live specimen of *Paralaoma servilis* collected in the Wai'anae Mountains on O'ahu. Scale bar = 1 mm

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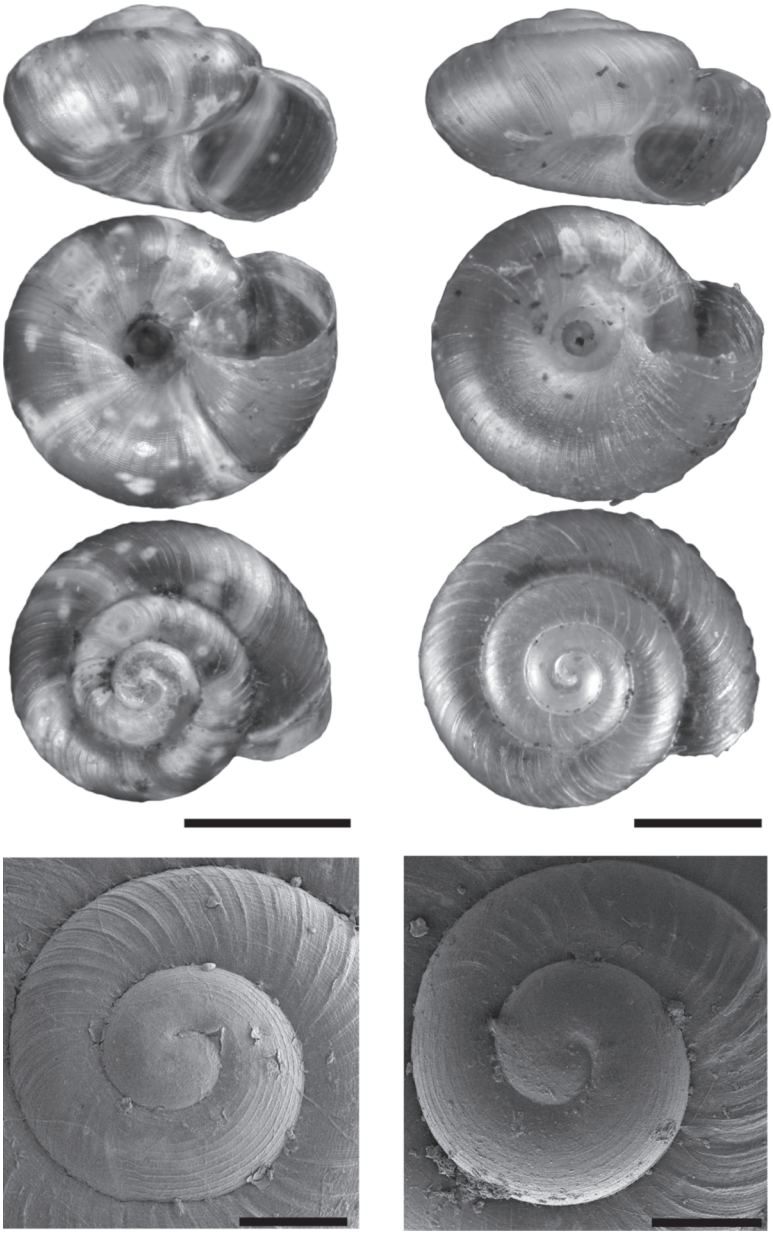

Figure 2. Shells of *Paralaoma servilis*. Left side - specimen collected on O‘ahu (275966); right side - specimen collected from the native range in New Zealand (274825). Images from top to bottom show views of aperture, umbilicus, apex, and scanning electron micrograph of embryonic whorl. Scale bars = 0.5 mm (left side) and 0.2 mm (right side) for SEM images

shells of the Hawaiian specimens were compared with New Zealand material. Preliminary phylogenetic analysis revealed less than 3.8% genetic distance (maximum likelihood corrected) at the 16S rDNA mitochondrial gene between specimens collected on O‘ahu and in New Zealand (Yeung & Hayes unpublished data). The apical sculpture of *P. servilis* (Fig. 1 bottom left and right; see also Roth 1986) consists of fine spiral threads, unlike the broader spiral ridges of *Striatura* as exemplified by *S. exigua* (Stimpson, 1850) and *S. milium* (Morse, 1859) (Solem 1977a, 1977b). Specimens in the Bishop Museum collection demonstrate that the species has been present on the Island of Hawai‘i since at least 1935.

Paralaoma servilis has had a long and complex taxonomic history. It was first described as *Helix pusilla* Lowe, 1831 (not *H. pusilla* Vallot, 1801 or Fleming, 1828), based on material from the Atlantic island of Madeira; subsequently, descriptions appeared for *Helix servilis* Shuttleworth, 1852, and *Helix caputspinulae* Reeve, 1852, based on material from the Canary Islands and New Zealand, respectively. Roth (1985, 1986, 1987) recognized the identity of Lowe’s *pusilla* and the North American *Punctum conspectum* (Bland, 1865) with the New Zealand *caputspinulae*, and Falkner *et al*. (2002) demonstrated that Shuttleworth’s *servilis* is the oldest available name for this taxon. In addition to the localities mentioned above, the species is now widespread in Australia (e.g., Smith 1992) and South America (e.g., Hausdorf 2002) and is rapidly expanding its range in Europe and elsewhere (e.g., Gittenberger *et al.* 1980; Guntrip 1986; Walbrink *et al*. 2001; Griffiths & Florens 2006). A multitude of synonyms, far too many to consider here, have been erected for populations of *P. servilis* that have become established in Europe, North and South America, and elsewhere. However, notwithstanding its relatively early emigration from New Zealand, it has as yet attained only a modest presence elsewhere in Polynesia; Climo (1981) concluded that *Paralaoma raoulensis* Iredale, 1913, of the Kermadec Islands, type species of *Paralaoma*, is a synonym of *P. servilis*, and Kirch *et al*. (2009) reported the species from Easter Island. Solem (1983) cited no records from this region in his monograph of Pacific Island Punctidae and Charopidae.

The status of *Paralaoma servilis* as indigenous to New Zealand is demonstrated by its presence there in numerous sites of Holocene age (Jones 1984; McFadgen 1997; Brooke 1999a, 1999b, 1999c, 2000; Brooke & Goulstone 1999). It has also been reported from sediments of Pleistocene age from Queensland, Australia (Price & Webb 2006). Although New Zealand is more often a recipient of alien nonmarine mollusks (Barker 1999) than a source of such invaders, *P. servilis* is not the only New Zealand snail to have ventured overseas. *Potamopyrgus antipodarum* (Gray, 1843), a freshwater hydrobiid, invaded Europe and Australia from New Zealand in the nineteenth century and has recently become established in North America (Ponder 1988; Städler *et al*. 2005).

All collected material is deposited in the Bishop Museum (BPBM) Malacology Collection and numbers refer to BPBM Malacology Collection numbers.

Material examined. HAWAIIAN ISLANDS: **O‘AHU**: Kahanahāiki, Wahiawā, N21°32.459', W158°11.774', NWY, T.H. Durkan, D.T.B. Ressler, D.R. Sischo, J.R. Kim, P.A. Curry, 4 Jun 2011 (275966); Mt Ka‘ala, Wahiawā, N21°30.786', W158°08.960' NWY, T.H Durkan, D.T.B. Ressler, D.R. Sischo, J.R. Kim, P.A. Curry, 20 May 2011 (275967); **HAWAI‘I:** Humu‘ula, 6400 ft, H.B. Baker, 9 Aug 1935 (161707); Kīlauea, Bird Park, H.B. Baker & C.M. Cooke, Jr., 11 Aug 1935 (161804); Pu‘u Wa‘awa‘a, Hawai‘i, M. Anderson, D. Anderson, 26 Dec 1937, (171765, 171766); Pōhakuloa, Hawai‘i, R.H. Cowie, G.M. Nishida, 10 Mar 1992 (275968); NEW ZEALAND: Chicken Island, F.J. Brook (274825).

Acknowledgments
We thank all the people named in the lists of material examined for help with collecting, and the landowners for permitting access. We especially thank Fred Brook for comparative material from New Zealand, Torsten Durkan for assistance with collections on O‘ahu, and Vincent Costello and the personnel of the O‘ahu Army Natural Resources Program for logistical support and access to U.S. Army land. Regina Kawamoto helped us with depositing specimens in the Bishop Museum. We also extend our appreciation to Dylan Ressler for photographic assistance and to Tina Carvalho of the University of Hawaii’s Biological Electron Microscopy Facility in the Pacific Biosciences Research Center. This work was supported by a National Science Foundation grant (DEB-1120906) to K.A. Hayes.

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Records of the Hawaii Biological Survey for 2011. Edited by
Neal L. Evenhuis & Lucius G. Eldredge. *Bishop Museum
Occasional Papers* 112: 9–16 (2012)

New Species of *Campsicnemus* (Diptera: Dolichopodidae) from the Ko‘olau Mountains of O‘ahu, Hawaiian Islands[1]

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Terrestrial arthropod surveys on O‘ahu over the years have resulted in a number of new species of endemic Hawaiian dolichopodids. The new species described here were all found in the Ko‘olau range of O‘ahu and are being described to allow their names to be used in the results of Hawaiian faunal surveys and phylogenetic and molecular analyses. The unusual discovery of three of these new species collected only recently from the commonly-hiked and entomologically-collected Poamoho Trail that were never discovered previously is a possible indication that further concentrated studies along the ridges and valleys of the Ko‘olau range specifically for these flies will turn up many more new species. The addition of the four new species described here brings the total number of Hawaiian *Campsicnemus* to 171, all of which are endemic to the islands.

Material and Methods

Material derives from the Bishop Museum, Honolulu (BPBM). Holotypes and paratypes of new species described herein are deposited in BPBM. Vouchers of some of these species that were collected into 95% ethanol have been sent to the University of California, Berkeley (UCB), for molecular analysis.

Terminology and abbreviations for morphological characters follows recent papers on Hawaiian *Campsicnemus* by Evenhuis (2007, 2011).

New Species Descriptions

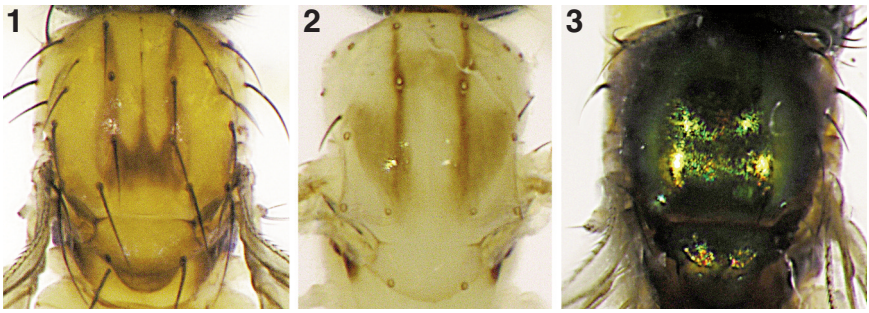
Campsicnemus ciliatoides Evenhuis, **new species**

(Figs. 1, 4)

Diagnosis. Similar to *C. ciliatus* Van Duzee, but can be distinguished by the mesonotum yellowish with a middorsal brown trident pattern (Fig. 1) (mesonotum all dark brown in *C. ciliatus*); mid tibia much longer than the mid femur and thin (mid tibia as long as the mid femur and slightly swollen at basal one-third in *C. ciliatus*); and long setae on the mid tibia restricted to the apical one-fourth (long setae restricted to the apical half of the mid tibia in *C. ciliatus*).

Description. **Male**. Body length: 3.2–4.0 mm. Wing length: 3.5–4.2 mm. *Head*. Black, face small, dark brown to black; oc and vt black, about three-fifths length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis yellowish brown to brown, extending below eye in lateral view; scape and pedicel of antenna yellow; postpedicel yellowish white with brown edges, long, subtriangu-

1. Contribution No. 2012-005 to the Hawaii Biological Survey.



Figures 1–3. *Campsicnemus* male thoraces, dorsal view. **1**, *C. ciliatoides*, n. sp. **2**, *C. niveisoma*, n. sp. (thoracic setae broken off) **3**, *C. scintillatus*, n. sp.

lar with blunt apex, length about 1.2 × width; arista slightly longer than head height.

Thorax: Mesoscutum and scutellum yellow (except for tinge of brown on posterior margin of latter), dorsum of mesonotum with trident pattern medially (Fig. 1); pleura yellow to yellowish white except brown on following: anepisternum, anepimeron (dark brown), laterotergite, postscutellum medially); thoracic setae black: 4 dc; 2 np; 2 ph; 1 pa; 1 sc; 12-14 ac on anterior half; halter stem and knob yellowish white.

Legs: CI white, with 3-4 strong black setae apically, fine hairs basally; CII brown; CIII and remainder of legs yellowish; It_1 slightly bowed with dense setation laterally (MSSC), remainder of foreleg unmodified; FII swollen at basal 2/5, tapering to thin apex, with row of 12–14 long strong setae ventral surface becoming shorter apically (MSSC); TiII (Fig. 4) long, thin, straight, laterally with two rows of short spines mesally, with long, slightly wavy setae laterally on apical one-fourth (MSSC); IIt_1 slightly longer than IIt_2, with short stiff setae and sparser finer long hairs slightly curved apically (MSSC); remainder of legs unmodified.

Wing: subhyaline throughout.

Abdomen. Tergites dark brown with short black hairs dorsally on each segment, a few longer hairs laterally; sternites I–IV, VI yellow to white, sternite V brown; hypopygium dark brown with brown cerci, not dissected.

Female. As in male but without MSSC; postpedicel of antenna half as long as high; mesonotal dark pattern darker and more filled in than male; brown areas of pleura darker brown and slightly more extensive than in male.

Types. *Holotype* ♂ (BPBM 17,517; preserved in fluid) and 1♀ paratype from HAWAIIAN ISLANDS: **O‘ahu**: Ko‘olau Mountains, Poamoho Trail, 30 May 2011, yellow pan traps in leaf litter in guava forest next to trail, 2300 ft [700 m], 21°31.984' N, 157°55.808' W, N. Evenhuis (BPBM). Other paratypes: 3♂, same data, 16 Sep 2011, trap left for an hour, K.R. Goodman (BPBM); 13♂, 9♀, same data, 17 Sep 2011, trap left for a day, K.R. Goodman (BPBM). Holotype and paratypes in BPBM.

Etymology. The specific epithet refers to its close appearance to *C. ciliatus* Hardy & Kohn.

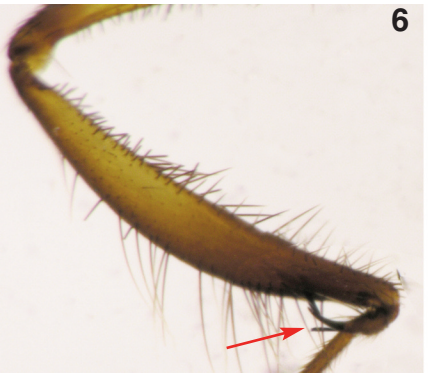
Figures 4–5. *Campsicnemus* male midlegs. **4**, *C. ciliatoides*, n. sp., femur, tibia, and basal tarsal segments. **5**, *C. niveisoma*, n. sp., femur, tibia, and tarsal segments.

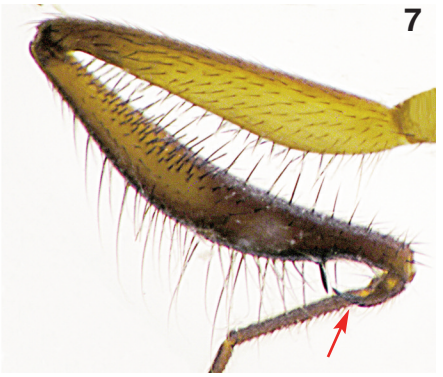
Campsicnemus kaluanui Evenhuis, **new species**
(Fig. 6, 10)

Diagnosis. Similar in appearance to *C. lawakua* Evenhuis from Kaua‘i on the basis of the similar shape and setation on the male mid tibia and the long antennal scape, but it can be distinguished by the lack of a second strong black subapical spur on the mid basistarsus (two spurs present in *C. lawakua* cf. Fig. 6) and the much longer peg-like setae on the mesal surface of the mid tibia (these peg-like setae shorter in *C. lawakua*; cf. Fig. 6).

Description. **Male**. Body length: 3.5 mm. Wing length: 4.0 mm. *Head*. Black, face brown with bluish highlights; oc and vt black; front, occiput, and vertex black with blue highlights; face slightly constricted at middle, slightly dichoptic, eyes separated below antennae by width of 4–5 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; scape and pedicel dark brown; postpedicel and arista broken off and missing.

Thorax: Dark brown; thoracic setae black: 4 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem white, knob yellowish.





Figures 6–7. *Campsicnemus* male midlegs. **6**, *C. lawakua* Evenhuis, 2003, femur, tibia, and basitarsus. **7**, *C. kaluanui*, n. sp., femur, tibia, and basal two tarsal segments. Arrows point to apical spur of basitarsus.

Legs: CI white, with strong brownish setae apically, fine whitish hairs basally; CII and CIII brown; remainder of legs dark brown; femora yellowish brown, brown apically; FII swollen at basal 1/3, tapering to thin apex, with row of short and longer strong setae along entire ventral surface (MSSC); FIII with long fine seta along entire ventral surface (MSSC); TiII (Fig. 5) relatively thick, slightly bowed, thicker medially, with two rows of blunt peg-like spines on basal 2/3 of mesal surface, long hairs apically on mesal surface, laterally with row of longer hairs along entire length, longest near middle becoming shorter basally and apically, with thick, black, blunt spine subapically (MSSC); IIt_1 (Fig. 5) short, subglobular, with single strong hook-like apical spur (MSSC); remainder of legs unmodified.

Wing: pale smoky yellowish brown throughout.

Abdomen (semi-detached from thorax). Tergites dark brown with short black hairs dorsally on each segment, a few longer hairs laterally; sternites I–IV, VI yellow to white, sternite V brown; hypopygium dark brown with brown cerci, surstyli black, not dissected.

Female. Unknown.

Types. Holotype ♂ (BPBM 17,518; preserved in fluid) from HAWAIIAN ISLANDS: **O‘ahu**: Kaluanui Stream, 350 ft [106 m], swept from cliff rocks at plunge pool (Fig. 10) [Kalu140503], 14 May 2003, D.J. Preston. Holotype in BPBM.

Remarks. The original description and illustration of *C. lawakua* (Evenhuis, 2003) failed to indicate the second spur (see Fig. 6) on the mid basitarsus and the presence of a subapical thick spine on the mid tibia; otherwise the description is correct in the remaining salient characters.

Etymology. The specific name refers to the type locality of Kaluanui Stream on O‘ahu and is treated as a noun in apposition.

Figure 8. *Campsicnemus niveisoma*, male habitus, lateral view.

Campsicnemus niveisoma Evenhuis, **new species**
(Figs. 2, 5, 8)

Diagnosis. Closest in appearance to *C. inermipes* Malloch from O‘ahu, and can be separated from it by the white mesonotum with faint admedial stripes (Fig. 2) (mesonotum brown on posterior half and without vittae in *C. inermipes*), the dense patch of hairs at the dorsal middle of the mid femur (this middle patch absent but present at the apex of the femur in *C. inermipes*), and the postpedical of the antenna more than 2 times the width (slighly longer than wide in *C. inermipes*).

Description. **Male**. Body length: 1.7–2.0 mm. Wing length: 1.9–2.2 mm. *Head*. Face and clypeus light brown, front and vertex dark brown; oc and vt pale yellow, about one-half length of antennal arista; clypeus yellow; face constricted at middle, eyes almost holoptic below antennae, separated by width of 2 ommatidia; palp small, white; proboscis white, extending below eye in lateral view; antennal segments white, postpedicel subtriangular, length 2.2 × width; arista subequal to head height.

Thorax. White except faint yellowish brown admedian vittae on mesonotum (Fig. 2), dark brown anepimeron, and brown spot laterally on laterotergite; thoracic setae brown: 4 dc; 2+1 np; 1+1 ph; 1 pa; 1 sc; 10–12 pale ac anteriorly.

Legs. White. Leg I unmodified, without MSSC. FII swollen medially with patch of fine hairs dorsomedially and appressed fine hairs on apical 1/2 of dorsal surface, 2–3 black spines ventromedially (MSSC); TiII (Fig. 4) long, thin, wider apically than basally, row of short sparse stiff setae on basal 1/2 (MSSC), short hairs elsewhere; longer black setae on apical 1/4 and 1 seta mesoapically (MSSC); IIt_1 subequal in length to IIt_2, with strong short black spur apically (Fig. 4) (MSSC); $IIt_{2–5}$ unmodified. $IIIt_1$ with apical pecten, remainder of leg III unmodified, without MSSC; halter and knob white.

Wing subhyaline.

Abdomen. Tergites and sternites white with short pale yellow hairs dorsally on each tergite, a few longer hairs laterally. Hypopygium white, surstyli black, not dissected.

Female. As in male but without MSSC; antennal postpedicel subconical, as long as wide.

Types. Holotype ♂ (BPBM 17,519; preserved in fluid) and 1♀ paratype from HAWAIIAN ISLANDS: **O‘ahu**: Poamoho Trail, 30 May 2011, yellow pan traps in leaf litter in guava forest next to trail, 2300 ft [700 m], 21°31.984' N, 157°55.808' W, N.L. Evenhuis (BPBM). Other paratype: 1♂, same data except: 17 Sep 2011, yellow pan traps left for a day, K.R. Goodman (BPBM). Holotype and paratypes in BPBM.

Remarks. The only three specimens known of *C. inermipes* are from Konahuanui (Ko‘olau Mountains near Honolulu) and an untraceable type locality on O‘ahu of “Kaumuahona”, which may have been an error for “Konahuanui”. *Campsicnemus niveisoma* is also from the Ko‘olau mountains but a few miles further north and is extremely close in appearance to *C. inermipes* (the two are the only two known species of *Campsicnemus* that lack melanization in almost all body parts), but it is clearly a separate species based on the consistent differences noted in the diagonsis.

Etymology. The specific epithet derives from the Latin *nivea* = snow white; referring to the complete absence of color in the integument except for the dark brown anepimeron and black occiput.

Campsicnemus scintillatus Evenhuis, **new species**

(Figs. 3, 9)

Diagnosis. Keys to *C. furax* Parent using the key to species in Hardy & Kohn (1964) but differs by having the mesonotum shining metallic green (mesonotum reddish yellow with admedian brown stripes in *C. furax*) and the yellow CII with brown on the anterior and posterior edges (CII all yellowish brown in *C. furax*).

Figure 9. *Campsicnemus scintillatus*, n. sp., male midleg, showing femur, tibia, and basal two tarsal segments. **Figure 10.** Collection habitat for *C. kaluanui*, n. sp. along wet rock wall to the immediate right of the waterfall splash zone. Photo: David Preston.

Description. **Male**. Body length: 3.2 mm. Wing length: 3.5 mm. *Head*. Black, face small, dark brown to black; oc and vt black, about three-fifths length of antennal arista; front, occiput, and vertex black with blue highlights; eyes holoptic; palp small, yellowish brown; proboscis brown, extending below eye in lateral view; antenna yellow; postpedicel subtriangular with blunt apex, length about 1.2 × width; arista slightly longer than head height.

Thorax: Mesoscutum and scutellum dark brown, dorsum of mesonotum and scutellum shining metallic green with brassy highlights (Fig. 3); pleura yellowish except brown on following: upper anepisternum, anepimeron (dark brown), laterotergite, and postscutellum medially; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 sc; ac absent; halter stem and knob yellowish white, knob dusky brown at base.

Legs: CI white, without setae apically; CII yellowish medially with brown on anterior and posterior margins; CIII and remainder of legs yellowish; It_1 slightly bowed, with rows of dense setae along entire length of medial and lateral surfaces; FII swollen at basal

2/5, tapering to thin apex, with patch of 8 strong black setae on subapical third of medial surface, 8 stiff setae on ventral surface (MSSC); TiII (Fig. 3) long, thin, slightly bowed, with long, slightly wavy setae laterally on basal one-half, straight along remainder of length, with shorter stiff setae on basal half of medial surface (MSSC); IIt_1 slightly longer than IIt_2, with short stiff setae (MSSC); remainder of legs unmodified.

Wing: subhyaline throughout.

Abdomen. Tergites dark brown with short black hairs dorsally on each segment, a few longer hairs laterally; sternites yellow to white, sternites V–VI brown; hypopygium dark brown with brown cerci, not dissected.

Female. Unknown.

Types. *Holotype* ♂ (BPBM 17,527; preserved in fluid) from HAWAIIAN ISLANDS: **O‘ahu**: Ko‘olau Mountains, Poamoho Trail, 16–17 Sep 2011, yellow pan trap in leaf litter in guava forest next to trail, left for a day, 2300 ft [700 m], 21°31.984' N, 157°55.808' W, K.R. Goodman (BPBM). Holotype in BPBM.

Etymology. The specific epithet derives from the Latin *scintillo* = sparkle, glitter; and refers to the characteristic shining metallic green thorax.

Acknowledgments

The following are thanked for their excellent assistance in the field, accommodating access to collections, and/or generosity in helping see this study to fruition: Kari Goodman, Gordon Bennett, Brian Ort, and Patrick O’Grady (University of California, Berkeley), Cynthia King and Betsy Gagné (Hawaii State Department of Land and Natural Resources, Honolulu). Shepherd Myers helped with some of the Automontage® photography and David Preston is thanked for supplying the habitat photo for *Campsicnemus kaluanui*. Fieldwork resulting in the majority of the collections above was supported in part by the NSF-funded “A comparative approach to dating the diversification of Hawaiian Diptera” DEB-0842348.

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Records of the Hawaii Biological Survey for 2011. Edited by
Neal L. Evenhuis & Lucius G. Eldredge. *Bishop Museum
Occasional Papers* 112: 17–18 (2012)

Recent introductions of Dolichopodidae (Diptera) in the Hawaiian Islands[1]

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Recent surveys of Dolichopodidae in the Hawaiian Islands for various projects have revealed two new introductions that are recorded here. Vouchers of specimens from both records are deposited in the Bishop Museum; while a number of specimens of *Sympycnus turbidus* Becker have been sent to the University of California, Berkeley, for DNA analysis as part of a grant-funded project dealing with speciation patterns in Hawaiian Diptera.

Family Dolichopodidae
Subfamily Sympycninae
Sympycnus turbidus Becker, 1922 **New state record**

Sympycnus is a commonly found genus, occurring virtually worldwide; however, this is the first record of the genus in the Hawaiian Islands. *Sympycnus turbidus* was originally described by Becker (1922) from India. It has since been recorded from a number of localities in the Oriental and Australian Regions including Nepal, Sri Lanka, Philippines, Papua New Guinea, Solomon Islands, Australia, China, Macao, Hong Kong, Taiwan, and Japan (Yang *et al*., 2006; D.J. Bickel, unpublished data).

The specimens recorded here were all collected on the island of Kaua'i by aerial sweeping nets and in yellow pan traps in various locations in the Koke'e area, all above 1200 m [ca. 4000 ft]. Collecting in the area previous to the initial collection in 2010 did not reveal any specimens. That fact, combined with the large numbers of specimens collected in 2011 at a number of different sites lends support to the presumption that this species was introduced to this area within the last few years and has successfully established stable and flourishing populations on the island of Kaua'i. An introduction to an island at such a high elevation without any records below this elevation is perplexing but may have occurred through pupae or larvae coming in via importation from Asia of mud or potting soil containing ornamental or medicinal plants.

Material Examined: HAWAIIAN ISLANDS: **Kaua'i**: 1♂, Pu'u O Kila Road, sweeping, 22.148°N, 159.633°W, 25 Jul 2010, K.N. Magnacca [m0296-05]; 5♂,2♀, Koke'e State Park, Kawai Koi Stream crossing road at intersection, pan trap in seep leading to stream, 19–20 Sep 2011, K.R. Goodman [KRG1138a, KRG1153a]; 2♂,2♀, same data except general sweeping [KRG1131a]; 1♂,2♀, same data except collected from stream [KRG1139a]; 1♂,5♀, Koke'e State Park, Kawai Koi Stream, 19–20 Sep 2011, K.R. Goodman [KRG1133b, KRG1150]; 5♀, Koke'e State Park, board-

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walk on trail to Kawaikoi Stream, K.R. Goodman [KRG1142a]; 5♂,2♀, Koke'e State Park, Pihea Trail, 18 Sep 2011, P.M. O'Grady [702.6]; 42♂,37♀, Koke'e State Park, Mohihi Road at Kawaikoi Camp, 19–20 Sep 2011, P.M. O'Grady [704.4, 705.1, 711.1, 711.2]; 1♂, Mohihi Road at stream crossing, 19 Sep 2011, P.M. O'Grady [711.1]; 7♂,14♀, Koke'e State Park, Mohihi Road at Kawaikoi Stream Trail, 19 Sep 2011, P.M. O'Grady [707.1]; 7♂14♀, Koke'e State Park, Pihea Trail in stream, 19 Sep 2011, P.M. O'Grady[708.1]; 2♂,5♀, Koke'e State Park, Pihea Trail, Kawaikoi Stream, 19 Sep 2011, P.M. O'Grady [709.1]; 5♂,10♀, Koke'e State Park, Kahua Ridge Trail, Mohihi Stream, 20 Sep 2011, P.M. O'Grady [712.2].

Subfamily Diaphorinae

Achradocera shannoni (Van Duzee, 1930) **New state record**

Previous to this record, only one species of *Achradocera* (*A. arcuata* Van Duzee, 1924) was known from the Hawaiian Islands (Bickel, 2000). This marks the first record of *Achradocera shannoni* (Van Duzee, 1930) from these islands. Both species are introduced. *Achradocera shannoni* was originally described by Van Duzee (1930) from Lima, Peru and has since been recorded from Panama and Costa Rica (D.J. Bickel, unpubl. data). Further concentrated collecting may show it to be much more widespread in the lowland Neotropics.

This species was collected from a wet seep on the Bishop Museum grounds, the seep deriving from a dripping irrigation pipe. Dozens of specimens were observed throughout the week water skating and landing on mud and rocks around the algae-covered seep.

Material Examined: HAWAIIAN ISLANDS: **O'ahu**: 4♂, 2♀, Bishop Museum grounds, 15–18 Nov 2008 (N.L. Evenhuis).

Acknowledgments

Fieldwork resulting in some of the collections above was supported in part by the NSF-funded "A comparative approach to dating the diversification of Hawaiian Diptera" DEB-0842348.

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Records of the Hawaii Biological Survey for 2011. Edited by
Neal L. Evenhuis & Lucius G. Eldredge. *Bishop Museum
Occasional Papers* 112: 19–20 (2012)

New helminth record for the moth skink, *Lipinia noctua* (Scincidae), from Hawai‘i

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Lipinia noctua is a cosmopolitan Pacific species known from Sulawesi through northern New Guinea, the Solomons, and Vanuatu to the Tuamotu Archipelago and Marquesas Islands to the Hawaiian Islands (Zug, 1991). To our knowledge, there is one report of a helminth from *L. noctua*, the nematode *Parapharyngodon maplestoni* (Goldberg *et al.,* 2010). The purpose of this note is to add to the helminth list of *L. noctua* and report a new helminth record for this species in Hawai‘i.

Nematoda: Spiroceridae
Physocephalus sp. **New host record**

The body cavity of 1 female (SVL 47 mm) *L. noctua* collected November, 1999 at Huelo Islet, Moloka‘i, Hawaiian Islands, USA (21.17075°N, 15.92117°W; WGS 84, elev. 27–60 m) and deposited in the herpetology collection of the Bishop Museum as (BPBM 13863) was opened and examined for coelomic helminths. Seven encysted nematodes were removed from the exterior of the small intestine. They were cleared in glycerol, placed on a microscope slide, coverslipped, examined under a compound microscope and identified as larvae of *Physocephalus*.

Physocephalus sexalatus is a nematode of wild and domestic pigs in Hawai‘i (Alicata, 1964), in which larvae first develop in dung beetles (Anderson, 2000). Infective encapsulated larvae of *Physocephalus* sp. are commonly found in gut tissues of amphibians and reptiles that have ingested infected beetles. In Hawai‘i it has been reported in the frog *Eleutherodactylus coqui* (Goldberg *et al.,* 2007) and the lizards *Anolis carolinensis* (Goldberg *et al.,* 2004a), *Anolis equestris* (Goldberg *et al.,* 2004b), *Anolis sagrei* (Goldberg & Bursey, 2000), *Chamaeleo jacksoni* (Goldberg *et al.,* 2004c), *Gehyra mutilata* (Goldberg *et al.,* 2004a), *Hemidactylus frenatus* (Brown *et al.,* 1995), *Hemidactylus garnotii,* (Brown *et al.,* 1995), *Lampropholis delicata* (Goldberg *et al.,* 2004a), *Lepidodactylus lugubris* (Brown *et al.,* 1995), *Phelsuma guimbeaui* (Goldberg *et al.,* 2003) and *Phelsuma laticauda* Goldberg *et al,,* 2003). Vouchers of *Physocephalus* sp. are deposited in the United States National Parasite Collection (USNPC), Beltsville, Maryland, USA as USNPC (104865). *Lipinia noctua* is a new host record.

Acknowledgments

We thank Lydia Garetano (BPBM) for permission to examine *L. noctua* and Pumehana Imada (BPBM) for facilitating the loan.

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Records of the Hawaii Biological Survey for 2011. Edited by
Neal L. Evenhuis & Lucius G. Eldredge. *Bishop Museum
Occasional Papers* 112: 21–28 (2012)

New Records of Alien Gastropoda in the Hawaiian Islands: 1996–2010[1]

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The alien nonmarine gastropods of the Hawaiian Islands were cataloged by Cowie (1997) and were reviewed by Cowie (1998a). Subsequent new records (both for the archipelago and for individual islands) were reported by Cowie (1998b, 1999, 2000), Kraus (2003), and, specifically associated with the horticultural industry between 2004 and 2006, by Hayes *et al*. (2007), reviewed and analyzed by Cowie *et al*. (2008). Subsequent surveys, covering 196 sites across the six largest main Hawaiian Islands during 2006–2010, have resulted in the additional new records reported here.

We surveyed 29 locations on Kaua'i, 48 on O'ahu, 13 on Moloka'i, 50 on Maui, 4 on Lāna'i, and 52 on Hawai'i. Sites ranged from highly disturbed lowland habitats dominated by nonnative vegetation to high elevation habitats at which most of the vegetation was native. Also included were a number of horticultural nurseries and agricultural research stations.

A small number of additional records based on collections by collaborators (1996–2007) are also included, as well as 2004–2005 records of *Allopeas clavulinum* that were inadvertently omitted by Hayes *et al*. (2007).

We document here the new state and island records. A more comprehensive analysis and discussion of all records will be published elsewhere.

Collections were made by Kenneth A. Hayes (KAH), Norine W. Yeung (NWY), Jaynee R. Kim (JRK), Robert H. Cowie (RHC), and others as indicated. All collected material, not only that reported here, is deposited in the Bishop Museum (BPBM) Malacology Collection. Catalog numbers are BPBM Malacology Collection numbers. Assignments to families follow Robinson (1999), with the exception of *Bulimulus guadalupensis*, which is assigned to the Orthalicidae following Bouchet & Rocroi (2005) rather than Bulimulidae, which these authors placed as a subfamily of Orthalicidae. Families are treated alphabetically. Latitude and longitude coordinates were recorded by GPS.

Agriolimacidae

Deroceras reticulatum (Müller) (Fig. 1A) **New island records**

This western European slug (Kerney & Cameron, 1979) was previously recorded in the literature only from the islands of Kaua'i and Hawai'i (Cowie, 1997). It is frequently brought to us for identification after being intercepted by State of Hawaii Plant Quarantine officials, especially on shipments of Christmas trees arriving in the islands from the Pacific Northwest of the mainland United States. It is widely seen as an agricultural pest (Barker, 2002). It may have been misidentified in the past, possibly confused with *Deroceras laeve* (Müller), but appears to be widespread and established on all six of the largest main Hawaiian Islands.

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Material examined: **O‘AHU**: Ka‘ala helicopter landing zone, Wahiawā, N21°30.670', W158°08.963', W. Weaver, 24 Oct 2006 (275953); Nike site, Wahiawā, N21°32.766', W158°11.714', M. Keir, 24 Oct 2006 (275954); Ka‘ala, Wahiawā, no coordinates, Army personnel, 23 May 2007 (275965); Top of Mānoa Cliffs Trail on Mānoa side, Honolulu, N21°20.460', W157°48.474', RHC, 27 Feb 2008 (270756); Top of Kōnāhuanui Ridge, Honolulu, N21°21.202', W157°47.325', KAH, JRK, A.F. Johnson, 26 Apr 2008 (270777); End of Pauoa Flats Trail, Honolulu, N21°20.727', W157°48.373', KAH, JRK, A.F. Johnson, 26 Apr 2008 (270780); Mt. Ka‘ala bog, end of boardwalk, Wahiawā, N21°30.154', W158°08.960', KAH, NWY, T.J. Skelton, 3 Sep 2008 (274174); Mt. Ka‘ala bog near Natural Area Reserve, Wahiawā, N21°30.436', W158°08.634', KAH, NWY, T.J. Skelton, 3 Sep 2008 (274183). **MOLOKA‘I**: Kamakou Preserve, Kaunakakai, N21°07.542', W156°55.132', KAH, W.M. Meyer, M.M. Parker, C.T. Tran, 27 Jun 2006 (282585); Kamakou Preserve, Kaunakakai, N21°06.988', W156°55.077', KAH, NWY, JRK, T.J. Skelton, C.H. Yee, 15 Nov 2008 (274261); Entrance to Pēpē‘ōpae Bog Trail, Kaunakakai, N21°07.093', W156°54.489', KAH, NWY, JRK, T.J. Skelton, C.H. Yee, 15 Nov 2008 (274263); Kamakou Preserve, Kaunakakai, N21°07.235', W156°55.127', KAH, NWY, JRK, T.J. Skelton, C.H. Yee, 15 Nov 2008 (274269). **LĀNA‘I**: Top of Lāna‘i, Department of Land and Natural Resources land, Lāna‘i City, N20°48.796', W156°52.541', KAH, NWY, JRK, T.J. Skelton, 25 Oct 2008 (274249). **MAUI**: Haleakalā National Park, crater floor, Kula, no coordinates, P. Krushelnycky, 1 Aug 1996 (275932); Haleakalā National Park, Pu‘u O Ili, N20°45', W156°14', P. Krushelnycky, 1 May 2002 (275933 - 275935), 1 Oct 2002 (275936 - 275941), 20 Jul 2003 (275942-275946), 24 Jul 2004 (275948 - 275951), 28 Aug 2004 (275952); Central Pali Trail, Kīpahulu, Kula, N20°42.177', W156°05.400', S. Joe, 22 Jul 2003 (275947); Between Pukalani and Makawao Avenue, right side heading east (Kaupea), Makawao, N20°50.642', W156°19.304', KAH, S.H. Arnason, J.R. Bedrosian, M.M. Parker, 8 Apr 2007 (283033); Kula Forest Reserve, Polipoli State Park, Waiakoa Loop Trail, Kula, N20°43.147', W156°17.888', KAH, NWY, JRK, T.J. Skelton, 12 Sep 2008 (274188); Just outside Kula Forest Reserve, on Hunalani Farm, 50 m in from road, Kula, N20°43.468', W156°18.559', KAH, NWY, JRK, T.J. Skelton, 12 Sep 2008 (274191); Corner of Kula Highway and Highway 377, Kula, N20°44.275', W156°20.000', KAH, NWY, JRK, T.J. Skelton, 12 Sep 2008 (274199); ‘Ulupalakua, N20°37.981', W156°21.540', KAH, NWY, JRK, T.J. Skelton, 13 Sep 2008 (274211); On road above Kanaio Natural Area Reserve, ‘Ulupalakua, N20°37.859', W156°21.350', KAH, NWY, JRK, T.J.Skelton, 13 Sep 2008 (274237); Waihou Spring Trail in the tree growth research area, Makawao, N20°48.299', W156°17.206', KAH, NWY, JRK, T.J. Skelton, 13 Sep 2008 (274307); ‘Īao Valley Spring Trail, Wailuku, N20°52.767', W156°33.263', KAH, NWY, JRK, T.J. Skelton, 14 Sep 2008 (274302); Haleakalā National Park, Hōlua cabin, Kula, N20°44.503', W156°13.082', KAH, NWY, JRK, T.J. Skelton, 24 Oct 2008 (274242); Haleakalā National Park, Kula, N20°45.127', W156°12.793', KAH, NWY, JRK, T.J. Skelton, 24 Oct 2008 (274244); Tedeschi Winery, Kula, N20°38.891', W156°23.371', KAH, NWY, JRK, 6 Feb 2009 (274331); Pu‘u Kukui trail, Kapalua, N20°55.612', W156°36.419', KAH, JRK, RHC, T.J. Skelton, 7 Feb 2009 (274288); Kapalua, N20°56.347', W156°37.894', KAH, NWY, JRK, RHC, T.J. Skelton, 8 Feb 2009 (274296); Maui Floral, Kula, N20°44.788', W156°19.066', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 27 Mar 2010 (274346); Paradise Flower Farms, Kula, N20°45.255', W156°18.691', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 27 Mar 2010 (274359); Rainbow Acres Nursery, Kula, N20°48.722', W156°17.089', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 27 Mar 2010 (274366); Enchanting Floral Gardens, Kula, N20°47.574', W156°19.589', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 27 Mar 2010 (274376); Maui Invasive Species Council Agricultural Site, Makawao, N20°50.228', W156°17.660', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 28 Mar 2010 (270842); Gobles Flower Farm, Kula, N20°41.417', W156°22.581', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 28 Mar 2010 (274381); Ali‘i Kula Lavender Farm, Kula, N20°44.009', W156°19.153', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 28 Mar 2010 (274385); Native Nursery LLC, Kula, N20°45.461', W156°20.718', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 29 Mar 2010 (275074); Proteas of Hawai‘i, Kula, N20°45.480', W156°19.305', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 29 Mar 2010 (275081); **HAWAI‘I**: Kīpuka ‘Āinahou Sanctuary, Huluhulu, N19°41’ W155°27', P. Krushelnycky, 22 Aug 2005 (275955 - 275964).

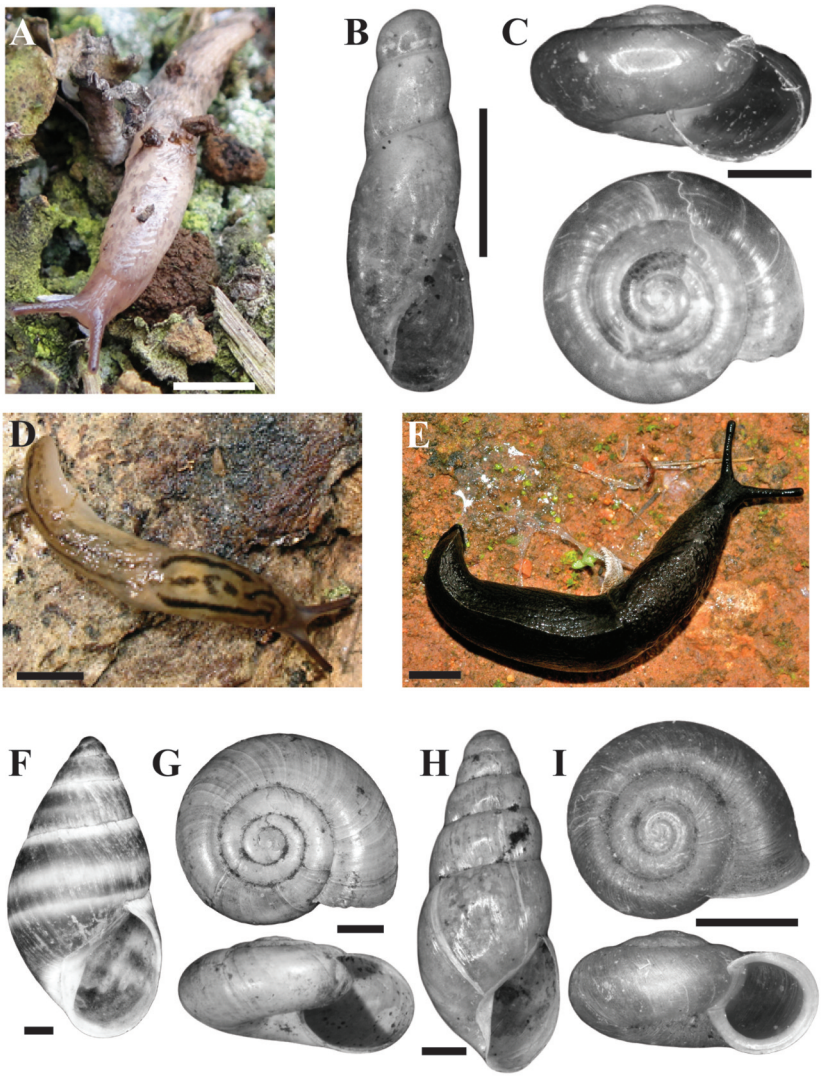

Figure 1: Alien land snails. **A**, *Deroceras reticulatum*, **B.** *Cecilioides aperta*, **C**, *Zonitoides arboreus*, **D**, *Lehmannia valentiana*, **E**, *Milax gagates*, **F**, *Bulimulus guadalupensis*, **G**, *Oxychilus alliarius*, **H**, *Allopeas clavulinum*, **I**, *Vallonia pulchella*. Scale bars for slugs = 5 mm; and for shells = 1 mm. All photos are of specimens in Hawai‘i except *Milax gagates* from Spain (Photo by Joaquín Ramírez).

Ferussaciidae

Cecilioides aperta (Swainson) (Fig. 1B) **New island record**

Previously recorded only from the islands of O‘ahu and Hawai‘i, but probably a synonym of *C. baldwini* (Ancey), though never formally synonymized, and therefore probably also

previously on Kauaʻi and Maui as well as Oʻahu and Hawaiʻi (Cowie, 1997). This is the first formal record of *C. aperta* from Maui. This species is thought to be native to the West Indies but has been spread widely by human activities (Solem, 1964), and has probably been in the Hawaiian Islands for a long time, though probably only subsequent to Western discovery of the Islands (Christensen, 1984).

Material examined: **MAUI**: Kapalua, N21°0.672', W156°38.487', KAH, S.H. Arnason, J.R. Bedrosian, M.M. Parker, 7 Apr 2007 (282991).

Gastrodontidae

Zonitoides arboreus (Say) (Fig. 1C) **New island record**

Previously only recorded from Oʻahu, Maui, and Hawaiʻi (Cowie, 1997), this species is common and widespread and probably occurs on all islands. This is the first record from Kauaʻi. A pest in orchid nurseries (Hollingsworth *et al*., 2003), it is now widespread in forest habitats.

Material examined: **KAUAʻI**: Kōkeʻe Road, right side, Waimea, N22°01.297', W159°41.533', KAH, J.R. Bedrosian, W.M. Meyer, M.M. Parker, 24 Mar 2007 (282849); Right side of Moi Road, near cemetery, Hanapēpē, N21°54.622', W159°35.633', RHC, S.H. Arnason, B.S. Holland, C.T. Tran, 25 Mar 2007 (282873).

Limacidae

Lehmannia valentiana (Férussac) (Fig. 1D) **New island records**

This Iberian species (Kerney & Cameron, 1979) is now widespread as a result of human activities (Barker, 1999). It was first recorded in the Hawaiian Islands as the junior synonym *Limax poirieri* Mabille in 1982 from Maui (Cowie, 1997). Although not abundant, this slug species is widespread in the Islands, and on the basis of the present records, is now present on all six of the largest islands.

Material examined: **KAUAʻI**: Alakaʻi Swamp Trail, Kāʻana, N22°08.448', W159°37.381', KAH, JRK, A.F. Johnson, C.H. Yee, 3 May 2008 (270783); **Oʻ AHU**: Mt Kaʻala, Wahiawā, no coordinates recorded, K. Kewelo, 14 Apr 2004 (275922), S.M. Joe, 9 Sep 2008 (275927); Mt Kaʻala, Wahiawā, N21°30.218', W158°08.510', J. Gustine, 26 Apr 2006 (275923 - 275924); Mt Kaʻala, Wahiawā, N21°29.342', W158°07.944', M. Keir, 26 Oct 2006 (275925); Mt Kaʻala, Wahiawā, no coordinates recorded, collector not known, 23 May 2007 (275926); Mt Kaʻala, bog end of boardwalk, Wahiawā, N21°30.154', W158°08.960', KAH, NWY, T.J. Skelton, 3 Sep 2008 (274173); **MOLOKAʻI**: Entrance to Pēpēʻōpae Bog Trail, Kaunakakai, N21°07.093', W156°54.489', KAH, NWY, JRK, T.J. Skelton, C.H. Yee, 15 Nov 2008 (274264); Kamakou Preserve, Kaunakakai, N21°07.235', W156°55.127', KAH, NWY, JRK, T.J. Skelton, C.H. Yee, 15 Nov 2008 (274270); **HAWAIʻI**: Waimea Lodge area, Waimea, N20°01.325', W155°40.135', KAH, C.T. Tran, 12 Feb 2006 (282556); Grass area along side of road and cattle fence, Kalaoa, N19°45.631', W155°50.529', KAH, NWY, W.M. Meyer, M.M. Parker, 13 Jun 2008 (270806); Kohala Forest Reserve, Waimea, N20°02.887' W155°40.426', KAH, NWY, W.M. Meyer, M.M. Parker, C.H. Yee, 14 Jun 2008 (270917); Just north of Honuaʻula Forest Reserve, Kalaoa, N19°42.924', W155°55.366', KAH, NWY, W.M. Meyer, C.H. Yee, 15 Jun 2008 (270830); 19-4127 Kalani Honua Loop, Volcano, N19°26.029', W155°14.527', KAH, NWY, JRK, T.J. Skelton, 20 Aug 2008 (270881); ʻŌlaʻa Forest Reserve, off Wright Road, Volcano, N19°27.728', W155°14.875', KAH, NWY, JRK, T.J. Skelton, 22 Aug 2008 (270908); University of Hawaiʻi College of Tropical Agriculture and Human Resources Volcano Research Station, Volcano, N19°04.943', W155°45.452', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 9 Apr 2010 (275104); University of Hawaiʻi College of Tropical Agriculture and Human Resources, Mealani Research Center, Waimea, N20°02.374', W155°36.452', KAH, NWY, JRK, T.J. Skelton, S. Sugiura, 9 Apr 2010 (275113).

Milacidae

Milax gagates (Draparnaud) (Fig. 1E) **New island record**

This European slug species has been present in the Hawaiian Islands since at least 1897; it was previously known only from Maui and Hawai‘i (Cowie, 1997). It appears to be a high elevation species, now recorded from the highest peak on O‘ahu. It is a major agricultural pest in Europe (Barker, 2002).

Material examined: **O‘AHU**: Mt. Ka‘ala, Wahiawā, N21°30.218', W158°08.510', J. Gustine, 26 Apr 2006 (275928–275929); Mt. Ka‘ala, Wahiawā, no coordinates recorded, S.M. Joe, 23 Jan 2007 (275930); Mt. Ka‘ala boardwalk, Wahiawā, no coordinates recorded, S.M. Joe, 9 Sep 2008 (275931).

Orthalicidae

Bulimulus guadalupensis (Bruguière) (Fig. 1F) **New state record**

This species originated in the Caribbean, where it is widespread, especially in disturbed habitats, (Robinson *et al*., 2009). It has been introduced to Florida, probably in association with agricultural or horticultural plants, and has been recorded in abundance in lawns and among ornamental plants in a residential area (Thompson, 1976), as was the present material. It is likely that it was introduced via the horticultural trade. The only two localities at which the species has been found in the Hawaiian Islands were close together and were also the only two localities at which *Vallonia pulchella* was found (see below). Although described originally from the island of Guadeloupe, Bruguière’s original spelling is retained because it is not clear that either the ‘a’ rather than ‘e’ or the ‘u’ rather than ‘ou’ were inadvertent errors (International Code of Zoological Nomenclature, Article 32.5).

Material examined: **O‘AHU**: 6416 101st Street, ‘Ewa Beach, N21°19.421', W157°58.922', KAH, NWY, JRK, RHC, B.S. Holland, 20 Jan 2009 (274138); 6284 Ibis Avenue, ‘Ewa Beach, N21°19.692', W157°58.715', KAH, NWY, JRK, RHC, B.S. Holland, 20 Jan 2009 (274152).

Oxychilidae

Oxychilus alliarius (Miller) (Fig. 1G) **New island records**

This western European species (Kerney & Cameron, 1979) is a facultative predator of other snails (Meyer & Cowie, 2010). It is known as the ‘garlic snail’ because of its ability to emit a strong smell of garlic when irritated. It was first recorded in the Hawaiian Islands in 1937 (Cowie, 1997), based on specimens in the Bishop Museum from Waimea, Island of Hawai‘i. Subsequently, it was recorded in abundance on both Hawai‘i and Maui (Cooke & Baker, 1947) where it was considered a threat to native species (Severns, 1984). It was later recorded from Kaua‘i and Moloka‘i (Cowie, 1997). Meyer & Cowie (2010) reported it from O‘ahu but without reference to voucher specimens. The present records formally extend its recorded distribution to all six of the largest Hawaiian Islands. It is now one of the most widespread snail species in the Islands.

Material examined: **O‘AHU**: Wai‘anae Range, Mokulē‘ia, N21°32.395', W158°11.650', KAH, NWY, JRK, T.J. Skelton, 4 Aug 2008 (270848); Wai‘anae Range, Mokulē‘ia, N21°32.693', W158°11.680', KAH, NWY, JRK, T.J. Skelton, 4 Aug 2008 (270849); Mt. Ka‘ala bog near Natural Area Reserve, edge of forest where grass turns into *Metrosideros polymorpha* forest, Wahiawā, N21°30.436', W158°08.634', KAH, NWY, T.J. Skelton, 3 Sep 2008 (274180); Outside of Nike nursery, Mokulē‘ia, N21°32.754', W158°11.685', RHC, NWY, JRK, S. Sugiura, 20 Oct 2009 (270816). **LĀNA‘I**: Top of Lāna‘i, Department of Land and Natural Resources land, Lāna‘i City, N20°48.796', W156°52.541', KAH, NWY, JRK, T.J. Skelton, 25 Oct 2008 (274245); Road down from the top of Lāna‘i, Department of Land and Natural Resources land, Lāna‘i City, N20°50.259', W156°53.823', KAH, NWY, JRK, T.J. Skelton, 25 Oct 2008 (274251).

Subulinidae

Allopeas clavulinum (Potiez & Michaud) (Fig. 1H) **New island records**

Subulinidae are notoriously difficult to identify and a number of species have been introduced widely in the islands of the Pacific, including the Hawaiian Islands (Cowie, 2001). Their geographical origins are somewhat obscure but *Allopeas clavulinum* is thought to be native to East Africa (Kerney & Cameron, 1979). It was first recorded in the Hawaiian Islands, from the Island of Hawai‘i, in 1906 (Cowie, 1997). Cowie *et al*. (2008) extended the recorded distribution to Kaua‘i, O‘ahu, and Maui without reference to voucher specimens and Hayes *et al*. (2007) did not include those records so they are provided here. The subspecies *hawaiiense* Sykes is probably a junior synonym (Cowie, 1997), although it has not been formally synonymized, and had been recorded from Kaua‘i, O‘ahu, Moloka‘i, Maui and Hawai‘i over a century ago by Pilsbry (1906–1907). This is the first formal record from Moloka‘i and the first vouchered records from Kaua‘i, O‘ahu, and Maui.

Material examined: **KAUA‘I**: Kaua‘i Hog and Ground Cover, Līhu‘e, N21°55.855', W159°28.983', KAH, C.T. Tran, 21 Mar 2005 (281346); Alexander’s Nursery, Kuamo‘o Road, Kapa‘a, N22°03.420', W159°22.878', KAH, C.T. Tran, 21 Mar 2005 (270634); Growing Green Nursery, Līhu‘e, N22°05.832', W159°22.112, KAH, C.T. Tran, 22 Mar 2005 (281367); **O‘AHU**: Charles Nii Nursery, Hawai‘i Kai, N21°18.280', W157°41.718', KAH, C.T. Tran, 26 Feb 2005 (281316); **MOLOKA‘I**: Kalaupapa lookout, Kalaupapa, N21°10.528', W157°00.310', KAH, M.M. Parker, C.T. Tran, 27 Jun 2006 (270708); **MAUI**: Ho‘olawa Nursery, Ha‘ikū, N20°55.875', W156°19.073', KAH, RHC, 15 Dec 2004 (281232); Tropical Gardens of Maui, Wailuku, N20°52.965', W156°31.022', KAH, RHC, 16 Dec 2004 (270626); Kihana Nursery, Kīhei, N20°44.248', W156°27.237', KAH, C.T. Tran, 12 Mar 2005 (270633).

Valloniidae

Vallonia pulchella (Müller) (Fig. 1I) **New state record**

The native range of this species is considered Holarctic (Kerney & Cameron, 1979), although including only Europe and eastern and central North America (Forsyth, 1999). It has been introduced to many places throughout the world (Gerber, 1996; Robinson, 1999). The only two localities at which the species has found in the Hawaiian Islands were close together and were also the only two localities at which *Bulimulus guadalupensis* was found (see above).

Material examined: **O‘AHU**: 6416 101st Street, ‘Ewa Beach, N21°19.421', W157°58.922', KAH, NWY, JRK, RHC, B.S. Holland, 20 Jan 2009 (274150); 6284 Ibis Avenue, ‘Ewa Beach, N21°19.692', W157°58.715', KAH, NWY, JRK, RHC, B.S. Holland, 20 Jan 2009 (274154).

Acknowledgments

We thank all the people named in the lists of material examined for help with collecting, and the landowners for permitting access. We especially thank Stephanie M. Joe, Vincent Costello and all the personnel of the O‘ahu Army Natural Resources Program for logistical support and collecting specimens from U.S. Army land. We are grateful to Betsy Gagné and Cynthia King of the Department of Forestry and Wildlife for their assistance with permitting and access to state lands. Regina Kawamoto helped us with depositing the specimens in the Bishop Museum, and Dylan Ressler assisted with photography, and Joaquín Ramírez provided the photograph of *M. gagates*. This work was supported by grants from the U.S. Department of Agriculture, Cooperative Agricultural Pest Survey (CAPS) program, and we thank Yolisa Ishibashi of that program.

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Records of the Hawaii Biological Survey for 2011. Edited by
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Occasional Papers* 112: 29–38 (2012)

A New Species of *Yaldwynopsis* from O‘ahu, Hawai‘i (Crustacea: Decapoda: Brachyura: Homolidae)[1]

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The homolid genus *Yaldwynopsis* Guinot & Richer de Forges, 1995, was established for *Paromola spinimana* Griffin, 1965, described from New Zealand. Guinot & Richer de Forges (1995: 439) subsequently reported this species from Japan, Hawai‘i, and French Polynesia. Richer de Forges & Ng (2007) revised the genus and recognized two new species, *Y. saguili* (from Japan and Taiwan) and *Y. guinotae* (from French Polynesia), distinguishing them from *Y. spinimana s. str.* by the proportions and structures of their third maxillipeds, chelipeds, and ambulatory legs. They commented that they were unable to examine the Hawaiian specimen at the time of their study and left its identity as incerta sedis.

The female specimen in question, deposited in the Bishop Museum (BPBM), Honolulu, was recently examined. While it has the ambulatory leg proportions of *Y. spinimanus*, the armature is closer to that of *Y. guinotae*; but the number and arrangement of spines was nevertheless different enough to indicate that the Hawaiian specimen should be referred to a new species, here named *Y. hawaiiiana*.

The present paper describes the species and compares it with congeners. Measurements provided are of the carapace length (cl) and width (cw), respectively. The terminology used essentially follows that proposed by Guinot & Richer de Forges (1995: Fig. 52) for the genus. The abbreviations P1–5 refer to pereiopods 1–5, respectively. Comparative material from the following institutions were also examined as part of this study: Muséum National d’Histoire Naturelle, Paris, France (MNHN); Crustacean Collection of the National Museum of the Philippines, Manila, Philippines (NMCR); National Museum of New Zealand, Te Papa Tongarewa, Wellington, New Zealand (NMNZ); and Zoological Reference Collection of the Raffles Museum of Biodiversity Research, National University of Singapore (ZRC).

Yaldwynopsis Guinot & Richer de Forges, 1995

Remarks. Four species of *Yaldwynopsis* are now known, all from the West Pacific (Ng *et al*., 2008). Through the courtesy of Colin McLay (University of Canterbury, Christchurch) and Rick Webber (National Museum of New Zealand, Wellington), the authors were able to examine an excellent series of photographs of the type male and another male specimen of *Y. spinimanus* in NMNZ. They complement the otherwise detailed description and figures of the species by Griffin (1965). As such, several characters cited by Richer de Forges & Ng (2007) as separating *Y. spinimanus* from *Y. guinotae* and *Y. saguili* need to be amended. One

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key character is the presence of two spines on the base of the dactylus of the chela, which was neither described nor figured by Griffin (1965). As such, Richer de Forges & Ng (2007) had regarded the dactylus as unarmed; which is incorrect. The chelipeds and ambulatory legs of the type male of *Y. spinimanus* are figured here to allow for more accurate comparisons.

Yaldwynopsis hawaiiana Ng & Eldredge, **new species**
(Figs. 1A, 2, 3, 5A, B, 6A–F)

Homala japonica - Clarke, 1972: 16 (not *Homola japonica* Parisi, 1915).
Paromola spinimana - Titgen, 1988: 144.
Yaldwynopsis spinimanus - Guinot & Richer de Forges, 1995: 439; Castro, 2011: 36; Garassino, 2009: 4, 39 (not *Paromola spinimana* Griffin, 1965)

Type. *Holotype* female (cl 44.7 mm [measured between bases of spines], cl 45.27 mm [including spines]; cw 35.4 mm [base of spines], cw 40.82 mm [including spines]) (BPBM S7866), Barbers Point, off Kane‘ohe, O‘ahu, Hawai‘i, in shrimp trap, 293 m (160 fathoms) depth, collection number 69-10-12, coll. T. Clarke, 9–10 Nov 1970.

Comparative material. *Yaldwynopsis spinimanus* (Griffin, 1965): holotype male (cl 53.0 mm, cw 41.0 mm) (NMNZ Cr 1550) [photographs examined], off North East Island, Three Kings Islands, New Zealand, 50 fathoms, coll. A. Baker, Auckland University Three Kings Expedition, Jan 1963; 1 male (cl 51.5 mm, cw 36.0 mm) (NMNZ Cr 1860) [photographs examined], off Pinnacle Rocks, near Poor Knights Islands, New Zealand, in crayfish pot, ca. 100 m, coll. F. Cotterill, 10 Jan 1969. *Yaldwynopsis saguili*, Richer de Forges & Ng, 2007: holotype male (cl 36.9 mm, cw 30.5 mm) (NMCR), 3 female paratypes (ZRC), 1 ovigerous female paratype (cl 25.4 mm, cw 20.7 mm) (ZRC), Balicasag Island, Bohol and Sulu Seas, 80-100m, Philippines, coll. Panglao 2004 and 2005 Expeditions; 1 paratype male (cl 32.3 mm, cw 26.0 mm) (ZRC 2001.0549), Balicasag Island, Panglao Island, Bohol, Philippines coll. fishermen with tangle nets on the reef slope, 100-500 m, 28 Nov 2001; 1 male (cl 20.8 mm, cw 17.4 mm) (ZRC), Tashi fishing port, northeastern Taiwan, T. Y. Chan, coll. 1999. *Yaldwynopsis guinotae*, Richer de Forges & Ng, 2007: holotype male (cl 34.0 mm, cw 25.0 mm) (MNHN-B 24312), station 231, 22°12.0’S–138°45.9’W, 270 m, Tuamotu, Fangataufa Atoll, French Polynesia, by traps, coll. J. Poupin, 21 May 1990.

Diagnosis. Carapace with 1 supraocular spine; 1 pseudorbital spine; 4 short protogastric spines; main anterolateral spine strong, pointing obliquely anteriorly; subhepatic region with 5 strong spines, first largest; sub-orbital area with 1 spine, slightly shorter than supraorbital spine; cheliped merus with 3 rows of long, sharp, curved spines; upper row with 7 spines; lower outer border with 18 spines; carpus with row of 6-8 spines along inner margin; palm with 2 rows of long spines: upper border with 6 or 7 spines; lower border with 11 spines; dactylar finger with 2 strong spines on upper border near base; ambulatory legs long, slender; P2 with upper margin of merus bearing 11 spines and sharp distal tooth, inner surface with about 10 spinules on proximal quarter; upper margin of merus of P4 with total of 11 spines; outer surface with 3 tubercles on proximal part; lower margin with total of 16 small spines; P5 slender, merus with 2 spines on dorsal margin, 4 spines and 2 spinules on ventral margin, outer surface of basal fifth with 2 distinct tubercles.

Description. Large species, very spiny on carapace, appendages, chelipeds and ambulatory legs (Figs. 1A, 2). Surface of the carapace with deep grooves and well marked regions (Fig. 1A). Rostrum simple, not longer than other spines of anterior part of carapace (Fig. 1A).

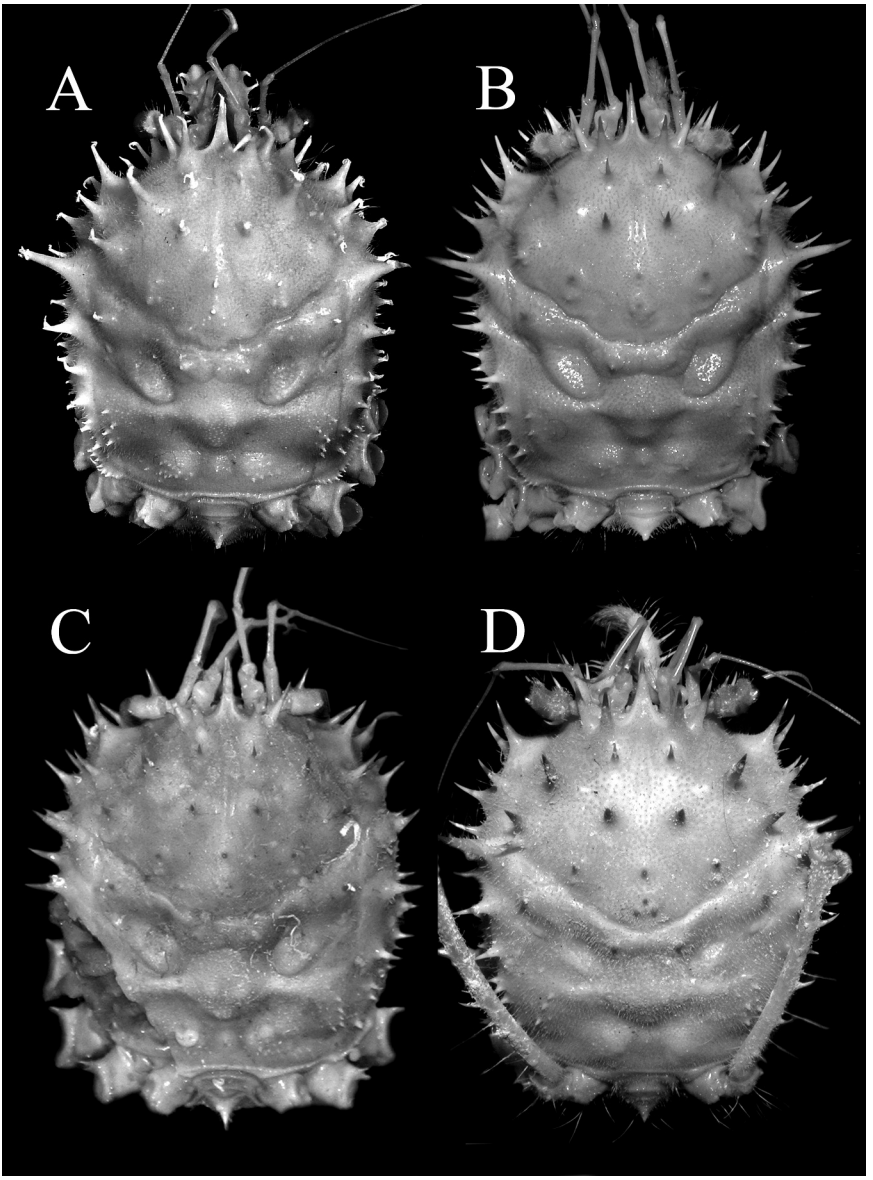

Figure 1. Dorsal views of carapaces. **A**, *Yaldwynopsis hawaiiana* sp. nov., holotype female (carapace length 44.7 mm, carapace width 35.4 mm) (BPBM S7866), Hawai'i; **B**, *Y. guinotae*, Richer de Forges & Ng, 2007, holotype male (carapace length 34.0 mm, carapace width 25.0 mm) (MNHN-B 24312), French Polynesia; **C**, *Y. spinimanus* (Griffin, 1965), male (carapace length 51.5 mm, carapace width 36.0 mm) (NMNZ Cr 1860), New Zealand; **D**, *Y. saguili*, Richer de Forges & Ng, 2007, holotype male (carapace length 36.9 mm, carapace width 30.5 mm) (NMCR), Philippines.

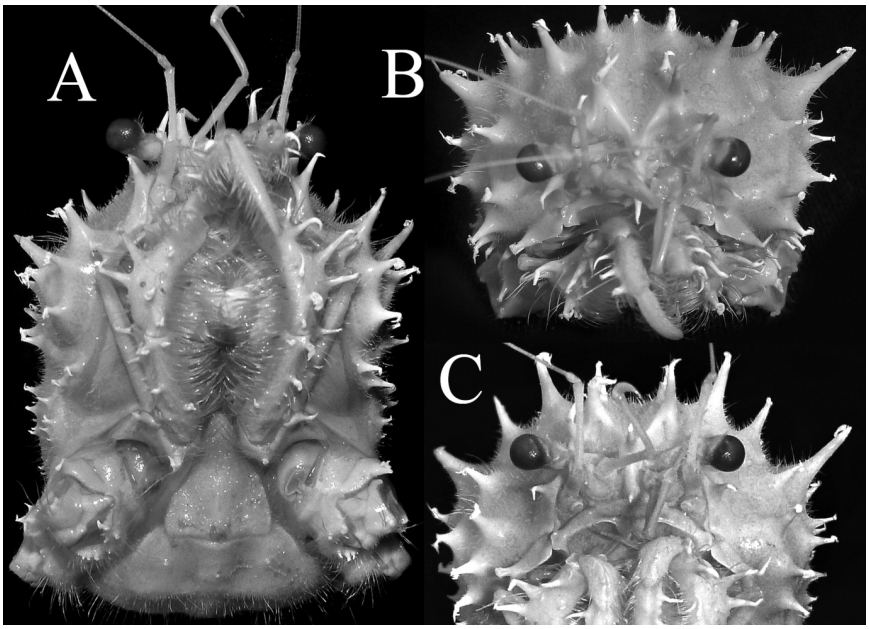

Figure 2. *Yaldwynopsis hawaiiana* sp. nov., holotype female (carapace length 44.7 mm, carapace width 35.4 mm) (BPBM S7866), Hawai'i. **A**, ventral view of thoracic sternum and abdomen; **B**, **C**, frontal view of carapace.

Carapace with 1 supraocular spine; 1 pseudorbital spine, with a spinule behind it; 4 short protogastric spines; anterolateral spine strong, pointing obliquely anteriorly, followed behind along posterolateral margin by a series of spines of decreasing sizes (Figs. 1A, 2A, B). Cervical groove prominently marked (Fig. 1A). Posterior carapace margin distinctly concave; lateral margins of branchiostegite serrulated (Fig. 1A). Lateral border of carapace on branchial region covered with scattered spinules (Fig. 1A). Subhepatic region with 5 strong spines, first largest, directed almost anteriorly (Figs. 1A, 2B, 2C). Sub-orbital area with 1 spine, slightly shorter than supraorbital spine (Figs. 1 A, 2B, C). Buccal spine strong (Fig. 2A). Ocular peduncle relatively short, slender, eyes subspherical (Fig. 2). Antennules with a bulbous basal article, other articles long, slender, with short flagellum (Fig. 2C). Antennae short, first article with large urinary article; second article cylindrical with 1 subterminal spine, third article long, slender (Fig. 1A). Third maxilliped subpediform, very spinous; inner margins lined with dense long yellow setae; basis with 2 strong lateral spines; ischium with 8 spines; merus with 11 spines of varying sizes; carpus short, unarmed; propodus with 3 long spines along outer border; dactylus long, unarmed (Fig. 2).

Cheliped relatively long, slender, spiny (Fig. 3); coxa with small anterior spine, ventral surface with several small granules; ischium subtrigonal in cross-section, with rows of spines on each margin; merus with 3 rows of long, sharp, curved spines; upper row with 7 spines; lower outer border with 18 spines (Fig. 1A, B); carpus relatively short, triangular in dorsal view, with row of 6-8 spines along inner margin, median ones longest; outer surface with 2 rows of short spines (Fig. 3A, 3B). Palm with 2 rows of long spines: upper border

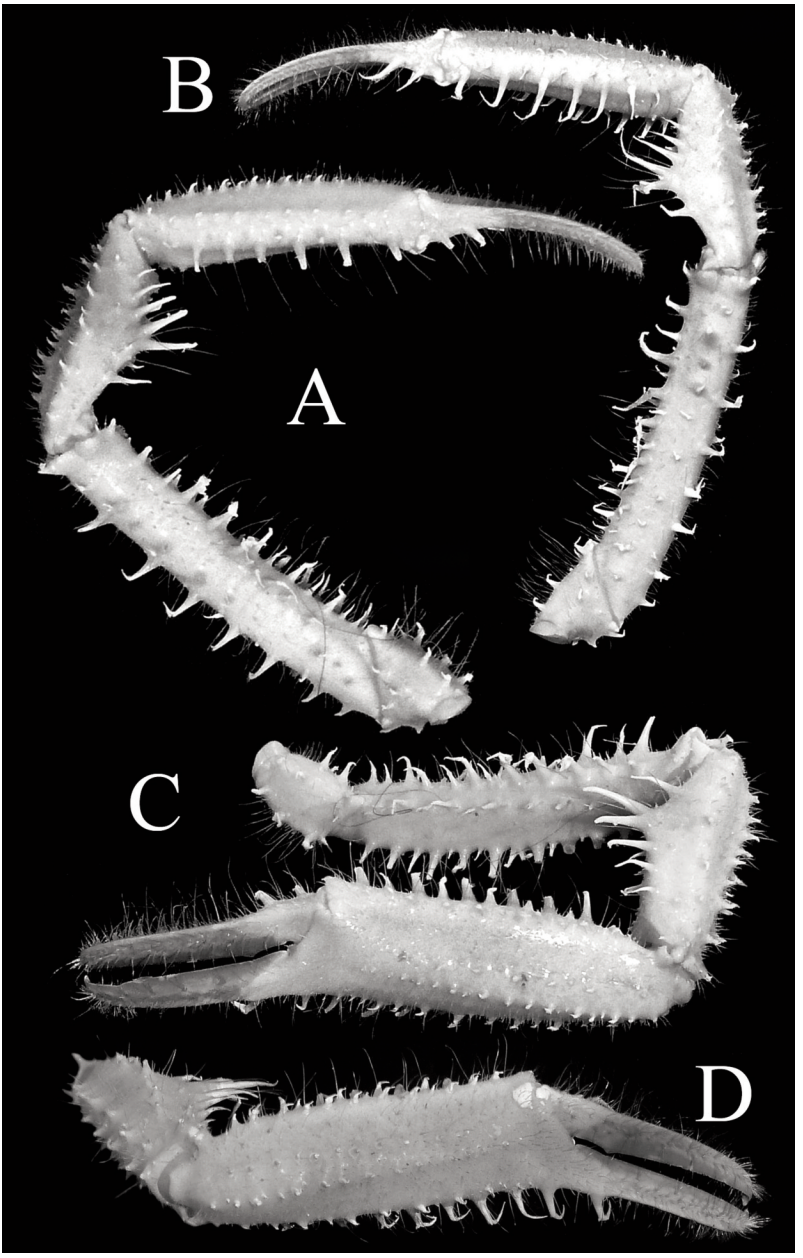

Figure 3. *Yaldwynopsis hawaiiana* sp. nov., holotype female (carapace length 44.7 mm, carapace width 35.4 mm) (BPBM S7866), Hawai'i. **A**, **B**, dorsolateral views of chelipeds; **C**, **D**, outer views of chelae. **A**, **C**, left cheliped; **B**, **D**, right cheliped.

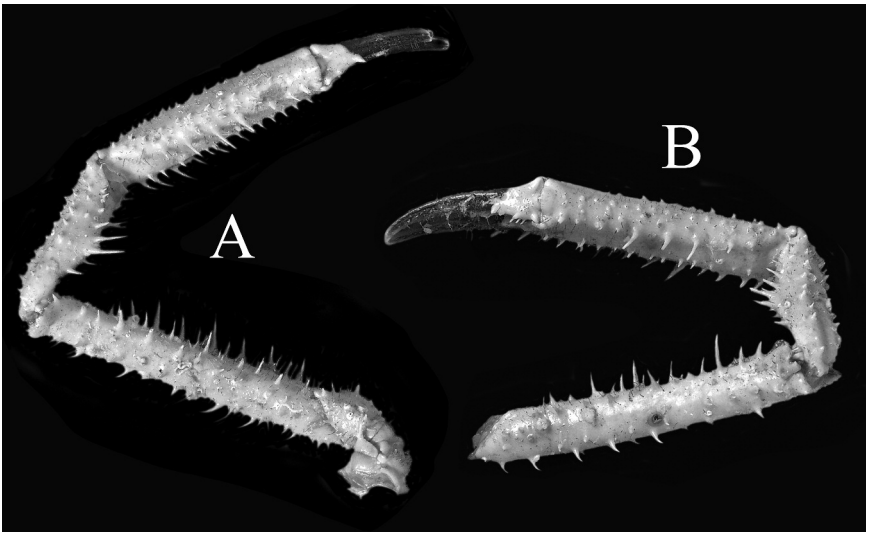

Figure 4. *Yaldwynopsis spinimanus* (Griffin, 1965), holotype male (carapace length 53.0 mm, carapace width 41.0 mm) (NMNZ Cr 1550), New Zealand. Dorsolateral views of chelipeds. **A**, left cheliped; **B**, right cheliped.

with 6 or 7 spines; lower border with 11 spines; fingers shorter than palm, with hooked tips, pigmented throughout most of length except near base, cutting edges blade-like; dactylus with 2 strong spines on upper border near base (Fig. 3C, D).

Ambulatory legs long, slender; coxa of P2–4 with 2 short spines on anterior margin. P2 with upper margin of merus bearing 11 spines and sharp distal tooth, inner surface with about 10 spinules on proximal quarter, basis-ischium with 3 ventral, 1 dorsal and 2 inner spines (Figs. 5A, 6B). Upper margin of merus of P4 with total of 11 spines, arranged as 2 rows of spines proximally (with 4 spines each), merging into single row distally (with 3 spines) (Figs. 5B, 6A); outer surface with 3 tubercles on proximal part; lower margin with total of 16 small spines, arranged in 2 rows proximally (with 7 and 5 spines), merging into single row distally (with 4 spines); basis-ischium with 1 dorsal spine. P5 slender; basis-ischium with 1 strong ventral spine; merus with 2 spines on dorsal margin, 4 spines and 2 spinules on ventral margin, outer surface of basal fifth with 2 distinct tubercles (Fig. 6C, D); dactylus and propodus forming prominent subchelate structure, inner margin of propodus armed with sharp spines (Fig. 6E, F).

Female abdomen ovate, completely covering thoracic sternal surface; telson triangular with rounded tip, distinctly sinuous lateral margins (Fig. 2A); somite 2 with small median spine; somite 6 with transverse row of 3 low granules; all other somites unarmed. Vulva on sternite 5 large, obliquely elliptical, without visible operculum.

Etymology. The species is named after the Hawaiian Archipelago.

Remarks. The labels associated with the specimens indicate the specimen was collected "by T. Clarke in a gill net from 100 fathoms depth on 28–29 October 1969, with a col-

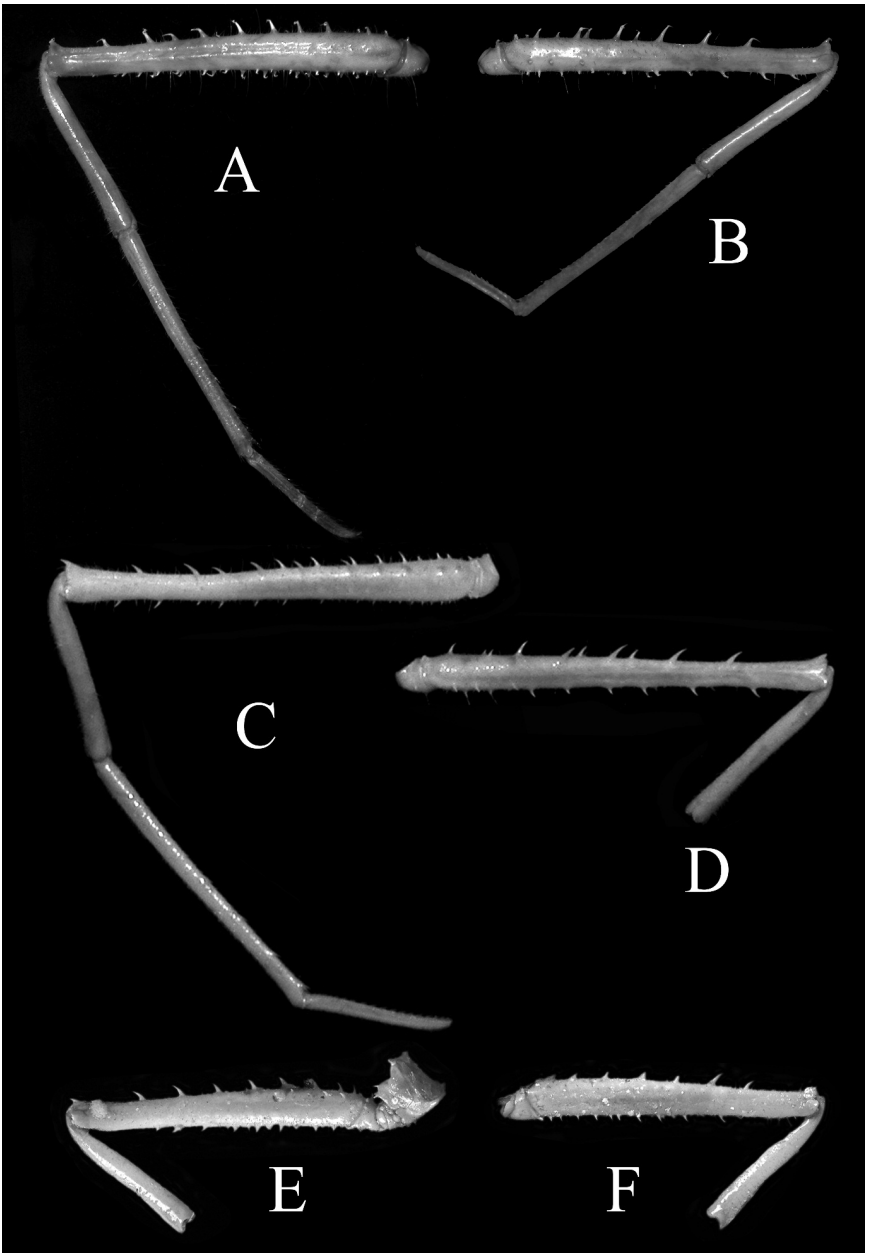

Figure 5. Ambulatory legs. **A, B**, *Yaldwynopsis hawaiiana* sp. nov., holotype female (carapace length 44.7 mm, carapace width 35.4 mm) (BPBM S7866), Hawai'i; **C, D**, *Y. guinotae*, Richer de Forges & Ng, 2007, holotype male (carapace length 34.0 mm, carapace width 25.0 mm) (MNHN-B 24312), French Polynesia; **E, F**, *Y. spinimanus* (Griffin, 1965), holotype male (carapace length 53.0 mm, carapace width 41.0 mm) (NMNZ Cr 1550), New Zealand. **A, C, E**, left P2; **B, D, F**, right P4.

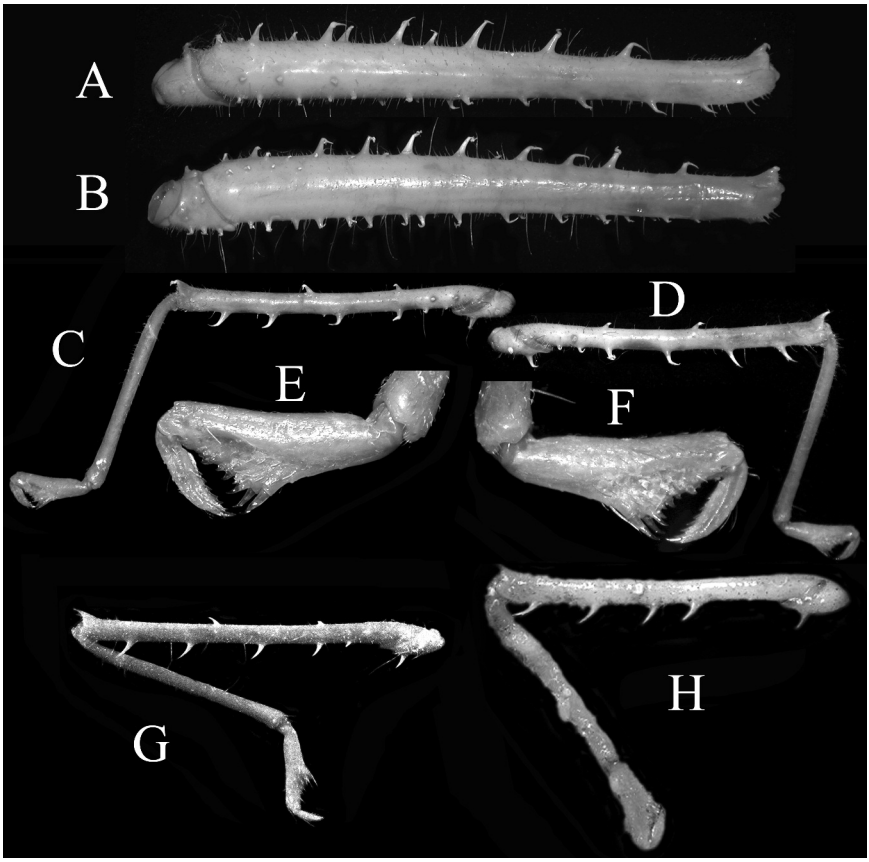

Figure 6. **A–F**, *Yaldwynopsis hawaiiana* sp. nov., holotype female (carapace length 44.7 mm, carapace width 35.4 mm) (BPBM S7866), Hawai'i; **G**, *Y. guinotae*, Richer de Forges & Ng, 2007, holotype male (carapace length 34.0 mm, carapace width 25.0 mm) (MNHN-B 24312), French Polynesia; **H**, *Y. spinimanus* (Griffin, 1965), holotype male (carapace length 53.0 mm, carapace width 41.0 mm) (NMNZ Cr 1550), New Zealand. **A**, right P4 (outer view); **B**, left P2, inner-marginal view; **C**, left P5; **D**, right P5; **E**, left subchelate structure of P5; **F**, right subchelate structure of P5; **G, H**.

lection number 69-10-12". However, Clarke's (1972) detailed report makes it clear that the specimen (which he incorrectly identified as "*Homala japonica*") was actually collected in 1970 from a trap in deeper water.

The type specimen of *Y. hawaiiana* on hand is not in good condition. It had clearly been preserved in formalin in the past and the carapace and appendages are slightly soft. Only the two chelipeds, two ambulatory legs and the last two pereiopods are present, but all are disarticulated. While it is no problem to determine whether the pereiopods are left or right, it was less easy to ascertain which pereiopod the two loose ambulatory legs belong to. In homolids, the last pair of legs (P5) is modified for carrying (see Guinot *et*

al., 1995) and the dactylus and propodus form a subchelate structure. The three unspecialised ambulatory legs (P2–4), however, are similar in structure and length. Examination of intact specimens of *Y. saguili* revealed some important features that enabled the identity of the two ambulatory legs in the present specimen of *Y. hawaiiana* to be determined. The outer surface of the merus (facing the posterior) of P4 has one to three median tubercles or granules on the proximal part; a feature absent on all the other meri. On this basis, the right ambulatory leg of *Y. hawaiiana* is here ascertained to be P4 (Fig. 6A). The spination on the basis-ischium of the legs is also different. In the basis-ischia of P3 and P4, the ventral margin is granular but never strongly spiniform. Prominent spines are present, however, on the basis-ischium of the P2. On this basis, the left leg of *Y. hawaiiana* is here identified to be the P2 (Fig. 6B).

The present specimen of *Yaldwynopsis* superficially resembles *Y. spinimanus* in possessing relatively shorter ambulatory legs (Figs. 4, 5). However the armature is completely different. In *Y. hawaiiana*, the inner ventral margin of the palm has 18 spines (Fig. 3) (versus 12 in *Y. spinimanus*, Fig. 4); there are a total of 11 spines and spinules on the dorsal margin of the merus of P4 (versus 7 in *Y. spinimanus*, Fig. 5F), the merus of P5 is relatively more slender (Fig. 6A, B) (versus proportionately stouter in *Y. spinimanus*, Fig. 6H); and the dorsal margin of the merus of P5 has two spines (Fig. 6A, B) (versus unarmed in *Y. spinimanus*, Fig. 6H).

Yaldwynopsis hawaiiana is perhaps closest to *Y. guinotae* in the armature of the ambulatory legs. It is the only species in which the merus of P5 also has two spines on the dorsal margin and their proportions are similar (Fig. 6G). In the case of *Y. hawaiiana*, there are also two additional tubercles on the outer surface near the base (Fig. 6C, D). In addition, the P2 and P4 are proportionately shorter in *Y. hawaiiana* (Figs. 5A, B, 6A, B) compared to *Y. guinotae* (Fig. 5C, D); there are two spines at the base of the dorsal margin of the dactylus of the chela (Fig. 3) (versus four in *Y. guinotae*, see Guinot & Richer de Forges, 1997: Fig. 53E; Richer de Forges & Ng, 2007: Fig. 7E); the inner dorsal margin of the palm has six spines (Fig. 3) (versus 10 in *Y. guinotae*, see Guinot & Richer de Forges, 1997: Fig. 53E; Richer de Forges & Ng, 2007: Fig. 7E); and the merus of P4 has a total of 11 and 16 spines on the dorsal and ventral margins, respectively (Figs. 5B, 6A) (versus 8 and 7, respectively, in *Y. guinotae*, Fig. 5D).

Ecology. Not much is known about the ecology of this species other than it was collected from gill nets set in deep water at about 183 m. As has been discussed by Ng *et al.* (2009) and Mendoza *et al.* (2010), there is a component of deep-sea fauna which is generally regarded as rare because their preferred habitats (steep rocky areas) are extremely difficult to sample.

Acknowledgments

The authors thank Colin McLay (University of Canterbury, Christchurch) and Rick Webber (National Museum of New Zealand, Wellington) for their help in photographing the specimens of *Y. spinimanus*. Thanks are also due to Bertrand Richer de Forges for his many insightful discussions on the genus. The study was partially supported by various travel and research grants to the first author from the Faculty of Science, National University of Singapore and Bishop Museum.

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Records of the Hawaii Biological Survey for 2011. Edited by
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Occasional Papers* 112: 39–42 (2012)

New Arthropod Records from Maui, Molokaʻi, and Lānaʻi[1]

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The following contributions include new arthropod records from the islands of Maui, Molokaʻi, and Lānaʻi. Voucher specimens were collected by the authors, members of the Maui public, and staff of the Molokaʻi and Maui Invasive Species Committees (MoMISC & MISC). Most of the ants (Hymenoptera: Formicidae) were collected using peanut butter lures during surveys for little fire ant (*Wasmannia auropunctata*), though many from Molokaʻi were also found in visual searches. Ants (Formicidae) were preliminarily identified by the authors and further identified and confirmed by Paul Krushelnycky. Beetles (Coleoptera) were identified by the authors and confirmed by Al Samuelson. Vouchers are housed in Bishop Museum, Honolulu (BPBM).

Coleoptera: Buprestidae

Chrysobothris octocola Le Conte **New island record**

Native to the dry Southwest United States and Mexico, *Chrysobothris octocola* was first recorded in Hawaiʻi in 1960, when three specimens were collected at Makua, Oʻahu on *kiawe* (*Prosopis pallida*) and two additional specimens were collected at Makaha, Oʻahu on a parked automobile (Ford 1961: 321). Previously known from Oʻahu, Lānaʻi, and Hawaiʻi (Nishida 2002: 38), this iridescent spotted borer is now known from Maui where it was collected in Pukalani on a sticky part of a truck that had been near *kiawe* getting cut above Kīhei earlier that day.

Material examined. **MAUI**: Pukalani, Pukalani Terrace Center, on truck that was recently working with *kiawe* (*Prosopis*) above Kīhei, 1400 ft [427 m], 23 Apr 2011, *Starr 110423-01* (2 specimens).

Coleoptera: Cerambycidae

Xystrocera globosa (Olivier) **New island record**

First recorded from the state in 1900 (Gressitt & Davis 1972: 220), *Xystrocera globosa* (monkeypod borer) was previously recorded from Niʻihau, Kauaʻi, Oʻahu, and Hawaiʻi (Nishida 2002: 47). This large beetle is now also known from Maui.

Material examined. **MAUI**: Makawao, Seabury Hall, collected on truck near gym by MISC staff, 1900 ft [579 m], 14 Mar 2011, *Starr 110314-01* (2 specimens).

Coleoptera: Oedemeridae

Thelyphassa apicata (Fairmaire) **New island record**

Previously known from Oʻahu (Nishida 2002: 70), *Thelyphassa apicata* is a potential health hazard, and is now known from Maui, where it was entering homes in Haʻikū and inflicting painful dermatitis on occupants while they slept.

Material examined. **MAUI**: Haʻikū, Ulumalu, inside house, collected by E. Speith and A. Barry, 600 ft [182 m], 4 Jun 2011, *Starr 110604-01* (16 specimens).

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Hymenoptera: Formicidae

Cardiocondyla obscurior (Wheeler) **New island record**

Native locality unknown. First recorded in Hawai‘i in 1994 (Seifert 2003: 272; Krushelnycky *et al.* 2005: 23), *Cardiocondyla obscurior* was previously reported from Kurtistown and Hilo on the island of Hawai‘i, and is now known from Moloka‘i.

Material examined. **MOLOKA‘I**: West Moloka‘i, Paka‘a Right of Way, on sea grape (*Coccoloba*) tree, collected by MoMISC #U4.7, 10 ft [3 m], 28 Sep 2011, *Starr 110928-02* (8 specimens). West Moloka‘i, Dixies Right of Way, by rubbish bin, collected by MoMISC #U4.8, 10 ft [3 m], 28 Sep 2011, *Starr 110928-03* (1 specimen)

Monomorium destructor (Jerdon) **New island record**

Native to Africa or India, and first recorded from the state in 1899, (Krushelnycky *et al.* 2005: 23), *Monomorium destructor* (Singapore ant) was previously known from Laysan, French Frigate Shoals, all the main Hawaiian Islands except Ni‘ihau, Moloka‘i, and Lāna‘i (Nishida 2002: 169; Starr & Starr 2007: 46; Starr & Starr 2011: 37). This tramp ant is now also known from Moloka‘i and Lāna‘i, leaving Ni‘hau the only main Hawaiian island it has yet to be documented from.

Material examined. **MOLOKA‘I**: Kaunakakai, Wharf, on *Plumeria* by Moloka‘i Princess, collected by MoMISC #M6.1, 5 ft [1.5 m], 19 Sep 2011, *Starr 110919-01* (50 specimens). **LĀNA‘I**: Kaumalapau Harbor, collected by MISC, 30 ft [9 m], 27 May 2011, *Starr 110527-02* (100 specimens).

Pheidole fervens F. Smith **New island record**

Native to Asia, and first recorded in Hawai‘i in 1967 (Krushelnycky *et al.* 2005: 24), *Pheidole fervens* was previously known from Kaua‘i, O‘ahu, Maui, and Hawai‘i (Nishida 2002), and is now also known from Moloka‘i.

Material examined. **MOLOKA‘I**: Kaunakakai, Wharf, in warehouse, collected by MoMISC #M6.3 & M6.5, 5 ft [1.5 m], 19 Sep 2011, *Starr 110919-04* (30 specimens)

Solenopsis sp.

Area of origin unknown. First recorded in the state in 2000, from Hilo, Hawai‘i (Gruner 2000). This small yellow *Solenopsis* is now known from Moloka‘i.

Material examined. **MOLOKA‘I**: Kualapu‘u, Kualapu‘u Recreation Center, next to kitchen entrance, collected by MoMISC #P1.8, 900 ft [275 m], 26 Sep 2011, *Starr 110926-01* (100 specimens).

Technomyrmex difficilis (Forel) **New island record**

Specimens of this species first appeared in state collections in 1994 (Krushelnycky unpub. data). *Technomyrmex difficilis* is easily confused with *T. albipes* (white-footed ant), and would have been identified as such in the past. Previously known from O‘ahu, Maui, and Kaho‘olawe (AntWeb 2011). This white footed black ant is now known from Moloka‘i.

Material examined. **MOLOKA‘I**: West Moloka‘i, Paniolo Hale, along entrance to building, collected by MoMISC #U1.3, 65 ft [20 m], 28 Sep 2011, *Starr 110928-01* (1 specimen). Kamalo Harbor, on *kiawe* (*Prosopis*) tree, collected by MoMISC #I1.2, 10 ft [3 m], 8 Sep 2011, *Starr 110908-01* (2 specimens). Kala‘e, residence, on stairways to yurt, collected by MoMISC #Q1.1, 1250 ft [380 m], 26 Sep 2011, *Starr 110926-02* (7 specimens).

Tetramorium bicarinatum (Nylander) **New island record**

Native to SE Asia, and first recorded in Hawai‘i in 1879 (Krushelnycky *et al.* 2005: 24), *Tetramorium bicarinatum* (Guinea ant) was previously known from most of the Northwestern Hawaiian Islands and all the main Hawaiian Islands except Lāna‘i and Moloka‘i (Nishida 2002: 170; Starr & Starr 2011). This moisture loving rough textured ant is now found on Lāna‘i.

Material examined. **LĀNA‘I**: Manele Harbor, collected by MISC, 10 ft [3 m], 27 May 2011, *Starr 110527-01* (24 specimens).

Tetramorium caldarium (Roger) **New island record**

Believed to be native to Africa and widely distributed across the Pacific and other tropical regions (Sarnat 2010), *T. caldarium* is nearly indistinguishable from *T. simillimum*, and many instances of *T. caldarium* are likely misidentified as *T. simillimum* (Sarnat 2010). Previously known from all the main Hawaiian Islands except Ni‘ihau, Moloka‘i, and Lāna‘i (AntWeb 2011; Starr & Starr 2011: 38), *T. caldarium* is now known from Moloka‘i.

Material examined. **MOLOKA‘I**: Kalama Kalama‘ula, Nā‘iwa Landfill, back of check in office, collected by MoMISC #O4.2, 300 ft [90 m], 20 Sep 2011, *Starr 110920-01* (7 specimens). Kaunakakai, Makoa Trucking, makai side of entrance, collected by MoMISC #M8.2, 10 ft [3 m], 28 Sep 2011, *Starr 110919-02* (1 specimen).

Tetramorium simillimum (F. Smith) **New island record**

Native to Europe, and first recorded in Hawai‘i in 1934 (Krushelnycky *et al.* 2005: 24), *Tetramorium simillimum* was previously known from all the main Hawaiian Islands except Ni‘ihau and Moloka‘i, and is now known from Moloka‘i, leaving Ni‘ihau as the only main Hawaiian Island from which this ant has yet to be documented.

Material examined. **MOLOKA‘I**: Kalama‘ula, Kalawe, in garden in front of house, collected by MoMISC #O1.1, 66 ft [20 m], 20 Sep 2011, *Starr 110920-02* (50 specimens). Kaunakakai, Duke Maliu Park, N of bathroom / walkway, collected by MoMISC #M3.2, 10 ft [3 m], 28 Sep 2011, *Starr 110919-03* (1 specimen). Kalama‘ula, Kulana ‘Ōiwi, W of turnaround, on wall, collected by MoMISC #N1.1, 33 ft [10 m], 28 Sep 2011, *Starr 110920-03* (30 specimens).

Acknowledgments

We thank Paul Krushelnycky and Al Samuelson for identification assistance, updated taxonomic insights, and review of earlier drafts of this paper; Elizabeth Speith for false blister beetle collection; MoMISC and MISC staff for ant and monkeypod borer collections; and the Bishop Museum staff and volunteers for curation of specimens and publishing new records.

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