RECORDS OF THE HAWAII BIOLOGICAL SURVEY FOR 1995
Part 2: Notes[1]

This is the second of two parts to the *Records of the Hawaii Biological Survey for 1995* and contains the notes on Hawaiian species of plants and animals including new state and island records, range extensions, and other information. Larger, more comprehensive treatments and papers describing new taxa are treated in the first part of this Records [*Bishop Museum Occasional Papers* 45].

New Hawaiian Pest Plant Records for 1995

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Fabaceae

Ulex europaeus L. **New island record**

On 6 October 1995, Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife employee C. Joao submitted an unusual plant he found while working in the Molokai Forest Reserve. The plant was identified as *U. europaeus* and confirmed by a Hawaii Department of Agriculture (HDOA) nox-A survey of the site on 9 October revealed an infestation of ca. 19 m^2 at about 457 m elevation in the Kamiloa Distr., ca. 6.2 km above Kamehameha Highway. Distribution in Wagner *et al*. (1990, *Manual of the flowering plants of Hawai'i*, p. 716) listed as Maui and Hawaii.

Material examined: MOLOKAI: Molokai Forest Reserve, 4 Dec 1995, *Guy Nagai s.n.* (BISH).

Melastomataceae

Miconia calvescens DC. **New island record**, **range extensions**

On 11 October, a student submitted a leaf specimen from the Wailua Houselots area on Kauai to PPC technician A. Bell, who had the specimen confirmed by David Lorence of the National Tropical Botanical Garden as being *M. calvescens.* This marks a **new island record** of this species from Kauai. A survey performed on the property by HDOA staff on 16 October revealed 2 *M. calvescens* plants at the residence. A survey of the surrounding area revealed another plant with 3 immature flower panicles growing in a gulch behind the homeowner's property. A subsequent survey of a nearby plant nursery revealed 20 *M. calvescens* plants ranging in height from ca. 1–12 m. According to the nursery's owner, a *M. calvescens* plant was given to him about 10 years ago by a friend who had obtained the plant in Honolulu. He destroyed that plant 2 years ago after he learned of its noxious characteristics. However, by that time, the plant had attained a large size with a trunk diameter of about 30 cm. Since then, the owner has been trying to control the volunteers.

1. All notes in this volume consitute Contribution No. 1996-006 to the Hawaii Biological Survey.

Assuming that the *M. calvescens* that was destroyed at the nursery was the source of the other plants in the vicinity, the infestation appears to be confined to an area within 300 m west of the nursery.

Material examined. KAUAI: Kawaihau District, Wailua Homesteads, Kauai Gardens subdivision, off Molo Street, 110 m, 13 Oct 1995, *A. Bell sub D. Lawrence 7715* (BISH, PTBG).

On 27 December 1994, the HDOA was called to report a *Miconia* tree at an abandoned nursery near the end of Kalihi street in upper Kalihi Valley (C. Yamane, pers .comm.). HDOA personnel removed this large fruiting tree on 28 December 1994. Over 70 other plants have been killed there by volunteers and HDOA staff. Only 1 of these other plants was fruiting and it had only 4 panicles. Distribution in Wagner *et al*. (1990: 903) of volunteer seedlings limited to near Lyon Arboretum, Oahu, and on private estates near Hilo, Hawaii.

Material examined. OAHU: Honolulu District, Kalihi Valley, TMK 1-4-14-1, ca. 0.4 km S of Kalihi Stream at abandoned nursery site, ca. 207 m, *Conant s.n.* (BISH).

On 10 February 1995 , HDOA personnel visited the Marks estate on Old Pali Road in Nuuanu Valley, Oahu and removed 2 fruiting trees, several seedlings and large saplings. The largest one was probably planted many years ago and all other plants were probably its progeny. Eradication work by HDOA at this site is continuing.

Material examined. OAHU: Honolulu District, Nuuanu Valley, TMK 1-9-5-4, 3860 Old Pali Road, former Marks Estate, ca. 200 m, *P. Conant s.n.* (BISH).

Melastoma candidum D.Don **New island record**

This plant was found naturalized for the first time on Oahu in Upper Kalihi Valley. Over 200 plants, some as tall as 6 m were pulled up or treated with herbicide in and around a commercial plant nursery on 19 July 1995 by HDOA staff. The proprietor of the nursery had no recollection of *M. candidum* being a part of the nursery inventory. Confirmation of the identification was made by George Staples at Bishop Museum. Distribution in Wagner *et al*. (1990: 911) is listed as Kauai and Hawaii.

Material examined. OAHU: Honolulu District, Kalihi Valley, TMK 1-4-20-12, 0.1km N of Kalihi Stream in plant nursery, 220 m, 23 May 1995, *Heu s.n.* (BISH).

Rosaceae

Rubus discolor Weihe & Nees **Range extension**

Two live specimens of this species were seen on the West side of Waiomao stream in Palolo Valley on 23 May 1995. No flowers or fruit were present. This site is below another known infestation site on Lanipo Trail (R.L. Stemmerman, 1986, *Newsl. Hawaii. Bot. Soc*. 25: 72–73). On a recent visit to that site, this species was found invading dead patches of *Dicranopteris linearis* fern.

Material examined. OAHU: Honolulu District, Palolo Valley, W slope of Waiomao Str, 240 m, 23 May 1995, *P. Conant & L. Nagasawa s.n.* (BISH).

New Hawaiian Plant Records for 1995

HERBARIUM PACIFICUM STAFF (Hawaii Biological Survey, Bishop Museum, P.O. Box 19000, Honolulu, HI 96817, USA).

These previously unpublished Hawaiian plant records include new state and island records and range extensions to supplement information published in Wagner *et al.* (1990) and in *Records of the Hawaii Biological Survey for 1994* (Evenhuis & Miller 1995). After the completion of the *Manual of the flowering plants of Hawai'i* (Wagner *et al.* 1990), curatorial support from National Science Foundation made possible an attempt to process all voucher specimens then in the BISH specimen backlog. This revealed some significant older collections that were unavailable to the authors of the *Manual*. Furthermore, recent voucher collections deposited at BISH and specimen identifications received from specialists subsequent to the conclusion of the *Manual* have provided more new information. These data are reported here. All supporting voucher specimens are on deposit at BISH.

Asteraceae

Sonchus oleraceus L. **New island record**

Although Wagner *et al.* (1990: 358) excluded Niihau from the distribution of *S. oleraceus*, there are 2 voucher specimens, both seen by the authors of the *Manual* in 1983, from that island. This oversight is here rectified and *S. oleraceus* is now known to occur on all the Hawaiian Islands.

Material examined. NIIHAU: Kaali, Jan 1912, *J. F. G. Stokes s.n.;* Kii, 15 ft, 29 Mar 1949, *H. St. John 23581*.

Boraginaceae

Cordia dichotoma G. Forst. **New naturalized state record**

Significance. Long cultivated on the University of Hawaii, Manoa campus, and in a few locations around Honolulu as a street and shade tree, this is the first collection made from plants that are clearly naturalized. Neal (1965) records *C. myxa* L. as a synonym for *C. dichotoma* but current taxonomic thinking recognizes 2 species (Verdcourt 1991). *Cordia dichotoma* is distinguishable from the 2 species discussed in Wagner *et al.* (1990: 392) by its softly hairy or glabrous foliage, fragrant white flowers less than or equal to 15 mm long, and flesh-colored to dull pinkish, pulpy fruits, the base of which is enclosed in a saucer-shaped calyx.

Material examined. OAHU: Waimanalo, Bellows Air Force Base, back road, seeds are probably being spread by bulbuls, 18 Oct 1994, *E. Funk s.n.*

Cyperaceae

Recent identifications for sedge specimens revealed 3 taxa new to Hawaii. Each record is based on a single voucher, and further collections are desirable to confirm that these species are successfully established in the state.

Cyperus confertus Sw. **New state record**

Significance. Native to the West Indies, Venezuela, Colombia, and the Galapagos Islands (Koyama 1979), this is the first record of this sedge in the Hawaiian Islands.

Material examined. HAWAII: S Kona, lava field inland of Kapua Bay, 7 Oct 1986, *L. Stemmermann 7125*.

Cyperus cyperoides (L.) Kuntze **New state record**

Significance. Previously known from the tropics & subtropics of Africa, Asia, and Australia, throughout Malesia, & probably introduced in the West Indies (Kern 1974), this is the first record for this sedge in the Hawaiian Islands.

Material examined. HAWAII: Kawaihae, Kohala, 1500 ft, 31 Aug 1936, *E. Y. Hosaka 1558*.

Schoenus apogon Roem. & Schult. **New state record**

Significance. Native from Australia and New Zealand to the Ryukyu Islands & Japan (Kern 1974), this is the first record for this sedge in the Hawaiian Islands.

Material examined. HAWAII: Volcano, near new "3500 ft" road sign, 4 Aug 1976, *O. Degener 35812*.

Euphorbiaceae

Antidesma platyphyllum H. Mann **New island record**
var. ***platyphyllum***

Wagner *et al.* (1990: 600) record the species' distribution as "all of the main islands except Niihau and Kahoolawe ..." and go on to discuss 2 varieties, as follows: *A. platyphyllum* var. *hillebrandii*, known only from Kauai, and var. *platyphyllum*, known from Oahu, Molokai, Lanai, Maui, and Hawaii. The MacDaniels specimen is the first record for var. *platyphyllum* from Kauai.

Material examined. KAUAI: Kalihiwai, E branch, 400 m, 12 Feb 1927, *L. H. MacDaniels 655*.

Fabaceae

Dalea emarginata (Torr. & A. Gray) Shinners **New state record**

Significance. Native from southern Texas to Veracruz, Mexico (Correll & Johnston 1979). The existence of 2 collections made 14 years apart in the vicinity of Honolulu Airport indicates that *D. emarginata* is sparingly naturalized.

Material examined. OAHU: Lagoon Drive, near Honolulu International Airport, landfill, ocean side, specimen label notes first collected in Feb 1977, this specimen collected 25 Jan 1979, *T. Watanabe s.n.;* Honolulu, Hickam Air Force Base, 5 ft, at edge of lawn area near runway at terminal, 12 Feb 1993, *K. Nagata 4263*.

Macroptilium lathyroides (L.) Urb. **New island record**

Significance. Distribution in Wagner *et al*. (1990: 674) probably on all the main islands but not documented for Molokai.

Material examined. MOLOKAI: Hoolehua, Plant Materials Center of Hawaii, 110 m, growing in 1 m high grass patch between windbreaks in lowland dry shrubland, common in area, 9 Oct 1990, *G. D. Hughes s.n.*

Neonotonia wightii (Wight & Arn.) Lackey **New island record, name change**

Significance. Distribution in Wagner *et al*. (1990: 674) limited to Oahu, Maui, Kahoolawe, and Hawaii. Wagner *et al.* (1990: 673–74) treated this naturalized legume under the name *Glycine wightii* (Wight & Arn.) Verdc. and noted that Lackey (1977) had removed the species to a new genus, *Neonotonia.* The rationale for segregating *Neo-*

notonia from *Glycine* was summarized by Hymowitz and Newell (1981) and this taxonomic concept has since gained general worldwide acceptance (Mabberley 1990, Wiersema *et al*. 1990, Lock & Simpson 1991, Arnold & de Wet 1993, Kartesz 1994). We therefore adopt the name *N. wightii* for Hawaiian populations of the species. The following specimen is the first recorded from Kauai.

Material examined. KAUAI: Koloa District, Kalaheo, along Puuwai Rd, ca. 850 ft, naturalized in vacant lot, 9 Mar 1995, *T. Flynn 5730*.

Senna septemtrionalis (Viv.) H. S. Irwin & Barneby **New island record**

Significance. Distribution in Wagner *et al.* (1990: 702) limited to Kauai, Oahu, Molokai, and Maui, with an extension to Hawaii reported in Wagner & Herbst (1995: 21). Lanai was omitted from the distribution reported in the *Manual*, despite the existence of 4 voucher specimens seen by its authors in 1986. This citation corrects the oversight.

Material examined. LANAI: E end mountains, Jun 1913, *C. N. Forbes 277.L;* Koele, 19 Oct 1913, *G. C. Munro 169*, *317;* Koele, 1740 ft, 11 Sep 1928, *G. C. Munro 393*.

Melastomataceae

Dissotis rotundifolia (Sm.) Triana **New island record**

Significance. Distribution in Wagner *et al.* (1990: 907) limited to Oahu, Maui, and Hawaii. Because *D. rotundifolia* is cultivated statewide as an ornamental it is to be expected that it will become naturalized eventually on all inhabited islands. The label for the following voucher specimen indicates the plants were "escaping from adjacent yards."

Material examined. KAUAI: Kawaihau District, ca. 280 ft, near beginning of proposed Wailua Cart Trail, 28 Jan 1992, *T. Flynn 4885*.

Oleaceae

Jasminum fluminense Vell. **New naturalized record**

Significance. Widespread in tropical Africa and extensively naturalized in South America and the West Indies, *J. fluminense* has long been cultivated in Hawaii as an ornamental (Neal 1965). Recent evidence indicates this jasmine is naturalizing in dry disturbed areas of Oahu and the island of Hawaii. In addition to the vouchered records, *J. fluminense* has also been sighted in dry thickets above Hanauma Bay, Oahu. The following collections unambiguously represent naturalized populations. One earlier collection, *Akira Kawasaki s.n*., from the McCandless Ranch on the Big Island dated 30 Oct. 1963, could be the earliest naturalized record for *J. fluminense*; the label does not indicate if the plants were cultivated or not.

Material examined. OAHU: Waimanalo, Bellows Air Force Base, sea level to 1000 ft, probably once planted as an ornamental, common, rapidly spreading, some plants cover 6–7 sq m, 18 Oct 1994, *E. Funk s.n.*; Honolulu, S side of Diamond Head, in gulch, 150 ft, 1 May 1955, *H. St. John 25517*; Honolulu, Waahila Ridge, 300 ft, 17 Oct 1987, *G. Linney 871017-43*. HAWAII: S Kona District, land of Kalahiki, along road to Hookena, 200 ft, 21 Jan 1976, *D. Herbst & G. Spence 5634*; S Kona District, road to Hookena Beach, disturbed roadside, 10 Mar 1988, *W.L. Wagner, C. Imada & W. Takeuchi 5938.*

Passifloraceae

Passiflora foetida L. **New island record**

Significance. Distribution in Wagner *et al.* (1990: 1011) limited to Niihau, Kauai, Oahu, Maui, and Hawaii. During archaeological survey work on Molokai, a specimen was gathered from the dig site that proved to be the first island record. The specimen is unusual in having small leaves that are densely velvety-hairy. The collector noted this was the only plant seen in the area.

Material examined. MOLOKAI: Halena, 50–70 ft, 4 Sep 1993, *Maurice Major s.n.*

Rhamnaceae

Gouania vitifolia A. Gray **Notable rediscovery**

Wagner *et al.* (1990: 1097) speculated that this species had become extinct. Known from just 7 collections, 5 of which came from the Waianae mountains of Oahu, the last place the species was collected this century. In 1990, Joel Lau located living plants in the Waianae Mts. (Obata 1992) which were subsequently vouchered on 2 occasions by John Obata. These vouchers represent 2 distinct populations located in the same area.

Material examined. OAHU: Waianae Range, Waianae Kai, 625 m, NE of the last water tank (reservoir) at the end of the paved road in the forest, in the upper reaches of a sub-gulch, on the gully floor, noted to be a very healthy flowering population estimated to be over 10 plants, 16 Dec 1990, *J. Obata 90-705;* Waianae Range, Waianae Kai, 2300 ft, in a subgulch, NE of the last water tank-facility at the end of a concrete road, 3/4 way up the gully floor, second of 2 known plants, 30 Dec 1990, *J. Obata & R. Hill s.n.*

Rosaceae

Photinia davidiana (Decne.) Cardot **New state record**

Significance. Long known in Hawaii as *"Cotoneaster frigida"* (Neal 1965: 386, St. John 1973: 172), a misidentification, this taxon has recently been correctly identified as a tropical species of *Photinia* native to southern China and northern Vietnam. First collected in 1940 around Nauhi at an elevation of ± 6000 ft, there is now a population "one-half mile or more around Nauhi Camp, Nauhi Gulch, and upper Piha area" [from label *A. Kikuta s.n.*]. A collection from Maui is included here because *P. davidiana* is very likely naturalized there as well, and field collections are needed to establish its status in and near the Kula Forest Reserve.

Material examined. MAUI: E Maui, Kula Forest Reserve, Polipoli Park, 1830 m, Oct 1986, *R. Hobdy 2699;* HAWAII: Hakalau Forest National Wildlife Refuge, 1585 m, Nauhi, naturalized in this area, 25 Aug 1993, *A. Kikuta s.n.*; Nauhi, 6000+ ft, native of the Himalayan region, 1 Mar 1940, *E. L. Caum s.n.*

Rubiaceae

Coprosma rhynchocarpa A. Gray **New island record**

Significance. Distribution in Wagner *et al.* (1990: 1130) limited to Hawaii.

Material examined. MAUI: E Maui, Auwahi District, S slope, 18 Dec 1981, *A. C. Medeiros 191 & 195.*

Psychotria greenwelliae Fosberg **New island record**

Significance. Reported to occur only around Kokee on Kauai in the *Manual* (Wagner *et al.* 1990: 1164), the following collections represent a significant range extension for this species. That *P. greenwelliae* could occur on the Manoa Cliff trail, on the very outskirts

of Honolulu, without being documented until 1990 underscores the need for further field collecting on all islands. The species is now known from both the Waianae and Koolau ranges on Oahu, as well as from Kauai.

Material examined. OAHU: Koolau Range, Manoa Cliff-trail, ca. 1600 ft, E exposed cliff, 22 Jul 1990, *M. Kiehn et al. MK-900722-4/1*; Waianae Range, Waianae Kai-trail, ca. 2000–2400 ft, steep S exposed slopes on the way to the ridge, 23 Sep 1990, *M. Kiehn et al. MK-900923-1/2* & *MK-900923-1/5*.

Rutaceae

Melicope elliptica A. Gray **New island record**

Significance. Previously known from relatively few collections, all confined to the Waianae range on Oahu, or from Maui (Wagner *et al.* 1990: 1188, as *Pelea elliptica)*, the occurrence of *M. elliptica* in mesic forest on Molokai is not surprising. Further collections are desirable to document the extent of the Maui and Molokai populations.

Material examined. MOLOKAI: Land section of Wawaia, Kua Gulch, 712 m, 18 Aug 1991, *J. Lau & J. L. Perry 3418*.

Urticaceae

Urtica urens L. **New island record**

Significance. Previously known only from the island of Hawaii (Wagner *et al.* 1990: 1314) this collection represents a range extension for the burning nettle. The label notes "a patch 9 ft x 12 ft" in extent, that can hopefully be eradicated before it spreads.

Material examined. OAHU: Along access road to Nuuanu Pali State Park, above highway (tunnel), 16 May 1995, *M. Hong s.n.*

Violaceae

Isodendrion pyrifolium A. Gray **Notable rediscovery**

Significance. Last collected in 1870 and presumed to be extinct because it had not been seen alive since (Wagner *et al.* 1990: 1331), the discovery of *I. pyrifolium* on the Kona coast of the Big Island was exciting news in 1991. The proximity of the few plants to the Kailua landfill in a disturbed area is cause for concern.

Material examined. HAWAII: North Kona, Land of Kealakehe, 240 ft, ca. 1/4 mile N of Kailua landfill, in arid, scrubby grassland, 14 Jul 1991, *K. Nagata 4215*.

Acknowledgments

These records were compiled by the staff of the Herbarium Pacificum (BISH) of Bishop Museum. In alphabetical order the contributors are Katie Anderson, Walter Appleby, Barbara Hawley, Clyde T. Imada, B. Leilani Pyle, and George W. Staples. We kindly thank the following individuals for providing identifications of voucher specimens: James Miller *(Cordia),* J.B. Phipps *(Photinia),* S. H. Sohmer *(Psychotria),* Mark T. Strong (Cyperaceae), Warren L. Wagner *(Antidesma),* and Grady L. Webster *(Antidesma).* We appreciate editorial guidance received from Neal Evenhuis and Scott Miller of the HBS. Processing the BISH curatorial backlog, thereby making some older specimens available for study, was partially supported by National Science Foundation curatorial grant BSR 8912364.

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Contributions to the Flora of Hawai‘i. V

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Publication of the *Manual of the flowering plants of Hawai‘i* (Wagner *et al*. 1990) has provided a modern accurate account of the angiosperms occurring indigenously and naturalized after introduction by humans directly or indirectly. Collecting efforts after the cut-off date for the *Manual* project (September 1987) have resulted in a substantial number of new distributional records and detection of additional naturalized species. Also,

recent publications have resulted in new classifications or nomenclatural changes for species that occur in the Hawaiian Islands. This paper provides records for naturalized species documented for the first time in the Hawaiian Islands, new range extensions for naturalized, and a few native species within the archipelago. The first 2 papers in the series (Wagner *et al*. 1986, 1989) were published as precursors to the *Manual*, while the others were published to update that work (Lorence *et al*. 1995, Wagner & Herbst 1995). These records and changes can be considered a supplement to the *Manual* (Wagner *et al*. 1990). In reporting additions to the flora we give diagnostic characters so that this paper can be used in conjunction with the *Manual* for identifications. We use the same definition for "naturalized" as used in the *Manual* (Wagner *et al*. 1990: 1645). We report 7 new island records for naturalized species. We also call attention to 6 newly naturalized species in the Hawaiian Islands. We discuss the rediscovery of *Tetramolopium capillare* and a novel form at a new locality for the rare *Munroidendron racemosum.* All identifications have been made by the authors except for those made by specialists listed in the acknowledgments.

Aizoaceae **New island record**

Trianthema portulacastrum L.

The following collection represents a new island record for Maui. It was previously known from O'ahu (Wagner *et al*. 1990: 179).

Material examined. MAUI: West Maui, Launiupoko, Kapuali, along cane road, 46 m, 5 March 1993, *Hobdy 3543* (BISH, US).

Araliaceae

Munroidendron racemosum (C. Forbes) Sherff **Notable discovery**

A collection of this species made in the Waimea Canyon from a single tree had the leaves just expanding, but it is clear that they are atypical in being glabrous. Previously all plants of this species were known to only have a densely whitish stellate-furfuraceous abaxial leaf surface. *Munroidendron* had previously been known from 3 areas: Nounou Mountain, Napali Coast, and Ha'upu Ridge (Lowry 1990: 229). This glabrous collection also extends the range to the Waimea Canyon. Another collection listed below represents a new locality for the typical pubescent form of the species, extending the range from the Napali Coast to Limahuli Valley.

Material Examined. KAUA'I: Waimea District., Koaie Canyon, lip of a precipice on a N-facing slope beyond Lonomea rest stop, 550 m, 1 tree, 12 Nov 1988, *Fay & Robinson s. n.* (BISH). Hanalei District, Limahuli Valley, 70° N-facing slope, 580 ft., degraded mixed mesophytic forest, population of 2 saplings and 2 mature individuals, 15 Dec 1989, *Wichman 218* (BISH).

Asteraceae

Ageratina riparia (Regel) R. King & H. Rob. **New island record**

The following collection represents a new island record from the island of Kaua'i. *Ageratina riparia* was previously known in the Hawaiian Islands from O'ahu, Moloka'i, Maui, and Hawai'i (Wagner *et al*. 1990: 255).

Material examined. KAUA'I: boundary of Lihue and Kawaihau Districts, headwaters of the N fork of the Wailua River, 600–670 m, 11 Mar 1993, *Flynn et al. 5279* (BISH, PTBG, US).

Flaveria trinervia (Spreng.) C. Mohr **New island record**

The following collection represents a new island record for this species. It was previously known from Barber's Point to Sand Island and Koko Head, O'ahu (Wagner *et al*.

1990: 317), and recently reported from Kaua‘i (Lorence *et al.* 1995).

Material examined. KAHO‘OLAWE: Smuggler’s Cove, 25 Jan 1991, *Ellshoff 196* (BISH).

Hypochoeris glabra L. **New island record**

The following collection represents a new island record for this species. It was previously known from all of the main islands except Ni‘ihau and Lana‘i (Wagner *et al.* 1990: 327).

Material examined. LEHUA: weathered cinder cone, common herb on N side, 0–700 ft., 10 Jan 1992, *Flynn 4859* (BISH).

Tetramolopium capillare (Gaud.) St. John **Rediscovery**

The following record represents a rediscovery of a species presumed to be extinct by Lowrey (1990: 363). This species was last collected in 1955 in the Lahaina Luna area of West Maui (*St. John 25604*, BISH). Several previous unsuccessful attempts had been made to relocate populations of this species.

Material examined. MAUI: West Maui, West Maui Mountains, back west side of Kauaula Valley, just above where main valley divides, and where 2 streams meet at a narrow gorge, 3020 ft., cliff walls with *Sadleria, Artemisia,* and *Lobelia hillebrandii,* [population of] about 100 plants, 16 Sep 1993, *Perlman 13764* (BISH, NY, PTBG, US).

Begoniaceae

Begonia reniformis Dryander **New island record**

The following collection represents a new island record for this species. It was previously known from North and South Kona districts, Hawai‘i (Wagner *et al.* 1990: 384).

Material examined. O‘AHU: Waikane Gulch, along gully floor and steep slopes along gully, ... dominant plant in this gulch, 366 m, 29 Dec 1993, *Obata s. n.* (BISH).

Brassicaceae

Capsella bursa-pastoris (L.) Medik. **New island record**

The following collection represents a new island record, the first record of this species from the Northwestern Hawaiian Islands. It was previously known from O‘ahu, Lana‘i, Maui, and Hawai‘i (Wagner *et al.* 1990: 403).

Material examined. MIDWAY ATOLL: Sand Island, Jul 1988, *Herbst & Takeuchi 9087* (BISH).

Dipsacaceae

Scabiosa palaestrina L. s.l. **New state record**

The following collection of a species of pincushion flower represents a new state record to the naturalized flora of the Hawaiian Islands. *Scabiosa* can be characterized by its opposite oblong to oblong-spatulate or linear, sometimes pinnatifid leaves, flowers in heads up to 5 cm in diam., subtended by involucral bracts, the florets are tubular, each with a basal epicalyx of connate bracteoles which are expanded into a corona, calyx of 5 bristle-like parts that lengthen and stiffen in fruit forming a star-like structure, corolla cream-colored, 2-lipped with 5 unequal lobes, 4 stamens, and fruit dry and indehiscent, enclosed in the epicalyx and surmounted by the persistent calyx.

Material examined. HAWAI‘I: Pu‘u Kapu Homestead, E of Waimea along Hwy 19, Marie McDonald’s *Protea* and cut-flower farm, escaping cultivation, 23 Jun 1985, *Wagner et al. 5545* (BISH).

Fabaceae

Caesalpinia major (Medik.) Dandy & Exell **New island record**

The following record represents a new island record of this probably naturalized species. It was formerly (Geesink *et al*. 1990: 648) known from Niʻihau, Oʻahu, Molokaʻi, Lanaʻi, and Hawaiʻi.

Material examined. MAUI: West Maui, West Maui Mountains, Honokowai, Haenanui Gulch, 550 m, 26 Feb 1994, *Hobdy et al. 3645* (BISH).

Fagaceae

Quercus suber L. **New state record**

The following collection represents a new state record for the cork-bark oak, which appears to be adventive or sparingly naturalized.

Material examined. HAWAIʻI: Hamakua District, Mauna Kea Forest Reserve, near Puʻu Koʻohe, 2042 m, 25 Mar 1993, *Herbst 9638* (BISH).

Najadaceae

Najas guadalupensis (Spreng.) Magnus **New state record**

The unidentified species of *Najas* discussed in a note by Wagner *et al*. (1990: 1466) has been identified as *N. guadalupensis* (Spreng.) Magnus, the common water-nymph. Additional material has been collected; it is definitely naturalized on the island of Hawaiʻi. It is characterized by: plants monoecious with much-branched stems up to 6 dm long; leaves 1–2.5 cm long, 0.5–1 mm wide, generally evenly-spaced, flexible, the sheath rounded to obtuse at the junction with the blade, few-toothed, 1-celled, the apex with 1–4, short, 1-celled spines; staminate flowers 2–3 mm long, anthers 4-celled; pistillate flowers 2–3 mm long, stigmas 2–3; fruit surface dull, conspicuously reticulate, pitted. *Najas guadalupensis* is native to North, Central and South America; it occurs in freshwater ponds, sluggish streams, and ditches. In the Hawaiian Islands it is known only from Lokoaka Pond and Wailoa estuary, both in Hilo, Hawaiʻi.

Material examined. HAWAIʻI: Lokoaka Pond, submerged, uncommon, 20 Aug 1987, *Stemmermann & Warshauer 7189* (BISH); Wailoa estuary, Hilo, submerged aquatic weed, 25 Jul 1987, *Stemmermann & Luce 7178* (BISH).

Poaceae

Hyparrhenia dregeana (Nees) Stent **New state record**

The following record of *Hyparrhenia dregeana* represents the first state record of this species in the Hawaiian Islands. It is naturalized at least at this 1 locality. This species is distinguished from the other 2 species naturalized in the archipelago by culms 15–20 dm, basal sheaths silky pubescent in the lower part; raceme bases subequal, the upper 1 1–1.5 mm long, flattened, stiffly bearded, usually with a scarious lobe ca. 0.5 mm long at the apex; 10–25 awns per raceme-pair. *Hyparrhenia dregeana* is native to Africa, and is apparently not widely naturalized outside of its native range.

Material examined. LANAʻI: Disturbed pasture along Keomuku Rd, 2.5 mi from Koele, clump grass of open, dry [sites], 30 April 1975, *Herbst & Spence 5289* (BISH).

Ischaemum timorense Kunth **New state record**

The following collection represents a new state record for *Ischaemum timorense*. It is distinguished from *I. byrone* (Trin.) Hitchc. by leaf blades 10–20 mm wide, distinctly

petiolate, the petiole up to 5 mm long; racemes 1.2–5 cm long, appressed at first but separating as maturity approaches; stalked spikelet 2.5–3.5 mm long, the awns 5–8 mm long; lower glume of sessile spikelet not keeled. *Ischaemum timorense* is native to the Malesian area, India, and Sri Lanka.

Material examined. MAUI: Nahiku, Hana, in pasture, 500 ft, 16 July 1941, *Hosaka 2596* (US).

Rosaceae

Heteromeles arbutifolia (Lindley) M. Roemer **New state record**

This shrub or small tree known as toyon was planted in or near Mauna Kea State Recreation Area, and is now apparently sparingly naturalized. It represents a state record for this species. It has simple, alternate, evergreen, coriaceous leaves 4–11 cm long, upper surface shiny dark green, the lower surface dull and paler, the margins sharply serrate. Flowers in terminal open, flat-topped panicles; hypanthium 2–3 mm long; sepals 1–2 mm long; petals 2–4 mm long, white; stamens 10 in pairs opposite the sepals. Fruit 5–10 mm in diam., bright red with mealy pulp, containing 3–6 compressed brown seeds. It is endemic to California, but widely cultivated.

Material examined. HAWAI'I: Hamakua District, Mauna Kea State Park, Pohakuloa area, 6300 ft, cultivated, 1 July 1968, *Herbst 1187* (BISH); Pohakuloa Training Area, naturalized on 1/4 acre site (area 1), 31 January 1989, *R. Bachman s. n.* (BISH).

Acknowledgments

We thank various specialists for determinations of specimens or comments on certain problems: D.S. Goyder (*Scabiosa*); R.R. Haynes (*Najas*). We appreciate comments on an earlier draft of this paper by Robynn Shannon, by which it was greatly improved.

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New Records of Hawaiian Flowering Plants Primarily from the United States National Herbarium

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During preparation of the *Manual of the flowering plants of Hawai'i* (Wagner *et al.* 1990), only portions of the United States National Herbarium (US) collection of Hawaiian material were examined. Recent curation of the Hawaiian collections at US has uncovered several collections earlier than those reported in the *Manual*, as well as several new island records, including many of the records reported below. Although they are new records in the sense that they have not previously been documented in the literature, most are not recent collections.

Amaranthaceae

Amaranthus viridis L. **New island record**

The following collection represents a new island record of this species for Laysan. It was previously known from the main islands of Kaua'i, O'ahu, Lana'i, Maui, Kaho'olawe, and Hawai'i, as well as the Northwestern Hawaiian Islands of Kure Atoll and Ka'ula (Wagner *et al.* 1990: 189).

Material examined. LAYSAN: May 1902, *Snyder s.n.* (US).

Asteraceae

Reichardia picroides (L.) Roth **New island record**

The following collection represents a new island record of this species for Moloka'i. It was previously known only from coastal areas of O'ahu, where it was first collected in 1909 (Wagner *et al.* 1990: 352).

Material examined. MOLOKA'I: about 2 km WSW of Kalani, Momomi sand strip, Kaluakoi, directly S of Ka'a, on eroded calcareous sandstone, 22 Feb 1948, *Fosberg 29563* (BISH, K, NY, US).

Buddleiaceae

Buddleia davidii Franch. **New naturalized record**

This species, cultivated in the Hawaiian Islands, is now at least sparingly naturalized.

Material examined. KAUA'I, Waimea Dist., Koke'e State Park, by cabins just S of park headquarters, along Highway 550; secondary forest and plantings in remnant mixed mesophytic forest with *Acacia koa* and *Metrosideros polymorpha*, originally planted and now sparingly naturalized along roadside in secondary vegetation, 1158 m, 28 Mar 1994, *Lorence and Flynn 7452* (US).

Fabaceae

Macroptilium lathyroides (L.) Urb. **New island record**

Wagner *et al.* (1990: 683) noted that this species probably occurs on all of the main islands but had not been documented from Moloka'i; the following collection provides that documentation.

Material examined. MOLOKA'I: Ho'olehua, Plant Materials Center of Hawai'i, used as a pasture plant, 110 m, 9 Oct 1990, *Hughes s.n.* (BISH).

Medicago polymorpha L. **New island record**

The following collection represents a new island record of this species for Moloka'i. It was previously known from Kaua'i, O'ahu, Lana'i, Maui, and Hawai'i (Wagner *et al.* 1990: 684).

Material examined. MOLOKA'I: Ho'olehua, in waste field, not uncommon, 4 Apr 1928, *Degener 3514* (US).

Melilotus alba Medik. **New island record**

As noted by Degener on the specimen label, the following collection represents a new island record for Moloka'i. It was previously known only from Midway Atoll and Hawai'i (Wagner *et al.* 1990: 686).

Material examined. MOLOKA'I: Maunahui, 8 Apr 1928, *Degener 11095* (US).

Najadaceae

Najas marina L. **New state record**

The first report of *Najas* for the Hawaiian Islands was by Chamisso (1829: 499), whose collection Hillebrand (1888) also cited (as *N. major* All., a synonym of *N. marina* L.). Since no modern researcher has seen a Chamisso collection of *Najas* from O'ahu, and since it has not been collected since, St. John (1973) thought that it was probably an erroneous record. A specimen of *N. marina* L. from O'ahu has been found at US, with the collector given as simply "Limu woman," and the common name of the plant as *limu kala wai*. Although it cannot be determined with certainty, we hypothesize that there was a population of *N. marina* L. around Waikiki prior to the construction of the Ala Wai Canal. When the canal was built during the 1920s (Glenn & McMurtry 1995) and the wetlands around Waikiki drained, the *Najas* population died out. The following collection represents the first verified record of *N. marina* L. for the state.

Material examined. O'AHU: Honolulu, Waikiki, 29 Apr 1905, *Limu woman 269* (on a Flora of Hawaii, U.S. Department of Agriculture, Hawaii Experiment Station label) (US).

Scrophulariaceae

Hebe speciosa (A. Cunn.) Cockayne & Allan **New naturalized record**

This cultivated species, mentioned by Wagner *et al.* (1990: 1235) as persisting vegetatively or perhaps escaping, is here reported as at least previously naturalized on Hawai`i.

Material examined. HAWAI'I: Hawaii Volcanoes National Park, Kilauea Volcano, near Park Headquarters, well established in densely grassy waste ground, 1220 m, 20 Sep 1965, *Fosberg 47737* (US).

Urticaceae

Pilea microphylla (L.) Liebm. **New island record**

The following collections represent a new island record of this species for Midway Atoll. It is thought to occur on all of the main islands, but has been documented only from Kaua'i, O'ahu, Maui, and Hawai'i (Wagner *et al.* 1990: 1306).

Material examined. MIDWAY ATOLL: Eastern Island, S of the E-W runway, 25 May 1964, *Long 1748* (US); at edge of runway in SW corner of island, 12 Aug 1964, *Lamoureux 2765* (US).

Violaceae

Viola odorata L. **New island record**

This species, reported by Wagner *et al.* (1990: 1332) as apparently naturalized on Lana‘i and Kaua‘i, is here reported as apparently naturalized on Hawai‘i.

Material examined. HAWAI‘I: Hawaii Volcanoes National Park, Thurston Lava Tube, Kilauea, well-established patches in *Metrosideros-Cibotium* forest, spreading by creeping rhizomes, 1220 m, 20 Mar 1965, *Fosberg 46053* (US).

Acknowledgments

We thank Royce Oliver for bringing some of the US collections to our attention, and Robert R. Haynes for identifying the specimen of *Najas*.

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Pathogenic Organisms of Penaeid Shrimp in the Hawaiian Islands

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Although many of the pathogens of penaeid shrimp in Hawaii have been introduced through the importation of penaeid species, some of the most common pathogens are ubiquitous in the environment. The objective of this work is to review the current pathogens of penaeid shrimp in Hawaii and to mention a few potential pathogens that may be introduced in the future.

Viruses

Infectious hypodermal and hematopoietic necrosis virus (IHHNV)

HHNV was first documented in *Penaeus stylirostris* Stimpson and *P. vannamei* Boone imported into Hawaii in 1983 (Lightner *et al*. 1983a). This virus is a single stranded DNA-containing parvovirus that has been associated with “runt-deformity syndrome” (RDS) in *P. vannamei* and severe mortalities in *P. stylirostris*. Juvenile shrimp with RDS display deformed rostrums, wrinkled antennal flagella, cuticular roughness, and other cuticular deformities (Kalagayan *et al*. 1990, Bell & Lightner 1984).

Penaeus monodon-type baculovirus (MBV)

MBV has been observed in imported penaeids in Hawaii (Lightner *et al*. 1983b). Usually, insignificant mortalities are noted for this pathogen.

Baculovirus penaei (BP)

BP, which is a occluded baculovirus, was first documented in Hawaii in *P. marginatus* Randall from the wild (Brock *et al*. 1986).

Taura Syndrome Virus (TSV)

TSV, which is a picornavirus, was first documented in *P. vannamei* in Hawaii in 1995 (Brock *et al*. 1995, Hasson *et al*. 1995). Its introduction was not associated with the importation of live penaeids.

Hepatopancreatic parvo-like virus (HPV)

This virus was noted in *P. chinesis* (Osbeck) that were imported to Hawaii from Asia. The Hawaiian introductions were destroyed and HPV was eradicated (Brock & Lightner 1990).

Reo-like virus disease (REO-III)

REO-III, which has been identified in *P. japonicus* Bate in Hawaii, has been circumstantially linked to "gut and nerve syndrome" (GNS), although the clinical importance of this virus is speculative (Lightner *et al*. 1984).

Lymphoid vacuolization virus disease (LOVV)

Lymphoid vacuolization virus, which has been found in Hawaiian penaeids, does not appear to cause significant disease (Bonami *et al*. 1992, Lightner 1993).

Rhabdovirus (RPS) of American penaeids

RPS has been isolated from *P. vannamei* and *P. stylirostris* in Hawaii (Nadala *et al*. 1992, Lu *et al*. 1990). The pathological significance of this virus is poorly understood.

Bacteria

Vibrio spp. (*V. alginolyticus* Miyamoto *et al., V. harveyi* Johnson & Shunk*, V. vulnificus* Reichelt *et al., V. parahaemolyticus* Fujino *et al*.)

These species are ubiquitous in the environment in Hawaii but can occasionally cause infections in shrimp (Lightner 1993).

Rickettsia-like microorganisms (Order Rickettsiales, Family Rickettsiaceae)

Infections with these organism have been described in wild penaeid shrimp in Hawaii (Brock *et al*. 1986). This organism has not been well characterized. Clinical signs of heavy infection include lethargy and anorexia.

Leucothrix mucor Oersted

This filamentous bacteria has a wide geographic distribution in the marine environment (Brock 1966) and has been noted on cultured *P. vannamei* as a epicommensal fouling organism (W. Carr, unpubl. data).

Fungi

Lagenidium callinectes

This phycomycete fungus has worldwide distribution including Hawaii and can

cause severe mortalities in larval penaieds (Lightner 1993).

Sirolpidium spp.

This phycomycete fungus has worldwide distribution (Lightner 1993) and has caused severe mortalities in cultured larval *P. vannamei* in Hawaii (W. Carr, unpubl. data).

Fusarium solani (Mart.) Sacc.

These fungi which are common in the environment worldwide, have been noted in *P. japoncus* in Hawaii (Lightner 1981). These fungi can cause melanized cuticular lesions in shrimp.

Protozoa

Peritrich protozoa (*Zoothamnium* sp., *Epistylis* sp.)

These protozoans have been noted as epicommensal organisms of cultured penaeid shrimp in Hawaii (Brock 1992).

Unidentified gregarine

An unidentified gregarine has been noted in *Penaeus merguinsus* De Man in Hawaii (J. Brock, pers. comm., 1995).

Helminths

Trypanocynch tapeworm

The procercoid-pleruocecoid stage of a trypanocynch tapeworm was found encysted in the hepatopancreas of *Penaeus merguinsus* in Hawaii (J. Brock, pers. comm., 1995).

Other pathogens

Other pathogens that currently have not been documented in Hawaiian penaeids but are likely to appear in the future include: white spot syndrome baculoviruses (WSSV) and Yellow-head virus (YHV). WSSV has not been reported in Hawaii, but this virus has caused severe mortalities in penaeids in Asia and Texas (D.V. Lightner, pers. comm.). Similarly, YHV has caused severe mortalities in Thailand but has not been documented in Hawaii (Flegel *et al*. 1995). Due to the distribution of these pathogens and the frequent transport of frozen and live shrimp, their introduction into Hawaii is likely.

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Rotifers of the Hawaiian Islands

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The rotifers of the Hawaiian Islands are sparsely investigated, and thus little known. Weber (1906), Richters (1908), Murray (1911a) and Hauer (1941) are the only references listing rotifer species found on the Hawaiian islands, with Oahu being the only island

studied. (Hope 1987 incompletely synonomizes the rotifers listed in Weber 1906). This paper updates the nomenclature and references for rotifers known from the Hawaiian islands, and comments on selected rotifer species.

Weber (1906) was the first to record rotifers in the Hawaiian Islands as a result of Monsieur le Dr. W. Volz's voyage to Sumatra, Java and the Sandwich islands in 1902. The next opportunity to identify rotifers from the region arose from samples taken on the journey of Professor Schauinsland to Samoa and Oahu in 1908 and examined by Richters. A few years later, James Murray identified the rotifers collected by the Shackelton Antarctic Expedition of 1909. Finally, Josef Hauer identified the rotifers found in collections taken on the Wallacea-Expedition. The correct nomenclature for the species found is listed with synonyms in Table 1.

Table 1. Species known to occur in the Hawaiian Islands (all found on Oahu) listed by author and date published (old nomenclature shown as, "(listed as . . .)" when required).

WEBER 1906 (ditches and pools - brackish water)
Lecane luna (Muller) (listed as *Cathypna luna* Ehrenberg)
Lecane (Monostyla) lunaris (Ehrenberg) (listed as *Monostyla lunaris* Ehrenberg)
Tripeuchlanis plicata (Levander) (listed as *Euchlanis plicata* Levander)

MURRAY 1911a,b (dry moss taken from trees and rocks - fresh water)
Adineta gracilis Janson
Adineta vaga (Davis)
Habrotrocha angusticollis (Murray)
Habrotrocha caudata Murray
Habrotrocha constricta (Dujardin)
Habrotrocha leitgebii (Zelinka)
Habrotrocha longiceps (Murray)
Habrotrocha perforata (Murray)
Habrotrocha pusilla (Bryce)
Macrotrachela ehrenbergii Janson (listed as *Callidina ehrenbergii* Janson)
Macrotrachela habita Bryce (listed as *Callidina habita* Bryce)
Macrotrachela multispinosa (Thompson) (listed as *Callidina multispinosa* (Thompson))
Macrotrachela plicata Bryce (listed as *Callidina plicata* Bryce)
Macrotrachela punctata Murray (listed as *Callidina punctata* Murray)
Macrotrachela quadricornifera (Milne) (listed as *Callidina quadricornifera* (Milne))
Mniobia russeola (Zelinka)
Mniobia symbiotica (Zelinka)
Otostephanos auriculatus (Murray) (listed as *Habrotrocha auriculata* Murray)
Philodina brevipes Murray
Philodina plena (Bryce)
Philodina rugosa Bryce
Philodina vorax (Janson)
Pleuretra alpium (Ehrenberg)
Pleuretra brycei (Weber)
Rotaria longirostris (Janson) (listed as *Rotifer longirostris* (Janson))

RICHTERS 1908 (moss - fresh water)
Macrotrachela angusticollis (Murray) (listed as *Callidina angusticollis* (Murray))
Macrotrachela perforata (Murray) (listed as *Callidina perforata* (Murray))

HAUER 1941 (brackish water ponds - euryhaline)
Hexarthra fennica (Levander) (listed as *Pedalia fennica* (Levander))

Notes on Selected Species

Tripleuchlanis plicata (Levander, 1894)

This is the only known marine rotifer in the family Euchlanidae. It was listed as *Euchlanis plicata* Levander by Weber (1906). Hope (1987) incorrectly records *Dipleuchlanis propatula* (Gosse) as a synonym for *Euchlanis plicata*.

Myers (1930) established the subgenus (now genus) *Tripleuchlanis* as different from *Euchlanis* by virtue of its having dorsal and ventral plates of nearly the same size, connected by a pair of lateral, longitudinal sulci, on each side of the body. A longitudinal flange of stiffened cuticle between each pair extends the entire length of the body, giving a bellows-like, cross-section appearance. It is a marine family, with *T. plicata* as its only known species and is found in marine habitats all over the world.

The Oahu specimens Weber lists from Honolulu and Waikiki are considerably larger than the species *s. str*. (ventral/dorsal plate lengths: - Levander 151µm/113µm vs Weber 216µm / 136µm). These differences suggest the possibility of a new form or potentially a new species (endemic?) within the genus.

Lecane (***Lecane***) ***luna*** (O.F. Müller, 1776)

This species was listed as *Cathypna luna* Ehrenberg in Weber (1906). It is a very common rotifer in the family Lecanidae. Hope (1987) lists it as *Lecane* (*Lecane*) *luna* (O.F. Müller, 1776) [syn. *Cathypna luna* (Müller), *lapsus* (Ehrenberg) in Weber (1906)].

Considerable confusion exists concerning the authorship of this species. Ehrenberg (1832) has been erroneously credited as author by several workers. However, Murray (1913) correctly recognized O.F. Müller as the original describer.

This species is primarily freshwater but has a high tolerance for salt and brackish waters.

Lecane (***Monostyla***) ***lunaris*** (Ehrenberg, 1832)

Listed as *Monostyla lunaris* Ehrenberg in Weber (1906), this is one of the commonest and most eurytopic rotifers in the family Lecanidae. This species is primarily freshwater but also has a high tolerance for salt and brackish waters.

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First Record of the Terrestrial Species *Geonemertes pelaensis* (Nemertea: Hoplonemertea) in Hawaii

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Five unidentified specimens of *Geonemertes pelaensis* Semper, 1863, collected by M. Mathis from houseplants in Waikiki on 30 September 1990, were passed along to me by B. Kumashiro of the Hawaii Department of Agriculture, Honolulu. In May 1992, through the hospitality of M. Hadfield, I collected 6 more individuals on the northeast outskirts of Honolulu, in a shaded and regularly misted outdoor concrete patio area with potted plants; 5 were found during the day under pots and 1 was found at night, crawling through exposed plant litter. All specimens discussed below are deposited in the National Museum of Natural History, Washington, DC.

Geonemertes pelaensis Semper, 1863

The body of *G. pelaensis* is darkish cream-white dorsally, somewhat paler ventrally, with a conspicuous brown mid-dorsal stripe extending from just behind the eyes to the posterior tip of the body. This agrees with the most commonly described appearance of specimens from other locations (cf. Moore & Gibson 1985). Undisturbed, gliding specimens ranged in length from 18–40 mm and were about 1 mm in diameter. A pair of large eyes near the tip of the head is easily visible to the unaided eye. Shortly posterior, 2 or 3 pairs of much smaller, closely spaced eyes give the superficial appearance of a single pair of eyes. Identity was established by histological study, which demonstrated the presence of "binucleate" flame cells and of an accessory lateral nerve cord.

Geonemertes pelaensis is widely distributed among Indo-Pacific islands, from Japan to Papua New Guinea to Samoa (Moore & Gibson 1985). Oki *et al*. (1987) cite Hawaii, apparently in error and without specific reference, as a location where it has been found; there does not appear to be any prior published record.

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First Record of the Land Snail Subfamily Achatinellinae on Kauai

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In May 1942, the late C. Montague Cooke, Jr. mapped 4 regions on Kauai where fossil forms of the land snail genus *Carelia* (family Amastridae) might occur: Moloaa, Lihue,

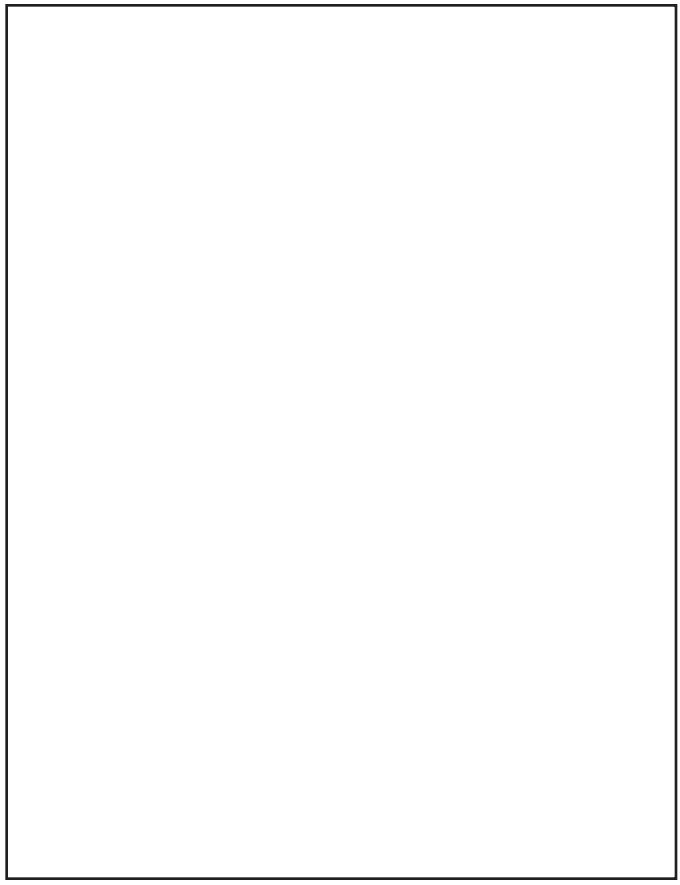

Fig. 1. *Newcombia* sp. from Waiopili, Kauai (BPBM 250717). The shell is 20.05 mm tall. (Photo T.A. Burch)

Lawai-Kukuiula, and Waikamoo Valley. Cooke & Kondo (1952) described a new fossil land snail species from near Waikamoo Valley, and a new fossil geographic race from Moloaa. Today, Kukuiula is being developed for homes, and Lawai Valley is the site of the National Tropical Botanical Garden. Both areas were impacted by Hurricane Iniki in 1992, and at Lawai the surge eroded the shoreline, uncovering fossil *Carelia*.

Having discovered the *Carelia* at Lawai, it seemed likely that fossil land snails might have been uncovered at additional locations. A diligent search of the the Koloa district was therefore undertaken. In May 1995, an eroding pocket of ancient soil (less than 2 m x 0.5 m and 0.5 m deep) was located on the seaward edge (within 4 m of the shore) of the lithified sand dune at Waiopili (Fig. 2). This soil was studded with fragmented and whole shells of the land snail genera *Orobophana* (Helicinidae), *Amastra*, *Carelia* (both Amastridae), *Cookeconcha* and *Endodonta* (both Endodontidae). In addition, shells belonging to a species of *Newcombia* (Achatinellidae: Achatinellinae) were found.

Fig. 2. Location of collecting site on Kauai.

Achatinellidae: **Achatinellinae**

***Newcombia* sp.** **New island record**

The subfamily Achatinellinae is endemic to the Hawaiian Islands and includes 4 genera: *Achatinella*, *Partulina*, *Perdicella* and *Newcombia*. There are over 200 species (Cowie *et al*. 1995). Until now, the subfamily had not been recorded from Kauai.

The genus *Newcombia* is highly distinctive, but the specific identity of the present specimens (Fig. 1) must await further study. The present record is, however, sufficiently significant to warrant rapid publication.

Material examined. KAUAI: Mahaulepu, Waiopili, in lithified sand dune, fossil, 8.v.1995, R. Genre, P. Sutter, R.P. Gage, II (BPBM Malacology 250717); 11.xi.1995, R. Genre, P. Sutter, R.P. Gage, II (BPBM 250718); 22.xi.1995, R. Genre, P. Sutter, R.P. Gage, II (BPBM 250719); 10.xii.1995, R. Genre, R.P. Gage, II (BPBM 250720).

Discussion

The family Achatinellidae is one of 4 land snail families endemic to Pacific Islands; the other 3 are Endodontidae, Partulidae (not Hawaiian) and Amastridae (endemic to the Hawaiian Islands). The subfamily Achatinellinae is one of the most distinctive elements of Hawaii's natural history. The relatively large size of the shells, and their often striking colors and patterns have made them the objects of intensive study since they were first discovered by Western naturalists (Dixon 1789).

The genus *Newcombia* consists of 7 species and 5 infraspecific taxa (Cowie *et al*. 1995). Prior to the present finding, a single species was known from Maui, the remaining taxa all being found on Molokai. The present record may represent a new species.

There are several lithified dunes on the southwest shore of Kauai. These appear to have been formed and lithified during glacial periods when sea level was lower, so that they now extend below the current sea level (Gavenda 1992). However, the age of the fossil deposit containing the *Newcombia* is unknown, although Olsen & James (1991) provided a radiocarbon date of 6740 ± 80 yr BP for fossil land snails at the nearby Makawehi dune. Certainly the present deposit predates human colonization of the Hawaiian Islands and the presence of *Newcombia* on Kauai cannot be attributed to human activities.

In general, Achatinellinae are snails of forest habitats, with many of the extant species appearing to favor *'ohi'a* (*Metrosideros polymorpha*) forest. The presence of *Newcombia* in a low coastal locality therefore suggests that the forest extended down to this elevation and, perhaps, that the climate was wetter than it is now. Median annual rainfall at Waiopili is now about 840 mm [33 inches], characteristic of the dry leeward coastlines of all the main Hawaiian Islands.

The absence of Achatinellinae from Kauai has often been considered something of a paradox (Cowie 1996). The family Achatinellidae is ancient, predating by far the present main Hawaiian Islands, but the subfamily Achatinellinae may have evolved more recently, perhaps on the Maui Nui complex (Zimmerman 1948). This seems particularly likely for *Newcombia*, given that its greatest diversity occurs on Molokai and Maui. Its presence on Kauai may be a simple historical accident resulting from the vagaries of dispersal.

Acknowledgements

I thank Robert Cowie and Carl Christensen for initial confirmation of the identity of the shells. Cowie assisted me in comparing the specimens with the collections in the

Bishop Museum, reviewed the manuscript, and greatly facilitated the submission of this note.

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New Records of Introduced Land and Freshwater Snails in the Hawaiian Islands

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Ampullariidae

Pomacea canaliculata (Lamarck) **New island record**

This freshwater species, here reported from Lanai, is 1 of 4 species of Ampullariidae ("apple snails") recorded from the Hawaiian islands (Cowie 1995). It has previously only been reported from the islands of Kauai, Oahu, Maui and Hawaii. It is of South American origin, but was deliberately introduced to South-East Asia in the late 1970s or early 1980s as a potential food source, and has since become an extremely serious pest of rice and other crops (Mochida 1991). It was probably brought deliberately to Hawaii from Asia in about 1989 and has rapidly become a serious pest of taro.

Material examined. LANAI: Koele golf course, water hazard at hole no. 15, 1760 ft. [536 m.], 27.iv.1995, D.J. Preston (BPBM Malacology 250486).

Cerionidae

Cerion viaregis Bartsch **New state record**

Cerionidae are land snails native to the Caribbean islands and Florida Keys. Studies of their genetics and morphological variation have made major contributions to evolutionary biology (e.g., Gould & Woodruff 1990). This species is from the island of Andros (Bahamas).

Live specimens were sent by Paul Bartsch of the U.S. National Museum (Smith-

sonian Institution) in 1922 to C. Montague Cooke, Jr., who attempted to establish populations in a number of places on Oahu. The purpose of these introductions was presumably similar to that of the introduction of Bahamian *Cerion* to Florida by Bartsch to investigate the extent (if any) of environmental, as opposed to genetic, determination of shell morphology (Bartsch 1920; Woodruff & Gould 1987). The populations on Oahu failed to establish (correspondence between Paul Bartsch and C. Montague Cooke, Jr., 3.viii.1922, 21.viii.1922, 6.ix.1922, 14.ii.1924, 8.ix.1924; Bishop Museum Archives).

Also introduced to Oahu as part of the same experiment were *Cerion casablancae* Bartsch, 1920, also from Andros, and an additional unspecified *Cerion* sp. from Cuba. Neither species became established and neither is represented in the collections of Bishop Museum.

Material examined. OAHU: Malaekahana, collected dead, 23.xi.1940, C.M. Cooke, Jr. (BPBM Malacology 188771).

Polygyridae

Polygyra cereolus (Mühlfeld, 1818) **New state record**

Polygyrids are terrestrial snails occurring naturally in North America. This is the first record of the family in Hawaii. *Polygyra cereolus* is native to Florida, where it is common. It is not known when or how it was introduced to Hawaii.

Material examined: OAHU: Commons lot on south side of Crozier Drive, Mokuleia, 28.vii.1995, L. Miyano (lot split: BPBM Malacology 250724, ANSP 398833); same location (including live specimens), 2.xii.1995, L. Miyano (BPBM Malacology 250716).

Helicidae

Helix aspersa Müller, 1774

This western European land snail was first recorded in Hawaii in 1952 (Kondo 1956a), and again in 1956 (Kondo 1956b), on both occasions from Oahu. It was first reported on the Island of Hawaii in 1976 (articles in the *Honolulu Star Bulletin* newspaper) and is apparently still present there, around Waimea at least (L. Miyano, pers. comm.). It was confirmed as still present on Oahu in 1980 and recorded from Maui (Kula) for the first time in 1981 (Tamura *et al*. 1981). The present record confirms its continuing presence on Maui, based on material collected in 1995 and deposited in the Bishop Museum collections.

Helix aspersa is a common snail in its native range, frequently found in cultivated gardens, where it can become a pest. It has been introduced to many parts of the world, where it has also frequently achieved serious pest status, e.g., California (Gammon 1943). It has not achieved a wide distribution in Hawaii nor become a serious agricultural pest. Being of temperate origin, it may be restricted in Hawaii to higher elevation localities and be unable to colonize low areas where temperatures may be too high.

Material examined. MAUI: Kula, 377 Haleakala Highway, 0.2 mi. [0.1 km.] makai [in the direction of the ocean] of Crater Rd., mauka [mountain] side of road, 3300 ft. [1006 m.] (elevation given by landowner), 3.ix.1995, P. Thomas (BPBM Malacology 250489).

Acknowledgements

I thank Gary Rosenberg (Academy of Natural Sciences of Philadelphia) for identifying the polygyrids, David S. Woodruff (University of California, San Diego) for discussion of the *Cerion*, and the various collectors for donating material to Bishop Museum.

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New Records and Synonymies of Hawaiian Diptera

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All specimens examined in this paper are vouchered in the Bishop Museum.

Dolichopodidae

Pelastoneurus lugubris Loew **New state record**

Specimens of this species were first collected by William D. Perreira at the Magoon Facilities at the University of Hawaii, Manoa on 30 January 1994. Since that collection, other specimens have turned up in ongoing Malaise trapping in north Halawa Valley by the Hawaii Biological Survey and in a recent survey of Lualualei Naval Magazine. All collections were made in grassy areas.

The species occurs naturally in the eastern United States from Michigan south to Mexico.

Material examined: OAHU: UH Manoa, Magoon Facilities, 30.i.1994 (W.D. Perreira); Lualualei Naval Magazine, Halona Valley, 21°25.862N, 158°05.708W, 1620 ft [495 m], 18–19.i.1996 (D.J. Preston), Malaise trap.

Tachytrechus sp. **New state record**

Numerous individuals of this circumtropical genus were collected at 6 different localities on Kauai by D.A. Polhemus during stream surveys. Determination to species has not yet been made.

Material Examined: KAUAI: Hanakapiai Str, 23.x.1993 (D.A. Polhemus); Hanalei Riv, 600 ft [183 m], 4.xi.1994 (D.A. Polhemus), wet bedrock; same except 12.vi.1994, 1200 ft [365 m]; Waimea Riv, 750–785 ft [229–240 m], 12.vi.1994 (D.A. Polhemus), midstream rocks; Waiahula Str, 12.vi.1994, 1000 ft [305 m] (D.A. Polhemus).

Chrysotus longipalpis Aldrich
Chrysotus longipalpis Aldrich, 1896: 329.
Chrysotus pallidipalpus Van Duzee, 1933: 313, **new synonymy**

This species was previously known in Hawaiian collections as *Chrysotus pallidipalpus* Van Duzee. *Chrysotus longipalpis* was originally described from the West Indies (Aldrich 1896), but has been reported as frequenting hot houses and green houses in widely disparate regions such as the UK and the neotropics.

At the request of the author, comparisons of the types of both species in The Natural History Museum, London were made by Mr. John E. Chainey. His comparison of the salient characters of both types showed them to be conspecific, thus the new synonymy here.

Micropezidae
Taeniaptera angularis Loew **New island record**

Specimens of this species were captured on the grounds of the Bishop Museum (13 and 26 Oct. 1995) by Wayman Paglinawan. Previously, this recent introductioon to Hawaii was known only from the Big Island.

Material Examined: OAHU: Honolulu, Bishop Museum, 13 & 26.x.1995, Bishop Museum staff (BPBM).

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Range Expansions and Name Changes for Moths (Lepidoptera) in the Hawaiian Islands

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This paper summarizes some of the changes in understanding of moth species in the Hawaiian Islands through the ongoing activities of the Hawaii Biological Survey. Two kinds of changes are recorded here: changes in understanding of distributions based on specimens accumulated at Bishop Museum (BPBM), and changes in nomenclature resulting from taxonomic work published elsewhere. Many of these taxonomic changes have already been incorporated in Nishida (1994), but this paper provides the background. This paper builds on recent reviews of Sphingidae (Riotte 1986), Noctuoidea (Riotte 1991) and Pyraloidea (Munroe 1989). The recent field guide to Pyraloidea and Microlepidoptera by Robinson *et al*. (1994), although not intended to cover the Hawaiian fauna, is very useful for family-level identifications and includes many species that occur in Hawaii.

Crambidae

Euchromius ocellus (Haworth) **New island records**

Previously known from Niihau, Kauai, Oahu, Molokai, and Lanai (Nishida 1994), the identification was verified as part of the revision by Schouten (1992). Schouten's new map record for Lanai was based on the specimens cited below.

Material examined. HAWAII: Kona Dist., Kaupulehu For. Res., 600 m, 24 March 1961, L.W. Quate; KAHOOLAWE: Beck's Cove, 10 m, 11–14 February 1980, G.M. Nishida; Hakioawa, 10 m, 27 April 1980, F.G. Howarth; LANAI: Manele, March 1961; no further data, T. Blackburn.

Maruca vitrata (Fabricius)

Maruca testulalis (Geyer), 1832, was placed as a synonym of *Maruca vitrata* (Fabricius), 1787, by Munroe (1995: 69). This cosmopolitan pest of legumes is known from Kauai, Oahu, Molokai, Lanai, Maui and Hawaii.

Spoladea recurvalis (Fabricius) **New island record**

Although recorded from all the other Hawaiian Islands (Nishida 1994) and represented from Kahoolawe in BPBM for many years, the island record has never been published.

Material examined. KAHOOLAWE: Hanakanaea Bay, w. end, 18 Feb. 1931, E.H. Bryan, Jr.; Hakloawa Pt., u.v. light, 5 m, 7 Nov. 1979, G.M. Nishida; 1.2 km SE Moaula, 19 April 1989, C.E. O'Connell.

Elachistidae

Perittia lonicerae (Zimmerman & Bradley)

Perittia lonicerae (Zimmerman and Bradley) was transferred to *Perittia* from the monotypic genus *Swezeyula* by Kuroko *in* Inoue *et al*. (1982: 208). This placement was confirmed by Kaila (1995: 209) and Traugott-Olsen (1995: 268–69, figs. 14-15, 30, 41). The species, which is adventive in Hawaii, has been recognized in Japan (Kuroko 1982), although Traugott-Olsen (1995) described the Japanese specimens as new. Several other species are known from the eastern Palearctic Region, so it is likely that *P. lonicerae* originated there.

Geometridae

Macaria abydata Guenée

First recorded from Kauai and Oahu in 1970 (*U.S. Dep. Agric. Coop. Econ. Insect Report* 20: 826, 842, 1970), this species is now also known from Molokai, Lanai, Maui, and Hawaii (Nishida 1994). It has been known in the Hawaiian literature as *Semiothisa santaremaria*, now a synonym of *Macaria abydata* (Holloway 1993). Holloway (1993: 161) documents the dramatic spread of this species across the Pacific and Asia, and illustrates a larval specimen from Hawaii (pl. 19). The rapid spread of this species since 1970 is similar to that of *Heteropsylla cubana* Crawford (Homoptera: Psyllidae) (Muddiman *et al*. 1992), which is also found on *Leucaena leucocephala* (Lam.) de Wit.

Immidae

Imma mylias Meyrick **New island record**

First recorded from Oahu in 1973 (Beardsley 1978) and found on Hawaii Island in 1975 (Murai 1988).

Material examined. KAUAI: Lawai Valley, National Tropical Botanical Garden, ca. 20 m, 7–9 Sept. 1988, S.E. Miller.

Psychidae

Brachycyttarus griseus de Joannis

First recorded from Oahu in 1984, the species is also known from the islands of Kauai and Hawaii. The taxonomy and biology are detailed by Davis (1990). Kamarudin *et al*. (1995) and Robinson *et al*. (1994: 37) provide additional data on the biology and natural range of the species, including an additional synonym, *Pteroma langkawiensis* de Freina.

Pterophoridae

Leioptilus beneficus (Yano & Heppner)

Oidaematophorus beneficus was transferred to *Leioptilus* by Miller & Gielis (1995: 108). This species was introduced from Mexico in 1959, 1965 (unsuccessful), and 1973 (successful) for the biocontrol of *Ageratina riparia* (Regel) K. & R. and is known from Oahu and Hawaii (Yano & Heppner 1983).

Pyralidae

Following the recent revision of North American *Homeosoma* (Goodson & Neunzig 1993), Neunzig (pers. comm., 1995) has confirmed that *Homeosoma albosparsum* (Butler) appears to be correctly placed in *Homeosoma*, although the female genitalia lacks a signum in the corpus bursae. He also suggests that *Unadilla humeralis* Butler probably belongs in *Homeosoma*, but the taxa involved are in need of further study.

Sphingidae

Hyles lineata (Fabricius) **New island record**

Known from all the major islands, this species is recorded here for the first time from Kahoolawe.

Material examined. KAHOOLAWE: Smuggler's Cove, u.v. light, 19 April 1989, C.E. O'Connell.

Tortricidae

Crocidosema lantana Busck

Epinota lantana was transferred back to the original genus, *Crocidosema*, by Powell *et al*. (1995: 154). This species was introduced from Mexico in 1902 for the biocontrol of *Lantana* and is known from Kauai, Oahu, Molokai, Maui, and Hawaii (Zimmerman 1978).

Acknowledgements

Jeremy Holloway (International Institute of Entomology, London), Lauri Kaila (University of Helsinki, Oslo), H.H. Neunzig (North Carolina State University, Raleigh), and Gordon Nishida (Hawaii Biological Survey) helped provide information for this paper.

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A New Larval Foodplant for *Tmolus echion* (Lepidoptera: Lycaenidae)

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During August 1995 *Tmolus echion* (Linnaeus) was locally common in the Waipi'o Valley on Hawai'i and its larvae fed on flower buds of *Clerodendrum chinense* (Osb.) Mabb. (Verbenaceae), tended by the ant *Paratrechina longicornis* Latreille (Hymenoptera: Formicidae). One *T. echion* oviposited on a flower bud of *Hibiscus furcellatus* Desr. (Malvaceae) but the neonate larva refused to eat it. However a penultimate instar larva taken from *Clerodendrum* readily ate into the furled *Hibiscus* petals. I had no opportunity to learn if *T. echion* might be adapting to endemic Malvaceae.

A reared *T. echion* imago and its pupal shell (det. F.R.) are deposited as vouchers in Bishop Museum, as are specimens of *P. longicornis* (det. D. Preston). *Clerodendrum chinense* was determined as *pikake hohono* by Linda Beech and Beatrice Krauss, and also was checked against the diagnosis in Wagner *et al.* (1990: 1319) though nomenclature follows Wagner (1995: 26). *Hibiscus furcellatus* was determined by F.R. from the diagnosis in Wagner *et al.* (1990: 995). No plant vouchers were preserved.

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Heteroptera (Insecta) Range Extensions and Rediscoveries in the Hawaiian Islands

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The following represent new island records and rediscovereies for Heteroptera species. Voucher specimens of all species treated are held in the Bishop Museum, Honolulu (BPBM) and the J.T. Polhemus Collection, Englewood, Colorado (JTPC).

Nabidae

Nabis kaohinani Kirkaldy **Notable rediscovery**

Nabis kaohinani is a micropterous damsel bug that was originally described on the basis of a unique male holotype taken by Otto Swezey at Kaumuohonu, Oahu. This locality cannot be found in any Hawaiian gazetteer so far consulted, nor is it listed in the detailed card file of Hawaiian place names compiled by the late E.H. Bryan, which is now housed in the Bishop Museum archives. Given the limited material and uncertain type locality, *N. kaohinani* has thus remained a poorly known and elusive species.

Recent collections in the Koolau Mountains have now shown that *N. kaohinani* is relatively common at higher elevations in that range. The species is a cursorial predator

that occurs on a wide variety of plants, although it is found most typically on the moss covered branches of *'ohi'a* (*Metrosideros polymorpha*), or in clumps of dried tree fern fronds. Nearly all recently collected specimens have been taken by beating vegetation at night, and the species' predominantly nocturnal habits, combined with the remote areas this species inhabits, no doubt account for its rarity in collections. A similar but distinct micropterous species, currently undescribed, is found on the summit plateau of Mt. Kaala in the Waianae Mountains, and 2 other more distantly related micropterous species, also undescribed, are known from the Eleao and Konahuanui massifs.

The current collections constrain the location of Kaumuohonu (also spelled on some labels as "Kaumuahona") to some high elevation site in the northwestern Koolau Mountains; this is further reinforced by the fact that several Koolau-endemic carabid beetles are at hand bearing the same date and locality data (Liebherr, pers. comm.). A further study of Swezey's field notes may shed light on this matter.

Material examined. OAHU: 14 (holotype), 12, Kaumuohonu, O.H. Swezey; 104, 92, Koolau Mtns, Poamoho summit, 2500 ft, 5 May 1995, D.A. Polhemus, J.K. Liebherr and A. Asquith, beaten from vegetation at night (BPBM).

Notonectidae

Anisops kuroiwae Matsumura **New island record, name change**

When originally recording *A. kuroiwae* from Hawaii, Polhemus (1995) followed the error of Brooks (1951) in using the name *Anisops batillifrons* Lundblad, which was proposed in 1933. Although widely used in the literature, *A. batillifrons* is in fact a synonym of *A. kuroiwae* Matsumura, a generally overlooked name that was proposed in 1915. The error is corrected herein.

Anisops kuroiwae was previously recorded from the islands (as *batillifrons*) based on a single specimen taken in a stock tank at at Kula, Maui in 1991; additional searches of this locality proved fruitless, raising questions regarding the permanency of the species' establishment in Hawaii. Recent collections on Lanai, however, have shown *A. kuroiwae* to be abundant in artificial aquatic habitats near Lanai City, in company with *Trichocorixa reticulata* (Guérin-Méneville).

Material examined. LANAI: many 4 2, ponds at Lanai City wastewater treatment plant, 1800 ft, 27 April 1995, D.A. Polhemus and A. Asquith (BPBM); 14, 12, water hazard pond at 15th hole, The Experience at Koele golf course, nr. Lanai City, 1900 ft, 27 April 1995, J.T. Polhemus and D.J. Preston (JTPC).

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New Hawaiian Island Records for Aquatic Heteroptera (Insecta)

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The following represent range extensions, plus clarification of species and genus identities for 2 species previously reported from Hawaii. Unless otherwise noted, voucher specimens will be found in the J.T. Polhemus Collection (JTPC) and Bishop Museum (BPBM), and all collections are by J.T. Polhemus.

Corixidae

Trichocorixa reticulata (Guerin-Méneville) **New island record**

This species is very widespread in the Western Hemisphere.

Material examined: LANAI: Koele Lodge, artificial ponds, 26 April 1995 (JTPC).

Gerridae

Halobates sericeus Eschscholtz **New island record**

This open ocean species is common on the seas along the Hawaiian Archipelago, and can be expected to be found on any of the islands, as it is commonly blown onshore by heavy winds.

Material examined: LANAI: Mauna Lei, beach near mouth of Maunalei Gulch, 26 April 1995 (D. Preston, J. T. Polhemus) (JTPC).

Hebridae

Merragata hebroides White **New island record**

This species is very widespread in the Western Hemisphere.

Material examined: LANAI: Koele Lodge, artificial ponds, 26 April 1995.

Mesoveliidae

Mesovelia mulsanti White **New island record**

This species is very widespread in the Western Hemisphere.

Material examined: LANAI: Koele Lodge, artificial ponds, 26 April 1995.

Mesovelia amoena Uhler **New island records**

This species is restricted to seeps and rheocrenes, and does not occur on open ponds as does *M. mulsanti.* It was previously recorded from Kauai and Oahu.

Material examined: LANAI: Maunalei Gulch, middle section, artificial forest stream created by leak in water pipe, 26 April 1995. MAUI: Small stream on north side of West Maui, about 5 km west of Waihee, 15 August 1991.

Notonectidae

Buenoa pallipes (Fabricius) **New island record**

This species was taken in a different pond than the ponds from which *Anisops kuriowae* Matsumura was collected; the latter species is reported from Lanai by D.A. Polhemus in this issue.

Material examined: LANAI: Koele Lodge, artificial ponds, 26 April 1995 (JTPC).

Notonecta indica Linnaeus **New island record**

This species is very widespread in the Western Hemisphere.

Material examined: LANAI: Koele Lodge, artificial ponds, 26 April 1995 (JTPC).

Pleidae

Neoplea apopkana (Drake & Chapman) **New island records**

Aside from Hawaii, this species was previously known only from Florida and Mississippi. It was previously reported from Oahu as *Plea*? sp. by J.W. Beardsley (*Proc. Hawaii. Entomol. Soc*. 24:5, 1982). Because these small insects fly readily, this species will probably be found eventually on all of the larger islands of the state of Hawaii.

Material examined: KAUAI: Lihue, uv light, 13 Oct. 1992 (C. L. Campbell) (Hawaii Dept. Agr., BPBM, JTPC). LANAI: Koele Lodge, artificial ponds, 26 April 1995, J. T. Polhemus. OAHU: Ewa, light trap, 20 Oct. 1978 (J. W. Beardsley) (JTPC); Hickam AFB, light traps, 29 Oct. 1980 (D. H. Oi) (Hawaii Dept. Agr., BPBM, JTPC).

Saldidae

Micracanthia humilis (Say) **New island records**

This species is very widespread in the Western Hemisphere. It was previously reported from Oahu as *Micracanthia* sp., possibly *humilis* by J.W. Beardsley (*Hawaii. Ent. Soc. Newsl*. 1 (2):2, 1991, and *Proc. Hawaii. Entomol. Soc*. 32:2, 1995).

Material examined: KAUAI: Head of Waimea Canyon, NW Alakai Swamp, mossy muddy trail, elev. approx. 1280 m, 25 August 1991 (J.T. & M.S. Polhemus) (JTPC). MOLOKAI: Near Puu Kolekole, damp trail near Kolekole Cabin, elev. 1140 m, 21 August 1991 (J.T. & M.S. Polhemus). OAHU: Mt Kaala, Waianae Mtns., summit, damp area at car park near bog, elev. 1220 m, 3 August 1991; same place, 29 April 1995.

Acknowledgments

The Lanai and Mt. Kaala specimens were gathered as a member of surveys conducted by D.A. Polhemus, D.J. Preston and Adam Asquith (Hawaii Biological Survey); I am grateful for their help with collections and logistics. I am also indebted to Bernarr Kumashiro (Hawaii Department of Agriculture) for the loan of specimens.

Microcrypticus (Coleoptera: Tenebrionidae) in Hawaii, with Notes on Distribution and Probable Origin

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While sorting unidentified Hawaiian beetles in the collection of the Bishop Museum (BPBM) in 1991, I found specimens of a small member of the tenebrionid tribe Crypticini that had been collected on Oahu. In placing them among the curated Tenebrionidae, I found them to be conspecific with specimens identified as "*Platydema obscurum* Sharp". Additional specimens so named were also found in the University of Hawaii Collection and the U.S. National Museum of Natural History, Smithsonian Institution (USNM). Since *Platydema* belongs in the Diaperini (Doyen 1984) and no crypticines had been recognized in any Hawaiian faunal lists, it was evident that some change in nomenclature was needed. Studies in progress on mainland U.S. crypticines led me to find that Gebien

(1939) had recognized this species was not a *Platydema* and had correctly transferred it to *Microcrypticus* Gebien (1920). A subsequent review of this genus (Kaszab 1975) also recognized *Microcrypticus obscurus* (Sharp).

The new combination had never been noted in U.S. museum collections and data files, and was not discovered soon enough for inclusion in the recent checklist of Hawaiian terrestrial arthropods (Nishida 1992, 1994) where the species is listed under *Platydema*. Sharp described the species from Oahu "at various elevations, and in various localities" (Blackburn & Sharp 1885); the beetle is also recorded from Ni'ihau (Nishida 1992, 1994), but not known from other Hawaiian islands.

Material examined: OAHU: Ewa, X-1974 (1), I-1977 (9), I-1978 (1), and IV-20-1978 (1), all "J.W. Beardsley collector; light trap"; Barbers Pt., X-5-1976 (2), 10-XI-1977 (1), and 10-I-1978 (2), all "J.W. Beardsley collector; light trap"; Honolulu, T.H., 1939 (no other data; 1); Kaimuki, 5-11-14 (no other data, 2); Kunia, III-24-86, "ex light trap; C. Kawauchi" (1); Manoa, 7-6-27, "O.H. Swezey collector; under house" (1); Manoa, IV-1947; N. L. H. Krauss (1); Public Health Dept., XI-8-65, "light trap; J.W. Beardsley collector" (1); Wahiawa, 10-58, "E.J. Ford, Jr.; light trap" (1); Waipio, IX-25-1956 (2) and 8-10-59 (1), all "light trap, J. W. Beardsley collector"; Waipio, 9-57, "light trap; E. J. Ford, Jr." (3).

Two other specimens (in BPBM) bear blank red tags but have no locality data; they are mounted on cards, each bearing a number on the back; "118" and "758"; the former is also labeled "RCL Perkins Collection" and these 2 specimens are in a pinning tray with a separate label "*Platydema obscurum*". They may represent part of Sharp's type series, but there are no labels or statements by Sharp that verify this.

Although described from Hawaii, *M. obscurus* is considered to be adventive there (Nishida 1992), but its origin has been unknown. In reviewing the genus, Kaszab (1975) found no synonymy involved with *M. obscurus* and reported no occurrence of the species outside of the Hawaiian Islands.

In the course of this study, a few specimens I consider to be conspecific with Hawaiian *M. obscurus* have been found: 3 in USNM labeled "RangoonBma, FJMeggitt, Apr. 1927" (Burma), "Mt Makiling, Luzon, Baker" (Philippines), "THAILAND: Kaen Municipality, 15 V-1954, R.E. Elbel" and 2 in the Museum of Comparative Zoology, Harvard University, labeled "Iwa, OKINAWA, Jul-Sept, 1945; C.T. Parsons & F.G. Werner- lt." (Ryukyu Islands, Japan). These records conform to the recognized natural distribution of the genus (Gebien 1920, Kaszab 1975) from Africa to Asia, and are localities that are likely historical sources of faunal introductions to Hawaii. *Microcrypticus obscurus* is probably indigenous to mainland SE Asia, where other closely related species occur. Its appearance on Okinawa is likely adventive.

It is evident that species of *Microcrypticus* and other crypticines are prone to introduction and establishment to new regions (Kaszab 1975; Steiner 1982, and unpubl. data). The microhabitat of *M. obscurus* is not known, but other crypticines are abundant in soil surface debris. It does not appear commonly in collections. Judging from the data above, use of light traps seems to be the best method for its collection, but pitfall traps and sifting leaf litter should also produce specimens. Blackburn and Sharp (1885) stated that it was taken "generally under stones".

Microcrypticus obscurus is the only established member of Crypticini known in Hawaii; with its small size (2.4–2.7 mm), compact oval form, distinctive (and variable) yellowish and dark brown elytral markings, it can not be confused with any other tenebrionid known from the islands. A single specimen (USNM) of another adventive cryp-

ticine of interest has been seen: *Gondwanocrypticus platensis* (Fairmaire), a South American species (Kulzer 1961), labeled "OKINAWA: Kadena AFB, at Hawaii 117, VII-19-1969, Morris; with aircraft, 69-14817". This larger, all black species is now established in a number of regions outside its original range (Steiner, unpubl. data).

Acknowledgments

For the loan of specimens for study and the generous help received while visiting their institutions, I thank Gordon M. Nishida, G. Allan Samuelson (BPBM), John S. Strazanac (UHIC), and Philip D. Perkins (MCZC).

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Clarification of *Plagithmysus hoikuahiwi*, Confused with the Nomen Nudum *P.ulihihi* (Coleoptera: Cerambycidae)

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The name "*ulihihi*" as applied to *Plagithmysus* was the only unresolved name in our unpublished appendix of *Plagithmysus* names that we use with the index to species by Gressitt & Davis (1971). Two publications by Gressitt (1975, 1978) appear to be the only articles in which the name "*ulihihi*" was used; in both cases, the name appeared in nearly identical diagramatic schemes of plagithmysines. In updating our databases of Hawaiian

arthropods, including the bibliographic one from which the *Hawaiian Terrestrial Arthropod Checklist* is derived (Nishida 1994), it became apparent that this problem should be resolved.

The problem seems to have arisen over a labelling error of the type series of *Plagithmysus (Neoclytarlus) hoikuahiwi* Gressitt & Davis (1974: 362–63). For some reason, this series was labelled as "*Plagithmysus ulihihi* Gressitt" and placed in the collection under that name. Tracing the only *Smilax*-associated plagithmysine from Kauai Island quickly produced the mislabelled series of *hoikuahiwi*, which of course was absent in the collection under that name. Also, "*ulihihi*" is shown in schematic diagrams instead of "*hoikuahiwi*" and all 7 *Smilax*-associated species (in subgenus *Neoclytarlus*) are diagramed together in the same branch grouping (Gressitt 1975: 44, 1978: 164).

The type series of *P. (N.) hoikuahiwi* was reared from *Smilax* collected from Pihea Trail, 1200 m, 19.xii.1972, by C. J. Davis and D. Sugawa. The specimen designated holotype female emerged on 19.i.1973, as cited in text (Gressitt & Davis 1974) [none of the specimens have emergence dates on labels]. The holotype female also happens to be the specimen figured on page 360, though the caption and text do not indicate that. The holotype, allotype, 4 paratypes [cited as types in the text but labelled as *P. ulihihi* Gressitt], plus 3 additional non-types [without paratype labels] all have identical data, including the Davis field number: K-72-46.

Accordingly, the name "*ulihihi*" as applied to *Plagithmysus* and/or to the subgenus *Neoclytarlus* is here recognized as a *nomen nudum*; the type series of *P. (N.) hoikuahiwi* Gressitt & Davis is having new type labels added to the pins [with invalid labels turned upside-down].

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The Status of *Gasteracantha mammosa* (Araneae: Araneidae) in the Hawaiian Islands

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Specimens of this spiny-backed spider were first collected December 1985 in Hilo, Hawaii Island and later identified as *Gasteracantha* sp. (Kumashiro 1988). Similar to *G. cancriformis* (Linnaeus, 1758), this species can be readily identified by the 2 distinct yellow spots on the dorsum. Pinter (1992) identified it as *Gasteracantha mammosa* C.L. Koch, 1845 from Kalaheo, Kauai.

Also in 1992, the name *Thelacantha brevispina* (Doleschall, 1857) was given to specimens from the University of Hawaii submitted to the Smithsonian Institution for identification. At that time, *T. brevispina* was the valid, acceptable name for the species (N. K. Scharff, pers. comm.), which subsequently appeared in later publications (Yates *et al*. 1990, Platnick 1993, Nishida 1994) and was also reported at entomological meetings (Kumashiro 1992; Yates, Pac. Entomol. Conf., 1994). When the picture of the spider (Fig. 1) appeared in Yates *et al*. (1990) as *T. brevispina*, but in Nishida & Tenorio (1993) as *G. mammosa,* and this same spider picture was shown during meetings under 2 different names, clarification of the nomenclatural situation was necessary. The purpose of this note is to present the current nomenclatural status of *G. mammosa,* and update what is known of the species and its distribution in the Hawaiian Islands.

Gasteracantha mammosa C.L. Koch

Gasteracantha mammosa (C.L. Koch, 1845) is the correct name for the spider reported as *Gasteracantha* sp. and *Thelacantha brevispina* from the Hawaiian Islands (N. K. Scharff, pers. comm.). Scharff is presently revising the genus *Gasteracantha*, and has seen both types as well as Hawaiian specimens.

As demonstrated by the extensive list of synonyms in Emerit (1974), the extreme polymorphism of the species, especially the varied coloration and abdominal configurations caused much taxonomic confusion among spider workers. For example, Butler (1873) placed what was to become synonymized under *G. mammosa* into 2 genera: *Stanneoclavis* and *Gasteracantha*, eventually describing 8 species in *Stanneoclavis*, and 2 species in *Gasteracantha* (Emerit 1974). Van Hasselt (1882) designated *Thelacantha mammosa* the type species of his new genus *Thelacantha*. Dahl (1914), probably certain of the valid generic status of *Gasteracantha,* reduced *Thelacantha* to subgeneric status when he redescribed *Gasteracantha (Thelacantha) mammosa*. Yaginuma (1960), Chikuni (1989), Feng (1990), and Chen & Gao (1990) recognized *G. mammosa,* but their concepts of *G. mammosa* were treated as *Thelacantha brevispina* by Platnick (1993). Aside from *Stanneoclavis*, *G. mammosa* has been variously placed in the genera *Plectana, Isacantha,* and *Actinacantha.*

Aside from Hawaii and Kauai Islands, *G. mammosa* is known from Molokai (Pinter 1992), Maui (Conant 1992), Oahu (Kumashiro 1992) and Lanai (Kumashiro, pers. comm.). The species is undoubtedly widely distributed in the islands. Emerit (1974) showed that the species is oriental-tropicopolitan in distribution.

Populations of *G. mammosa* in urban Honolulu seem to be declining, perhaps

because of bird predation (pers. observ.) or through parasitization by the ichneumonid wasp, *Tromatobia ovivora* (Boheman, 1821), a spider egg parasite (B. Kumashiro, pers. comm.).

Acknowledgments

I am indebted to Nikolaj Scharff, Zoological Museum, Copenhagen, for his expertise and encouragement. Bernarr Kumashiro, Hawaii Department of Agriculture, Honolulu, provided information on the egg parasite and the new island record from Lanai.

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New Records of Hawaiian Fish-Associated Isopods and a List of Known Species

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Collections of isopods associated with fishes that we made in 1986, and others sent to us since that time, from Hawaii, contain a new species, a new record for the northern Pacific, new state and islands records, and new host records. We would be pleased to identify additional fish-associated isopods, with the understanding that all material will be deposited in the Bishop Museum and/or the U.S. National Museum. Personal communications noted below were originally recorded in 1986 and were reconfirmed in October 1995.

Abbreviations**:** ADP = Aquaculture Development Program, State of Hawaii; BPBM = Bishop Museum; LACM = Los Angeles County Museum, California; USNM = United States National Museum, Crustacea Collection.

Isopoda: Aegidae

Aega deshaysiana (H. Milne Edwards) **New island and host records**

Richardson (1906) reported a specimen of this species from the Pailolo Channel between Molokai and Maui Islands and Northeast Approach 254–308 m, USNM 28974. Our records are new island records, but this isopod probably occurs around every island in the Hawaiian chain. Brusca (1983) reported *A. deshaysiana* as a single, circumtropical/subtropical species, but more recent investigations suggest it represents a multiple species complex, with the Hawaiian form probably representing a new species (N. Bruce, pers. comm.).

Material examined. MOLOKAI: 1 specimen on dorsal body of pink snapper *Pristipomoides sieboldii* (Bleeker) (Lutjanidae) in deep water, summer 1987, Collector: Joanne Ho, ADP Case No. 87-140, BPBM. NORTHWESTERN HAWAIIAN ISLANDS: 1 specimen on pelvic fin of a 22-26 kg Seale's grouper *Epinephalus quernus* Seale from deep water, 21.xi.1986, Collector: Joanne Ho, ADP Case No. 86-264, BPBM.

Aega sp.

Two specimens of this isopod were observed on dogfish, but only 1 was collected. The collected specimen had blood in its gut and appeared to be feeding on the dogfish. Several hundred dogfish were captured and examined, thus less than 1% were infected. No copepods or other obvious, external parasites were seen. The one specimen conforms to the genus *Aega* but is quite distinct from any described species. We would be pleased to describe this new species, if we receive additional examples. If specimens are available, we can send them to be used in a revision of the genus (Bruce pers. comm.).

Material examined. SOUTHEAST HANCOCK SEAMOUNT: (northwest of Midway Islands) 29˚47'24"N, 179˚03'36"E, 1 ♀ on left side of body just below and forward of the dorsal fin of 72.7 cm TL shortspine spurdog *Squalus mitsukurii* Jordan & Fowler (Squalidae) in 300 m depth, 16.iv.1987, Collector: Frank A. Parrish, BPBM.

Isopoda: Cymothoidae

Anilocra gigantea (Herklots) **New state record**

This parasite has been reported from deepwater on red snapper *Etelis carbunculus* Cuvier (Lutjanidae) in New Caledonia (Trilles 1972) and *Pristipomoides flavipinnis* Shinohara (Lutjanidae) and *Epinephalus* sp. (Serranidae) in Fiji (Bruce & Harrison-Nelson 1988). Our record is the first from the northern Pacific and a range extension of approximately 5000 km. Bruce and Harrison-Nelson (1988) note that this is the only species in the genus that occurs in the gill chambers of its host. The present specimens were attached consistently to the body of the host just dorsal and posterior of the gill opening. This position would seem to be more in agreement with the external attachment of all the other members of the genus; however, we have no way of evaluating the previous reports of location on the hosts. Previous records of attachment position on these deepwater, offshore commercially important fishes were third-person from fishermen and may have been due to post mortem movements. The present observations were made directly by a biologist (J. Ho pers. comm.). The question of attachment positions will require the study of more specimens in the field.

Material examined. OAHU: 1♀ on body just above and posterior to gill opening of *Etelis carbunculus*, 20.iv.1986, Collector: Joanne Ho, ADP Case No. 86-85, USNM; 4♀♀ on body just above and posterior to gill opening of 4 *Etelis carbunculus* 37.5–42.0 m depth, 28.xii.1986, Collector: Joanne Ho, ADP Case No. 86-291, BPBM; 5♀♀ on body just above and posterior to gill opening of 5 *Etelis carbunculus*, Collector: Joanne Ho, BPBM.

Creniola breviceps (Schiodte & Meinert) **New island and host records**

Edmondson (1946) reported *Nerocila* sp. from either giant trevally *Caranx ignobilis* (Forsskål) or bigeye trevally *Caranx sexfasciatus* Quoy & Gaimard (Carangidae), and Johnson (1982) reported an isopod from glasseye *Heteropriacanthus cruentatus* (Lacepede) (Priacanthidae), which were probably this species of isopod. Bruce & Harrison-Nelson (1988) suggested that this species was probably endemic to the Hawaiian Islands and had only been found in Oahu. The report below from the island of Hawaii is a **new island record**. Similar isopods have been observed on coral reef fishes along the Northwestern Hawaiian Island chain north of the main Hawaiian Islands (J.D. Parrish pers. comm.). We have not had the opportunity to collect these examples, but they may represent this species and suggest a wider range for this parasite.

Material examined. HAWAII: 1♀ on pectoral fin of *Heteropriacanthus cruentatus* in shallow water, 11.v.1987, Collector: Joanne Ho, ADP Case No. 87-114, BPBM; 1♀ on milletseed butterflyfish *Chaetodon miliaris* Quoy & Gaimard (Chaetodontidae), Kawaihae, south of Puako, Kona Coast, 1985, Observer: Thomas Hourigan. OAHU: 1♀ on *Carangoides equula* (Schlegel) (Carangidae), Fish Collection, Edmondson Hall, University of Hawaii; 1♀, 2♂♂ on 46 cm *Caranx ignobilis* from Coconut Island, 31.iii.1986, Collectors: LBW and EHW, BPBM. MIDWAY ISLAND: 1♀ on side of caudal peduncle of yellow eyed or goldring surgeonfish *Ctenochaetus strigosus* (Bennett) (Acanthuridae) observed in Midway Lagoon for a period of one year (1983–1984), 6 m depth, Observer: Robert Schroeder.

Ichthyoxenus puhi (Bowman)

The *Cymothoa* sp. frequently taken from Oahu from the branchial chamber of eels (Edmondson 1946) was probably *I. puhi*. Bowman (1960) noted "Dr. Gosline has occasionally found very similar if not identical isopods in the gill cavities of other Hawaiian

Table 1. Fish-Associated Isopods from Hawaii

Species	Host	Location	Locality	Museum Numbers[1]	Source
Aegidae					
Aega deshaysiana	*Epinephelus quernus*	pelvic fin	Leeward Islands	USNM	This paper
"	*Pristipomoides sieboldii*	body	Molokai	USNM	This paper
Aega sp.	*Squalus mitsukurii*	body	Hancock Seamount	BPBM	This paper
Cymothoidae					
Anilocra giganteus	*Etelis carbunculus*	body	Oahu	USNM, BPBM	This paper
Cymothyoa recta	——	——	Puako Bay, Hawaii	USNM 28977-83	Richardson 1906
"	——	——	Hilo, Hawaii	——	Edmondson 1946
Cymothoa sp.	*Polydactylus sexfilis*	tongue	——	——	Edmondson 1946
Cymothoa sp.[2]	"eels"	gill chamber	Oahu	——	Edmondson 1946
Creniola breviceps	*Priacanthus cruentatus*	pectoral fin	Hawaii	BPBM	This paper
Ichthyoxenus puhi	*Gymnothorax eurostus*	gill chamber	Oahu	USNM 103123-4	Bowman 1960
"	*Gymnothorax* spp.	gill chamber	Oahu	——	Bowman 1960
"isopod"	*Priacanthus cruentatus*	——	Hawaii	——	Johnson 1982
Nerocila sp.[3]	*Caranx* sp.	——	Hilo, Hawaii	——	Edmondson 1946

[1] some museum numbers not yet available

[2] probably *Ichthyoxenus puhi*

[3] probably *Creniola breviceps*

species of *Gymnothorax*...". We corresponded with the late Drs. Bowman and Gosline, but neither could find in their notes or remember which other species of hosts were infected. It would be of interest to determine which other species of moray eels are infected and whether or not this isopod occurs on other islands besides Oahu.

Acknowledgments

We thank James A. Brock, Aquaculture Development Program (ADP), State of Hawaii, for sending specimens; Joanne Ho, Division of Aquatic Resources, State of Hawaii, and Frank A. Parrish, NOAA/NMFS, Southwest Fisheries Center, Honolulu Laboratory, for collecting isopods; and James D. Parrish and Robert Schroeder, Hawaii Cooperative Fishery Research Unit, University of Hawaii, and Thomas Hourigan, USAID, and for specimens, observations and assistance. This manuscript was reviewed by J.D. Parrish and Niel L. Bruce, Zoological Museum, University of Copenhagen, Denmark.

Summary

A new species of *Aega* sp. was associated with *Squalus mitsukurii*. *Aega deshaysiana* (Milne Edwards) from *Epinephalus quernus* and *Pristipomoides sieboldii* are new island and host records. *Anilocra gigantea* (Herklots) from *Etelis carbunculus* is a new northern Pacific record. *Creniola breviceps* (Schiodte and Meinert) from *Heteropriacanthus cruentatus*, *Chaetodon miliaris*, *Carangoides equula*, *Caranx ignobilis*, *Ctenochaetus strigosus* are all new host records for this isopod, and Hawaii and the Northwestern Hawaiian Islands are new island records. *Cymothoa* sp. of Edmondson, 1946 = *Ichthyoxenus puhi* (Bowman, 1960). *Nerocila* sp. of Edmondson, 1946 = *Creniola breviceps*.

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New Records of Lizards Established on Oahu

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Iguanidae

Anolis sagrei Duméril & Bibron **New island record**

This species has become established on Oahu in the Lanikai/Kailua area. Records from the State Department of Agriculture, Plant Quarantine Branch (PQ) and specimens in Bishop Museum (BPBM) indicate that it became established in the early 1990s. The first recorded capture of this species was in 1992 in Lanikai (BPBM). In 1993, specimens were collected at the Royal Hawaiian Hotel in Waikiki (BPBM). Between 1993 and 1995, PQ personnel have recorded several captures at different localities in Kailua and Lanikai.

We verified a thriving population in the Lanikai/Kailua area in October 1995. Large numbers of adults and juveniles were observed in 2 separate localities in bushes, hedges, and on fences. At a Kailua residence, over 20 individuals, mostly juveniles, were seen in 2 small (ca. 1 m^2) area among ornamental rocks and potted plants. Many hatched egg shells were found in pots and under nearby hedges. Two unhatched eggs were found in the moist soil of potted plants. These were collected and kept on damp sphagnum moss to verify the species: the hatchlings were *A. sagrei*.

Anolis sagrei is native to a wide area that includes the Bahamas, Cuba, Jamaica, Little Cayman, Swan Island, and the Yucatan Peninsula (Ruibal 1964). Over the last 50 years it has succeeded in colonizing roughly 75% of the Florida peninsula (Lee 1992). Its common name is the Brown Anole.

Anolis equestris Merrem **New island record**

This is another anole that appears to have become established on the Windward side of Oahu. We were unable to locate specimens in the field, but the documented occurrences give rather conclusive evidence that it has become established. Although a Department of Agriculture spokesperson is quoted in the *Honolulu Advertiser* as saying that a colony was established here in the mid-1980s (Wright 1995), our search of records and specimens at PQ, BPBM, and the Honolulu Zoo only uncovered documented captures between 1990 and 1995. Out of a total of 24 documented captures, 1 specimen was from Honolulu, the others were from Lanikai, Kailua, Kahaluu, and Waimanalo. Both adults and juveniles have been captured by or turned in to PQ personnel (D. Cravalho, pers. comm., 1995). One female being held temporarily in BPBM laid 2 eggs in its holding container. Yearly captures for at least the past 5 years plus the presence of juveniles and a gravid female are all strong evidence for an established population.

Anolis equestris is native to Cuba where its preferred habitat is high in the treetops of orchards, palm groves and trees along roads (Collette 1961). It is a large lizard (snout-vent to about 157 mm) with a varied diet, which includes other lizards, fruit, tree frogs, insects, and birds—nestlings and caged birds (Collette 1961, Ruibal 1964). Its common name is the Cuban Knight Anole.

Gekkonidae

***Phelsuma* guimbeaui** Mertens **New island record**

This is the second species of this genus to become established on Oahu. Walsh (1990) noted that *P. laticauda* had become established by the late 1970s. The first recorded capture of *P. guimbeaui* was in 1984 from Kailua (BPBM). The next recorded capture was not until 1992 (when the Honolulu Zoo's records show that several specimens were obtained from Kailua), and then again in 1994. We verified the presence of *P. guimbeaui* in the Kailua locality in November 1995. At least 3 individuals were seen using the top of a fence as a basking site and "freeway" connecting sections of a tall hedge. Although no direct evidence of breeding was found, the persistence of this species through at least a 10 year period despite active collecting by local children (according to area residents), and the successful breeding of the species at the Honolulu Zoo, are convincing evidence that it has become established in the area.

P. guimbeaui is native to the island of Mauritius where it lives in large colonies on huge forest trees (McKeown 1993). It is a very striking gecko, bright green with red-orange lines and spots running from head to tail. In the right light, the orange is almost neon in its intensity. Its common name is the Mauritius Forest Day Gecko.

Acknowledgments

We thank Duane Meier of the Honolulu Zoo and Domingo Cravalho, Jr. of PQ for access to their records. This study was undertaken as an intermediate school Science Fair project.

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Fibropapillomas in Hawaiian Sea Turtles

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A circumtropical/subtropical panzootic of fibropapillomas has occurred in the last few years in green sea turtles, *Chelonia mydas* (Linnaeus) (Williams *et al*. 1994). The earliest records for fibropapillomas in the Pacific was in 1958 (Hendrickson 1958, Balazs

& Pooley 1991). These tumors were described in the Atlantic 20 years previously (Smith & Coates 1938). Since no earlier records were known from the Pacific, there was some question whether fibropapillomas occurred in the Pacific when they were first described in the Atlantic. Fibropapillomas occur largely in green turtles, rarely in a few other sea turtles, and have not been reported from hawksbills, *Eretmochelys imbricata* (Linnaeus) (Williams *et al*. 1994). We report here an ca. 10-yr earlier Pacific record and non-histologically confirmed records in the hawksbill.

Materials and Methods

We examined histological slides of fibropapillomas, field notes, and photographs prepared in 1952 by Prof. Charles E. Cutress. We received reports of fibropapilloma-appearing conditions from field researchers. Samples from a biopsy of 1 hawksbill and a necropsy of a second specimen were preserved in 10% histological grade formalin and deposited in the Registry of Tumors of Lower Animals (RTLA).

Earliest Pacific Record of Fibropapillomas

The histological microscope slides prepared and stained by Prof. Cutress that one of us (EHW) examined in 1991 appeared to represent fibropapillomas. These slides could not be located after the death of Prof. Cutress in 1993. Three photographic slides in Cutress's materials dated 1952 appear to be of a green turtle with fibropapillomas (Fig. 1). Cutress recalled in 1991, and his notes confirmed, that green turtles with fibropapillomas in Hawaii had been reported to him since the late 1940s. Thus, these fibropapillomas occurred in the Pacific ca. 10 years after they were described in the Atlantic. This suggests that fibropapillomas probably occurred circumtropically/subtropically in the green turtle when this condition was first described and did not spread from the Atlantic to the Pacific after 1938.

Presumed Fibropapillomas in Hawksbill Turtles

We found internal tumors in green turtles that had external fibropapillomas (Williams *et al*. 1994). These internal tumors technically cannot be called fibropapillomas (multiple mature granulomas) but appear quite similar. We found the same internal tumors in a hawksbill (RTLA 5698, Table 1). We have received reports of 4 hawksbills with growths observed in Hawaii, Florida, and the Caribbean that appeared to be fibropapillomas but were not collected (Table 1). These similar tumors and observations of presumed fibropapillomas suggest that this disease will eventually be histologically confirmed in the hawksbill. Fibropapillomas on hawksbills should be sampled by biopsy or necropsy, preserved in 10% formalin, and sent to the RTLA for confirmation. We emphasize that proper samples are required, because 3 of the 4 observers of hawksbills (Table 1) had handling permits and could have taken samples if they had known the importance of histological confirmation.

Acknowledgments

We thank the late Prof. Charles E. Cutress for allowing our examination of the Hawaiian turtle material, Bertha Cutress for allowing the use of 1 of Prof. Cutress' photographs; Karen L. Eckert, Wider Caribbean Sea Turtle Conservation Network; Zandy Hillis, Virgin Islands National Park, Nancy M. Lee, Dept. of Defense Schools, Benito Pinto-Rodríguez, Dept. of Natural and Environmental Resources, Commonwealth of

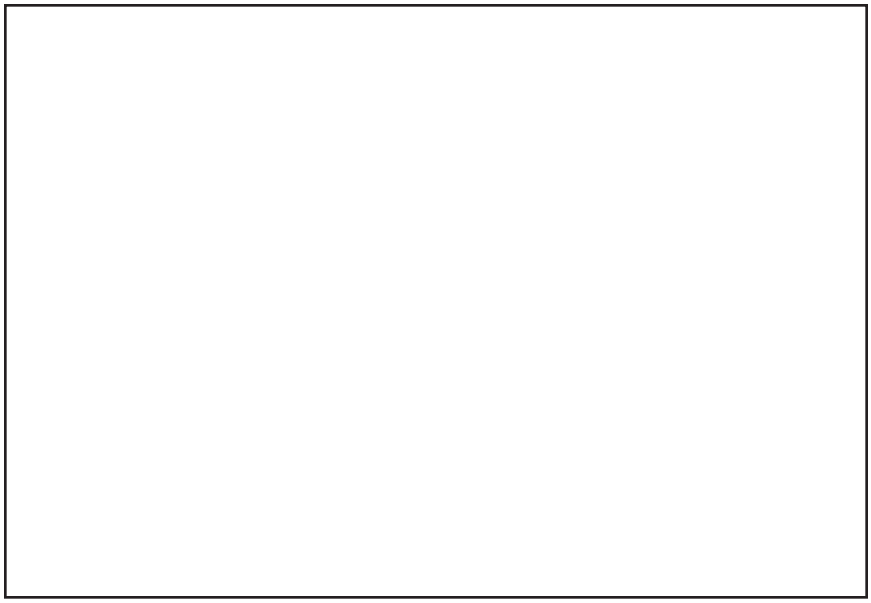

Fig. 1. Green turtle, *Chelonia mydas,* with fibropapillomas collected from Waikiki, Oahu, Hawaii, in 1952. (Photo Charles Cutress)

Puerto Rico, and Richard K. Wallace, Alabama-Mississippi Sea Grant for observations of sea turtles with tumors; John C. Harshbarger, RTLA, for preparing and depositing specimens; and Andrew Bruckner for preparing photograph copies.

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Table 1. Sea turtles with fibropapillomas and other tumor-like conditions.

Locality	Type of Report[1]	Source
	Chelonia mydas, green turtle	
Oahu, Hawaii	M	Cutress pers. comm.[2]
Waikiki, Oahu, Hawaii	H	present paper
	Eretmochelys imbricata, hawksbill[3]	
Waikiki, Oahu, Hawaii	M	Cutress pers. comm.[2]
south Florida, USA	M	Pinto pers. comm.[2]
eastern Puerto Rico	M	Lee pers. comm.[2]
St. Croix, USVI	M	Hillis pers. comm.[2]
Playa Sardinera, Mona Island	T[4]	present paper
National Aquarium, Dominican Republic	T[5]	present paper
	Caretta caretta, loggerhead	
St. Petersburg, Florida, USA	M	Wallace pers. comm.[2]

[1]Histologically confirmed fibropapillomas (H), observed lesions which morphologically appeared similar to fibropapillomas (M), and other tumor-like conditions (T).

[2]Prof. Charles E. Cutress, Dept. Marine Sciences, University of Puerto Rico, pers. comm; Z. Hillis, National Park Service, pers. comm.; Nancy M. Lee, Department of Defense Schools, pers. comm.; Benito Pinto-Rodríguez, Department of Natural and Environmental Resources, Commonwealth of Puerto Rico; R. K. Wallace, Alabama-Mississippi Sea Grant, pers. comm..

[3]Turtle species not reported to have fibropapillomas

[4]Multiple mature granulomas in internal organs, but not fibropapillomas, RTLA 5698

[5]Parakeratosis, not a neoplasm, RTLA 5396

Taxonomic Changes Published in This Volume

INSECTA
Diptera: Dolichopodidae
Chrysotus pallidipalpus Van Duzee is a **new synonym** of *Chrysotus longipalpis* Aldrich, 1896.