

Nomenclatural and Taxonomic Notes on Names of Hawaiian Coccinellidae (Coleoptera)

John R. Leeper

University of Hawaii Insect Museum, 310 Gilmore Hall, 3050 Maile Way,
Honolulu, Hawaii 96822; rtacleeper@outlook.com

Abstract. Hawaii has a long and successful history of coccinellid introductions for biological control of pest insects and powdery mildew. This paper discusses the names of five established species (*Chilocorus nigrita* (Fabricius), *Hippodamia quinquesignata ambigua* LeConte, *Psyllobora vigintimaculata* (Say), *Sasajiscymnus anomalus* (Chapin), and *Scymnus ambulans* Blackburn), giving spelling corrections, changed generic combinations, and one new combination (*Sasajiscymnus anomalus* (Chapin), **n. comb.**) to allow accurate usage of these names in the Hawaiian literature. Justification is also provided for the use of *Hyperaspis pantherina* Fursch which, until Nishida (2002), appeared in Hawaiian literature as *Hyperaspis jocosa* (Mulsant).

Key words: Coccinellidae, name changes, *Sasajiscymnus anomalus* (Chapin) **N. comb.**

In the process of updating an earlier review of Hawaiian Coccinellidae (Leeper 1976) a number of name changes were found that have not appeared in Hawaiian literature, primarily the Proceedings of the Hawaiian Entomological Society (<https://scholarspace.manoa.hawaii.edu/handle/10125/25>), Nishida (2002), and the University of Hawaii Insect Museum (UHIM) Insect Holdings Database (<http://www.ctahr.hawaii.edu/insectmuseum/insectholdings.htm>). The purpose of this paper is to place justification for these changes into Hawaiian literature.

Six names are justified within this paper. Three of the name changes are recognized by the Integrated Taxonomic Information System (ITIS). Although ITIS does not list *Hyperaspis pantherina* Fursch the validity of the name is justified below by Booth et al. (1995). Another name change not currently recognized by ITIS, *Chilocorus nigrita* (Fabricius), is justified by Samways

(1989) and Booth (1998). The third name change not currently recognized by ITIS, *Scymnus ambulans* Blackburn, is based on a recent determination (Slipinski et al. 2012). Effort was also made to reference the authorities making the name changes followed by the names historically used within Hawaiian literature.

Chilocorus nigrita (Fabricius 1798).

The use of *Chilocorus nigrita* (Fabricius) represents a correction in spelling from the use of *Chilocorus nigrinus* (Fabricius).

Justification: Although ITIS lists this name as *Chilocorus nigrinus* (Fabricius) (TNS: 186963), Samways (1989) justified the use of the spelling *Chilocorus nigrita* (Fabricius) stating “R. G. Booth (pers. comm.) has pointed out that strictly the name should be *C. nigrita*, as Fabricius (1798) originally named it *Coccinella nigrita* and ‘*nigrita*’ being a noun cannot change gender.”

In addition, Booth (1998) provided the following comments and listed the following synonyms: "The etymology of the name *nigrita* is uncertain, but its treatment as a noun, rather than as an adjective, is consistent with its original use by the early taxonomic authors (Grenstead 1951). Thus as Fabricius originally used the combination *Coccinella nigrita*, *nigrita* being a noun, does not change its ending when combined with a generic name of different gender from the original."

Coccinella nigrita Fabricius 1798: 79.
Chilocorus nigritus: Mulsant 1850: 463;
 Crotch 1874: 184; Korschefsky 1932:
 240; Bielawski 1957: 86; Davis 1959:
 65; Kapur 1967:171; Nagaraja and
 Hussainy 1967:252; Miyatake 1970:
 318, 333; Davis 1972: 188; Chazeau et
 al. 1974: 278; Tsuda 1974: 317; Davis
 1974: 357; Leeper 1976: 287; Great-
 head and Pope 1977: 264; Chazeau
 1981:17; Funasaki et al. 1988: 113;
 Nishida 2002: 50.

Chilocorus nigrita: Bielawski 1957: 86;
 Samways 1989: 345; Booth 1998: 362;
 Booth et al. 1990: 90.

Names Used in Hawaii: Leeper (1976: 287) and Nishida (2002: 50) treated this species as *Chilocorus nigritus* (Fabricius) and noted that as the only spelling of the name used in Hawaiian literature to date. The UHIM currently lists this species as *Chilocorus nigritus* (Fabricius).

This is the first use of *Chilocorus nigrita* (Fabricius) in Hawaiian literature.

***Hippodamia quinquesignata ambigua* LeConte, 1852.**

The use of *Hippodamia quinquesignata ambigua* LeConte represents an updating to the most recent usage and a downgrading of *ambigua* to subspecies status.

Justification: ITIS lists *H. quinquesignata ambigua* (TNS: 692658) and cites Gordon (1985). Gordon (1985: 729–731) justified the use of *Hippodamia quinque-*

signata ambigua LeConte stating: "Crotch (1873) and Casey (1899) considered *H. punctulata* a synonym of *H. ambigua*, but Crotch (1874) revived the name *H. punctulata* and authors since have considered it a subspecies or race of *H. ambigua*. Timberlake (1943) pointed out the difficulty in separating *H. ambigua* and *H. punctulata* due to the variability of the thoracic color pattern. *Hippodamia punctulata* is the form lacking convergent pronotal spots; *H. ambigua* has those spots; however, most large series from a single locality will contain examples of both forms. I cannot logically maintain these forms as subspecies and therefore regard *H. punctulata* as a junior synonym of *H. ambigua*. *Hippodamia obliqua* Casey is a form of *H. ambigua* with the pronotum having the black area reduced and the convergent pale spots large. *Hippodamia q. ambigua* is a Pacific Coast subspecies ranging from southern California to northwestern Washington, but some of the northern series examined contain some specimens not separable from *H. q. quinquesignata*. In spite of this, I feel it best to maintain both subspecies for the present. *Hippodamia obliqua* is represented by 7 types in the Casey collection, and I here designate and label a male as the lectotype and the remainder as paralectotypes."

Gordon (1985: 729–731) provided the following synonyms for *H. quinquesignata ambigua*:

Hippodamia ambigua LeConte 1852:
 131; Crotch 1873: 366; Crotch 1874:
 96; Casey 1899: 79; Leng 1903a: 41;
 Timberlake 1919: 172.

Hippodamia 5-signata ambigua: Timberlake 1943: 12.

Hippodamia quinquesignata ambigua:
 Chapin 1946: 16; Hatch 1961: 173.

Hippodamia punctulata LeConte 1852:
 131; Crotch 1873: 366; Crotch 1874: 96;
 Casey 1899: 79; Timberlake 1919: 172.
Hippodamia quinquesignata punctu-

lata: Chapin 1946: 16.

Hippodamia obliqua Casey 1899: 79;
Chapin 1946: 13.

Hippodamia quinquesignata obliqua:
Timberlake 1943: 12.

Names Used in Hawaii: Leeper (1976: 294) treated this taxon as *Hippodamia quinquesignata punctulata* LeConte with a notation of first use in Hawaii by Williams (1948: 203) as *Hippodamia 5-signata punctulata* LeConte and most recently Nishida (2002: 51) lists both *Hippodamia ambigua* LeConte and *Hippodamia quinquesignata punctulata* LeConte.

The Bishop Museum Hawaiian All-Species Checklist currently lists the following *Hippodamia* names that are or could be synonyms of *Hippodamia quinquesignata ambigua* LeConte:

Hippodamia 5-signata

Hippodamia ambigua Le Conte

Hippodamia quinquesignata

Hippodamia quinquesignata subsp. punctulata LeConte

Hippodamia 5-signata subsp. punctulata

The UHIM currently lists this species as *Hippodamia quinquesignata punctulata* LeConte.

This is the first use of *Hippodamia quinquesignata ambigua* LeConte in Hawaiian literature.

***Hyperaspis pantherina* Fursch, 1975.**

The inclusion of *Hyperaspis pantherina* Fursch in this paper is to clarify any confusion that may exist over the use of this name in place of *Hyperaspis jocosa* (Mulsant) in Hawaiian literature. The species was first introduced into Hawaii from Mexico in 1908 as *H. jocosa* (Mulsant 1850) (Kotinsky 1909). In 1948 the species was introduced to Kenya from Hawaii as *H. jocosa* (LePelley 1959). Fursch (1975), in Kenya, determined that the species had been misidentified at the

time of its introduction into Hawaii and further determined that it was an entirely new species which he named *Hyperaspis pantherina*. First use of *H. pantherina* in Hawaiian literature appears to be by Nishida (2002: 51).

Justification: Booth et al. (1995) provided a detailed taxonomic history of the species that justifies its validity of *H. pantherina*. In summary, they state that studies “have shown that a history of misidentifications has prevailed” which included Gorham’s (1894) description and naming of the species under *H. jocosa* which they speculate contributed to the misidentification by early Hawaiian entomologists.

Names Used in Hawaii: Leeper (1976: 295) treated this species as *Hyperaspis jocosa* (Mulsant). This was the only name found in Hawaiian literature prior to Nishida (2002: 51).

***Psyllobora vigintimaculata* (Say, 1824).**

Swezey (1925: 374) noted the failed introduction of *Psyllobora taedata* LeConte for California in 1896 for the control of *Oidium*. No further record of this species appears in Hawaiian literature until Nishida (2002) listed it as purposely introduced but not established. Brenner (2010) and Tavares et al. (2013) reported collections on Maui and Oahu respectively.

Justification: ITIS lists *P. vigintimaculata* (TNS: 692589) and cites Gordon (1985). Gordon (1985: 857) justified the name *Psyllobora vigintimaculata* (Say) stating “*Psyllobora taedata* has been considered a synonym or variety of *P. vigintimaculata* by some previous authors, and most recently, Timberlake (1943) regarded *P. taedata* as a valid species. I consider *P. taedata* a junior synonym of *P. vigintimaculata* because the morphological differences between the eastern and western population are gradually clinal and it is impossible to delimit well

characterized geographic races.” Gordon (1985: 855-858) provided the following synonyms of *Psyllobora vigintimaculata* (Say):

Coccinella 20-maculata Say 1824: 96.
Psyllobora viginti-maculata: Mulsant 1850: 183; Mulsant 1866: 137; Crotch 1874: 141; Gorham 1892: 167 (in part); Timberlake 1943: 42.

Psyllobora 20-maculata: Crotch 1873: 375; Wickham 1894: 303; Casey 1899: 101; Leng 1903b: 210; Blatchley 1910: 517; Timberlake 1943: 59.

Psyllobora viginti-maculata: Leng 1920: 215.

Psyllobora vigintimaculata: Korschefsky 1932: 569; Wingo 1952: 45; J. Chapin 1974: 70; Belicek 1976: 353.

Psyllobora taedata LeConte 1860: 70; Wickham 1894: 306; Casey 1899: 102; Leng 1903b: 211; Timberlake 1943, pp. 42, 59.

Psyllobora 20-maculata var. *taedata*: Crotch 1873: 376; Korschefsky 1932: 570; Hatch 1961: 184.

Psyllobora obsoleta Casey, 1899: 101; Casey 1908: 407.

Psyllobora 20-maculata var. *obsoleta*: Leng 1903b: 210.

Psyllobora separata Casey 1899: 102; Leng 1903b: 211.

Psyllobora taedata separata: Casey 1908: 407.

Psyllobora vigintimaculata ab. *separata*: Korschefsky, 1932: 569.

Names Used in Hawaii: Leeper (1976: 280) did not list this species. However, since that date, the species *Psyllobora vigintimaculata* (Say) can be found in Hawaiian literature as:

Psyllobora taedata LeConte; Nishida 2002: 52.

Psyllobora taedata LeConte; misspelling, Brenner 2010: 22.

Psyllobora viginti taedata; Tavares et al. 2013: 3.

The UHIM currently does not list the

species within their collection. Three specimens were donated to the museum by Jane Tavares in April, 2014, labeled as *P. viginti taedata*.

This is the first use of *Psyllobora vigintimaculata* (Say) in the Hawaiian literature.

***Sasajiscymnus anomalus* (Chapin, 1965) N. comb.**

Justification: ITIS lists *S. anomalus* (TNS: 187043) and cites Vandenberg (2004). Vandenberg (2004: 483-484) proposed the generic *Sasajiscymnus* as a replacement name and objective synonym for *Pseudoscymnus* Chapin. The latter is a junior homonym of *Pseudoscymnus* Herre (1935), which is a genus of kitefin shark (Squaliformes: Dalatiidae).

Names Used in Hawaii: Leeper (1976: 280) listed this species in the genus *Pseudoscymnus*. The species can be found in Hawaiian literature as:

Pseudoscymnus anomalus Chapin; Beardsley 1970: 508; Leeper 1976: 280; Nishida 2002: 52.

Pseudoscymnus sp.; Davis 1971: 61.

The UHIM currently lists *Pseudoscymnus anomalus* Chapin. This is the first use of *Sasajiscymnus anomalus* (Chapin) and represents a **new combination**.

***Scymnus ambulans* Blackburn, 1895.**

Justification: Although ITIS lists *Scymnus varipes* Blackburn (TNS: 187060); Slipinski et al. (2012) recognized *Scymnus varipes* Blackburn as a new junior synonym of *Scymnus ambulans* Blackburn.

Names Used in Hawaii: Leeper (1976: 301) treated this species as *Scymnus varipes* Blackburn. This has been the only name for this species in found in Hawaiian literature. Nishida (2002: 53) listed *S. varipes*. The UHIM currently lists *S. varipes* (Blackburn).

This is the first use of *Scymnus ambu-*

lans Blackburn in Hawaiian literature.

Acknowledgments

I wish to thank my wife, Catherine Lindburg Leeper, for her support and encouragement in pursuing my interests in the coccinellids of Hawaii. I also wish to recognize the services provided by the Michael Nivison Public Library, Cloudcroft, New Mexico and thank its librarians Charlotte Zimmerman and Joyce Komraus for their support in locating and obtaining copies of pertinent documents.

I am also grateful to Dr. Roger G. Booth, Natural History Museum, London, for his personal communications and support, particularly for information on the correct treatments of *Chilocorus nigrita* and *Hyperaspis pantherina*.

My gratitude is also extended to Dr. Neal Evenhuis, Bernice Pauahi Bishop Museum, for his constructive guidance in writing this paper.

Last but not least, I am indebted to the Department of Plant and Environmental Protection Sciences, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa for my appointment as Visiting Scholar and to Dr.s Kenneth Grace, Mark Wright, Dan Rubinoff, and Ms. Lynnet Higuchi for their support and actions in securing the appointment.

Literature Cited

- Beardsley, J.W.** 1970. Notes and Exhibitions. Proc. Hawaiian Entomol. Soc. 20(3).
- Belicek, J.** 1976. Coccinellidae of western Canada and Alaska with analyses of the transmontane zoogeographic relationships between the fauna of British Columbia and Alberta (Insecta: Coleoptera; Coccinellidae). Quaest. Entomol. 12: 283–409.
- Bielawski, R.** 1957. Coccinellidae (Coleoptera) von Ceylon. Verhandlungen der Naturforschenden Gesellschaft in Basel 68, 72–96.
- Blackburn, T.** 1895. Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species. Trans. Royal Soc. S. Austral. 201–258.
- Blatchley, W.S.** 1910. An illustrated catalogue of the Coleoptera or beetles (exclusive of the *Rhyncophora*) known to occur in Indiana. Bull. Indiana Dep. Geol. Res. 1: 1–1386.
- Booth, R.G.** 1998. A review of the species resembling *Chilocorus nigrita* (Coleoptera: Coccinellidae): potential agents for biological control. Bulletin of Entomological Research, 88: 361–367.
- Booth, R.G., M.L. Cox, and R.B. Madge.** 1990. IIE Guides to insects of importance to man 3. Coleoptera. Wallingford, CAB International.
- Booth, R.G., A.E. Cross, S.V. Fowler, and R.H. Shaw.** 1995. The Biology and Taxonomy of *Hyperaspis pantherina* (Coleoptera: Coccinellidae) and the Classical Biological Control of its prey, *Orthezia insignis* (Homoptera: Ortheziidae). Bulletin of Entomological Research, 85: 307–314.
- Brenner, G.** 2010. Programmatic Arthropod Monitoring at the Haleakalā High Altitude Observatories and Haleakalā National Park Maui, Hawaii. Scio, Oregon: Pacific Analytics, L.L.C. 23 p.
- Casey, T.L.** 1899. Revision of the American Coccinellidae. J.N. York Ent. Soc. 7(2): 71–169.
- Casey, T.L.** 1908. Notes on the Coccinellidae, Canadian Entomol. 40: 393–421.
- Chapin, E.A.** 1946. Review of the New World Species of *Hippodamia Dejean* (Coleoptera: Coccinellidae). Smithsonian Mis. Coll. 106(11): 1–39.
- Chapin, E.A.** 1965. Insects of Micronesia. Coleoptera. Coccinellidae. Insects of Micronesia 16(5): 189–254.
- Chapin, J.B.** 1974. The Coccinellidae of Louisiana (Insecta: Coleoptera). Louisiana St. Univ. Exp. Sta. Bull. 682: 1–87.
- Chazeau, J.** 1981. La lute biologique contre la cochenille transparente du coctier *Temnaspidiotus destructor* (Signoret) aux Nouvelles-Hebrides (Homoptere Diaspididae). Cahiers de l'Office de la Recherche Scientifique et Technique Outre-Mer, Serie Biologie 44, 11–22.
- Chazeau, J., J. Etienne, and H. Fursch.** 1974. Les Coccinellidae de l'île de La Reunion (Insecta Coleoptera). Bulletin de Museum National d'Histoire Naturelle, Paris 3^e serie,

- no 210, Zoologie 140, 265–297.
- Crotch, G.R.** 1873. Revision of the Coccinellidae of the United States. Trans. American Entomol. Soc. 4: 363–382.
- Crotch, G.R.** 1874. A revision of the Coleopterous family Coccinellidae. London, E.W. Janson, 311 pp.
- Davis, C.J.** 1959. Recent Introductions for Biological Control in Hawaii – IV. Proc. Hawaiian Entomol. Soc. 17(1): 62–66.
- Davis, C.J.** 1971. Recent Introductions for Biological Control - XVI. Proc. Hawaiian Entomol. Soc. 20(1): 59–62.
- Davis, C.J.** 1972. Recent Introductions for Biological Control - XVII. Proc. Hawaiian Entomol. Soc. 21(2): 187–190.
- Davis, C.J.** 1974. Recent Introductions for Biological Control - XVIII. Proc. Hawaiian Entomol. Soc. 21(3): 355–358.
- Fabricius, J.C.** 1798. Supplementum entomologiae systematicae. Hafniae [= Copenhagen]: Proft and Storch, 572 pp.
- Funasaki, G.Y., L.M. Nakahara, and B.R. Kumashiro.** 1988. Introduction for Biological Control in Hawaii: 1985 and 1986. Proc. Hawaiian Entomol. Soc. 28(1): 101–104.
- Fursch, H.** 1975. Zwei bemerkenswerte *Hyperaspis*-Arten aus Ostafrika (Coleoptera: Coccinellidae). Senckenbergiana Biologica 36: 43–45.
- Gordon, R.D.** 1985. The Coccinellidae (Coleoptera) of America North of Mexico. Journal of the New York Entomological Society 93(1): 1–912.
- Gorham, H.S.** 1892. Biologia Centrali-Americana, Insecta, Coleoptera: Coccinellidae 7: 161–176.
- Gorham, H.S.** 1894, 1899 (1887–1899). Erotylidae, Endomychidae and Coccinellidae. Biologia Centrali-Americana. Insecta Coleoptera. 7: 1–276 + 13 plates.
- Grenstead, L.W.** 1951. A note on the trivial names *nigrita* and *nigritus*. Entomologist's Monthly Magazine 87, 251–252.
- Greathead, D.J., and R.D. Pope.** 1977. Studies on the biology and taxonomy of some *Chilocorus* spp. (Coleoptera: Coccinellidae) preying on *Aulacaspis* spp. (Hemiptera: Diaspididae) in East Africa, with description of a new species. Bulletin of Entomological Research 67: 259–270.
- Hatch, M.H.** 1961. Beetles of the Pacific Northwest, part III: Pselaphidae and Diver-sicornia. Univ. Washington Press, Seattle, 503 pp.
- Herre, A.W.C.T.** 1935. Notes on fishes in the Zoological Museum of Stanford University. II. Two new genera and species of Japanese sharks and a Japanese species of *Narcetes*. Copeia 1935 (no.3): 122–127.
- Kapur, A.P.** 1967. The Coccinellidae (Coleoptera) of the Andamans. Proceedings of the National Institute of Sciences of India 32B [1966], 148–189.
- Korschefsky, R.** 1932. Pars 120: Coccinellidae. II. pp. 225–659 in Junk, W. & Schenckling, S. (eds) Coleopterorum Catalogus. Berlin: W. Junk.
- Kotinsky, J.** 1909. Introduction, Breeding and Distribution of Useful Insects. Report of the Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii, Honolulu 5: 109–110.
- LeConte, J.L.** 1852. Remarks upon the Coccinellidae of the United States. Proc. Acad. Phila. 6: 129–145.
- LeConte, J.L.** 1860 (1857). Report on explorations and surveys, etc. from the Mississippi River to the Pacific Ocean. No. 1. Report upon Insects Collected on the Survey 9:1–72. Washington.
- Leeper, J.R.** 1976. A review of the Hawaiian Coccinellidae. Proc. Hawaiian Entomol. Soc. 22(2): 279–306.
- Leng, C.W.** 1903a. Notes on Coccinellidae. Jour. New York Entomol. Soc. 11: 35–45.
- Leng, C.W.** 1903b. Notes on Coccinellidae. II. Jour. New York Entomol. Soc. 11: 193–213.
- Leng, C.W.** 1920. Catalogue of the Coleoptera of America, north of Mexico. Mount Vernon, New York, 470 pp.
- Le Pelley, R.H.** 1959. Agricultural Insects of East Africa. 307 pp. Nairobi, East Africa High Commission.
- Miyatake, M.** 1970. The East-Asian coccinellid-beetles preserved in the California Academy of Sciences Tribe Chilocorini. Memoirs of the College of Agriculture, Ehime University 14, 303–340.
- Mulsant, E.** 1850. Species des Coléoptères trimères sécuripalpes. Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie, Lyon, (2) 2: 1–1104.
- Mulsant, E.** 1866. Monographie des coccinellides. Memoires de l'Academie imperiale

- des sciences, belles-lettres et arts de Lyon 15: 1–310.
- Nagaraja, H., and S.U. Hussainy.** 1967. A study of six species of *Chilocorus* (Coleoptera: Coccinellidae) predaceous on San Jose and other scale insects. *Oriental Insects* 1, 249–256.
- Nishida, G.M.** 2002. Hawaiian terrestrial arthropod checklist. Fourth edition. iv + 310 pp. [HBS 2002-005].
- Samways, M.J.** 1989. Climate diagram and biological control: an example from the areography of the ladybird *Chilocorus nigritus* (Fabricius, 1798) (Insecta, Coleoptera, Coccinellidae). *Journal of Biogeography* 16: 345–351.
- Say, T.** 1824. Descriptions of coleopterous insects collected in the late expedition to the Rocky Mountains, performed by order of Mr. Calhoun, Secretary of War, under the command of Major Long. *J. Acad. Sci. Phila.* 4: 83–99.
- Slipinski, A., H. Pang, and R.G. Booth.** 2012. Revision of the Australian Coccinellidae (Coleoptera), Part 8. Genus *Scymnus* Kugelann. *Annales Zoologici*, Volume 62, Number 4, December 2012, pp. 679–704(26).
- Swezey, O. H.** 1925. Records of introduction of beneficial insects into the Hawaiian Islands. *Hawaiian Planters' Record* 29(4): 373.
- Tavares, J., K-H. Wang, and J. Uyeda.** 2013. Not all lady beetles are created equal: Learn about different types of lady beetles in Hawaii with special talent. HānaïʻAi. 2013 Spring.
- Timberlake:H.** 1919. Notes on the American species of *Hippodamia* (Coleoptera). *Jour. New York Entomol. Soc.* 27:162–174.
- Timberlake:H.** 1943. The Coccinellidae or lady beetles of the Koebele collection-Part I. *Hawaiian Planters' Record* 47: 1–67.
- Tsuda, D.** 1974. Notes and Exhibitions. *Proc. Hawaiian Entomol. Soc.* 21(3):317.
- Vandenberg, N.J.** 2004. Homonymy in the Coccinellidae (Coleoptera), or something fishy about *Pseudoscymnus* Chapin. *Proceedings of the Entomological Society of Washington*. 106: 483–484.
- Wickham, H.F.** 1894. The Coleoptera of Canada. V. *Canadian Entomol.* 26:297–306.
- Williams, F.X.** 1948. Notes and Exhibitions. *Proc. Hawaiian Entomol. Soc.* 13(2):203.
- Wingo, C.W.** 1952. The Coccinellidae (Coleoptera) of the upper Mississippi Basin. *Iowa State Jour. Sci.* 27:15–53.