

Adventive Hawaiian Dermestidae (Coleoptera): An Annotated List

R. S. Beal, Jr.¹

ABSTRACT

Within the islands 13 species of Dermestidae are recognized as adventive and established. Two species have been reported as adventive but are considered indigenous. Three economically important species collected in the islands are listed but are not considered established.

The following is a list of dermestid beetles considered to have been introduced into the Hawaiian Islands since European settlement. Only the 1st published occurrence of the discovery of the species in the islands is listed. Unless otherwise noted, the existence of each species in the islands has been verified by the author or by Loschiavo and Okumura (1979) through examination of museum specimens or from personal collections. Synonyms are not listed unless they differ from those given in Mroczkowski (1968).

All the introduced species feed as larvae on dried protein materials. Species of *Dermestes* are more commonly found on dried meats, dried fish, hides, cheese, and bones, whereas species of *Trogoderma*, *Attagenus*, and *Anthrenus* are more likely to be pests of seeds, wool, silk, hair, and feathers (Hinton 1945). In natural habitats species of *Dermestes* listed here are ordinarily found in carrion in the last stages of decomposition. Larvae of the other genera are found as scavengers in sheltered bird nests and nests of spiders, wasps, and solitary bees. *Trogoderma variabile* is a particular pest of seeds, mixed animal feeds and mashes, and many dried grocery commodities (Strong et al. 1959) but can develop on other foods with high protein content such as pollen and dried insects. Among the introduced species of Dermestidae it is possibly the most economically important. *Thyrodrias contractus* is found on carrion in very dry situations, such as a dead bat in an attic, but also feeds on dried insects and has been known as a pest in stores of silk (Hinton 1945). *Thorictodes heydeni* is found in stored grains, but whether it feeds on the grain or on the remains of other insects infesting the grain has not been established.

1. *Dermestes (Dermestes) ater* De Geer. Cosmopolitan species, probably introduced through early commerce. Ref.: Sharp, 1908, *Fauna Hawaiiensis* 3(5):413.
2. *Dermestes (Dermestinus) caninus* Germar. Nearctic species previously unreported from the islands; established on Kaua'i (Kaua'i: Polihali, 3.xii.70, on road-killed toads, R. S. Beal; Po'ipū, 19.iii.70, D. Sagawa).
3. *Dermestes (Dermestinus) carnivorus* Fabricius. Nearly cosmopolitan species. Ref.: Shiroma, 1966, *Proc. Hawaii. Entomol. Soc.* 19:129.
4. *Dermestes (Dermestinus) frischeri* Kugelann. Nearly cosmopolitan species. Ref.: Ford, 1954, *Proc. Hawaii. Entomol. Soc.* 15:284.

1. Colorado Christian University, 180 S. Garrison St., Lakewood, Colorado 80226, USA.

5. *Dermestes (Dermestinus) maculatus* De Geer. Cosmopolitan species, probably introduced through early commerce. Ref.: Sharp, 1908, Fauna Hawaiiensis 3(5):413.
6. *Thorictodes haydeni* Reitter. Minute, blind, rarely collected species usually found in stored products, originally Palearctic but possibly now nearly cosmopolitan. Ref.: Loschiavo and Okumura, 1979, Proc. Hawaii. Entomol. Soc. 13:100.
7. *Trogoderma anthrenoides* (Sharp). Neotropical species now abundant at lower elevations in the islands, apparently replacing various indigenous dermestid species of *Labrocerus* by occupying the same niches.

It is difficult to know when *T. anthrenoides* was 1st reliably reported from the islands. The earliest reference to the name (Swezey 1921, Proc. Hawaii. Entomol. Soc. 4:487) seems almost certainly to be a misidentification because it refers to the specimens found in a tightly sealed tin box of seeds imported from Pennsylvania. The species does not occur in Pennsylvania. The earliest collection I have seen of this species is from O'ahu (Wahiawā "7-5-29," J. F. Illingworth). The same year it was collected on Maui (Ha'ikū, 12.viii.29, N.L.H. Krauss).

8. *Trogoderma inclusum* LeConte. Nearctic species moderately common in stored products. Ref.: Yanamura for Olson, 1970, Proc. Hawaii. Entomol. Soc. 29:491.
9. *Trogoderma variabile* Ballion. Palearctic species introduced into the mainland United States probably about 1933 and now nearly a cosmopolitan pest of stored products. Ref.: Loschiavo and Okumura, 1979, Proc. Hawaii. Entomol. Soc. 23:100.
10. *Anthrenus (Anthrenus) flavipes* LeConte. Nearly cosmopolitan species common in stored products. Ref.: Bianchi, 1952, Proc. Hawaii. Entomol. Soc. 14:349.
11. *Anthrenus (Anthrenus) oceanicus* Fauvel. The species was 1st reported in Hawai'i in 1922 but listed erroneously as *Anthrenus thoracicus*. Its limited distribution among Pacific islands supports the consideration that it is an introduced species. Additionally, the species appears at present to be limited to O'ahu. It was originally described from New Caledonia and has been reported from Malaysia and Sri Lanka (Mroczkowski 1968). Ref.: Fullaway, 1922, Proc. Hawaii. Entomol. Soc. 5:80.
12. *Anthrenus coloratus* Reitter. A single specimen was taken on O'ahu ('Ewa, iv.75, J. W. Beardsley) in a light trap. Its collection at light suggests that the species is established, but this needs further confirmation. It is listed here somewhat tentatively. The species is Palearctic in origin and is now widespread across the southern tier of the mainland states. The earliest American collection I have seen is dated 1964.
13. *Attagenus fasciatus* (Thunberg). This species occurs nearly throughout the tropical and subtropical areas of the world. The geographic origin of this species is unknown, but its affinities appear Palearctic. Ref.: Sharp, 1885, Trans. R. Dublin Soc. 3:147 (as *A. plebeius* Sharp).
14. *Thylocladius contractus* Motschulsky. Synanthropic species distributed throughout most of the Holarctic region. Mroczkowski (1968) thinks its origin is Central Asia. I have not seen specimens from Hawai'i, but its occurrence is not unexpected, and it is not likely to have been misidentified. Ref.: Korschefsky, 1944, Arb. Physiol. Angew. Entomol. Berlin-Dahlem 11:147.

The following dermestid beetle species have been reported as introduced into the Hawaiian Islands, but it seems more likely that they were indigenous or were introduced before European settlement.

1. *Aethriostoma undulata* Motschulsky (listed in Mroczkowski as *Attagenus undulatus*) has been considered an introduced species, probably because of its absence in the *Fauna Hawaiiensis* (Fullaway, 1922, Proc. Hawaii. Entomol. Soc. 5:77 as *Telopes undulata*).

Specimens listed under this name apparently belong to a complex of species that is widespread in tropical and subtropical coastal areas of the western Pacific and Indian oceans. D.G.H. Halstead (pers. comm.) has dissected the genitalia of specimens from different populations and believes there is evidence for 4 or more distinct species within the complex. The genitalia of Hawaiian specimens are distinct from others he has studied. The form in Hawai'i lives as a scavenger in various animal nests and is only rarely found in stored products, a fact increasing the likelihood that it is not introduced. Pending further studies it seems best to consider it an indigenous species.

2. *Orphinus fulvipes* (Guérin-Méneville) and *O. terminalis* (Sharp) are widespread throughout coastal areas of the Pacific. The former has been introduced into many other areas of the world (Mroczkowski 1968). It is unlikely that either originated in Hawai'i, but it is impossible to say that either was introduced into Hawai'i within historic times. The absence of the former in the *Fauna Hawaiiensis* is not surprising, since it is not often collected by conventional methods.

The following adventive species have been found in the islands but are not known to be established.

1. *Anthrenus (Nathrenus) verbasci* Linnaeus has been collected twice in Hilo: once in an automobile from California and once "ex walnut." The 1st is doubtlessly an agricultural interception, the 2nd possibly so. In April 1990, it was found in the Bishop Museum in Honolulu in a shipment of artifacts from Oregon. Whether escaped specimens became established is not known at present. The species is nearly cosmopolitan with probably a Palearctic origin (Mroczkowski 1968).
2. *Trogoderma glabrum* Herbst has been collected in Kaua'i, probably as an agricultural interception (Nāwiliwili, 7.i.71, C. Ragasa). In the absence of other collections it cannot be considered established. This is a Palearctic species introduced into the mainland United States around 1933 and now a major pest in granaries across the continent.
3. *Attagenus unicolor* Brahm has been reported from the islands (as *A. piceus*, Anonymous, 1954, Proc. Hawaii. Entomol. Soc. 15:284). In the absence of further collections, it cannot be considered established. It is Holarctic in its distribution with the nominate subspecies originating in Europe but introduced into the mainland United States. The subspecies *A. unicolor japonicus* occurs in Japan and the Pacific Northwest.

ACKNOWLEDGMENTS

I am particularly grateful to Dr. G. A. Samuelson for information regarding literature on Hawaiian Dermestidae and for many helpful suggestions on the manuscript.

LITERATURE CITED

- Loschiavo, S. R. & G. T. Okumura. 1979. A survey of stored product insects in Hawai'i. Proc. Hawaii. Entomol. Soc. 13:95-118.
- Mroczkowski, M. 1968. Distribution of the Dermestidae (Coleoptera) of the world with a catalogue of all known species. Ann. Zool. 26(3):15-191.
- Strong, R. G., G. T. Okumura & D. E. Sbur. 1959. Distribution and host range of eight species of *Trogoderma* in California. J. Econ. Entomol. 52(5):830-36.