

## Recent Introductions for Biological Control In Hawaii-III<sup>1</sup>

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HONOLULU, HAWAII

(Presented at the meeting of December 9, 1957)

This paper is a check list of beneficial organisms released in Hawaii by the Board of Agriculture and Forestry since the last published listing by Weber ("PROCEEDINGS," 16(2):313-314, 1957.)

Three categories of biological control are encompassed, namely, snail, plant, and insect pests. Organisms marked with an asterisk were previously introduced.

### SUMMARY

#### I Snail Pest Control

Of the ten insect and snail predators released, the most promising control for *Achatina fulica* Bowdich appears to be *Euglandina rosea* (Férrusac). This carnivorous snail was introduced in 1955 from Florida, where it preys on the citrus tree snail, *Drymaeus dormani* Bienny. It is well suited to climatic conditions in Hawaii and 2,483 individuals were recovered from Hauula and Makiki, Oahu in December 1957. It feeds voraciously on infant and juvenile African snails but will attack *Achatina* up to 40 millimeters in length. Worthy of note is its fondness for *Bradybaena* (*Eulota*) *similaris* (Férrusac), the destructive garden snail.

*Gonaxis quadrilateralis* (Preston) has been found at all release points on Oahu, but proper evaluation is not practical at this time.

*Gonaxis kibweziensis* (Smith) was introduced previously and is established at several Oahu release points but apparently has not spread and multiplied as it did on Agiguan, Marianas Islands. There are indications, however, that it is doing well on Maui.

#### II and III Plant and Insect Pest Control

With the exception of *Aerenicopsis championi* Bates, a branch-boring cerambycid previously introduced from Mexico for *Lantana camara* L., none of the insects reported for the control of listed plant and insect pests have been recovered to date. Most of the insects were recent releases.

<sup>1</sup> This paper is a continuation of a series commenced in 1951 by the late Philip W. Weber. The title was previously changed to include groups other than insects.

New Introductions and Additional Releases for Biological Control in Hawaii

PEST NEEDING CONTROL	ORGANISM INTRODUCED	SOURCE	COLLECTOR	DATE OF RELEASE (1957)	**RELEASE POINT
I SNAIL PESTS <i>Achatina fulica</i> Bowdich . . . (giant African snail)	* <i>Gulella wahlbergi</i> (Krauss)	Durban, South Africa	N. L. H. Krauss	Jan. 2	Maui: Haiku Oahu: Nuuanu Oahu: Hauula
	* <i>Euglandina rosea</i> (Férrusac)	Delray Beach, Florida	Klemann	Feb. 9	Oahu: Kaneohe
	* <i>Gonaxis kibweziensis</i> (Smith)	Diani and Tiwi Beaches, Mombasa, Kenya, Africa	N. L. H. Krauss	May 4	Oahu: Kaneohe
	* <i>Tefflus zanzibaricus</i> <i>alluaudi</i> Sternberg	" " "	" "	" "	Oahu: Kaneohe
	<i>Tefflus purpureipennis</i> <i>wituensis</i> Kolbe	" " "	" "	" "	" "
	<i>Thermophilum</i> <i>bexastictum</i> Gerst	" " "	" "	" "	" "
	* <i>Oleacina oleacea</i> <i>straminea</i> (Deshayes)	Cuba	A. Thistle	May 26	Oahu: Hakipuu
	<i>Edentulina affinis</i> C. R. Boettger	Diani Beach, Mombasa, Kenya, Africa	N. L. H. Krauss	June 5	Oahu: Haiku Valley Road
	<i>Gonaxis quadrilateralis</i> (Preston)	Kwale, Kenya, Africa	N. L. H. Krauss	June 16	Oahu: Makiki Maui: Paia, Haiku Oahu: Haiku Valley
	* <i>Lamprophorus tenebrosus</i> (Walker)	Gurudeniya near Kandy, Ceylon	N. L. H. Krauss	Aug. 14	Oahu: Haiku Valley
<i>Subulina octona</i> Bruguiere . . . (conical snail)	<i>Gulella bicolor</i> Hutton	Manila, Philippine Islands	N. L. H. Krauss	Oct. 10	Oahu: Haiku Valley and Tantalus

\* Previously introduced.

\*\* Applies to initial releases only.

New Introductions and Additional Releases for Biological Control in Hawaii

PEST NEEDING CONTROL	ORGANISM INTRODUCED	SOURCE	COLLECTOR	DATE OF RELEASE (1957)	**RELEASE POINT
II PLANT PESTS					
<i>Emex australis</i> Steinh.....	<i>Apion antiquum</i> Gyllenhal	Durban, South Africa	N. L. H. Krauss	Jan. 2	Hawaii: Parker Ranch, Waimea
<i>Emex spinosa</i> Campd. (emex)					
<i>Lantana camara</i> L..... (lantana)	<i>Hypena jussalis</i> Walker * <i>Aerenicopsis championi</i> Bates	Diani Beach, Mombasa, Kenya, Africa Vera Cruz, Mexico	N. L. H. Krauss A. Thistle	May 10 May 13	Oahu: Tantalus Hawaii: Pahala Hawaii: Magoon Ranch, South Kona
III INSECT PESTS					
<i>Aphis</i> sp.....	<i>Alesia striata</i> Fabricius	Kenya, Africa	N. L. H. Krauss	May 21	Oahu: Moanalua
<i>Spodoptera mauritia</i> ..... (Boisduval) (armyworm)	<i>Calosoma</i> sp.	Kenya, Africa	N. L. H. Krauss	May 29	Oahu: Mahinui Place, Kaneohe Hawaii: Parker Ranch, Waimea Oahu: Haiku Valley
<i>Maruca testulalis</i> (Geyer).... (bean pod borer)	<i>Bracon cajani</i> Muesebeck	Mauritius	A. Moutia	Aug. 16	
<i>Protaetia fusca</i> (Herbst)..... (scarab beetle)	* <i>Campsomeris annulata</i> (Fabricius)	Yigo, Guam	N. L. H. Krauss	Oct. 26	Oahu: Koko Head and T.H. Hospital, Kaneohe
<i>Heliothis zea</i> (Boddie)..... (corn earworm)	<i>Chelonus narayani</i> Rao	New Delhi, India	G. Angalet	Nov. 11	Oahu: Waimanu
<i>Siphona irritans</i> (L.)..... (horn fly)	<i>Geotrupes</i> sp.	Northern Iran	E. Esfandiari	Dec. 24	Oahu: Kualoa

NOTE: Scarabaeidae (dung beetles) and Histeridae (hister beetles) from China and Africa were received, but these are pending identification and will be reported later.

\* Previously introduced.

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