Pacific Insects 4 (2): 319–323 July 30, 1962

AIR-BORNE INSECTS TRAPPED ON "MONSOON EXPEDITION"[1]

By J. L. Gressitt, J. Coatsworth, and C. M. Yoshimoto

BISHOP MUSEUM, HONOLULU, HAWAII

Abstract: Fifty-four insects were trapped from the air and 164 marine water striders were taken by Coatsworth on the Scripps Institution of Oceanography's "Monsoon Expedition" in S. Pacific and Indian oceans, 1960–61.

Introduction: Through the kindness of the authorities of Scripps Institution of Oceanography, Bishop Museum was able to send a graduate student (Coatsworth; University of Hawaii) on the Scripps "Monsoon Expedition", 1960–61. Coatsworth spent half his time in the trapping of air-borne insects and the other half in his own research (ichthyology).

The "Monsoon Expedition", aboard the R. V. Argo, spent 7½ months, largely at sea, in crossing the Pacific and Indian oceans, as far as Mauritius, and return. The approximate route is shown in Fig. 1. The itinerary, in brief, was as follows:

1960–61

26 Aug.—6 Sept.	San Diego to Honolulu
17 Sept.—6 Oct.	Honolulu to Cairns, via Howland (24 Sept.), Nanumea (28 Sept.)
8 Oct.—17 Oct.	Cairns to Darwin
19 Oct.— Nov.	Darwin to Djakarta
18 Nov.—7 Dec.	Djakarta to Mauritius, via Christmas I.
10 Dec.—2 Jan.	Mauritius to Fremantle, via St. Paul I. (23–24 Dec.)
6 Jan.—15 Jan.	Fremantle to Hobart
17 Jan.—22 Jan.	Hobart to Wellington
28 Jan.—2 Feb.	Wellington to Wellington, via Chatham Is.
2 Feb.—22 Feb.	Wellington to Dunedin, via Campbell I. (5 Feb.), Antipodes Is. (20 Feb.)
26 Feb.—15 Mar.	Dunedin to Tahiti, via Bounty Is. (28 Feb.)
23 Mar.—18 Apr.	Tahiti to San Diego

Methods: All air trapping done on the expedition was with the conical nylon organdy nets on steel rings (75 cm diameter). These were described in Yoshimoto and Gressitt (1960, Pac. Ins. 2: 239, fig. 1). As far as possible, 10 nets were in constant use, five on each side on a cable from railing to cross-arm of foreward mast. Most of the nets had detachable terminal cones, but these often proved a liability, because of fouling on cable,

1. Partial results of the project "Studies of air-borne insects over the Pacific Ocean" supported by a grant from the Biology Branch, Office of Naval Research, through the Pacific Science Board (National Research Council). This forms part of the program "Zoogeography and evolution of Pacific Insects" operated by Bishop Museum.

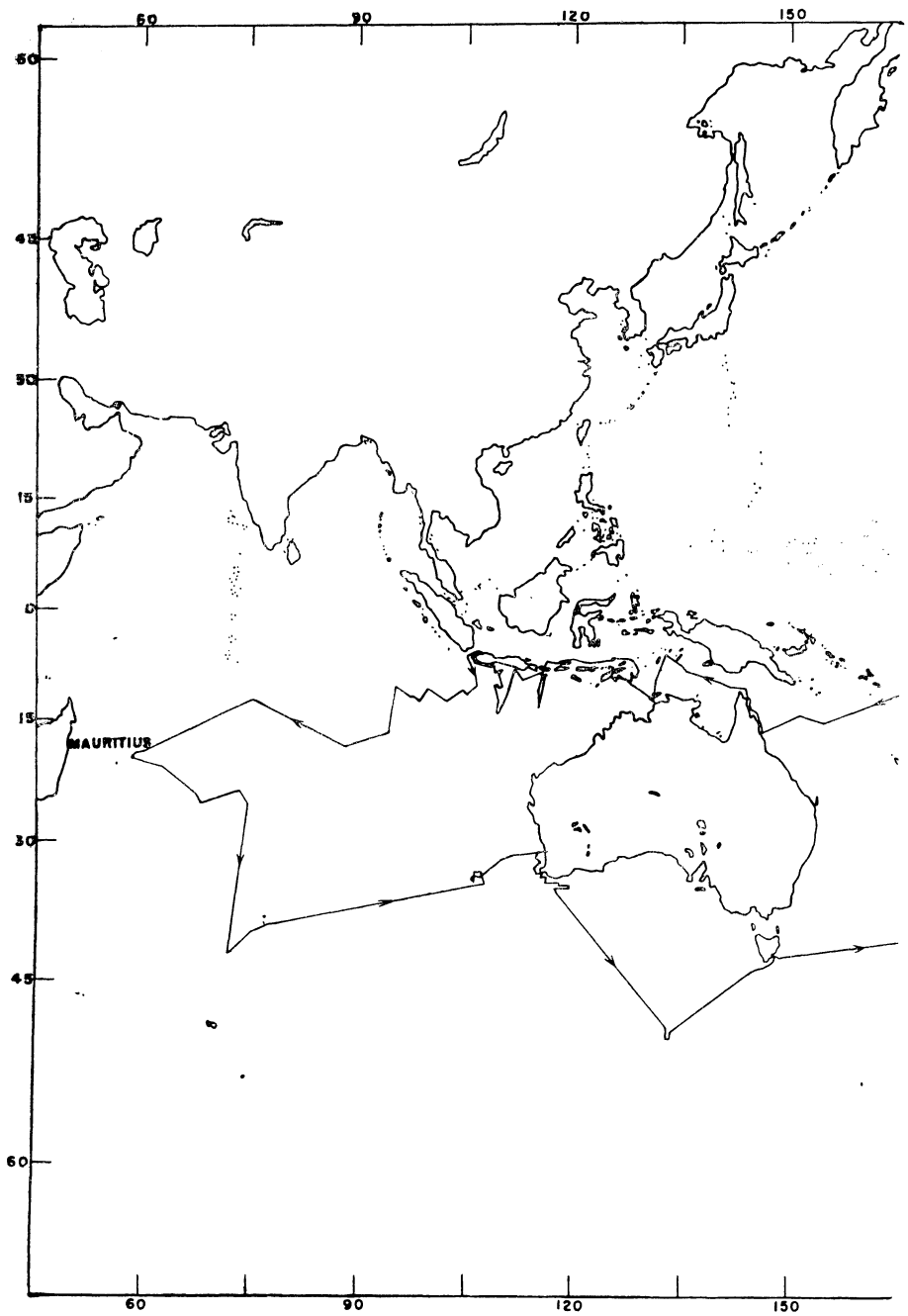
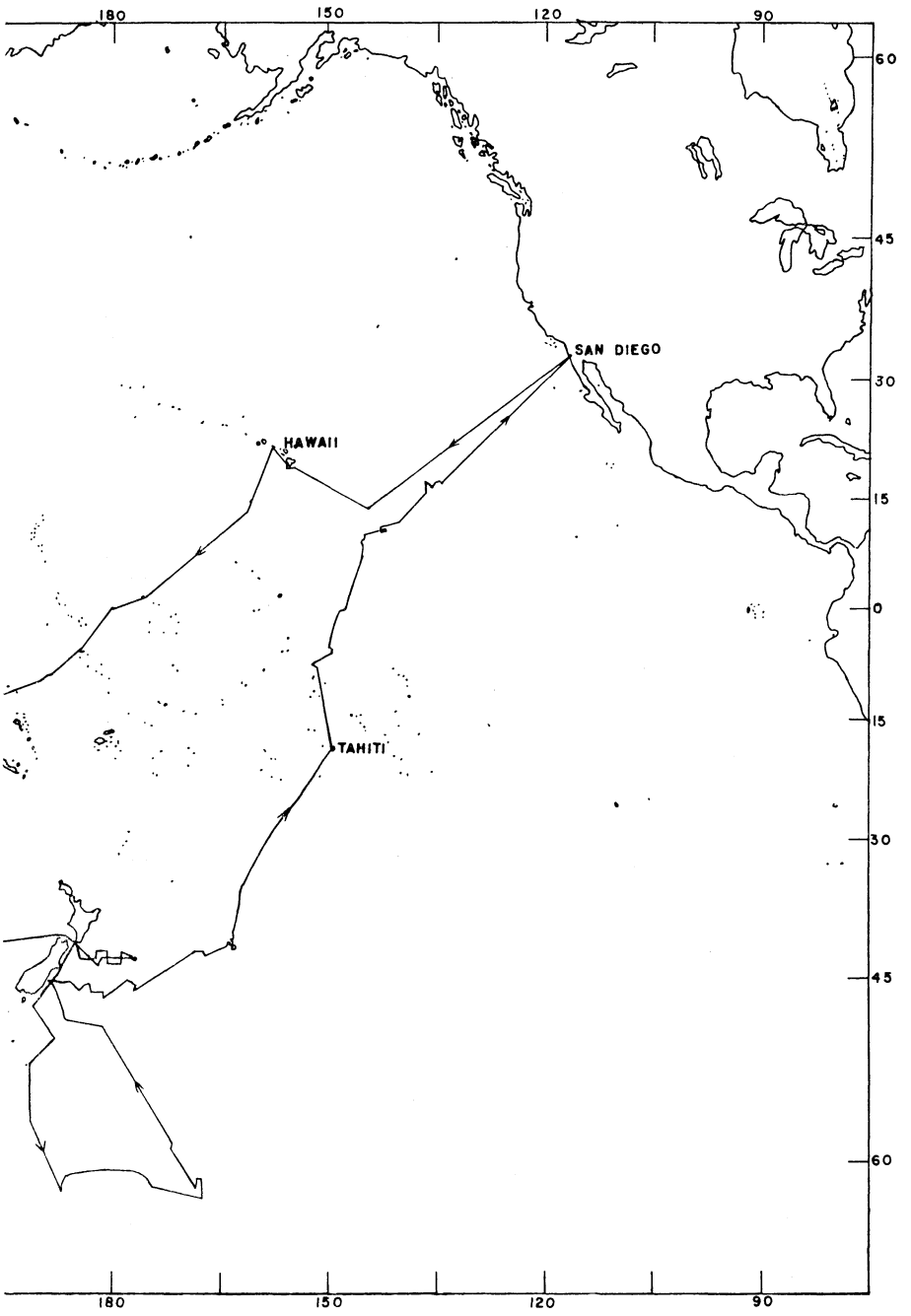


Fig. 1. Map of Pacific and Indian oceans, showing



route of "Monsoon Expedition".

Table 1. Insects trapped by Coatsworth on Monsoon Expedition

Date	Wind Direc.	Speed (knots)	Lat.	Long.	Approx. dist. in km from nearest land	No. of specimens	Order	Family
1960								
19. IX.			13°N.	161°W.	1000 Hawaii	1	Lepidoptera	Pyralidae
6. X.	NW		16°S.	147°E.	250 Great Barrier Reef, Austr.	1	Neuroptera	Chrysopidae
24. 〃		5	7°10′S.	127°16′E.	100 Timor I.	1† 1+	Coleoptera 〃	Buprestidae 〃
28. 〃	NNW	6	8° S.	117°E.	50 Lombok, Lesser Sunda Is.	1 1	Lepidoptera 〃	Noctuidae Pyralidae? (fragments)
2. XI.	SE	10	10°10′S.	115°17′E.	100 Lombok	1	〃	Noctuidae
7. 〃	〃	〃	13°19′S.	109°35′E.	500 Java	1	〃	Gelechiidae
13. 〃	WNW	11.5	7°44′S.	107°35°E.	50 Java	5†	Heteroptera	Pentatomidae
13. 〃	〃	〃	7°40′S.	107°24′E.	30 Java	1†	Orthoptera	Gryllidae (Pentacentrinae)?
14. 〃	ENE	13	6° S.	107° E.	20 Java	1 2 1 1 14 1	Heteroptera Lepidoptera 〃 Diptera Hymenoptera 〃	Pentatomidae Blastobasidae Noctuidae Milichiidae Formicidae Torymidae
1961								
8. I.	WNW	15	37°32′S.	117°56′E.	100 West Cape Howe, Austr.	1†	Lepidoptera	Noctuidae
10. 〃	〃	12	42°10′S.	123°21′E.	250 S. Austr.	1	Heteroptera	Lygaeidae
22. 〃	Var.	25	41°33′S.	171°08′E.	400 South I. N. Z.	1 8 1 2	Diptera 〃 〃 〃	Leptoceridae Milichiidae Drosophilidae? Coelopidae? (no head, apex of wing)
29. 〃	WNW	15	43°28′S.	176°44′E.	50–100 South I. N. Z.	1	〃	Milichiidae
9. III.	ENE	25	35°53′S.	163°01′E.	600 Ball's Pyramid	130+**	Heteroptera	Gerridae—3 spp.
10. 〃	NNE	0	29°25′S.	158°58′W.	600 Brisbane, Austr.	30+**	〃	〃 2 〃
11. 〃		0	27°19′S.	157°30′W.	500 Brisbane		〃	〃 1 sp. seen
19. 〃	NNE	0	17°32′S.	149°35′W.	0.5 Papeete, Tahiti	1†	〃	Reduviidae
24. 〃	N	10	13°53′S.	150°30′W.	200 Line Is.: Flint I.	1†	Hymenoptera	Apidae *Apis* sp.
25. 〃	NxE	0	10°45′S.	151°05′W.	50 Line Is.: Caroline I.	1†	Heteroptera	Pentatomidae
28. 〃	NNE	0	4°26′S.	149°24′W.	500 Line Is.: Malden I.	1†	〃	〃
31. 〃	N	13	0°04′S.	147°36′W.	1200 Line Is.: Christmas I.	2+**	〃	Gerridae
4. IV	N	14	5°50′N.	146°02′W.	1309 Christmas I.	2+**	〃	〃

\+ On surface of sea † On deck * Alive, or partly alive ** Attracted to night light

and detaching of snaps. Nets was examined once a day, as a rule.

Results: A total of 54 specimens was taken in the air nets or found on deck at sea, and an additional 164 marine water striders were taken from the surface of the sea (see table 1). Specimens taken ashore, such as on subantarctic islands, will be reported elsewhere. The specimens taken farthest from land (500 km) were a small moth south of Hawaii, another between Australia and Java and a pentatomid bug east of the Line Is. The next most distant from land was a small fly 400 km from the South Island of New Zealand.

Acknowledgments: We are greatly indebted to the Scripps Institution of Oceanography of the University of California for the opportunity of sending Coatsworth on the "Monsoon Expedition" to carry on the trapping program, and to the Office of Naval Research and the Pacific Science Board (National Research Council) for the financial backing to make the participation possible. We are particularly indebted to Dr. Robert L. Fisher (Scripps Institution of Oceanography), Dr. S. R. Galler and Dr. H. L. Hayes (Office of Naval Research), and Dr. H. J. Coolidge and Mrs. L. Smith (Pacific Science Board). Miss S. Nakata, Bishop Museum, gave various assistance with arrangements and equipment.

RECENT LITERATURE ON PACIFIC INSECTS

LEPIDOPTERA

Buttiker, W. 1959. Observations on feeding habits of adult Westermanniinae (Lepid., Noctuidae) in Cambodia. Acta Trop., Basel **16** (4): 356–61.

Clarke, J. F. G. 1962. New species of Microlepidoptera from Japan. Ent. News **73** (4): 91–102.

Common, I. F. B. & W. Arndt. 1959. *Tonica effractella* (Snellen) (Lepidoptera: Oecophoridae) as a pest of cotton in Northern Australia. Emp. Cott. Gr. Rev. **36** (1): 28–31, 2 pls., 1 fig.

Delfinado, M. D. 1959. A survey of rice stem borer parasites in Rizal, Laguna and Pangasinan. Philipp. Agric. **42** (8–9): 345–57.

Diakonoff, A. 1961. Records and descriptions of exotic Tortricoidea (Lep.) Ann. Soc. Ent. France **130**: 49–76, 1 pl.

Hughes, R. A. 1962. Notes on the butterfly fauna of Machupicchu, South-East Peru. Entomologist **95** (1186): 65–73.

Inoue, H. 1960. Two new species of the Pyralididae from Japan (Lepidoptera). Kontyû **28** (3): 170–71, 1 pl.

———— 1961. Lepidoptera: Geometridae (1). Insecta Japonica ser. 1, **4**: 1–106, 7 pls., 193 figs.

———— & H. Yamamoto. 1961. A synonymic note on several Japanese species of the genus *Eilema* (Lepidoptera, Arctiidae). Kontyû **29** (1): 72–78.

Kim Hon Kyu. 1961. An analysis of the geographical distribution of Korean butterflies (Preliminary Report). Korean Culture Research Inst., Jour. **2** (1): 253–94, 57 figs., 3 pls.

Kodama, T. 1961. The larval of Glyphipterygidae (Lepidoptera) in Japan (I). Ent. Lab., Univ. Osaka Pref., Pub. **6**: 35–45 (in Japanese).