X. TERRESTRIAL FAUNA

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The effect on the terrestrial fauna by Typhoon OPHELIA was much less than expected in terms of the general damage to the atoll. On an atoll the size of Jaluit, it seems apparent that even with very severe damage to parts of the atoll, in most groups of land animals the percentage of survival of species is fairly high, at least in one part or another of the atoll. Thus, as those parts of the atoll that lost much of their vegetation and soil regain a normal vegetational situation, presumably the faunal picture will regain its previous status within a reasonable period. The length of this time period will be largely controlled by distances and wind directions, in relation to less affected portions, and by the habits and habitats of the animals and their vagility (natural ability for dispersal), as well as by rate of revegetation and by human travel.

It is felt that the natural populating of oceanic islands by insects is effected primarily by passive transport in air currents. In the case of mid-Pacific atolls the potential sources of additional species of insects are distant and therefore strongly limited. Also, the number of species of insects, and other animals, that an atoll can support is strongly limited by the lack of many types of environments present on high islands, and by the limitations of flora, soil, and fresh water. If some species were exterminated from the atoll as a whole, repopulation by those species not associated with man might be very slow.

Mammals: These on Jaluit were limited to rats, except for man and his domestic dogs, cats, and pigs. Possibly three kinds of rats* were present, or at least intermittently present, but precise data are lacking. Rats suffered considerably from the typhoon -- perhaps more than most groups of animals. Apparently rather few survived. None were seen during the survey, and only slight evidence of one was noted on Jabor.**

Those presumably present earlier were RATTUS RATTUS, R. norvegicus and R. exulans. One opinion expressed was that the rats were largely exterminated, at least on Jabor, but that repopulation had taken place from ships which had come in since the storm. Pigs and pets were only in small part lost during the typhoon. Only sixteen of the 1,300 people on the atoll were killed (two of these died of exhaustion immediately following the storm).

Birds: Birds were not greatly affected by the typhoon. Local residents stated that although some dead birds were noticed after the storm, in general the number of birds present afterwards did not appear to be

* Mice, Polynesian rats and common black or brown rats were previously reported from Jaluit by Schnee (1904) and Kuroda (1934), Norway rat (as Mus decumanus) by Finsch (1893, p. 122) --F.R.F.

** Coconuts, gnawed open by rats, were seen on Majurirek I. --F.R.F.
materially decreased. During the week’s observations, two land birds with rather few Marshall Is. records (New Zealand cuckoo and Micronesian pigeon) were observed. During a visit to "Bird I." (Lijeron), large numbers of birds were seen, particularly White-capped Noddies, Brown Boobies and Frigate Birds, the former with abundant nests (of Pisonia leaves on twigs), eggs, and young birds. One White Tern egg was seen. Birds seen were as follows (in addition to those listed below, 13 other species are recorded from Jaluit and 25 from the Marshalls as a whole by earlier authors):

Species not previously recorded at Jaluit Atoll are starred (*).

Letters refer to the places of observations as follows:

E -- Majurek (Elizabeth)  L -- Lijeron
I -- Imroj  M -- Majatto
J -- Jabor  P -- Pinlep
K -- Kinajon  R -- Ribon

*Puffinus pacificus cuneatus (Salvin) -- Wedge-tailed Shearwater . . . . J
*Phaeton lepturus dorotheae (Mathews) -- White-tailed Tropic Bird. . . . . P
*Sula leucogaster plotus (Forster) -- Brown Booby. . . . . . . . . . . . . L
*Frigata minor minor (Gmelin) -- Pacific Man-O’-War (Frigate Bird) . . . . I

Demigretta sacra sacra (Gmelin) -- Reef Heron . . . . . . . . . . . . . MRJE
*Pluvialis dominica fulva (Gmelin) -- Pacific Golden Plover. . . . . . . IRJP

Numenius phaeopus variegatus (Scopoli) -- Whimbrel. . . . . . . . . . . . J
Heteroscelus incanus (Gmelin) -- American Wandering Tattler. . . . . . . . . . . . KJPE

Arenaria interpres interpres (Linn.) -- Turnstone . . . . . . . . . . . . . JPL
Thalasseus bergii pelecanoides (King) -- Crested Tern . . . . . . . . . . . . . L
Anous stolidus pileatus (Scopoli) -- Common Noddy . . . . . . . . . . . . . MRKEPL
Anous tenuirostris marcus (Bryan) -- White-capped Noddy. . . . . . . . . . MRJKEL
Cygic alba candida (Gmelin) -- White Tern . . . . . . . . . . . . . . . . . MRJEPL

Ducula oceanica oceanica (Lesson and Garnot) -- Micronesian Pigeon . . . K
Eudynamis taitensis (Sparrman) -- Long-tailed New Zealand Cuckoo. . . . . JL

Reptiles: Terrestrial reptiles in the Marshalls include only lizards.

These do not seem to have been seriously affected by the typhoon. Large populations of the small striped skink were seen on most islets, and also fair numbers of geckos and the green, black and slender blackish brown skinks. The lizards are the most important predators of insects in the Marshalls, where perching birds are absent. Thus with any diminution of
the lizard population, serious consequences might result with an abundance of insects resulting. The lizards observed are as follows:

- **Lepidodactylus lugubris** -- Small House Gecko ........................................ J
- **Gehyra oceanica** -- Big Tree Gecko .......................................................... J
- **Dasia smaragdina smaragdina** -- Green Skink ........................................... EJ
- **Emoia cyanura cyanura** -- Striped Skink .................................................... MRIJEPL
- **Emoia arnoensis** -- Black Skink ................................................................. JPK
- **Emoia boettgeri (?)** -- Slender Skink ....................................................... P

**Amphibians:** There are no native amphibians, and the giant toad *(Bufo marinus)* has apparently not been introduced to Jaluit.

**Fresh water fish:** There are no native fresh water fish in the Marshalls. *Gambusia* minnows have been introduced to Jaluit for mosquito control. *These survived in at least one cistern (elevated about 1 m.) in the middle of the wide portion of Jabor. Those in non-elevated water tanks apparently were killed by salt water inundation.**

**Insects:** In general, insects seem to have been very successful in surviving the typhoon. About 225 species of insects and about 23 species of other terrestrial arthropods were collected during the survey. The number of species surviving is undoubtedly very much larger. Insect collections may be incomplete for the atoll as a whole because we worked mainly on islets more heavily hit by the typhoon. Various traps (light trap, fly traps, and AEC fallout sheets) were operated on Jabor, but strong winds, rain and a bright moon interfered with their functioning. It is estimated that the normal insect fauna of Jaluit should number about 500 or more species. Probably very few, if any, of these were eliminated by the storm. But one week, with much time spent in reaching the different islets, was insufficient for an adequate survey. The insect population appeared to be reviving and increasing rapidly. With short life-cycles for many groups of insects in this latitude, some species had undoubtedly already multiplied their populations many fold in the 3½ months since the typhoon.

In abundance of individual species, there was great variation, partly related to normal trends, but partly accentuated by the typhoon. Soil insects, normally weakly represented on atolls, were particularly scarce, especially on islets that were inundated.

In some limited spots on less affected islets, and on broader parts of more disturbed islets, litter (rotting vegetation) was found which contained spring-tails, phorid flies and maggots of other flies. Some of this material consisted of rotting Pandanus leaves (even of lost roofing), rotting leaves of downed coconut palms, or old rotting logs. As mentioned elsewhere, much soil, humus, and dead vegetation was washed into the lagoon, besides many living trees. With the superabundance of newly killed trees, the populations of many of these scavenging insects, reduced
by the typhoon, will undoubtedly undergo further great increase. On the other hand, the burning frequently practised by the Jaluit people (noticed particularly in the case of Majurirek) will considerably restrict these insects, as well as humus production, which are related. Insects that live under dead bark survived reasonably well, and were found to be breeding up very large populations because of the great abundance of killed and fallen trees, particularly breadfruit trees.

In the many old Japanese water cisterns, or oil tanks, as on Jabor, considerable breeding of some insects was observed, even in tanks which had been overrun by salt water. Most of these tanks now contain rotting plant debris, and many of them support numerous mosquito larvae (Culex quinquefasciatus), as well as larvae of a pale tendipedid (chironomid) fly, a dark ephyrid fly, a damsel fly and two species of dragonflies. The day-biting mosquito (Aedes marshallensis) was much rarer than the night-biting Culex, and was seen breeding in a hole in the side of a downed coconut palm.

House flies were quite abundant, together with other filth-flies, particularly sarcophagids, and to a much lesser extent calliphorids. The breeding places were not too well determined, other than latrines. In some villages, flies were being trapped in large numbers in screen fly traps baited with dead fish.

The insects which were encountered in perhaps greatest numbers were a species of pale broad leafhopper (Exitianus fusconervosus) on grasses, herbs, and some trees; a dark-striped lygaiid bug (Nysius pulchellus) on Physalis, Cyperus, Phyllanthus, Sorghum, grasses, Morinda, and other plants; a slender predaceous bug (nabid) often on these same hosts and on Crotaaria; certain small species of flies, mainly seen resting on leaves or flowers of Terminalia, Hernandia, Tournefortia; certain species of small ants on various plants; and several species of moths. The moths included several abundant microlepidopterans and pyrales on Terminalia, Hibiscus, etc. and some noctuids, some of which often heavily defoliated Wedelia, and also some on Pemphius, etc. The ubiquitous day-flying moth, Utetheisa pulchelloides, was seen on Tournefortia on all islets. The single butterfly species (with several color forms), Hypolimnas bolina, was very abundant on the wide part of Jabor, and on the less affected islets. An abundant beetle, besides those found under bark of dead breadfruit trees, was a small antcid, probably a predator, on Sorghum, Cyperus, etc.

One group of insects which was noticeably scarce was the locusts. Only one specimen was found, whereas one or more species are generally very abundant on most atolls in grassy areas. The long-horned grasshopper, Physis, was also quite rare, and seen mostly in the nymphal stage, indicating population build-up from a low level.

Spiders: About four species were moderately abundant, a few others rare. Two species of centipedes were taken, and one scorpion. No millipedes were taken except for a minute questionable form.

Terrestrial Mollusks: Terrestrial mollusks are scarce in species in the Marshalls and mostly quite small. Because of their protective devices, they did not suffer much from the typhoon. Only in a few cases were any
found to be abundant. On Kinajon Islet a small species of snail was very abundant on leaflets of young coconut palms, as well as on Canavalia vines entangling the young palms. A more elongate land snail was found in several spots (see Appendix II).

Fresh water or brackish water snails of about three species were found in the mangrove pools on Majurirek, Pinlep and Imroj Islets.

Other terrestrial invertebrates: Few other strictly terrestrial forms were encountered. No earthworms were seen. Isopods and amphipods were scarce, aside from shore-living or mangrove-pond species. A few small shrimps were found in mangrove swamps:

Ceridena sp. (Ateidae) -- in mangrove pond, Imroj

Leander sp. (Palaemonidae) -- in mangrove pond, Majurirek

Metabetaeus minutus (Alphaeidae) -- in mangrove pond, Jabor, Mejatto, Imroj

Land crabs included Sesarma, Grapsus grapus tenuicrustatus, and Metasesarma rousseauxi.