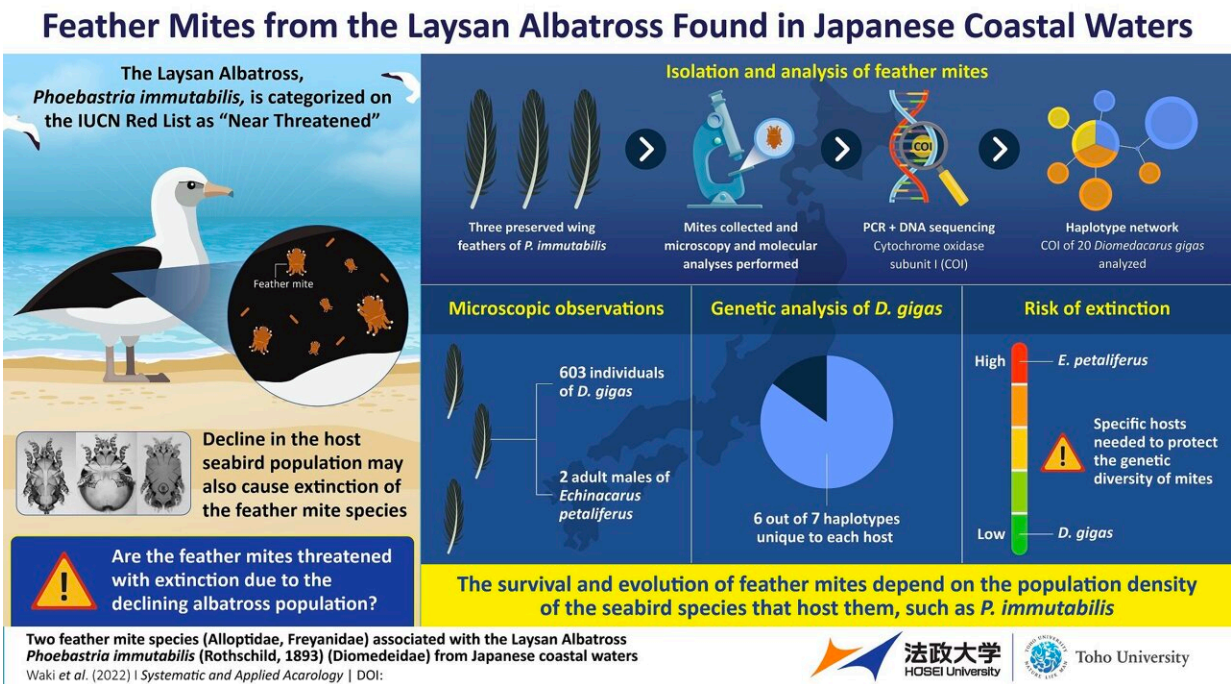


# Feather mite species associated with Laysan albatross discovered in Japan

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Two species of feather mites (both males) from the Laysan Albatross. A) *Echinacarus petaliferus* (Trouessart, 1898) and B) *Diomedacarus gigas* (Trouessart, 1895). Credit: Tsukasa Waki from Toho University, Japan.

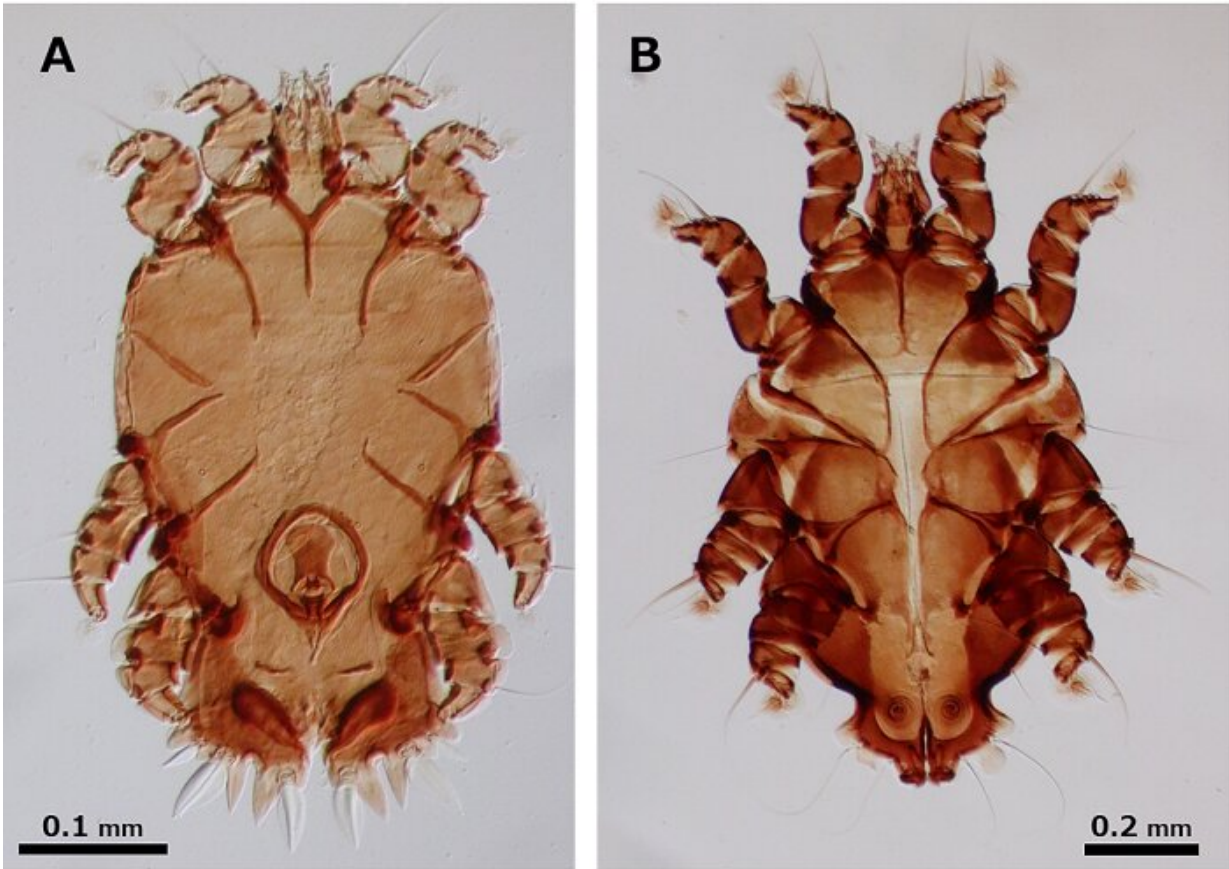
*Phoebastria immutabilis*, commonly known as the Laysan albatross, is a large seabird native to the North Pacific Ocean. Owing to the decrease in their population size, this species has been listed as "Near Threatened" in the Red List of the International Union for Conservation of Nature.

Laysan albatrosses, like other birds, have a symbiotic relationship with feather mites, a species of highly host-specific parasites that inhabit the feathers of the birds.

Now, with the threat of extinction looming over *P. immutabilis*, the feather mites could be in danger, too. Changes in the [population dynamics](#) of either host or their symbiont (the organism living in symbiosis with the host) can lead to an ecological imbalance. However, their [current population](#) and infection status remains ambiguous in Japan.

To bridge this gap, Professor Satoshi Shimano from Hosei University, along with Associate Professor Tsukasa Waki from Toho University and Professor Masaki Eda from Hokkaido University, all in Japan, investigated the current status of *P. Immutabilis* feather mites.

They studied bird specimens from in and around Japanese coastal waters. Their recent work was published in *Systematic and Applied Acarology*. Sharing the motivation behind their investigation, Prof. Shimano states, "The feather mite *Compressalges nipponiae*, which infects the Crested Ibis, is known to have become extinct with the disappearance of its host population in Japan. Therefore, information on the mite symbionts, thought to clean the host's feathers, could be helpful in conserving the Laysan Albatross."



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Feather mites from three preserved *P. immutabilis* wing feathers were studied using microscopy and molecular analyses. The team identified 603 members of *Diomedacarus gigas*, and two adult males of *Echinacarus petaliferus*. Remarkably, this is the first study to report on the occurrence of *D. gigas* in Japan in the last 50 years, and the first-ever on *E. petaliferus*. The team provided a detailed morphological redescription of the isolated mites. Twenty *D. giga* and one *E. petraliferus* mites were selected for analysis of haplotype network—a

method to determine [genetic diversity](#) and lineage.

Every organism has a unique set of genes that do not undergo much variation over time, which makes them a molecular fingerprint. Cytochrome Oxidase Subunit I (COI) was used as the target gene for haplotype analysis of *D. gigas*. The COI parsimony network revealed seven different haplotypes, of which six were unique to their hosts. The large proportion of unique COI haplotypes pointed to a greater genetic diversity and stable population of *D. gigas*. On the other hand, [genetic information](#) could not be obtained for *E. petaliferus* and additional research is expected for this species. The team concluded that *E. petaliferus* was a rare species in Japan, with a high risk of extinction.

In summary, these findings highlight the strong correlation between the ecology of the mites and the population of *P. immutabilis*. Foreseeing possible future avenues for their work, Dr. Waki speculates, "We believe that the information on the Laysan albatross and the distribution of its symbionts will enable better conservation planning and extinction risk assessment for this species. This knowledge will ultimately lead to a better preservation of ecosystems for future generations."

**More information:** Tsukasa Waki et al, Two feather mite species (Alloptidae, Freyanidae) associated with the Laysan Albatross *Phoebastria immutabilis* (Rothschild, 1893) (Diomedeidae) from Japanese coastal waters, *Systematic and Applied Acarology* (2023). [DOI: 10.11158/saa.28.1.7](https://doi.org/10.11158/saa.28.1.7)

Provided by Hosei University

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