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Chewing Lice: Tiny Insects in Raging Seas

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Insects are the most dominant group of animals on earth. They were invading the land about 400 million years ago during Devonian Period [1]. From these days, they occupied their niches in every corner of our terrestrial ecosystems including some fresh water habitats. Ranging from very small snow flea *Hypogastrura nivicola* (Fitch, 1846) of order Collembola in Arctic to large three-horned rhinoceros beetle *Chalcosoma moellenkampi* Kolbe, 1900 of order Coleoptera in Borneo tropics, the insects had all extremes of behavioral, morphological and physiological features that help them to achieve such evolutionary success. Their impressive story based on many different factors such as: possessing wings, external skeleton and huge progeny [2], but they seemed to fail in marine ecosystem exams leaving the space to their crustacean cousins to dominate. Seas with their high salinity, rhythm tides, surges weather and raging waves stand agnist the spread of Hexapoda on the largest ecological habitat of our planet, but these never ban them to be there. Yes, there is a great absent of large insect groups in marine habitats [3] however on the background there are very tiny insects adaptive themselves in completely different way to be one of few representative of Class Insecta in our marine mega fauna. These are the chewing Lice. Chewing lice are ectoparasites of order Phthiraptera. They are very small insects that act as parasites of birds and mammals. With about 4000 species they form one of the most diverse parasitic insects on Hexapoda [4]. These insects are completely permanent ectoparasites that spend their entire life on the bodies of their hosts and they feed mainly on feathers, dry flakes of dead skin and other debris that available by their hosts [5]. These insects are completely adapted to their way of life as they are very small to hide through their hosts feathers or hairs and armed with characteristic chewing moth parts and hanging legs to firmly attach to hosts bodies. Such adaptation confirmed their ability to invade the marine life through the bodies of sea birds [6]. There are more than 1600 species and sub-species of chewing lice recorded from marine birds [7]. Beside their relative of sucking lice of Pinniped, they form the largest insect group in the marine ecosystem. They recorded from all orders of sea birds including: marine Anseriformes, Charadriiformes, marine Falconiformes, Pelecaniformes, Procellariiformes and Sphenisciformes (Figure 1). They also found through all of our seas and oceans from *Carduiceps lapponicus* Emerson, 1953 of Bar-tailed godwit *Limosa lapponica* (L., 1758) of Pacific Ocean [8], *Saemundssonia hexagona* (Giebel, 1874) of Red-tailed tropicbird *Phaethon rubricauda* Boddaert, 1783 from tropical coasts [9] to *Austrogoniodes mawsoni* Harrison, 1937 of Emperor penguin *Aptenodytes forsteri* Gray, 1844 from Antarctica seas [10]. The distribution pattern of chewing lice among sea birds varied greatly from cosmopolitan species such as *Saemundssonia lari* (Fabricius, 1780) that infected almost all the gulls' species of the planet (Figure 2) [11] to very restrictedly distributed species that infesting some endemic marine birds such as *Eidmanniella nancyae* Ryan and Price, 1969 which infested vulnerably endangered Socotra Cormorant *Phalacrocorax nigrogularis* Ogilvie-Grant and Forbes, 1899 around the Arabian Peninsula (Figure 3) [12]. The studying of chewing lice of wild birds forms a very interesting branch of entomology especially for species that parasitized marine birds. The important of achieving a complete understanding of surrounding fauna of any country form the main trigger for investigating such minute insects. The information concerning host/parasite interaction and distribution is also very valuable to study sea birds phylogeny and evolution [13]. Penguins chewing lice phylogeny of genus *Austrogoniodes* and *Nesiotinus* were studied and the result indicate potential instances of co-speciation between these lice and their host birds and consequently better-resolving of penguin phylogeny [14].The distribution pattern and host switching events of chewing lice among sea birds is of great significance especially for islands ecosystems. Recently, White cheeked tern *Sterna repressa* Hartert, 1916 were examined for chewing lice for the first time in two different islands in Arabian Gulf and the result indicated that each population has its own chewing lice parasite of genus *Saemundssonia* [15]. This may point out that the two populations are reproductively isolated from each other and such kind of ecological information is well worth for conservation biologists. Although the present of great heritage of chewing lice knowledge and species records from marine birds, the way is still very far from achieving complete understanding of these characteristic creatures. More and more new species of these insects discovered from sea birds every year [16,17]. Little is known about their biology, ecology and physiology [6]. A lot of marine birds

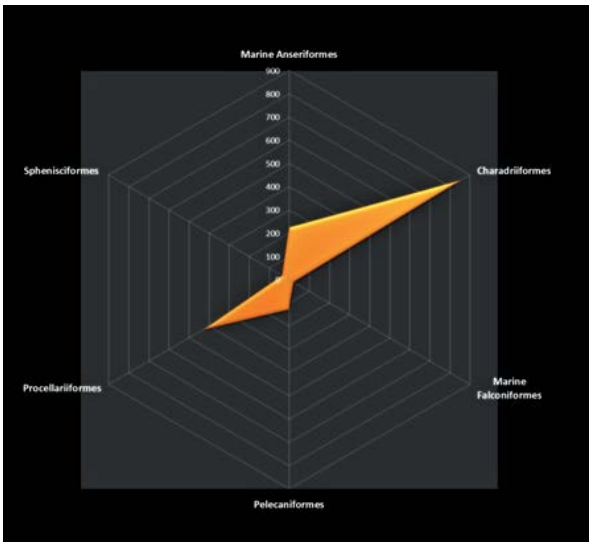

Figure 1: Hexagonal graph showing the number of recorded chewing lice species from each sea bird order.

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Figure 2: On the left Female *Saemundssonia lari* the cosmopolitan chewing lice of gulls' "photos using special technique [4]"; on the right one of *Saemundssonia lari* hosts Juvenile Armenian gull *Larus armenicus* Buturlin, 1934.

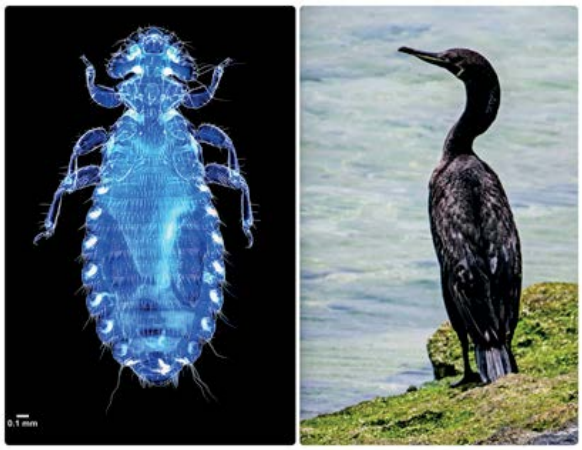

Figure 3: On the left female *Eidmanniella nancyae* the characteristic chewing lice with restricted distribution "photos using special technique [4]"; on the right the host Socotra Cormorant *Phalacrocorax nigrogularis* Ogilvie-Grant and Forbes, 1899.

are still never checked for chewing lice before [7]. Many obstacles usually face the scientists working in this field including: shortage in the number of peoples interesting in this group of insects, minimum requirements of ornithological knowledge either to collect or interpret the data by the entomologists working in this field, access to remote islands and sea birds breeding places which usually prohibited, catching these birds without harming them or their breeding populations. So, A lot of efforts are needed to achieve better apprehend the role of these insects in our marine ecosystems.

Finally, through the body of these birds flying around our harbors, diving under water for food, running in front of you on the shore or breeding on very far islands, there are small insects that chose their way to defy the odds of marine habitats to consummate the domination of their terrestrial relatives on the land and to well-deserved the title tiny insects in raging seas.

References

1. Grimaldi D, Engel MS (2005) Evolution of the Insects. Cambridge University Press, Hong Kong 1.
2. Gullan PJ, Cranston PS (2010) The insects: an outline of entomology. Chapman & Hall, London, Fourth Edition: 5-7.
3. Springer M (2009) Marine Insects. Marine Biodiversity of Costa Rica, Central America Monographiae Biologicae 86: 313-322.
4. Nasser M, Alahmed A, Shobrak M, Aldryhim Y (2015) Identification key for chewing lice (Phthiraptera: Amblycera, Ischnocera) infesting the Indian Peafowl (*Pavo cristatus*) with one new country record and new host record for Saudi Arabia. Turk Jour of Zoo 39: 88-94.
5. Imms AD, Richards OW and Davies RG (1977) Imms' General Textbook of Entomology. Classification and Biology. Chapman and Hall, London UK 2.
6. Alahmed A, Shobrak M, Kheir S, Nasser M (2015) Little known chewing lice (Phthiraptera) infesting crab plover Dromas ardeola Paykull, 1805 (Charadriiformes: Dromadidae) from the Red Sea. Acta Tropica 150: 171-175.
7. Price RD, Hellenthal RA, Palma RL, Johnson KP, Clayton DH (2003) The chewing lice: world checklist and biological overview. Illinois Natural History, USA.
8. Emerson KC (1953) A new species of *Carduiceps*. Proceedings of the Entomological Society of Washington 55: 209-211.
9. Pilgrim RLC, Palma RL (1982) A list of the chewing lice (Insecta: Mallophaga) from birds in New Zealand. Nat M N Zea Misc Ser 6:1-32.
10. Harrison LJS (1937) Mallophaga and Siphunculata. Australasian Antarctic Expedition 1911-14.
11. Al-Ahmed A, Shobrak M and Nasser M (2014) Chewing lice (Phthiraptera: Amblycera, Ischnocera) from Red Sea gulls with new host-parasite records, Zootaxa 3790: 567-576.
12. Ryan SO, Price RD (1969) A review of the genus *Eidmanniella* (Mallophaga: Menoponidae) from the Pelecaniformes. Annals of the Entomological Society of America 62: 815-823.
13. Hafner MS, Nadler SA (1988) Phylogenetic trees support the coevolution of parasites and their hosts. Nature 332: 258-259.
14. Banks JC, Paterson AM (2004) A penguin-chewing louse (Insecta: Phthiraptera) phylogeny derived from morphology. Invertebrate Systematics 18:89-100.
15. Shobrak M, Alahmed A, Palma R, Almalki M, Nasser M (2015) New records of species of *Saemundssonia* (Insecta: Phthiraptera: Philopteridae) infesting breeding terns in the Arabian Peninsula, with notes on their phylogeny and ecology. Parasitology Research 114: 2587-2597.
16. Palma RL (2012) Three new species of the louse genus *Saemundssonia* (Insecta: Phthiraptera: Philopteridae). Zootaxa, 3478: 38-48.
17. Banks JC, Palma RL (2003) A new species and new host records of *Austrogoniodes* (Insecta: Phthiraptera: Philopteridae) from penguins (Aves: Sphenisciformes). N Z J Zool 30: 69-75.