

LATVIAN COLEOPTEROLOGISTS STUDY BEETLES IN THE TROPICAL RAINFORESTS OF THE PHILIPPINES

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Science that studies beetles is called coleopterology. This name comes from the Latin name of the beetle order *Coleoptera*. Daugavpils University has the only coleopterological research centre in Latvia and the Baltic, which is well-known in the world.

Beetles are one of the most numerous and diverse species of insects in terms of insect orders in the world. More than 400 000 species are known to be found virtually everywhere around the globe, except in ocean waters and areas of ice and permafrost. Beetles live in forests, meadows, agrocenoses, rivers and lakes, caves, bird nests and human apartments. Beetles play an important role in nature. They promote decomposition of various parts of plants, including wood, they are natural sanitizers, they maintain the balance of ecosystems, pollinate plants, indicate significant changes in the environment. Beetle blood – haemolymph contains various chemicals that are of great importance in medicine, but their body surface structure, structure of individual body parts and mechanical movements are used in mechanics and materials science. Many beetle species are highly endangered and can serve as umbrella species to protect entire ecosystems, such as the hermit beetle (*Osmoderma*) species found in Europe. To protect this species, a human protects its habitat – old hollow trees, which in parallel are important for hundreds of other species living there, which are also endangered, because in nature the number of old, hollow trees is reducing. Many popular beetles and especially their larvae are also used

in food. The diversity of beetles and their uses are being studied around the world.

One of the research directions that beetle researchers at Daugavpils University are developing is the research of tropical beetle biodiversity. Tropical rainforests are currently one of the most endangered ecosystems in the world. Forests are cut down in huge numbers, giving way back to palm gardens and livestock pastures. At the same time, tropical forests have the highest biodiversity in the world and are very poorly studied in a number of regions. Beetle researchers at Daugavpils University mainly specialise in the study of beetle diversity in the Philippine archipelago.

The Philippines is one of the 18 mega-biodiverse countries of the world, which contains two-thirds of the earth's biodiversity and between 70% and 80% of the world's plant and animal species. The Philippines is also one of the world's biodiversity hotspots. The Philippine archipelago is an isolated group of 7000 small islands and it may harbour the greatest concentration of unique species per unit area in the world. Approximately 33 percent of its plants, 75 percent of its amphibians, 70 percent of its reptiles, and 44 percent of its birds are endemics and can be found only on the Philippine archipelago.

The diversity of beetles is much higher in the Philippine archipelago, which is still very poorly studied. Therefore, every year many hundreds of new beetle species are discovered in the Philippine



Tropical rainforests in the environment of Mount Talomo, Mindanao island



Arvīds Barševskis together with the girls of the tribe Bagoba Tabagawa and coleopterologist Dr. Analyn Anzano Cabras Island

archipelago. The latest updated list of beetles in the Philippines was done by Ballentes in 2001 of which she listed a total of 7375 species from 1567 genera and 87 families. 5840 species, or 79.20%, are endemic to the Philippines. There are a very few data in literature about the distribution of Philippine beetles. For many species, no new records have been published since they were described. Annual expeditions to the Philippines, joint studies with coleopterologists at the University of Mindanao, and joint scientific communication activities with local tribes can do much to protect the local rainforest biodiversity. Every year, beetle researchers at Daugavpils University discover and describe dozens of new species and genera for science.

In 2020, a total of 80 new taxa for science were discovered and described by scientists at the Coleopterological Research Centre at Daugavpils University. Among them, 9 unknown genera were discovered of which five are fossil (extinct),

described from the Baltic amber, but four of them were present-day genera, which are from the tropical regions of East Asia (three genera) and the Caucasus (one genus). Last year, 68 scientifically new beetle species were described, of which the most newly discovered species are from the Philippines – 23 species. Research on beetle biodiversity in the Philippines is necessary, because local biodiversity is under a great threat due to tropical deforestation. Assuming that almost 80% of the beetle species in this country are unique local endemics, catastrophic deforestation has an irreversible effect on the biodiversity here. Many undiscovered species are disappearing. The Philippines is, therefore, clearly one of the world's hotspots for biodiversity.

According to some scientists, the Philippines had 70% forest cover of the country's total land area in 1900, to 50% in 1950 and to less than 19% by 1990. Less than 1 million ha consists of virgin forest. Forest resources are being rapidly depleted (by an average of about 120 000 ha per annum) and there is a real prospect of Philippine forests being virtually eliminated within the next 20 years. In 2011, the official forestry statistics showed that the country had only around 7.2 million ha of forests. The Philippines lost around 10 million ha of its forests over the last seven decades, placing the country among those with the highest deforestation rates in the world. These processes show us that the most serious action is necessary to ensure real protection of the Philippine's biodiversity. Much more extensive support programmes are needed for local tribes to offset the income from timber sales, and they need to be introduced to the world's richest countries, which mainly use these tropical timber resources. Therefore, biodiversity research in the world's biodiversity hotspots must clearly be one of the global priorities for scientific development. Daugavpils University scientists in close cooperation with Philippine colleagues not only discover new species, but also offer solutions for their protection. Particular attention is paid to the Philippine endemic species, which form a unique, previously unexplored genus mimicry complex, *Doliops-Pachyrhynchys-Metapocyrtus*, whose inter-species relationship is crucial to offer as a potential umbrella species

Agnia ritai Barševskis, 2018,
from Panay island



Batocera victoriana Thomson,
1856, collected in the
environment of Mt. Talomo,
Mindanao island



Callimetopus bumbierisi HT

Callimetopus cabrasae
Barševskis, 2018 from
Mindanao island



Doliops daugavpilsis
Barševskis, 2014 from
Mindanao island. This
species is named after
Daugavpils City



Parazosmotes shavrini Barševskis,
2020, from Mindanao island

complex for the protection of all Philippine rainforest biodiversity.

To promote the development of coleopterological research in the Philippines, Daugavpils University coleopterologists initiated the establishment of the Coleopterological Research Centre at the University of Mindanao (Davao, Philippines) and the establishment of the Philippine Coleopterological Network (PhilColNet). In collaboration with Philippine coleopterologists Dr. A. A. Cabras and Dr. M. N. Medina, joint expeditions, joint seminars for students, and joint trainings for local coleopterologists are held every year. This will facilitate the development of coleopterological research in the Philippines.

Mankind are responsible for the preservation of biodiversity for life on Earth. Alongside research on global climate change, related research on global biodiversity must be a priority for scientific development at an international level. Until we have the fullest possible information on what lives on the planet, we cannot think seriously about protecting its ecosystems, especially those that are most diverse and most at risk, thus, securing a full and sustainable future for humanity. In these processes, faunistic and floristic research play an invaluable role.



Pseudodoliops ditumaboensis
Barševskis, 2018, from Luzon island