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History of Entomology in the Faculty of Agriculture, Kyushu University*

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As an introduction to the contributed papers, I will briefly review the history of the Entomological Laboratory, Faculty of Agriculture, Kyushu University, and also describe the history of the Hikosan Biological Experimental Facility, which for many years has been used as a base for monitoring insects.

(1) The Entomological Laboratory

The Entomological Laboratory of Kyushu University is one of the five oldest laboratories of the Faculty of Agriculture, which was initially designated the Second Laboratory of Zoology when established in 1921. In 1923, Teiso Esaki, a pioneer of entomological studies in Japan, took up the post of associate professor upon graduating from Tokyo Imperial University. In the following year, he embarked on four and a half-year period of his career, during which he studied abroad in Europe and the United States. After returning to Japan, he was promoted to the post of first professor of the laboratory in 1930, and thereafter commenced work on its development. During the six years of the World War II and immediate post-war years, Takashi Shirôzu, who was to become a world-renowned lepidopterist, was enrolled under Assistant Professor Keizo Yasumatsu. The post-war years also saw the enrolment of a number of other academics, including Kazuo Yasutomi, Tetsusaburo Tachikawa, Ryuichi Matsuda, Akira Nagatomi, Shoichi Miyamoto, Yozo Murakami, Hiroyuki Kamiya (Sasaji), and so on. In 1958, Keizo Yasumatsu became a professor, under whose guidance, Toyohi Saigusa, Koji Yano, Yorio Miyatake, Takeshi Kawarabata, Fusao Nakasuji, Hiroshi Shima, Kenkichi Kanmiya, Osamu Yata,

and so on were to study. Thereafter, Professors Yoshihiro Hirashima, Katsura Morimoto, Junichi Yukawa, and Osamu Tadauchi took over the running of the laboratory. As of 2022, the staff consists of Toshiya Hirowatari (Professor, Lepidoptera), Satoshi Kamitani (Associate Professor, Hemiptera), Toshiharu Mita. (Assistant Professor, Hymenoptera), and Yagi Sadahisa (Assistant Professor, Lepidoptera), who are currently involved in research on phylogenetic systematics and taxonomy, and are devoted to the development of insect taxonomy and the training of successors.

Teiso Esaki (period of professorship: 1930–1957) (Fig. 1) was mainly engaged in the taxonomy and systematics of Hemiptera and Lepidoptera, and during his tenure, collected large numbers of specimens on expeditions to Sakhalin, Korea, Manchuria, China, the Ryukyu

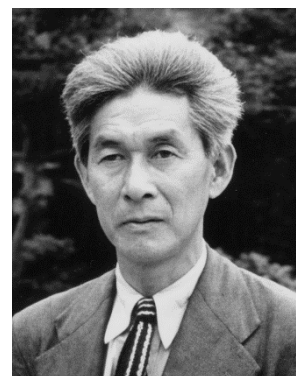


FIGURE 1. Teiso Esaki.

Islands, and Micronesia. During the 28 years following his appointment, he focused in particular on collecting and organizing insect specimens and documents that form the basis of research in the field of entomology, thereby laying the foundations for entomological research in Japan. He was the first Japanese scholar to receive an award from the Biogeographic Society, and also

*Most of the information presented in this brief historical account are derived from the publication “100th Anniversary, Faculty of Agriculture, Kyushu University, 2020” written in Japanese. For more detailed information regarding the Hikosan Biological Experimental Facility, see Hirashima Y & Chujo M, 1987. A short history of the Hikosan Biological Laboratory. *Esakia*, (24): 1–4.

served as a member of the Committee for the International Code of Zoological Nomenclature, making full use of his linguistic proficiency.

Keizo Yasumatsu (period of professorship: 1958–1971) (Fig. 2) was engaged in research on the taxonomy and ecology of Hymenoptera (including parasitic wasps). He sent a large number of students from the Entomological Laboratory to the Bishop Museum, Hawaii, and conducted scientific research in Japan and the United States under the International Biological Programme, as well as in other regions, including the Ryukyus. In 1964, he discovered the parasite *Anicetus beneficus*, a natural enemy of the citrus pest red wax scale *Ceroplastes rubens*, on the campus of Kyushu University, and using this parasite, developed the first successful procedure for the biological control of pests in Japan. On the basis of this work, in 1964, he established the Institute of Biological Control at Faculty of Agriculture, Kyushu University.



FIGURE 2. Keizo Yasumatsu.

Yoshihiro Hirashima (period of professorship: 1972–1989) (Fig. 3) contributed to the development of the taxonomy of bees in the Asia-Pacific region, with a particular focus on East Asia, including Japan, and Papua New Guinea. In addition to the taxonomy of bees, he also conducted research on wasps that parasitize the eggs of planthopper and leafhopper pests of rice, the use natural enemies of the gall midge that damages conifers, and pest clarification and conservation of Miyamakirishima (*Rhododendron kiusianum*). In addition, he published numerous books on scientific names and nomenclature, including “Scientific Names of Animals, Plants and Bacteria” (University of Tokyo Press,



FIGURE 3. Yoshihiro Hirashima.

2007).

Katsura Morimoto (period of professorship: 1989–1997) (Fig. 4) has been highly commended for his research on termites, which was mainly conducted during his time at the Forestry Research Institute, and the ecology of the Japanese pine sawyer (*Monochamus alternatus*) and pine needle gall midge (*Thecodiplosis japonensis*), which serve as vectors of the pine wood nematode. At Kyushu University, he became engaged in the phylogenetic classification of weevil species (Coleoptera) from East Asia, mainly Japan and Korea, during which time, he described approximately 240 new species. He also authored the publications “Insects of Japan” (Touka Shobo, 2006) and “The Coleoptera of Japan in Color” (Hoikusha, 1986).



FIGURE 4. Katsura Morimoto.

Junichi Yukawa (period of professorship: 1997–2004) (Fig. 5) conducted research on the classification and ecology of gall-forming insects, such as gall midges, the ecological succession of the Krakatau Islands in Indonesia, and the impact of global warming on insects. Much of his research on insects was published in “Insect and Mite Galls of Japan in Color” (Zenkoku Noson Kyoiku Kyokai, 1996). He also contributed to establishing the Kyushu University Museum, for which he served as the first director.



FIGURE 5. Junichi Yukawa.

Osamu Tadauchi (period of professorship: 2004–2012) (Fig. 6) conducted research on the taxonomy and systematics of bees from Japan, China, the Korean Peninsula, and Central Asia. As a pioneer in the use of computers in taxonomy, he led a range of research on quantitative

taxonomy, the development of a computer-based classification system, and the creation of “KONTYU,” an open access database containing information on approximately 450,000 Asian insect species.



Among the current members of staff, Toshiya Hirowatari (period of professorship: 2013–present) and Assistant Professor Sadahisa Yagi (2020–present) work mainly on leaf-mining and detritivorous Lepidoptera; Associate Professor Satoshi Kamitani (2004–present) works on Hemiptera, focusing on leafhoppers; and Assistant Professor Toshiharu Mita (2015–present) works on Hymenoptera, focusing on parasitic wasps. Recently, in addition to traditional taxonomy based on morphological information, we have also become engaged in research covering areas such as biogeography based on genetic analysis, environmental assessment and conservation using insects, biomimetic research, and the use of insects as food, through interdisciplinary collaboration.

Center of insect taxonomy in Japan

Consistent with the broad interests of the laboratory's first professor, Teiso Esaki, successive professors of the Entomological Laboratory have developed interests in a wide range of research fields, including insect taxonomy, biogeography, ecology, and pest management. Research on the taxonomy and systematics of insects has been a constant primary focus, and the laboratory has produced the largest number of insect taxonomists in Japan. A considerable amount of the research conducted by members of the laboratory has been published in both domestic and international academic journals, including the in-house journal *Esakia* (which ceased publication in 2014). The laboratory also published the first list of all insect species recorded in Japan, “A Check List of Japanese Insects” (Entomology Laboratory, Faculty of Agriculture, Kyushu University and Japan Wildlife Research Center, 1989), as well as establishing a database of type specimens held by domestic re-

search institutes. As such, the Entomology Laboratory has played a central role in the development of insect taxonomy in Japan.

Largest collection of insects in Japan

In addition to conducting research, the Entomological Laboratory serves as a repository of insect specimens, and during its 100-year existence, the total number of insect specimens accumulated from the collections of successive staff and graduate students in Kyushu University (mainly in the Entomological Laboratory) has reached approximately 4 million, including more than 3,000 holotypes, making it the largest insect collection among research institutes in Japan. The collection mainly comprises insects in the orders Lepidoptera (200,000), Hemiptera (200,000), Hymenoptera (500,000), Diptera (400,000), and Coleoptera (700,000), included among which, are valuable specimens donated from sources outside the university, such as the Iwahiko Sugitani collection (global Lepidoptera, including specimens from the northern part of the Korean Peninsula) and the Tetsusaburo Tachikawa collection (natural enemy parasitic wasps) containing contributions from eminent entomologists.

In terms of distribution, the collection contains specimens obtained from a number of foreign countries and regions, including Micronesia (Professors Esaki and Yasumatsu), Papua New Guinea (Professor Hirashima), South Korea (Professor Morimoto), Indonesia (Professor Yukawa), China and Central Asia (Professor Tadauchi). As a consequence of the continual stream of academic research projects, the collection of insects from the Asia-Pacific region has reached substantial proportions, even from a global perspective.

In addition to the Entomological Laboratory, insect specimens are stored at the Hikosan Biological Experimental Facility (see below), the Biosystematics Laboratory, the Faculty of Social and Cultural Studies, the Kyushu University Museum, and the Institute of Tropical Agriculture, Kyushu University.

(2) The Hikosan Biological Experimental Facility

History of the Facility

The Hikosan Biological Experimental Facility was established on October 20th, 1936, as the Hikosan Biological Laboratory attached to Kyushu Imperial University, funded by donations from Baron Nobumaro Takachiho (Fig. 7) and Etsuji Nakayama. Takachiho, the head of Buzen Mt. Hikosan, had an interest in biology, particularly insect research, and in 1900 established the Takachio Entomological Laboratory, thereby making an important early contribution to entomological research in Japan. In later years, concerned that the specimens and documents he had collected might be ruined or lost, he was keen to entrust the research laboratory to Kyushu Imperial University, thus making a significant contribution to the academic world. Following consultation with Professor Teiso Esaki, it was decided to construct a laboratory affiliated to the university, for which Takachiho donated approximately 10,000 tsubo (ca. 33,000m²) of land (including trees), specimens, and documents, and Etsuji Nakayama, the president of Nakayama Steel Works, contributed to the cost of building the laboratory and ancillary construction.

The stated objectives of the laboratory included (1) to study the diversity, distribution, and biology of organisms in mountainous areas to clarify the characteristics of organisms in the Kyushu region; (2) to conduct experiments on animals and plants that are difficult to breed and culture in the lowlands of Kyushu, thereby contributing to the development of basic and applied biology; and (3) to exhibit a proportion of the specimens and contribute to social education.

The facility is located at an altitude of 650–700 m on the site of the former Hikosan Zasu-in Temple. The Western-style one-story wooden building, which covers an area of approximately 100 tsubo (ca. 320 m²), is equipped with a laboratory, specimen room, library, specimen display room, breeding room, dark room, roof balcony



FIGURE 7. Nobumaro Takachiho.



FIGURE 8. Hiroshi Kuroko.

for night collection, accommodation room, bathroom, and janitor's room. To date, it has not undergone any major renovations, and consequently retains its quaint original appearance. It also encompasses a Momoyama-style garden, which was restored from the site of the former Hikosan Zasu-in Temple. This garden dates from the same period as the Kameishibo garden, which is said to have been established by Sesshu in the Muromachi period. Furthermore, in the Botanical Garden, a large number of montane plants, including beech (*Fagus crenata*), Hikosan-himeshara (*Stewartia serrata*), and Mitsumata (*Edgeworthia chrysantha*), are planted and used for various studies and observations.

During his tenure as the first Director, Teiso Esaki (1936–57) contributed to the establishment of the facility, and bequeathed a huge body of research on the taxonomy of Hemiptera and Lepidoptera, his main research fields. Under the directorship of Esaki, Keizo Yasumatsu (1958–71), Shushiro Ito (1944–47), Akinobu Habu (1948–53), and Hiroshi Kuroko (1953–65) (Fig. 8) served as successive research directors. S. Ito conducted research on planthoppers and leafhoppers, fruit flies, and butterflies, whereas A. Habu conducted research on beetles, among which, he described new species of ground beetle, for which Mt. Hikosan is the type locality. H. Kuroko made considerable progress in taxonomic research on small moths, including leafminers. As part-time workers, N. Takachiho and Hiroshi Hori (1936–39) contributed to the collection and preparation of insect specimens, and Koroku Abe (1943–48) undertook research on



FIGURE 9. The Hikosan Biological Experimental Facility, Entrance.

birds.

From 1936, when the facility was initially established, until 1939, Keizo Yasumatsu (1958–71) served as research chief, prior to moving to the Faculty of Agriculture as an assistant. In 1959, management was transferred from Kyushu University Headquarters to the Faculty of Agriculture. In the following year, 1960, he launched *Esakia* as a magazine devoted to presenting the results of research conducted on Mt. Hikosan, thereby making a notable contribution to the development of entomological research in Japan. Under Director Yasumatsu, H. Kuroko continued as Research Director and was promoted to Assistant Professor in 1962. Succeeding H. Kuroko, Shinsaku Kimoto (1962–69) was appointed as Research Director. He conducted taxonomic studies on Coleoptera, particularly leaf beetles, and research on community ecology. On the retirement of Dr. Kimoto, he was succeeded as Research Director by Chujo Michitaka (1969–98), whose main focus was the taxonomy of mealworms.

Haruo Chikushi (1971–75), a professor affiliated to the Laboratory of Sericultural Science, was appointed as the third Director of the Facility, under whom, Kenkichi Kanmiya, Kazuo Nozato, and Nariaki Yoshida served as research assistants. After Yoshihiro Hirashima became the fourth Director (1973–89), he promoted Research Director Chujo to Assistant Professor in 1976, and during this period, M. Chujo and K. Kanmiya continued to promote research. As the fifth Director, Professor Katsura Morimoto, (1989–97), worked with M. Chujo and Research Associate Koichi Takeno and Technical Assistant Takashi Teshima to clarify the insect fauna of Mt. Hikosan.



FIGURE 10. The Hikosan Biological Experimental Facility, Exhibition room.

Following the retirement of K. Morimoto, Yoshimi Hirose (1997–98) worked on the development of the laboratory as its final director (1997–98). As a consequence of organizational reforms and personnel transfers associated with an increasing prioritization of the graduate school in the Faculty of Agriculture, the laboratory closed down in 1998. The closing ceremony held in March 1998 also served as a celebration of the retirements of M. Chujo, K. Takeno, and T. Teshima.

Having ceased as the Hikosan Biological Laboratory, the facility was subsequently resurrected as the Hikosan Biological Experimental Facility (Figs 9–10), and is currently managed by Technical Manager Daisuke Yamaguchi (1998–present), together with faculty members of the Entomology Laboratory.

Academic activities

The Experimental Facility houses specimens of approximately 300,000 insects, 280 stuffed specimens of mammals and birds, 180 immersed specimens of reptiles, amphibians, and fish, and 900 specimens of shellfish, all of which are on permanent display in the exhibition room.

Esakia, which bears the name of the first director, was launched in 1960 as an irregular publication of the Hikosan Biological Laboratory of the Faculty of Agriculture, Kyushu University, and by the time publication indefinitely ceased in 2014, a total of 54 issues had been published. In the same year in which *Esakia* was launched, several lists of the insects recorded on Mt. Hikosan were published: “Enumeratio Insectorum Montis Hikosan. I. Lepidoptera” (Hikosan La-

boratorium Biologicum Universitatis Kyushuen-sis, 1957), “ibid., Supplement 1” (ibid., 1959) by H. Kuroko; “Enumeratio Arachnidarum Montis Hikosan. I. Araneina.” by Chiyoko Okuma. (ibid., 1960); “Enumeratio Insectorum Montis Hikosan. II. Coleoptera” (ibid., 1959) by M. Chujo et al.; and “Hikosan Biological Bibliography” (Hikosan Biological Laboratory, 1969) by Yasumatsu, Kimoto, and Kamiya.

Given that numerous stands of natural forest remain on Mt. Hikosan, and it is possible to conduct long-term research whilst staying at the Hikosan Biological Experimental Facility, it is perhaps not surprising that more than 50 new species of different insect taxa have been described from Mt. Hikosan as the type locality, including the coleopterans species *Agonum (Hikosanoagonum) ehikoensis* and *Pterostichus macrocephalus* described by A. Habu; the hemipteran species *Psylla yasumatsui* described by

Yorio Miyatake; the dipteran species *Dixa hikosana* described by Dr. Mitsuo Takahashi; and the lepidopteran species *Antispila hikosana* and *Adela luminaris* described by Hiroshi Kuroko and Toshiya Hirowatari, respectively.

In terms of social education, one of the stated management objectives at the time of establishment, environmental entomology and field training have been conducted annually since 2002, as part of the Faculty of Agriculture experience class program for high school students. In addition, since 2006, insect specimens and explanatory panels have been on permanent display at the Hana Station of the Hikosan Slope Car. Given that Mt. Hikosan was designated as a National Historic Site in February 2017, we are currently collaborating with Soeda Town to promote the utilization of this area, which has both historical and natural assets.