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Galápagos Vegetation Studies in
1970 and 1978

Syuzo ITOW

2009

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Field notes of Galápagos vegetation studies in 1970 and 1978

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P r e f a c e

I (Syuzo ITOW) conducted field studies of plant and vegetation from February to June, 1970, and from February to April, 1978, in the Galápagos Islands, Ecuador. Thereafter I also conducted brief supplemental fieldwork in 1981 and 1986. When in the field, I recorded individual plants and other aspects of vegetation, as well as topography and habitat conditions, using Japanese and Chinese characters. I also recorded scientific plant names in so far as I was able to determine them in field; but, otherwise, I gave temporary names for difficult-to-identify plants, collecting voucher specimens that could be properly identified at a later date.

Prior to the above-mentioned fieldwork, I had joined the 1964 Galápagos International Scientific Project (GISP) organized by the University of California Berkeley and had carried out a limited amount of fieldwork on some of the islands. The present notes comprises records of fieldwork that have not yet been published. Original descriptions in Japanese have been translated into English, and field identifications of plant names are confirmed, or converted to scientific names, according to voucher specimens, as described later.

Methods of vegetation studies in the field and subsequent data processing in the office follow the recommendations of Braun-Blanquet (1964). Mueller-Dombois & Ellenberg (1974) also describes the Braun-Blanquet method. Outlines are provided below. In the field, I recorded the altitude, slope direction, slope steepness, and percentage of lava on the ground surface of the sample site (or stand), average height and total cover percentage of each stratum (layer) of the vegetation, and dominance and sociability classes of every component plant species. In connection with vegetation sampling, I collected as many voucher specimens as possible of component plants for identification. Many of the vegetation records (relevés) are compiled into association tables in the present notes. (Also see Itow 1990 as example.)

On some of the islands and volcanoes, I recorded plants encountered along the trail, together with altitude and time, for the study of plant distribution and vegetation zonation. In those trips I also collected voucher specimens of plants.

Identifications of the collected plants were determined in the following manner.

Ira L. Wiggins, Professor of Botany at Stanford University, a member of the 1964 GISP, identified my specimens collected in the 1964 GISP and gave me the list of names prior to my second visit to the Galápagos in 1970. In 1970 again, I collected specimens as vouchers of component species in the vegetation sampling. Immediately after I finished fieldwork in July, I sent the duplicate set of the specimens from Guayaquil directly to Japan. Also I carried with me another set of specimens to the Dudley Herbarium of Stanford University. At that time, Ira L. Wiggins had finished his work and his manuscript for the publication of Wiggins & Porter's (1971) *Flora of the Galápagos Islands*. He kindly identified many of my new collections, of which he added a few words to his manuscript of the *Flora* (see Wiggins & Porter, 1971: p. 173-174). Also, he kindly gave me access to the identified herbaria on which he worked for the *Flora*. Working at the Dudley Herbarium, I finished identification of my collections during three months from July to September, 1970. Since then my collections have been stored in the Dudley Herbarium, and were thereafter transferred to the Herbarium of the California Academy of Science (CAS). The identifications I made at the Dudley Herbarium of Stanford University were applied to the duplicate set of collections that had been sent to and stored in the Plant Ecology Lab of the Nagasaki University.

In addition, I determined the identity of specimens collected in 1978 by consulting Wiggins & Porter's (1971) *Flora of the Galápagos Islands*, which then had been published, as well as the identifications of my 1970 collections. In 1997 I donated all the herbaria of the 1970 and 1978 collections to the Makino Herbarium (MAK) of the Tokyo Metropolitan University and the duplicates to the Herbarium of the Kitakyushu Museum of Natural History (KMNH) (see Itow, 1997).

I have already published a limited number of papers (Itow 1971, 1988, 1990, 1992, 1995, 2003; Itow & Weber 1974, Itow & Mueller-Dombois 1988, Kitayama & Itow 1999). Those papers, excepting Itow 1990, give only integrated distributional or ecological aspects of selected plant species and vegetation zonation patterns, while the present

notes describe detailed species compositions of plant communities and plant distributions, that were source of data for the published papers.

Records, data and descriptions in the present notes are open to public use in any form. The recommended citation is “Itow, S. 2009. Field notes of Galápagos vegetation studies in 1970 and 1978. p. 1-113, NAOSITE (Nagasaki University’s Academic Output Site).”

The following information will help when reading the present notes that follow.

1. Descriptions in the field notes were simply translated into English in many cases, whereas others were compiled to association tables. Further in some case, I added comments and remarks to the original descriptions at the time of translation and compilation.
2. In the association tables, vegetation records (relevés) are given individual numbers such as 50304, which means Vegetation sample (relevé) no. 04 recorded on May 3, 1970, or as 78038, which means the sample recorded on page 38 in the 1978 field note. For further details see Itow (1997).
3. Records in Gothic type or underlined in the association tables, and asterisks (*) in the other lines, mean voucher specimens, which are listed in Itow (1997).
4. Figures 1 to 10 in Itow (1997) give the fieldwork routes on each of the islands. They are cited again here at the end of the field notes that follow. Figure 2 of Itow & Weber (1974) is also cited, to which some notes are added.

Acknowledgements

During the course of my vegetation studies on remote islands and uninhabited areas, I owe in earnest thanks for much logistic support to the Charles Darwin Research Station. The Galapagos National Park Service permitted me to perform collecting work and export the collected material. On field trips, many people were my companions, without whom I would not have conducted my fieldwork well. They include Tjitte de Vries, Daniel Weber, the late Robert Silverglid and Jacinto Gordillo in 1970; J. Gordillo, the late Arnaldo Tupiza and C. Carapucha in 1978; and the late Jonas E. Lawesson and Kunito Nehira in 1986. The late Dr. Ira L. Wiggins, Stanford

University, kindly identified specimens I collected on my field trips in 1964 and 1970, and permitted me access to sheets that had already been approved for publication in Wiggins & Porter's (1971) *Flora of the Galapagos Islands*. To those people and organizations, I send my sincere thanks.

References

- Braun-Blanquet, J. 1964. *Pflanzensoziologie*. 3Aufl. Springer.
- Itow, S. 1971. A study of vegetation in the Galápagos Islands. *Noticias de Galápagos* 17:10-13. (URI: <http://hdl.handle.net/10069/7368>)
- Itow, S. 1988. Species diversity of mainland- and island forests in the Pacific area. *Vegetatio* 77: 193-200. (URI: <http://hdl.handle.net/10069/7371>)
- Itow, S. 1990. Herbaceous and ericaceous communities in the highland of Santa Cruz, the Galápagos Islands. *Monog. Syst. Missouri Bot. Gard.* 32: 47-58. (URI: <http://hdl.handle.net/10069/7364>)
- Itow, S. 1992. Altitudinal change in plant endemism and species turn-over and diversity on Isla Santa Cruz, the Galápagos Islands. *Pacific Science*. 46(2): 251-268. (URI: <http://hdl.handle.net/10069/6479>)
- Itow, S. 1995. Phytogeography and ecology of *Scalesia* (Compositae) endemic to the Galapagos Islands. *Pacific Science* 49: 17-30. (URI: <http://hdl.handle.net/10069/6478>)
- Itow, S. 1997. List of plant specimens collected in the Galápagos Islands, Ecuador. *Bull. Fac. Liberal Arts (Nat Sci.)*, 38 (1): 53-144. (URI: <http://hdl.handle.net/10069/7359>)
- Itow, S. 2003. Zonation pattern, succession process and invasion by aliens in species-poor insular vegetation of the Galápagos Islands. *Global Environmental Research*, 7 (1) : 39-58. (URI: <http://hdl.handle.net/10069/7367>)
- Itow, S. & D. Mueller-Dombois 1988. Population structure, stand-level dieback and recovery of *Scalesia pedunculata* forest in the Galápagos Islands. *Ecological Research*, 3: 333-339. (URI: <http://hdl.handle.net/10069/7370>)
- Itow, S. & D. Weber 1974. Fens and bogs in the Galápagos Islands, Ecuador. *Hikobia*, 7 (1-2): 39-54. (URI: <http://hdl.handle.net/10069/7355>)
- Kitayama, K. & Syuzo Itow 1999. Aboveground biomass and soil nutrient pools of a

Scalesia pedunculata montane forest on Santa Cruz, Galápagos. *Ecological Research*, 14:405-408.

Mueller-Dombois, D. & H. Ellenberg 1974. *Aims and methods in vegetation ecology*. John Wiley & Sons. New York.

Wiggins, I. L. & D. M. Porter 1971. *Flora of the Galápagos Islands*. 998 pp. Stanford University Press.

まえがき

私(伊藤秀三)は、1970年2～6月、1978年2～4月に、ガラパゴス諸島において植生調査を行った。この冊子は、このときの調査記録のうち、まだ論文として公表していない部分の野帳記録を英訳してまとめたものである。この調査に先立ち、1964年にはカリフォルニア大学バークレー校の企画によるガラパゴス国際科学事業計画(Galapagos International Scientific Project、略称:1964 GISP)に参加し、1-2月に30日間ガラパゴスに滞在し、このときに行った植生調査の記録の一部も含めた。また1981年8月および1986年8月に行った補充調査の一部の記録も含めた。

現地での植生調査は、Braun-Blanquet (1964)の方法に従った。この方法は、のちに Mueller-Dombois & Ellengerg (1974)にも詳述されている。フィールドでは、調査地点の海拔高、傾斜の方位と傾斜角度、地表にしめる溶岩の被覆割合、群落の各階層(高木層、亜高木層、低木層、草本層)の平均的な高さと同被覆度を記録し、階層ごとに各種類の優占度と群度を目測し記録した。また着生植物も記録した。植物の種の同定のためになるべく多くの標本を採取し、事後の同定に備えた。

いくつかの島あるいは火山においては、登頂ルートに従って時間経過および海拔を記録し、それぞれの地点で観察した植物を記録し、またいくつかの植物標本を採集した。

採集品の種同定は下記のように行った。

1964年GISP調査時の採集品に関しては、すべてをStanford大学 I. L. Wiggins 教授に預けて同定を依頼した。その結果は、1970年の調査時には受け取っていた。1970年調査のあと、私は採集品を2つのセットに分け、1セットはエクアドル国ガヤキルから日本に船便で送り出し、もう1つのセットは1970年7月にStanford大学のDudley Herbarium に持参した。当時、I. L. Wiggins 教授は、翌年に出版する予定の I. L. Wiggins & D. M. Porter (1971) Flora of the Galapagos Islands. 998 pp. Stanford

University Press. の原稿を完成していた。教授は私が持ち込んだ標本のかなりの数を同定してくれた。その結果の一部は同書に加筆された(同書の173-174頁参照)。また同教授は、同書の執筆に当たって参照した同定済みの標本群の閲覧を私に許してくれた。教授の好意によって、私の1970年採集標本の同定はStanford 大学に滞在中、同年7月～9月に終わることが出来た。このときの私の標本はDudley Herbarium に収蔵され、のちにカリフォルニア科学アカデミーの標本室に移管されている。ガヤキルから日本に直接送った標本については、Stanford 大学での同定結果を同年11月の帰国後に長崎大学においてラベルに記入した。

1978年に採集した植物標本は、長崎大学に所蔵してあった1970年の同定済み標本と前掲の植物誌(Wiggins & Porter, 1971)を参照して私が同定した。これらの標本の同定結果はItow (1997) にまとめてある。標本は首都大学東京(東京都立大学)牧野標本館(MAK)と北九州市立自然史博物館(KMNH)に収蔵されている。

本冊子からのデータや文章などの引用は、いかなる目的であっても、またいかなる形でも自由である。事前の通知も必要ではない。引用の場合には、具体的なページを明記し、下記の形式を取られたい。

Itow, S. 2009. Field notes of Galapagos vegetation studies in 1970 and 1978. NAOSITE. (URI: <http://hdl.handle.net/10069/21987>)

本冊子は、以下に記述するやりかたで作られている。

1. 野帳のなかの記録は、島ごとに、群落ごとに、調査ルートごとに、適宜、まとめた。そのとき、日本語の記録文章を英語に翻訳し、またその時点でのコメントを書き加えた。

2. 群落ごとにまとめるに際しては、組成表を作成した。その際の植生記録は、1970年調査では「月日＋番号」(例:5月3日に行った4番目の植生調査は50304)、1978年調査では「78＋野帳頁番号」(例:78年野帳38頁記載のものは78038)とした。これらは、Itow (1997) に記述した植物標本番号と同一である。

3. 現地調査において採集し同定した植物標本は、次のように記述してある。群落組成表の中においては、優占度・群度の記録をゴシック体とした。その標本は、Itow (1997)の中において、植生記録番号に続いて2桁番号で表されている(例:50303-02、または78038-04)。植生調査と関連しない植物標本は、種名に*を付した。標本の多くは前記の標本番号で Itow (1997) の中に挙げてあるが、一部の標本は種の同定に使用したあとに廃棄した。

4. 調査ルートを示す地図は、Itow (1997) の掲載地図を再度掲載した。サンタクルス島の高地の調査地点は、Itow & Weber (1974)の地図を再度掲載し、調査地点の詳細な位置を書き加えた。

文 献

英文まえがきの末尾にリストした文献を参照されたい。