THE MAKING OF A REGIONAL FLORA

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Abstract: An account of the history of the preparation of the Okinawa Flora.

Users of published regional Floras may sometimes wonder how they came to be written and how the feat was accomplished. Of course no two Floras were ever born of the same circumstances, which indeed are rarely recorded. Here is the story of the antecedents and the preparation of a Flora of Okinawa and the Southern Ryukyus by Egbert H. Walker, Botanist Emeritus. It is appropriately included in a memorial volume honoring Dr. Charles E. DeVol, for Charles was one of the many who aided its preparation.

The story really began during World War II, although then no published Flora was contemplated. The author and Professor H. H. Bartlett of the University of Michigan developed an informal Serviceman's Collecting Program, encouraging the biologically minded Americans in the U.S. Armed Forces, which were scattered almost throughout the world, to collect plant and other biological specimens in their often idle time to add to the reference collections in U.S. Museums and other institutions. Besides adding to scientific reference collections this program successfully stimulated and maintained many participants' biological interest for future post-war activities. Through these servicemen, when Okinawa was occupied, contact was made and specimens were obtained from Okinawan botanists. These servicemen in Okinawa were unable to find any publications to satisfy their curiosity about the local flora and fauna. Indeed no real Flora of the area had ever been written in any language. But discovery was made of an elderly local resident, Sakakuya, who before the war had developed a herbarium of sorts and knew the plants well from long experience and contact with visiting Japanese botanists. He was therefore requested by the U.S. Army to prepare a Flora for use by these American biologists. After many vicissitudes of health and the lack of such material resources as paper and botanical reference works, and with the aid of his younger associates, Shinjun Tawada and Tetsuo Amano, a manuscript Florula Okinawensis was written and turned over to the U.S. naturalists. It was a tabular systematic list of the scientific names of seed plants and ferns with their Japanese and Okinawan names and with brief notes on distribution and uses. There was also a blank colum for adding the English names. It was useful, as far as any such checklist can be, and was eventually brought to Elmer D. Merrill, Director of the Arnold Arboretum of Harvard University. He referred it to the writer, who realized its potential usefulness in aiding further plant collecting, even though it was not documented by extant preserved plant specimens and had other limitations. Nearly two years were spent editing this, verifying some of its scientific names, and adding citations to scientific literature. A new manuscript was then typed, entitled a Flora of Okinawa by S. Sonohara, S. Tawada, and T. Amano, edited by E. H. Walker.

In 1951, because of his involvement with Okinawan botany, the writer became the first participant in a program of Scientific Investigation in the Ryukyu Islands (the SIRI Program), developed by the U.S. Civil Administration and the Pacific

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Science Board of the National Academy of Sciences in Washington. This was designed to increase the basic scientific information needed for developing economic programs, which it was hoped would increase the self-sufficiency of these islands. Hence, from June to September 1951, the writer botanized over the area from Okinawa Island to Yonaguni Island at the southern end of the Ryukyu archipelago. Besides dealing with various botanical problems, his major objective was to collect plant specimens that might eventually be used in writing a real Flora of Okinawa and the Southern Ryukyus, a need that was primary to many undertakings in biological and other fields. His constant companion was S. Tawada with T. Amano and S. Sonohara often joining the collecting trips. The manuscript Flora of Okinawa, which he had prepared, was such a useful tool in this work that after his return to Washington, the U. S. Civil Administration in the Ryukyus and the Ryukyu Forestry Bureau mimeographed, mainly for local use, 200 copies of this Flora of Okinawa by E. H. Walker.

Eventually the stock of this amplified checklist was exhausted and its editor was asked to submit material for a second edition. This he declined to do, because of its many deficiencies, notably its lack of any foundation in documenting specimens and because of its many unverifiable reports. Instead he began preparing a new checklist founded in part on the considerable herbarium specimens which had by then been accumulated. No descriptions or keys were to be included. When about a third had been completed, two American botanists visiting Okinawa reported that this would still be little use to the Okinawans, a fact its author fully realized, but was then unable to correct. Hence, this third undertaking was abandoned and a fourth project was initiated designed to include keys and many more useful notes. However, even before the ferns and ferns allies had been completed, circumstances required that this project be suspended in favor of another undertaking.

Finally, on February, 1, 1961, in his retirement after 29 years with the Department of Botany in the Smithsonian Institution, the writer began to give all of his time to preparing a full Flora of Okinawa and the Southern Ryukyu Islands, replete with descriptions and based as far as possible on herbarium specimens. No efforts would be spared to make this serve the needs of the Okinawan people and the many westerners there, especially the Americans with the U. S. Civil Administration. It would especially supply the world's need for a full flora of this region.

This project was funded by two grants from the U. S. National Science Foundation to the Pacific Science Board in Washington, which supported this project in effect as a continuation of the SIRI Program. In the beginning, working space was provided for the author at the Herbarium of the National Arboretum of the U. S. Department of Agriculture, later at the U. S. National Herbarium at the Smithsonian Institution. As many herbarium specimens as possible were the first and primary requirement for this undertaking. The already sizeable collections at the Smithsonian Institution and the National Arboretum were augmented by borrowing from or referring to some 20 private or institutional herbaria in Okinawa, Taiwan, Japan, the United States, Canada, and Europe. Many specimens were obtained by exchanging duplicates of the author's 1951 collections.

Although these collections document most of the species to be found in the area, there were many other species reported to occur there that were not so documented. It was therefore necessary to find and examine all such records. Extensive literature was accumulated and evaluated. The two most extensive publications were the Enumeratio Trachyeophytarum Ryukyu Insularum, by Genkei

Figure 1. *Erythina variegata*

HABIT	Tree to 20 m high	Shape	5-toothed at apex
BRANCHES	thin barked gray prickles small or minute	Size	2.5–3 cm
STIPULES	lanceolate 1 cm long, stipuls glandular form	Surface	subglabrous
LEAVES: Kind	pinnate trifoliolate	COROLLA or PETALS	standard erect at anthesis
Petiole	10–15 cm long without prickles, petiolules 75–10 mm long	Shape	
Shape	leaflets broadly ovate or rhombic-ovate, broader than long	Size	standard 5–6 cm long, 2.5 cm wide, wings and keel subequal, ½ as long as calyx
Size	leaves 20–30 cm long leaflets 10–15 cm long	Surface	
Apex	leaflet rounded and cuspidate	STAMENS	prominent
Base	leaflet truncate or rounded	Anther	
Margin		Filament	
Surface	leaflets puberulous or glabrous, brilliant green	PISTIL	
Veins		Stigma	
INFL: Kind	terminal racemes, densely flowered	Style	
Size	15 cm long	Ovary	
Peduncle	spreading, 7–10 cm long	FRUITT: Kind	pod thick
BRACTS: Shape	fls. bibracteolate at base	Shape	torulose
Size		Size	up to 30 cm long
FLOWERS: Size		Surface	
Pedicel	6 mm long	SEEDS	dark carmine, reniform, 1.5 cm long, 1 mm wide
Color	deep red (corolla)	MISCELLANEOUS	Cultivated and escaped; native from tropical Asia to Polynesia. National Tree of the Ryukyus.
CALYX or SEPALS	spathaceous with oblique mouth, splitting down back to base, minutely		

Masamune, issued in parts from 1951 to 1964, whose extensive collections were deposited in Taipei, Taiwan, and the three editions of the Flora of Okinawa by Sumih ko Hatusima and Tetsuo Amani, 1958, 1959, and 1967. This latter was initially prepared to serve in effect as the revised edition of the 1952 mimeographed Flora of Okinawa by Sonohara, Tawada, and Amano, edited by Walker, mentioned above as not having been prepared.

After all specimens had been accumulated the next step was to properly identify and annotate them, usually through comparison with other specimens in the large reference collections in the U. S. Nationl Herbarium and often elsewhere. Of course many scientific publications were used in this study. Next came the task of preparing descriptions of the species, genera, and families represented. These were first outlined on special blank forms (see figure 1), working primarily with the identified specimens. By first using these forms, items previously overlooked were readily revealed, and the subsequent drawing up of unified coordinated final descrip-

tions was much facilitated. These having been prepared, the documenting specimens were then cited, the synonymy and literature citations were prepared, and keys to families, genera, and species were devised. Reported but as yet undocumented species were variously treated in accordance with the probable validity of the report. Ideally their occurrence in the area should have been verified by further collecting, but this was not feasible. Doubts were freely expressed so that future critical workers could review and evaluate the data given. The admonition "express your convictions, keep your doubts to yourself" was freely violated.

The author of a regional Flora can not be a specialist on all taxonmic groups, nor can he prepare all the needed critical revisions. He must therefore rely on published treatments and specialists for assistance, as did the author of this Flora. At least 69 specialists generously responded to his requests for aid. Some of their contributions were full treatments of their respective taxonomic groups. Much invaluable advice was given and gratefully received. Indeed because of this assistance this work at least approaches the observation of a prominent botanist that "the day of the one-man Flora is ended." Charles E DeVol was one of many who aided the preparation of the treatment of the Pteridophytes, both directly and through his many publications. He also aided the borrowing of many specimens from the National Taiwan University herbarium. He was very generous in answering the author's many questions by examining other specimens in the valuable collections in Taipei. In the preparation of this Flora many species names previously considered valid were reduced to synonymy, a very valuable feature. Very few new species have been described, the author usually preferring to await the accumulation of more material that will aid subsequent botanists to determine the limits of variation in the species concepts.

The flora of a region is commonly considered to consist of the native plants plus the introduced speccies which are definitely established there. Many such introductions are found in this area but the present status of many other introductions is not known. Hence the introduced and cultivated species are treated here more thoroughly than in most Floras. Who can tell which ones now known only in cultivation may escape and become established in this favorable subtropical climate?

Because this Flora in English will presumably be used extensively in Japanese-speaking Okinawa, the glossary of technical terms gives also the eqivalents in Japanese. Since the meanings of the scientific plant names are an intriguing subject, these are recorded in this Flora except for those readily found by referring to the glossary or those of geographic origin readily recognized. For satisfying the curiosity of westerners the Japanese plant names are translated or explained, a valuable and distinctive feature of this Flora, kindly provided for the most part by Professor Takasi Tuyama of Ochanomizu University in Tokyo. The Okinawan plant names derived from the original Florula Okinawensis are included, but could not be similarly translated. English names are added for the few plants so endowed, mostly those introduced or cultivated of exotic origin.

During the 12 years required for the preparation of this Flora, the manuscript grew to nearly 3300 pages plus about 200 text figures, estimated to make a book of about 1100 pages. The two National Science Foundation grants supporting its preparation ran out about two and a half years before its completion. Funds for its publication have been sought from many sources but so far without success. The search at the present time is continuing. It is greatly regretted that its future publication can not be announced with this account, thus assuring Charles E. DeVol

and the many others who have so generously contributed to this Flora that their efforts will bring benefits to the Okinawans and to scientists elsewhere who need to know the plants of this area. It is, however, "dedicated to the present and future botanists in this area with the hope that it will enrich the appreciation and understanding of their plants and that it will stimulate the collecting and publication of further information concerning them."