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THE RIJKSHERBARIUM AND ITS CONTRIBUTION TO PHYCOLOGY

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In modern handbooks the development of plant systematics is given as occurring in four overlapping phases: the pioneer (or exploratory) phase, the consolidation phase, the biosystematic phase, and the encyclopaedic phase. In systematic phycology research is still largely in the pioneer phase, with scattered attempts to reach the second, third, or even fourth phase. In many cases in phycology the biosystematic phase has to precede the consolidation phase. Knowledge of algae (growing mainly in marine or freshwater environments, but also occurring in soils or snow and on rocks or trees) is quite scanty in most parts of the world, and even for taxa that are supposed to be well known, the information is often but fragmentary. The encyclopaedic phase is for most groups of algae very remote and probably it will never be attained.

Research on algae connected with the Rijksherbarium reflects the phases of systematic phycology.

In pre-linnean times A. van Royen named several species of algae in his Florae Leydensis Prodromus (1740) and several of his Latin phrase-names were used by Linnaeus in his Species Plantarum. The specimens of the Van Royen herbarium are still present in the collections of the Rijksherbarium. In the next century F. T. Kützing described many new species of algae. Like many of his contemporaries he was not aware of the complex polymorphism of many algae, and as a result he described almost any morphological variant as a new taxon. This typological approach was used by most phycologists of that time, also by W. F. R. Suringar, who was director of the Rijksherbarium from 1871 to 1898. Suringar was a wealthy man, and when the Rijksherbarium had no means of purchasing algal collections which were on offer, he bought them privately. He did this with the precious herbarium of Kützing, which contained nearly 30,000 specimens. Inasmuch as there was a rather intensive mutual contact between Kützing and his contemporaries his herbarium comprises several algae originating from collections of e.g., Lyngbye, Meneghini, Greville, J. G. Agardh (Europe), Sonder, Binder & Von Mueller (Australia), Hooker (North-America), and Von Humboldt (South-America). Suringar himself was interested in the sea weeds of Japan, which is expressed in several publications. In his herbarium marine algae from Japan (sent by Gratama & Tanaka) are incorporated together with notes on their use and with water-colours, which are the originals of the illustrations of his Algae Japonicae (1870). A number of algae from the Netherlands are also present in the Suringar herbarium, for the large part collected by Van den Bosch. After his death his collection passed into the hands of Mrs. A. A. Weber-Van Bosse (1852 – 1942). She also mainly used the typo-

logical-hierarchic method, as shown in her 'Monographie des Caulerpes', published in 1898. During her research in the Malay Archipelago in 1899 and 1900 (resulting in her Opus Magnum: 'Liste des algues de la Siboga expedition', 1928) she became aware of the large variability in the algae. She sometimes regretted only having the possibility of studying the morphology of the algae. She would have liked to experiment with them and to study their reproduction in their natural habitat. Over 50 years she built up an extensive herbarium collection, famous among phycologists all over the world. The first enlargement of her collection came during the already-mentioned Siboga-expedition. In collaboration with the specialists A. & E. S. Gepp (*Codiaceae*), Foslie (*Corallinaceae*), Barton (*Halimeda*), and Reinbold (*Sargassum*) she elaborated this collection over the next 25 years. Numerous new species and many new genera were described. Her herbarium was also enriched by many important gifts, such as a number of *Cystoseira* specimens from Sauvageau, algae from the French coasts from Bornet and Thuret, Californian and other algae from Setchell and Gardner, etc. Besides these minor acquisitions and the large collection of Suringar (including that of Kützing), Weber-Van Bosse also succeeded in becoming the owner of the important collection of Hauck and of a part of the herbarium Lenormand (see also Koster 1936, 1948). In 1934 she presented her collection of algae to the Rijksherbarium, making the condition that a special curator for this collection be appointed. This post was offered to and accepted by Miss J. Th. Koster. In the course of many years she rearranged the Rijksherbarium algal collection in such a way that it became very accessible. Type-specimens in particular can now mostly be found easily by means of extensive indexes. She also published taxonomic studies on Cyanophyta and several green algae (Koster 1941, 1955, 1966), and became very much aware of the great variability of especially the Cyanophyta. She was an enthusiastic supporter of Drouet's controversial revisions of Cyanophyta, in which he reduced the total number of accepted taxa from several thousands to less than a hundred.

From 1938 to 1942 J. S. Zaneveld was on the staff of the Rijksherbarium as an assistant for the mycological collection. He graduated, however, on a phycological thesis (1940).

In 1960, C. van den Hoek was incorporated in the scientific staff of the Rijksherbarium. His well-known revision of the European species of the genus *Cladophora* (1963) was based on studies of living specimens in natural surroundings, uni-algal cultures, and herbarium collections. During a stay at the laboratory of Von Stosch in Giessen (B.R.D.) he improved his knowledge of specialized methods of culture and caryology, which he used in his later studies on life-histories (Van den Hoek & Flinterman, 1968). He was also much interested in phyto-geography and phyto-sociology of algae (Van den Hoek 1960, Van den Hoek & Donze 1966, 1967). After his appointment as professor of systematic botany at the university of Groningen he and his staff continued their research in these directions.

In 1966 Van den Hoek was succeeded by W. F. Prud'homme van Reine, who started monographic studies on *Sphacelariales* (Phaeophyceae), focussed on observations on living specimens from nature as well as dried specimens from European herbaria. In culture rooms the morphology of the species is studied as well as life-histories. Ultrastructural studies, numerical taxonomic methods, and phyto-geographic data are also involved (e.g. Prud'homme van Reine 1974, 1978). This sometimes reaches the biosystematic phase, the consolidation phase is, however, still the main purpose. In collaboration with several students he made observations

about the morphology, taxonomy, geography, and ecology of the red algae *Catenella caespitosa* and *Bostrychia scorpioides*.

After the retirement of Miss Koster in 1967, C. den Hartog was appointed in her place. He was a student of prof. J. Heimans at the university of Amsterdam, and graduated in 1959 on a study of the epilithic algal communities occurring along the coast of the Netherlands. In 1963 he was appointed as a specialist of phanerogamic water plants at the Rijksherbarium, and in 1967 he shifted to the department of phycology. Den Hartog applied himself mainly to studies on algae from brackish waters and salt marshes (Den Hartog 1967, 1971, 1973). Several students were involved in these studies, which resulted in a considerable number of reports (e.g. Geesink 1973, Polderman & Prud'homme van Reine 1973, Polderman 1974). When he became professor of aquatic ecology at the Catholic University in Nijmegen in 1973 he still had the opportunity of being involved with phycology. In collaboration with him and with his staff member P. J. G. Polderman the ecological investigations on salt marsh algae have been continued at the Rijksherbarium for several years resulting in a considerable number of student reports.

Den Hartog was succeeded by G. M. Lokhorst, who took his doctor's degree in 1974 on the thesis 'Taxonomic studies on the freshwater species of *Ulothrix* in the Netherlands' at the Free University of Amsterdam. Lokhorst continued to study at the Rijksherbarium the brackish-water and marine *Ulothrix* species of Western Europe. In his monograph (1978) five species were extensively treated. These investigations were carried out on living specimens in their natural habital, uni-algal cultures, and herbarium collections. In these studies the life-history, growth in culture, cross-breeding, ultrastructure, and phyto-geography were involved. So this monograph is more or less in the fourth or encyclopaedic phase, but several aspects like cytology are still missing.

Plans and prospects

Apart from the continuation of taxonomic and autecological research on *Sphacelariales*, *Ulotrichales*, *Chaetophorales*, and salt-marsh Rhodophyceae, attention will be given to phyto-geographical research in the southeastern part of the North Atlantic Ocean. This so-called CANCAP-project started in 1977 and was made possible by joining a marine biogeographic expedition to the Canary Islands. In the years to come such expeditions will be continued.

REFERENCES

GEESINK, R. 1973. Experimental investigations on marine and freshwater Bangia (Rhodophyta) from the Netherlands. J. exp. mar. Biol. Ecol. 11: 239–247.

HARTOG, C. DEN, 1967. Brackish water as an environment for algae. Blumea 15: 31–43.

—— 1971. The border environment between the sea and fresh water, with special reference to the estuary. Vie et Milieu, Suppl. 22: 739–751.

—— 1973. Preliminary survey of the algal vegetation of salt-marshes, a littoral border environment. Hydrobiol. Bull. 7: 3–14.

HOEK, C. VAN DEN, 1960. Groupements d'algues des étangs saumâtres méditerranéens de la côte française. Vie et Milieu 11: 390–412.

—— 1963. Revision of the European species of Cladophora. Thesis, State University, Leiden.

—— & M. DONZE. 1966. The algal vegetation of the rocky Côte Basque (SW France). Bull. Cent. Etud. Rech. sci., Biarritz, 6: 289–319.

—— & —— 1967. Algal phytogeography of the European Atlantic coasts. Blumea 15: 63–89.

—— & A. FLINTERMAN. 1968. The life-history of Sphacelaria furcigera Kütz. (Phaeophyceae). Blumea 16: 193 – 242.
KOSTER, J. TH. 1936. Some preliminary notes on the algae collection Weber-Van Bosse. Blumea 2: 229 – 234.
—— 1941. Quelques observations sur les Bryopsis du Golfe de Naples. Blumea 4: 225 – 258.
—— 1948. De wierenverzameling van het Rijksherbarium te Leiden. Biol. Jb. Dodonaea 15: 54 – 68.
—— 1955. The genus Rhizoclonium Kütz. in the Netherlands. Pubbl. Staz. Zool. Napoli 27: 335 – 357.
—— 1966. Some remarks on the taxonomy of Cyanophyceae. Acta Bot. Neerl. 15: 57 – 62.
LOKHORST, G. M. 1974. Taxonomic studies on the freshwater species of Ulothrix in the Netherlands. Thesis, Free University, Amsterdam.
—— 1978. Taxonomic studies on the marine and brackish-water species of Ulothrix (Ulotrichales, Chlorophyceae) in Western Europe. Blumea 24: 191 – 299.
POLDERMAN, P. J. G. 1974. The algae of saline areas near Vlissingen (the Netherlands). Acta Bot. Neerl. 23: 65 – 79.
—— & W. F. PRUD'HOMME VAN REINE. 1973. Chrysomeris ramosa (Chrysophyceae) in Denmark and in the Netherlands. Acta Bot. Neerl. 22: 81 – 91.
PRUD'HOMME VAN REINE, W. F. 1974. Geographic distribution of European Sphacelaria-species in the world (Phaeophyceae, Spacelariales). Soc. Phycol. de France, Bull. 19: 171 – 177.
—— 1978. Criteria used in systematic studies in the Sphacelariales. In: D. E. G. Irvine & J. H. Price 'Modern Approaches to the Taxonomy of Red and Brown Algae', pp. 301 – 323, Academic Press, London and New York.
ROYEN, A. VAN, 1740. Flora Leydensis Prodromus. Leiden.
SURINGAR, W. F. R. 1870. Algae Japonicae. Haarlem.
WEBER-VAN BOSSE, A. A. 1898. Monographie des Caulerpes. Ann. Jard. Bot. Btzg. 15: 243 – 401.
—— 1928. Liste des algues du Siboga. Brill, Leiden.
ZANEVELD, J. S. 1940. The Charophyta of Malaysia and adjacent countries. Blumea 4: 1 – 223.