

**TWO NEW SPECIES OF THE GENUS POTAMOGETON L.
(POTAMOGETONACEAE) FROM PAPUA NEW GUINEA AND THE
SOLOMON ISLANDS**

G. WIEGLEB

Fachbereich Biologie, Universität Oldenburg, Postfach 2503, D-2900 Oldenburg, Germany¹

SUMMARY

Two new species of the genus *Potamogeton*, *P. papuanicus* and *P. solomonensis*, are described. The systematic position of the species within the genus is discussed. *Potamogeton papuanicus* belongs either to section *Nodosi* or section *Colorati*, while *P. solomonensis* is related to section *Sclerocarp*.

INTRODUCTION

Leach & Osborne (1985) reported the occurrence of "*Potamogeton malaianus* Miquel" from Papua New Guinea. They presented a description, a list of specimens, and a figure. In the course of a taxonomic revision of *Potamogeton wrightii* Morong (= *P. malaianus* auct.; Wiegleb, 1990c) also New Guinea specimens were studied. It soon became obvious, that "*Potamogeton malaianus*" of Leach & Osborne is a mixture of different forms. Thus, a closer examination of *Potamogeton* specimens from New Guinea and the surrounding areas became necessary, which was carried out in the framework of the preparation of a revision for Flora Malesiana.

The study resulted in the discovery of two new species of the genus *Potamogeton* L., of which abundant herbarium material is available. Moreover, several specimens were seen which almost certainly do not belong to a described species, but in those cases the material was too fragmentary for a formal description. The number of *Potamogeton* taxa to be recognized in New Guinea and surrounding areas is surely higher than assumed by Leach & Osborne (1985). New collections are urgently needed.

TAXONOMIC DESCRIPTIONS

***Potamogeton papuanicus* Wiegleb, *spec. nov.* – Fig. 1**

Potamogeton malaianus auct. non Miq.: Osborne & Leach, Freshwater Pl. New Guinea (1985) 226, fig. 51, p. p.

Planta perennis, herbacea, crescentia submersa aquis dulcibus. Folia submersa vel natantia, folia submersa alterna vel subopposita, breve petiolata, folia natantia subopposita, longe petiolata; inflo-

1) Present address: IBL (Consulting Biologists and Engineers), Unterm Berg 39, D-2900 Oldenburg, Germany.

rescentia terminalis vel e axillis foliorum submersorum et natantium; pedunculi elongati, crassi; fructus ignotus. — Holotypus: Sirunki, Western Highlands, Lake Ivivi, south side of lake, 8400 ft [approx. 2700 m], *Walker ANU 650* (CANB; isotypes in A, K, L, LAE).

Herbaceous perennial plant, fresh-water aquatic, with both floating and submersed leaves. *Stems* at least 1 m long and 1.2 to 1.8 mm wide, unbranched or with short axillary leafy shoots, internodes short at the base, upwards up to 100 mm long. *Submersed leaves* oblong lanceolate to lanceolate, 105 to 160 mm long, 12 to 28 mm wide, leaf base cuneate to slightly cordate or sagittate, margin entire, petioles (2–)8–45 mm long. *Floating leaves* elliptic to oblong lanceolate with rounded tip, 65 to 115 mm long, 18 to 27 mm wide, petioles 115 to 185 mm long. The plants produce short-petioled submersed leaves at the base, followed by longer-petioled submersed leaves. In the flowering region there are floating leaves, followed again by submersed leaves with varying petiole length. Stipules 60 mm long, acute. *Inflorescence* terminal, spikes in the axils of both submersed and floating subopposite leaves, with 1 to 4 spikes per vertical shoot. Peduncles 130 to 180 mm long, 1.8 to 3.2 mm wide, wider than the stem, approximately as long as the petioles of the adjacent floating leaves. *Spike* 21 to 28 mm long, not elongating in flower, flowers dense in 12 to 14 whorls. Number of carpels 4. Ripe fruits not seen.

Anatomy of the stem: The anatomy of the stem is variable. The stele ranges from a typical eight bundles type with 2 phloema to a prototype construction with 3 median and 4 lateral bundles. The sclerenchyma are present as caps (on the lateral bundles) and sheaths (around the median bundles), similar to *P. nodosus*. The endodermis seems to be of the O-type. Neither interlacunar bundles nor subepidermal bundles are present. A pseudo-hypodermis is not developed.



Fig. 1. *Potamogeton papuanicus* Wiegleb (*Walker ANU 650*). The arrows indicate the diagnostic characters (see text).

Notes – 1. So far the plant has been exclusively found in a restricted area (Enga Province, former part of Wester Highlands Province) in the central part of Papua New Guinea. The different place names (Ipea, Iviva, Ivivi, Sirunki) found on the labels and in Leach & Osborne (1985) refer to the same lake. Specimens from West Papua, New Caledonia, and Timor show characters related to this species, but cannot be assigned here beyond doubt.

2. *Potamogeton papuanicus* shows a high degree of phenotypic plasticity. In the typical state, however, the species can be easily recognized by a number of characters, the combination of which is unique:

- the long, straight peduncles, which are remarkably thicker than the stem, but not thickened at the apex;
- the sequence of leaves with submersed leaves, very long-petioled floating leaves, and again submersed leaves;
- the cordate or sagittate leaf base that is developed in some submersed leaves.

These differential characters can be observed in the holotype.

3. Leach & Osborne (1985) included specimens of *P. papuanicus* in *P. malaianus* auct. (= *P. wrightii* Morong) which belongs to the subsection *Lucentes* (Hagstroem, 1916). A character of subsect. *Lucentes* is the thick peduncle. However, no other character of this subsection can be observed. The leaf margins are smooth and the stem anatomy is completely different. *Potamogeton papuanicus* belongs either to section *Nodosi* or section *Colorati*. The stem anatomy is most similar to *P. nodosus* and *P. distinctus*, both belonging to sect. *Nodosi* (Wiegleb, 1988, 1990b). But also species of sect. *Colorati* have to be considered, as plants of this group need not necessarily have subepidermal bundles (Hagstroem, 1916; Wiegleb, 1990a). The growth habit of *P. papuanicus* with the continuous growth of the vertical shoot after flowering is regularly observed in *P. polygonifolius* and *P. coloratus* (Roweck et al., 1986; Brux et al., 1991), but rarely in *P. nodosus*. The general habit of *P. papuanicus* is most similar to deep water forms of *P. coloratus*, except for the long-petioled floating leaves. A final decision can only be made after an investigation of ripe fruits, which have not been seen so far, and chromosome number.

Further specimens seen:

PAPUA NEW GUINEA. 24 miles from Wabag, Wabag-Laiagam road, Western Highlands Prov., margin of Lake Iviva and river leading from lake, alt. 9000 ft [approx. 2800 m], *Womersley NGF 15246* (A, BM, BRI, CANB, L); Lake Sirunki, Enga Prov., alt. 2578 m, *Kapush MK 2* (UPNG); near beach, *Mungkaje AJM 1* (UPNG); *Leach & Osborne 7583* (UPNG).

Potamogeton solomonensis Wiegleb, *spec. nov.* – Fig. 2

Herba perennis rhizomate repenti, crescentia submersa aquis dulcibus. Folia submersa vel natantia; folia submersa alterna, longe lanceolata, falcata, margine integra, breve petiolata; folia natantia oblonge-lanceolata, subopposita, longiori petiolata; stipula acuta; inflorescentia lateralis foliis submersis opposita vel terminalis e axillis foliorum submersorum et natantium; pedunculi non elongati; floribus 4-carpellatis; fructus ignotus. — Holotypus: Solomons, Guadalcanal Island, Bonega River, 8 miles west of Honiara, *Gray 10* (K; isotypus CANB, L, SING).

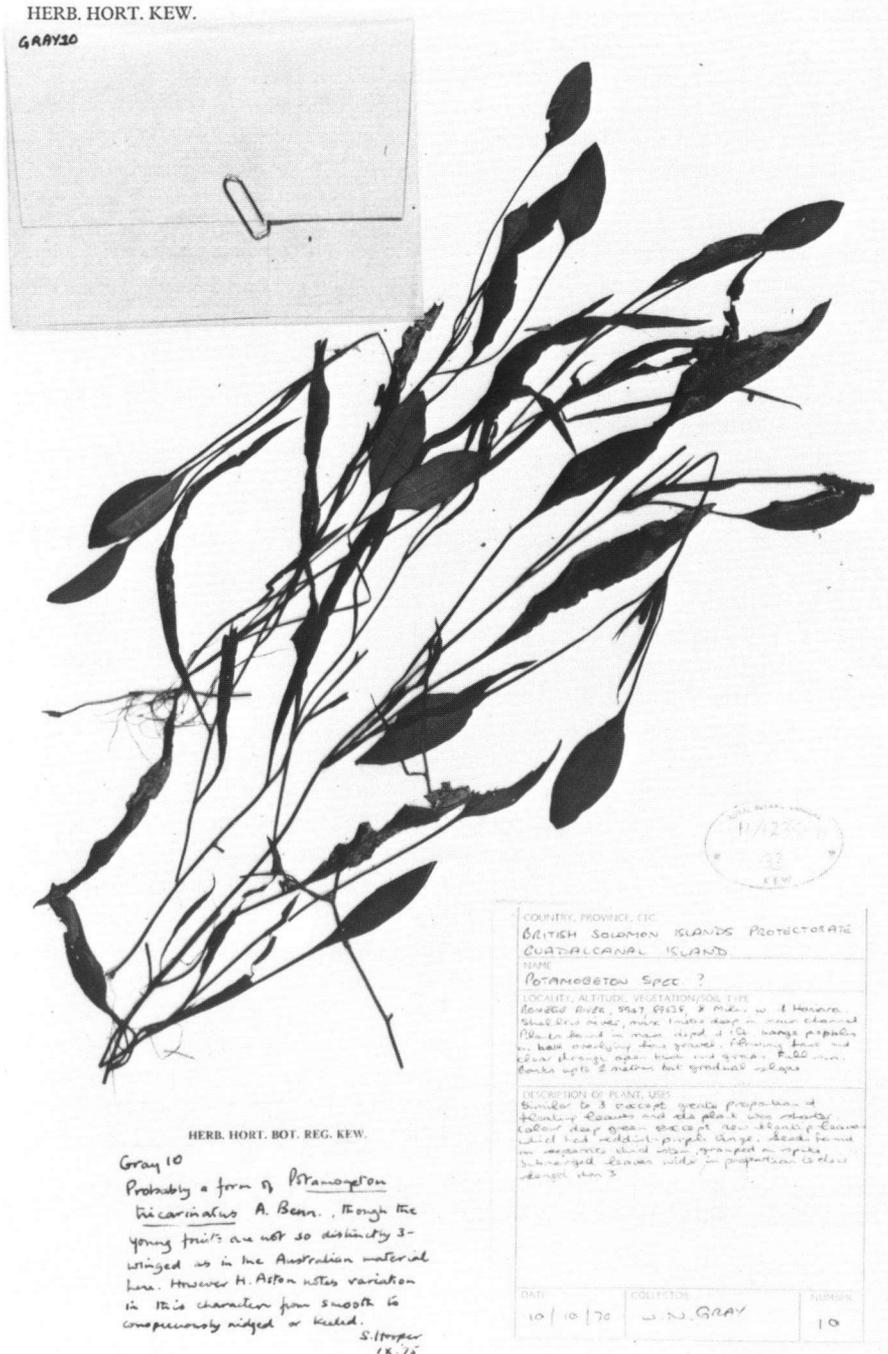


Fig. 2. *Potamogeton solomonensis* Wiegleb (Gray 10).

Herbaceous perennial plant, freshwater aquatic, with both floating and submersed leaves. *Stem* up to 0.5 m long, unbranched. Horizontal shoots stoloniferous, whitish, branched. Stems at least 0.5 m long and c. 1 mm wide, unbranched, internodes short at the base, upwards up to 40 mm long. *Submersed leaves* lanceolate to ribbon-like, partly falcate, 80–135(–150) mm long, 5–8(–15) mm wide, tips acute, margins entire, petioles (0–)20–50 mm long. *Floating leaves*, if present, oblong-lanceolate, 35–45 mm long, 12–18 mm wide, with 9 main longitudinal nerves, tips obtuse, petioles 40–80 mm long. Stipules 2–3 cm long, persistent, acute. *Inflorescence* terminal or lateral, spikes dimorphic. Peduncles of apical spikes in the axils of subopposite leaves, c. 50 mm long, spikes 10–15 mm long, dense, c. 17 flowers in 6–8 whorls. Peduncles of lateral spikes subopposite to submersed leaves, 10 mm long, spike 6 mm long, often undeveloped. Number of carpels 4. Ripe fruits not seen.

Anatomy of the stem: Stele of reduced eight bundles type or four bundles type. Endodermis of O-type. Interlacunar and subepidermal bundles absent, pseudohypodermis absent or 1-layered.

Notes – 1. The species seems to be endemic in the Solomon Islands (Guadalcanal, New Georgia, San Cristobal). It has been found mainly in shallow rivers of a coastal floodplain, up to 1m depth.

2. The taxonomic affinities of the new species are not quite clear, as ripe fruits and chromosome number are unknown. In the herbaria the plant was confused with *P. tricarinatus* F. Muell. & A. Bennett, a confusion derived from the general confusion regarding *P. tricarinatus* and *P. cheesemanii* in Australia (see figure 114 in Aston, 1977, which shows typical *P. cheesemanii* under the name *P. tricarinatus*). In general habit and stem anatomy the plant from the Solomon Islands resembles indeed *P. cheesemanii* A. Bennett. It differs from *P. cheesemanii* by the petiolate and more acute submersed leaves. It can be provisionally assigned to subsection *Sclerocarpi* (Hagstroem, 1916) or the *P. cheesemanii* group (Wiegleb, 1988)

Further specimens seen:

SOLOMONS. Guadalcanal Island, White River, approx. 2.5 miles west of Honiara, *Gray 3, 4, 5* (all in K), *Gray BSIP 14786* (K, SING); Mbonehe River, *van Zanten BSIP 13251* (K, SING). New Georgia, stream at Hill Falls, *Waterhouse 65* (K, L). San Cristobal: the specimen from Hotabila River, Maru Bay, *Gafui et al. BSIP 12850* (K) may also belong to this species, but has a slightly different shape of the floating leaves.

ACKNOWLEDGEMENTS

I wish to thank G. Lampen (Oldenburg) for the technical assistance with the stem anatomical studies, J. Birkigt (Oldenburg) for the morphometrical measurements on herbarium specimens, and Dr. G.J. Leach (Palmerston, Australia) for providing information on the exact geographical origin of some specimens.

REFERENCES

- Aston, H.I. 1977. Aquatic plants of Australia. Melbourne Univ. Press.
 Brux, H., & G. Wiegleb. 1991. Comparison of life history characters of broad-leaved species of the genus *Potamogeton* L. I. General characterization of morphology and reproductive strategies. *Aquat. Bot.* 39: 131–146.

- Hagstroem, J.O. 1916. Critical researches on the Potamogetons. Kungl. Svenska Vetensk. Handl. 55 (5): 1–281. Stockholm.
- Leach, G.J., & P.L. Osborne. 1985. Freshwater plants of Papua New Guinea. Port Moresby. 254 pp.
- Roweck, H., K. Weiss & A. Kohler. 1986. Zur Verbreitung und Biologie von *Potamogeton coloratus* und *P. polygonifolius* in Bayern und Baden-Württemberg. Ber. Bayer. Bot. Ges. 57: 17–52.
- Wiegleb, G. 1988. Notes on pondweeds – an outline of a monographical treatment of the genus *Potamogeton* L. Feddes Repert. 99: 249–266.
- Wiegleb, G. 1990a. The importance of stem anatomical characters for the systematics of the genus *Potamogeton* L. Flora 184: 197–208.
- Wiegleb, G. 1990b. A redescription of *Potamogeton distinctus* A. Bennett, incl remarks on the structure of the *P. nodosus* group. Pl. Syst. Evol. 169: 245–259.
- Wiegleb, G. 1990c. A redescription of *Potamogeton wrightii* Morong. Pl. Syst. Evol. 170: 53–70.