CONTRIBUTIONS TO PAPUASIAN BOTANY III. THREE NEW SPECIES OF PITTOSPORUM (PITTOSPORACEAE) FROM NEW GUINEA

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Pittosporum pumilum Schodde, *sp. nov.* — **Fig. 1.**

Frutex circa 1 m altus affinis *P. sinuato* Bl., differt pumilione, ramulis dense ferrugineis arachnoideo-tomentosis, foliis ± anguste obovato-spathulatis (1½—)2—4(—4½) cm longis tenuiter coriaceis integris, et fructibus semper solitariis ellipsoideo-rostellatis bi- et tenui-valvibus. Flores ignoti.

Typus: *C. D. Sayers no. T.G.H. 12571*, Mt. Shungol, 5 miles SW. of Wagau, New Guinea, 17-12-1963; holotypus: A.

Slender open-branched shrub *ca.* 1 m high. *Stems* slender, below with rather smooth, striate, fawn-grey bark, ultimately with a rather dense, ferrugineous, arachnoid pubescence and scattered caducous cataphylls. *Leaves* mostly in pseudo-verticils, the internodes (1—)2½—5 cm; blade ± narrow obovate-spathulate (1½—)2—4(—4½) × (½—)1—1½(—2) cm, thinly coriaceous, glabrous; the midrib impressed on the upper face and 5—10 pairs of rather close parallel nerves running obliquely to near the margin and elevated with the reticulum on both faces; the apex broadly rounded, the margin entire and slightly revolute, and the base cuneately narrowed into a petiole 2—4 mm long ± hairy below. *Flowers* unknown. *Fruit* solitary, (pseudo-)terminal, later subterminal, on a rather stout, early ferrugineous arachnoid puberulous, later glabrescent peduncle 5—8 mm long. Capsule ellipsoidal, acuminate when young becoming shortly rostellate and stipitate and 2½—3 × 1½ cm when mature, of two thin coriaceous valves with planate mucilage-lined margins when dehiscing; outer valve walls dull olive, rugulose, and ferrugineous arachnoid puberulous when young, becoming red in life and drying dark orange, coarsely bullato-rugose, and glabrescent when mature; inner valve walls ± muriculate, without conspicuous transverse ribs, and with funicles inserted to near top. *Seeds* ± 8, semi-reniform, *ca.* 5 mm long, on long slender funicles, reddish brown in life, drying black.

Distribution. Known only from the type collection from Mt. Shungol, Morobe District, East New Guinea.

Ecology. Recorded as occurring in 'lower moss forest'; altitude 2100 m. Fruiting in December.

Affinities. Because of its (pseudo-)terminal and solitary fruits, relative capsule size and shape, internally unribbed fruit valves, long funicles, and large semi-reniform seeds, *P. pumilum* seems to be most closely allied to *P. sinuatum* Bl. It is readily distinguished, on the other hand, from all species of the genus in New Guinea by its diminutive form, small, thinly coriaceous, obovate-spathulate leaves with an impressed midrib and 5—10

conspicuously elevated parallel nerves, and solitary, (peudo-)terminal, beaked, and coarsely rugose fruit with thin valves and few seeds.

Pittosporum tenuivalve Schodde, *sp. nov.* — **Fig. 2.**

Frutex laxus circa 1—2 m altus affinis *P. sinuato* Bl., differt omnino glabritate, foliis

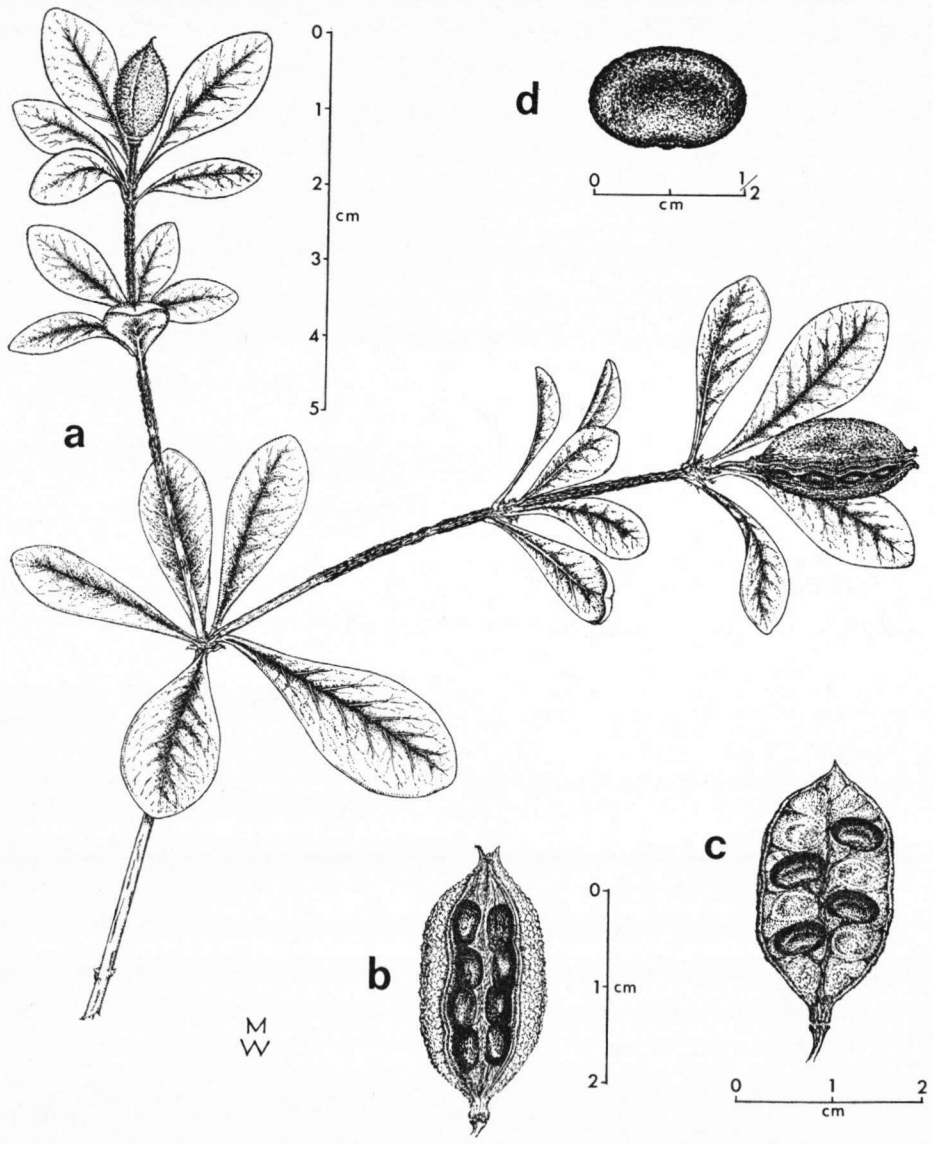

Fig. 1. *Pittosporum pumilum* Schodde. a. (Ultimate) branchlet with fruit; b. whole fruit, ripe and dehiscing; c. inner face of fruit valve with seeds; d. seed (all from *Sayers T.G.H. 12571*, type).

obovatis integris apici caudato et nervis supra sulcatis, fructibus ellipsoideo-rostratis bi- et tenui-valvibus, et seminibus globularibus. Flores ignoti.

Typus: R. G. *Robbins 888*, Namaro, Bena Bena Valley, New Guinea, 23-9-1957; CANB.

Weak loose-branched shrub *ca.* 1—2 m high, glabrous in all parts. *Stems* slender, below with smooth, flaky, pale fawn-grey bark, ultimately smooth, faintly striate, and browner, with scattered caducous cataphylls. *Leaves* mostly 3—4 in pseudo-verticils, sometimes ± opposite, the internodes (3—)5—8 cm; blade ± (narrow-) obovate, *ca.* 7—15 × 2—6 cm, chartaceous to thinly coriaceous; the midrib and nervation conspicuously impressed above, prominent below, laxly reticulating with 4—6 main nerves looping as in *P. sinuatum*; the apex acuminate caudate, the margin entire, hardly repand, and the base cuneately narrowed into a deeply grooved petiole *ca.* 5—10 mm long. *Flowers* unknown. *Fruits* in (pseudo-)terminal umbellate clusters of 3—8, on rather stout glabrous peduncles 3—6 mm long. Capsule ellipsoidal, slenderly rostrate and shortly stipitate, 2½—3 × ± 1¼ cm, glabrous, of two quite chartaceous valves when mature with ± undulate margins when dehiscing; outer valve walls quite smooth, orange in life, drying yellow orange; inner valve walls ± smooth, ± without transverse ribs, and with funicles inserted to near top. *Seeds* 12—16, rather smooth, ± spheroidal, 3—5 mm diameter, on slender funicles, ± enveloped in persisting mucilage when ripe, black in life, drying dull dark orange.

Distribution. Central highlands of East New Guinea.

Ecology. Occurs in montane forest at altitudes of about 2100 to 2300 m. Fruiting from July to October.

New Guinea. *Bulmer 1*, Kaironk Valley, Madang District; *Robbins 888* (type), Namaro, Bena Bena Valley; *Robbins 1121*, Kubor Range above Kuli.

Vernacular name and uses. Sleknyuw (Kaironk Valley). The seeds are eaten by Kaironk Valley natives, *fide Bulmer 1*.

Affinities. P. tenuivalve is closely allied to *P. sinuatum* and perhaps a mountain representative of it. In *P. sinuatum* the distinguishing characters are the reddish hirsute pubescence of the shoots, young stems, and petioles; the papyraceous leaves in which the midrib and often the nerves and veins are ± elevated above; the obtusely subglobose and angular fruits which are puberulous when young, finely rugose when mature, and comprise 2—5 incrassate valves *ca.* 1½—3 mm thick; and the large semi-reniform seeds 5—8 mm long drying without mucilage.

The only other member of the *P. sinuatum* group to have been described from New Guinea mountains is *P. brassii* M. & P. from the central mountains of West Irian, of which authentic material — *Brass 10996, 12671* (isotype), and *12694* — was loaned by herb. BRI for comparison. As already indicated by Bakker (1957, p. 349), it appears to lie within the range of variation of *P. sinuatum*, and the sole character in which it resembles *P. tenuivalve* rather than *P. sinuatum* is leaf shape, which is notably variable in the latter species.

NOTE ON THE AFFINITIES OF THE PITTOSPORUM SINUATUM GROUP

Pittosporum sinuatum and its forms are rather distinct from the other previously known Papuan species of the genus and have been maintained in the section *Chelidospermum* Bl., endemic to New Guinea, by Pritzel (1930, p. 274) and Merrill and Perry (1940). If it is practicable to maintain this group, *P. pumilum* and *P. tenuivalve* should be added to it.

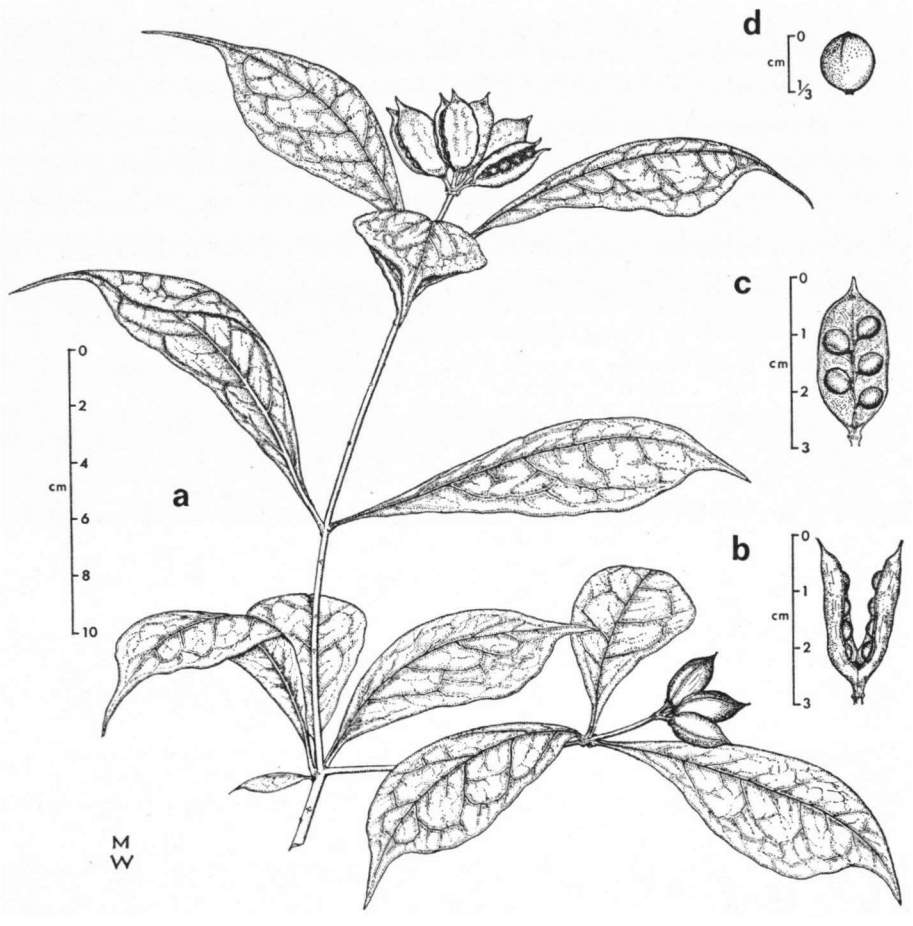

Fig. 2. *Pittosporum tenuivalve* Schodde. a. (Ultimate) branchlet with fruit; b. whole fruit, ripe and dehiscing; c. inner face of fruit valve with seeds; d. seed (all from *Robb'ns 888*, type).

Outside New Guinea, the affinities of sect. *Chelidospermum* appear to lie with the *Pittosporum revolutum* alliance in Australia, comprising, according to Cooper (1956, pp. 119—120), *P. revolutum* Ait., *P. rubiginosum* F. v. Muell., and *P. undulatum* Vent. The similarities are closest between *P. sinuatum* and *P. revolutum*, being in their shrubby habit, leaf arrangement and, to an extent, form, short pseudo-terminal inflorescences, and few short-stalked, relatively large, thick-valved fruits with numerous reniform-globose seeds on long arils. The fruits of *P. sinuatum* are 2—5-while those of *P. revolutum* are 2-, rarely 3-, valved. Both groups are associated with warm rainforest habitats, a feature which is no doubt more significant in the case of the Australian species.

The relationship between these two alliances makes an interesting comparison with the two main subgeneric groupings *Bivalvae* and *Trivalvae* proposed in *Pittosporum* by two of its most recent revisers, Gowda (1951) and Cooper (op. cit.), according to the number of valves per fruit. Cooper (op. cit. p. 109) records both *Trivalvae* and

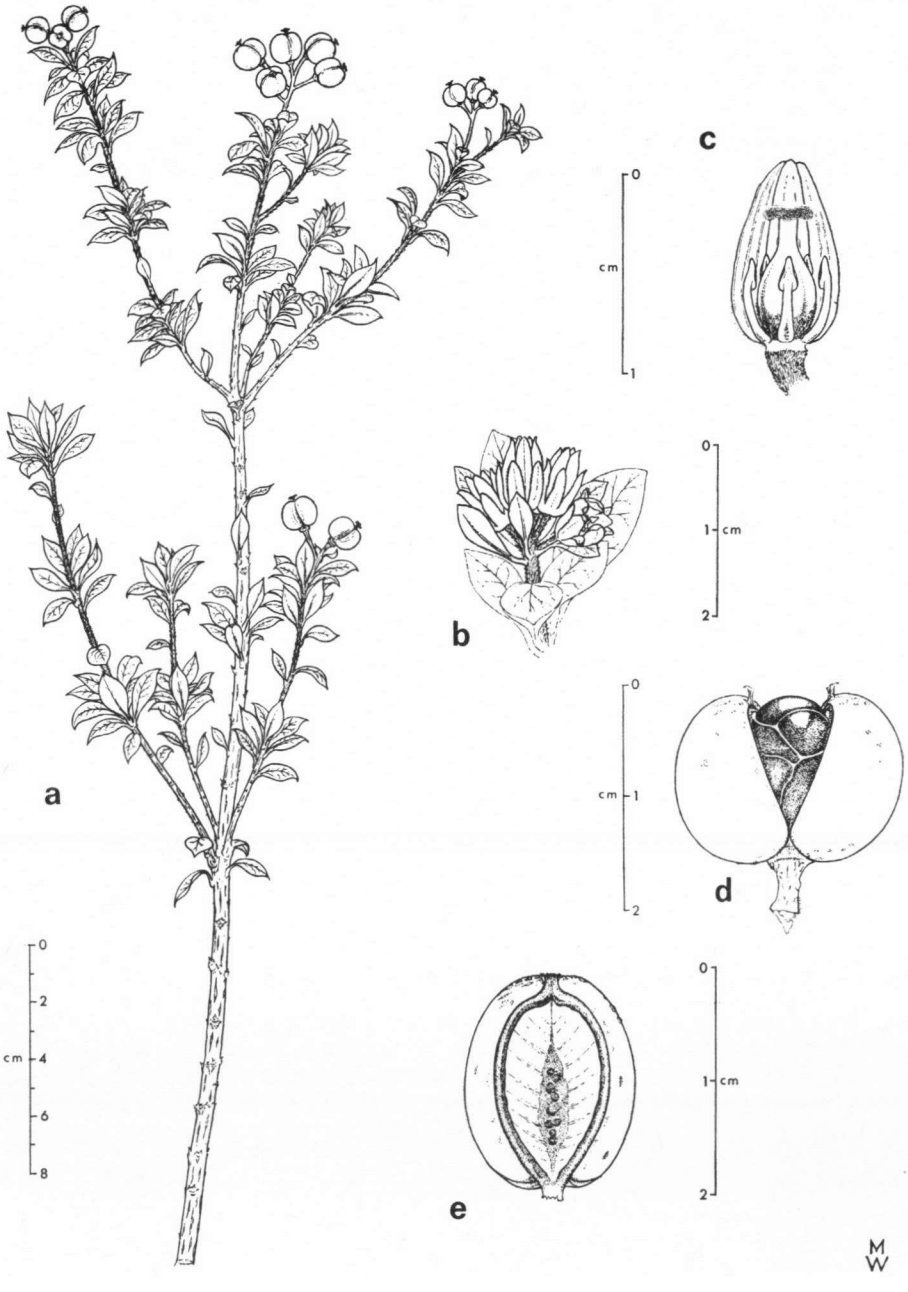

Fig. 3. *Pittosporum nubicola* Schodde. a. Branchlets with fruit; b. flower cluster; c. flower with part of perianth removed to show stamens and pistil; d. ripe fruit; e. inner face of fruit valve showing placenta and ribbing (all from *Pullen 5084*, type).

Bivalvae from New Guinea where *P. sinuatum* alone could be considered a member of the former group, yet only *Bivalvae* from Australia including *P. revolutum* and its allies. It appears then that the relationship between *P. sinuatum* and *P. revolutum* cuts across the *Bivalvae-Trivalvae* grouping and attention is drawn to Bakker's comment (1957, p. 348) that such a division of the genus is more of practical value than an indication (in all cases) of affinity.

Pittosporum nubicola Schodde, *sp. nov.* — **Figs. 3 and 4.**

Frutex gracilis circa 1—2 m altus affinis *P. pullifolio* Burk., differt ramulis junioribus indumento laxe arachnoideo, foliis minutis ± 10 × 5—6 mm coriaceis late oblanceatis, inflorescentiis terminalibus racemosis densis a foliis obtectis, sepalis petaloideis lingulatis obtusis longitudine ± ½—⅔ × petalis maturis, ovariis sessilibus et stigmatibus capitatis bilobatis, infructescentibus emergentibus, fructibus carnoso-coriaceis, valvis apertis incurvis fere induplicatis.

Typus: *R. Pullen 5084*, NE. slope of Mt. Kinkain, Kubor Range, New Guinea, 20-7-1963; holotypus: CANB 134424.

Slender erect shrub *ca.* 1—2 m high. *Stems* not too slender, below with striate or furrowed mid grey bark often marked with leaf scars, ultimately with a loose, arachnoid, pale brown to dirty white pubescence which extends to the inflorescence axes. *Leaves* mostly in pseudo-verticils, or closely alternate toward the stem apices, the internodes (3—)5—10(—15) mm; blade broad oblanceate, *ca.* (6—)10(—14) × (3—)5—6(—7) mm, coriaceous, glabrous but young leaves with sparse, caducous, arachnoid hairs on the upper surface, lower margin, and under midrib; the midrib and venation finely impressed above and broad but not very prominent below; the apex broadly acute to almost acuminate, the margin entire and rather revolute, and the base cuneately narrowed into a petiole 1—2(—3) mm long. *Inflorescence* terminal, condensed, racemose, with 2—8 flowers clustered among leaves on pedicels ± 3 mm long in the axils of narrow oblanceate bracts 6—9 mm long which become broader and more foliose below. Mature *flowers* small and inconspicuous, apparently bisexual. *Sepals* free, ligulate with rounded apices, *ca.* 3—4½ × 1¼—1¾ mm long, ± half as long as corolla, petaloid, glabrous; cream-green with a strong purplish wash in life and when dry. *Petals* ligulate navicular, 7—8 × 2 mm when mature; cream-green with a strong purplish wash in life and when dry. *Stamens ca.* 3—4 mm long, as long as the ovary, with filaments *ca.* 2 mm long and obtusely sagittate anthers *ca.* 1½ mm long. *Ovary* sessile, broad ellipsoid, *ca.* 3—4 mm long, loosely arachnoid pubescent at the base, becoming glabrous above; with a glabrous style *ca.* 1 mm long and broad, bi-lobed, capitate stigma. *Infructescence* of (1—)3—5(—6) fruits on incrassate glabrescent pedicels 5—8 mm long, emerging above leaves on an enlarged incrassate axis. *Capsule* broad ellipsoid, inconspicuously mucronate, 11—13 × 11—13 mm, glabrescent, of two thick coriaceo-carnose valves with involute to almost induplicate margins when dehiscing; outer valve walls smooth to slightly rugose, bright orange in life drying darker; inner valve walls with ribs ascending obliquely from placentas and funicles inserted to a little over half way up. *Seeds* numerous, ± 12—16 on each placenta, irregular and planated, the longest axis *ca.* 4 mm, black in life and when dry.

Distribution. Known only from the type collection from Mt. Kinkain, Kubor Range, East New Guinea.

Ecology. Recorded growing on the border of alpine shrubbery adjacent to peaty (alpine) grassland at an altitude of 3600 m. Flowering sparingly and fruiting copiously in July.

P. nubicola appears to be an element of the tree line vegetation, which on Mt. Kinkain is natural and undepressed by native interference, and may be confined to the highest altitudes for the genus in New Guinea. According to Pullen (pers. comm.), *P. pullifolium* occurs in taller shrubbery at lower altitudes on Mt. Kinkain up to within 100 metres of *P. nubicola* but no farther. In view of their affinities, it may be that *P. pullifolium* and *P. nubicola* are allopatric, at least in an ecological sense.

Vernacular name. Nam-gaguma (Yoowi dialect, Hagen-Chimbu language).

Affinities. P. nubicola is clearly most closely allied to *P. pullifolium* Burk., and is perhaps to be regarded as a diminutive high mountain relative of it, their common characters being the sparse, dirty white, arachnoid hairiness of the young parts, condensed terminal inflorescence, petaloid calyx, fully sessile ovary, rather strikingly incrassate infructescence axis and pedicels, and thick rather carnose valve walls in the fruit with obliquely vertical ribs on the inner face.

Although dwarf high mountain forms of *P. pullifolium* are well known (Bakker 1957, pp. 353—354, and van Steenis 1957, p. CLXXX), the new species is distinguished by its still smaller form in leaf, flower, and fruit parts, its relatively longer and narrower calyx lobes, relatively short style, apically glabrous ovary, and fruit valves that become strongly involute on dehiscing.

NOTE ON SPECIATION IN PITTOSPORUM IN NEW GUINEA

The species of *Pittosporum* described here, increasing by half the number of species known from New Guinea, have all been found in recent years in the mountains of the eastern part of the island. In this category may also be included *P. inopinatum* Bakker (1958), known only from around Mt. Otto. With the possible exception of *P. tenuivalve*, all of them appear to be narrow endemics confined to isolated mountains and ranges where they occur in high montane forest at altitudes from about 2100 to 3600 m. The affinities of each of the mountain endemics apparently lie, moreover, with more widespread species of often lower altitudes: *P. nubicola* with *P. pullifolium*, *P. pumilum* and *P. tenuivalve* with *P. sinuatum*, and *P. inopinatum* with *P. berberidoides* Burk. (*fide* also Bakker, 1958). It would appear then that the mountains of East New Guinea are a centre of diversity for *Pittosporum* and may be expected, with more botanical exploration, to reveal further novelties in the genus.

ACKNOWLEDGEMENTS

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Fig. 4. *Pittosporum nubicola* Schodde, life habit (photograph by W. Vink from *Pullen 5084*, type).