ABSTRACT

For a clearer understanding of *Riccardia obtusa* S.W. Arnell, it is here described and illustrated in greater detail than in Arnell’s (1952) initial publication of his new species. Subsequently, with minor alterations, Arnell (1963) repeated his treatment of *R. obtusa* in *Hepaticae of South Africa*. Wigginton & Grolle (1996) have, however, remarked that this species needs to be clarified, along with the other two Arnellian species of *Riccardia*, namely *R. capensis* and *R. rhodesiae*, which will be treated in detail in future papers.

INTRODUCTION

*Riccardia obtusa* S.W. Arnell appears to be quite widespread in southern Africa, ranging from Karkloof in KwaZulu-Natal to Joubertina in Eastern Cape and Knysna in Western Cape, according to Arnell (1963). The specimen from Pretoria that Arnell (1963) mentioned, had been identified earlier by Sim as *R. compacta*, which is not correct either, as the thalli are much too thin. According to my own observations, *R. obtusa* is also known from Long Tom Pass and Buffelskloof Nature Reserve, Mpumalanga, as well as Kirstenbosch, Cape Town. Samples of fresh collections of it from Fem Forest, Diepwalle (Figure 1), taken in October 2000, were kept alive for as long as 17 months, in order to observe the branching pattern of the thalli, as well as the oil bodies (see Specimens examined). Although Arnell did not remark upon the oil bodies of *R. obtusa*, they are quite distinctive in being very dark and irregular in shape. By the time Arnell described his new species, the oil bodies must have already disappeared.

*Riccardia obtusa* S.W. Arnell in Botaniska Notiser 1952: 142; S.W. Arnell: 96 (1963). Type: Cape Province, Knysna, Deepwall (= Diepwalle) Forest Reserve, on a wet sandstone slope, Arnell 1602 (BOL, holo.; S!).

Thalli prostrate, in densely overlying patches, 2–4 layers thick and tightly adherent to substrate, as well as to each other, often highly contorted and difficult to separate, bottle green and rather brittle; apices of distal branches thickened and fleshy, variously shallowly lobed, margins opaque and obtuse (Figure 2A, B); primary and secondary branches with winged and translucent margins (Figure 2A, C, D); when dry, dark green to brown; smallish to medium-sized. *Main axis* mostly 10–15 mm long, rarely longer, clearly differentiated, distally trifurcated to subpalmately divided, the closely adjoining or overlapping branches lobulate and short, 500–1550 μm wide, their combined width across up to 4.9 mm, apically each branch once, or 2 or 3 times shallowly notched, with continued growth elongating and becoming fan-shaped and thinner; proximally, main axis generally retaining its dominance, dorsally convex, up to 900 μm wide, narrowing somewhat toward base, branching somewhat irregularly pinnate on both sides, rarely with a much elongated side branch up to 8.5 mm long, similarly branched and in all probability, eventually forming a new main axis. *Primary branches/pinnae* opposite or subopposite, single, 350–375 μm long, up to 525 μm wide, obliquely spreading at angles of 40°–70° with the main axis and separated by intervals of 825–2300 μm between them; sometimes with only 1 weaker, rarely with 2 (1 on each side) secondary branches/pinnules, so that occasional trifurcate lateral branches arise. *Stolons* (Figure 2C) quite rare, developing laterally from upper or lower part of main axis, or from tip of primary pinna, seldom branched. *Dorsal epidermal cells* in median part of apical segment of main axis from above, 5–7-sided (Figure 2E), cell walls somewhat thickened, 45.0–60.0(–87.5) x 25.0–32.5(–37.5) μm, subdorsal cells larger, 112.5–212.5 x 50–85 μm, subventral cells 105–200 x 52.5–77.5 μm, ventral epidermal cells 50–75 x 25–40 μm. *Oil bodies* very densely crowded at meristematic apical notches of branches and then present in up to 90% of dorsal and ventral epidermal cells, as*


FIGURE 1.—Distribution of *Riccardia obtusa* in southern Africa.
FIGURE 2.—Riccardia obtusa. A–C, thallus: A, with subpalmate distal branching and irregularly pinnate lateral branching; B, with several gynoe­cial branches; C, with single male branch and a stolon. D, primary branch. E, median dorsal epidermal cells (solid lines) of ultimate seg­ment of axis with smaller oil bodies, and large subdorsal cells (stippled lines) with larger oil bodies (oil globules indicated by stippling); F, marginal cells of ultimate segment of axis, oil bodies stippled; G, H, c/s axis at ± middle of ultimate segment; I–K, c/s primary branches; L, c/s stolon; M, mucilage papillae at ventral apical notch of branch; N, N, gemmae. O–Q, antheridial branch: O, from above; P, from side; Q, c/s, gynoe­cial branch from side; S, calyptra; T, c/s calyptra wall; U, c/s seta; V, c/s part of bistratose wall of capsule valve showing different cell walls: abr, abaxial radial; adr, adaxial radial; it, inner tangential; mw, median; ot, outer tangential. W1, W2, spores; X, elater.

well as in marginal and internal cells, mostly 1, but occasionally 2 or 3 per cell, smaller in dorsal and ventral epidermal cells, 12.5–20.0 × 12.5–17.5 μm, larger in internal cells, 25.0–32.5 × 15.0–27.5 μm, irregular or kidney-shaped, occasionally subspherical, very dark, composed of many tiny globules. *Margins* of ultimate segments of main axis (Figure 2F) with outer cells generally somewhat smaller than intramarginal ones, from above 42.5–57.5 × 27.5–47.5 μm, rectangular to subquadrat, free walls bulging slightly outward, most cells with a single oil body, 12.5–20.0 × 10–20 μm; intramarginal cells 5- or 6-sided, 57.5–100.0 × 35.0–62.5 μm, with 1, occasionally 2 oil bodies each.

*Cross section* at ± middle of ultimate segment of main axis biconvex (Figure 2G, H), 840–1040 μm wide and 5–8(–11) cell rows or up to 325 μm thick medianly, gradually tapering to obtuse margins, thickness of dorsal cells 12.5–15.0 μm, subdorsal cells 25–30 μm, medullary cells (40-)60–100 μm, subventral cells ± 30 μm and ventral cells ± 15 μm; base of main axis generally narrower than younger part further along, ± 680 μm wide, 6 cell rows or ± 200 μm thick, margins shortly acute; cross section of primary branch/pinna (Figure 2I–K) 85–110 μm or 3 or 4 cell layers thick medianly, unistratose margins 3 or 4 cells wide; cross section of secondary branch/pinnule ± 55 μm or 3 cell layers thick; cross section of stolons (Figure 2L), oval to elliptical, ± 140 × 210 μm. *Mucilage papillae* (Figure 2M) ventral, crowded together at shallowly notched apex of branch and then in 2 spaced rows, one on either side of midline, 150–225 μm between successive ones, club-shaped, 50–80 μm long, 17.5–37.5 μm wide above, tapering to foot, 10.0–12.5 μm wide. *Rhizoids* ventral along branches, 10.0–12.5 μm wide. *Asexual reproduction* by gemmae (Figure 2N) occasionally observed on dorsal surface of upper branches, consisting of 2 cells joined together, ± 65 × 40 μm.

Monoicous. *Antheridal branches* rather few in number, arising laterally on main axis (Figure 2C), immediate-ly below base of primary branch or subopposite to base of primary branch, sometimes 2 together, sometimes shortly stipitate, oblong-linear, 1125–1300 μm long, width 250–270 μm, in cross section ± 240 μm high, bearing up to 11 pairs of antheridia, on same plant occasionally shorter male branches, 460–830 μm long, width up to 220 μm, with 4–9 pairs of antheridia, antheridal cavities from above 50.0–62.5 × 32.5–47.5 μm, surrounding cells 37.5–42.5 × ± 30 μm, 1 or 2 adjoining cells between pairs of cavities; margins (Figure 2O) crenulate, with single erect layer of swollen cells, 65.0–87.5 × 45–65 μm. *Gynoecial branches* (Figure 2R) short, arising laterally on same side along length of main axis, 2 or 3 in a row, sometimes in pairs on opposite sides of primary branch, ± 260 μm high, 450 μm wide, surrounding paraphyses up to 310 μm long, composed of 3 or 4 cells joined end to end, archegonia in 2 rows. *Calyptra* (Figure 2S) clavate, length 2.0–3.5 mm, ± 0.85 mm wide above and narrowing below to ± 0.6 mm; cross section of wall (Figure 2T) 170–200 μm wide, many cells of outermost row markedly protuberant, 115–135 × ± 25 μm, cells in corona up to 175 μm long. *Seta* ± 5.7 mm long, 220–280 μm wide, with 4 inner and 12 outer cell rows, i.e. 4 cells diam. (Figure 2U). *Capsule* ellipsoidal, 1150–1675 μm long, with 4 valves, ± 325 μm or 21–23 cell rows wide, bistratose; cells of epidermal layer in external longitudinal view (Figure 3A) 67.5–90.0 × 10.0–12.5 μm, end walls straight or oblique, with vertical (nodular) thickenings; in cross section (Figure 2V) cells rectangular in shape, thickenings on adaxial radial and inner tangential walls, bands on one side of median wall alternating in a mirror image with those on the other side; inner cells in internal longitudinal view, 65–90 × 10.0 ×17.5 μm, without nodular thickenings (Figure 3B); in cross section (Figure 2V) cells faintly thickened on adaxial radial walls. *Spores* 12.5–15.0 μm diam., finely scabrate, pink with internal green areas. *Elaters* 115–340 × ± 12.5 μm, reddish, with single spiral band, 7.5–10.0 μm wide, the tapered tips at one or both ends without spirals.
In his paper on the genus *Riccardia* in tropical Africa, Jones (1956) remarked that he had not seen specimens of *R. campanuliflora* S.Arnell, *R. capensis* S.Arnell or *R. rhodesiae* S.Arnell (Botaniska Notiser 1952), but he made no reference to *R. obtusa* S.W.Arnell, which was published in the same paper as Arnell’s other three new species. Later on, Engel (1975) identified a specimen collected on Réunion as *Riccardia* cf. *obtusa* S.Arnell, but added a question mark as follows: ‘Wet woods, Forêt de Bebour, 1300 m (?), species. Later on, Engel (1975) identified a specimen published in the same paper as Amell’s other three new species. Later on, Engel (1975) identified a specimen published in the same paper as Amell’s other three new species.


Bearing in mind Meenks’ (1987) admonition that herbarium collections of *Riccardia* more than 20 years old, are often useless, Arnell’s identification of three collections of *R. obtusa* specimens is accepted, because he had the advantage of studying them when fresh. According to Arnell, this species resembles *R. latifrons*, in that it has short, blunt branches. Schuster (1992) described *R. latifrons* as closely adherent to the substrate and subpalmately branched distally; the epidermal cells of the thalli are, however, typically very large, always thin-walled with colourless walls and the oil bodies are absent near the meristematic tips and in all the epidermal cells. It is also confined to the Northern Hemisphere. There are, therefore, significant differences between these two species.

*R. obtusa* specimens are distinguished by the following characters: 1, the obtuse margins (hence the specific name) of the distal branches; 2, the distal trifurcate to subpalmate branching pattern; 3, the closely adjoining or overlapping, lobulate apical branches; 4, the markedly thickened ultimate segments of the main axes, 5–8–(11) cell rows thick; 5, the primary and secondary branches with unistratose margins; 6, the prominent cell protrusions on the calyptra wall; 7, the distinct oil bodies, which are very dark and irregular to kidney-shaped or subspherical.

**SPECIMENS EXAMINED**

Arnell 1602 (holotype), Deepwall (= Diepwalle) Forest Reserve, on a wet sandstone slope (BOL), (isotype) (S), 1620 Deepwall Forest, wet slope (S), 1628, near Parkes Station, Knysna, wet sandstone slope (BOL).

Esterhuyzen 24255, N side of Zitzikamma Mts, near Joubertina, wet shaded rock at side of stream on steep slope (BOL).

Koekemoer 2246, Buffelskloof Nature Reserve, south of Lydenburg, in stream south of Research Cottage, on roots and stem of fern (PRE).

Perold, Burgoyne & Smithies 4742, 4743, Long Tom Pass, near ‘Staircase’, ± 25 km from Lydenburg, in gulley down steep slope (PRE).

Perold & Koekemoer 4456, 4457, 4460, 4462, Valley of Ferns, on rotting logs, sent of stone, along footpaths. 4592, Kirstenbosch, in dark gorge above ladders (PRE).

Schelp 5154, ‘Braco’, Karkloof, Natal, on fallen logs in forest (BOL).

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**REFERENCES**


