New taxa, combinations and records of Pteridophyta from southern and central Africa

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ABSTRACT

Four new taxa of ferns are described and illustrated from southern Africa: *Ophioglossum convexum* J.E. Burrows, *Mohria caffrorum* (L.) Desv. var. *ferruginea* J.E. & S.M. Burrows, *Marsilea farinosa* Launert subsp. *arrecta* J.E. Burrows and *Asplenium seungweense* J.E. Burrows. The combination of *Grammitis rigescens* (Bory ex Willd.) J.E. Burrows is made. *Ophioglossum thomasi* Clausen, *O. rubellum* Welw. ex A. Braun, *Vittaria ensiformis* Swartz and *Asplenium buettneri* Hieron. ex Braun are new records for Zimbabwe, while *Hymenophyllum splendidum* V.d. Bosch and *Asplenium uhligii* Hieron. are new records for Malawi and Zimbabwe. *Actiniopteris semiflabellata* Pichi-Sermolli is recorded from Namibia and *Thelyspteris oppositiforums* (C. Chr.) Ching is recorded from the Transvaal.

INTRODUCTION

While carrying out research on southern African pteridophytes, it became obvious that there were a few undescribed taxa from, as well as a number of new records to, the area covered by *Flora zambesiaca* (BM, holo.) and *Flora zambesiaca* (Thomas 1903 (BM, holo.)). This paper attempts to update our knowledge of southern African ferns in the light of recent collections and research.

1. *Ophioglossum thomasi* Clausen in Memoirs of the Torrey Botanical Club 19: 152 (1938). Type: Uganda, Kampala, Kabaka's Lake, *Thomas 1903* (BM, holo.).

ZIMBABWE.—2028: Matopo Hills, Besna Kobila Farm, 1 465 m, Jan. 1956, Miller 3305 (PRE). Distribution: Liberia, Ivory Coast, Ghana, Nigeria, Cameroon, Gabon, Zaire, Uganda, Tanzania and Zambia.

2. *Ophioglossum convexum* J.E. Burrows, sp. nov.

*Rhizoma* elongatum, 5—25 mm longum cum vel sine aliquot basibus petiolorum persistentibus. *Radices* proliferae. *Folium* unum (raro duo), ad angulum 0—30° portatum vix supra vel terrain adpressum. *Petiolus* 6—25 mm longus, 60—90% longitudinis subterraneus. *Lamina sterilis* desuper convexa, ovata vel late ovata, late acuta vel obtusa et breviter apiculata; basis late cuneata vel truncate; nervatura obscura. *Spica fertilis* 30—100 mm longa, ad vix infra basin laminae sterilis inserta; sporangia paribus 6—15; apex acutus vel breviter apiculatus.

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FIGURE 1.—*Ophioglossum convexum* J.E. Burrows, in natural habitat, Lisabon State Forest, Lydenburg, Transvaal, Burrows 3427.

and narrower rhizome, only a single leaf (*O. rubellum* almost always has two or more), and in having the leaf appearing convex from above with the margins generally curving downwards although the midrib region may be concave, while the leaf of *O. rubellum* appears folded along the midrib, sloping upwards to the margin and is never appressed to the ground, being held at 10–20° from the horizontal. There are a number of collections of plants identified as *O. rubellum* from east and central Africa which have a single leaf and are stated to have the lamina lying flat upon the ground which are undoubtedly *O. convexum*. The confusion has almost certainly arisen from a misinterpretation of Welwitsch’s type from Angola which is in Kew (isotype in BM). On the three sheets (two in K, one in BM), there are a total of 41 plants, of which six bear a single leaf, 29 with two and six with three leaves. Schelpe (1970) states that *O. rubellum* has a single leaf, quoting and illustrating a plant collected from Zambia (H.M. Richards 10371 — said to be in Kew but not found by the author) that is clearly *O. convexum*. It is likely that this error has been perpetuated elsewhere in Africa.

*O. convexum* is also similar to *O. nudicaule* L. f. (Figure 3). *O. nudicaule* sens. strict. is, in the author’s opinion, confined to the Cape Province and has up to five leaves per plant, each leaf being concave when viewed from above, with the whole lamina somewhat deflexed. Like most species of *Ophioglossum*, *O. convexum* does not appear to be closely linked to climate or altitude, occurring in the Transvaal in montane grassland at altitudes of between 1 200 and 1 900 metres, but in warmer climates and at lower altitudes north of the Limpopo River (Figure 4). Proliferating roots as found in this species are not unusual in the genus, although they are seldom documented (Chen & Chiang 1972). Due to its proliferous roots the species tends to form colonies of several square metres.

3. *Ophioglossum rubellum* Welw. ex A. Braun in Kuhn, Filices africanae: 179 (1868). Type: Angola, Pungo Andongo, *Welwitsch 33* (K, holo.; BM, iso.).

Icon: Tardieu-Blot: pl. 1, fig. 8 (1953).

Specimens collected on seasonally wet sandy soils in the Sengwa Wildlife Research Area lack the reddish tinge that gave the specific name to the type collection, but in all other characters are identical to Welwitsch’s plants examined by the author. There are collections from Zambia, Kenya and Ethiopia that have smaller, single leaves with a bluish tinge that have been attributed to *O. rubellum* but they may in fact be *O. convexum* J.E. Burrows (Figure 1), or an undescribed species. (See also notes under the previous species.)

ZIMBABWE.—1828: Gokwe, Sengwa Wildlife Research Institute, 0,5 km NE of bridge over the Sengwa Gorge, 880 m, 12.2.1983, Burrows 3019 (BOL, K, PRE, SRGH, Herb. Burrows). Figure 2.

Distribution: Ethiopia, Kenya, Uganda, Tanzania, Zambia and Angola.

4. *Mohria caffrorum* (L.) Desv. var. *ferruginea* J.E. & S.M. Burrows, var. nov., a var. *caffrorum* rhachidi juventute perdense squamis atrorubinaceae obtecta differt.

TYPE.—Natal, (2929) Underberg: Drakensberg Mts, Injasuti, below Women Grinding Corn (—AB), Burrows 3670 (BOL, holo.; K, PRE, iso.).

FIGURE 2.—*Ophioglossum rubellum* Welw. ex A. Braun, in natural habitat, Sengwa Wildlife Research Institute, Gokwe, Zimbabwe, Burrows 3019.
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FIGURE 3.—Ophioglossum nudicaule L. f., ex hort., 14 km from Grahamstown on Cradock Road, Cape Province, Burrows 3685.

**Rhizome** erect to procumbent, 5—8 mm in diameter, with closely packed, tufted, erect fronds. **Rhizome scales** rusty brown, linear-lanceolate, attenuate, entire, concolorous, 2—6 mm long. **Stipe** 40-120 mm long, brown basally, stramineous distally when dry, variously set with dark, reddish brown, subulate, entire scales, 0.5—2 mm long, and scattered scales near the base similar to those on the rhizome, becoming subglabrous with age. **Lamina** 120-300 x 30—60 mm, narrowly elliptic to narrowly oblanceolate, 3-pinnatifid. **Pinnae** ± 25 x 16 mm, ovate to triangular, bluntly acute. **Pinnules** oblong, obtuse, deeply pinnatifid into rounded lobes, margins widely and shallowly serrate-crenate, involute, glabrous above, with occasional, minute subulate scales below, both surfaces with scattered, opaque, linear, gland-like projections ± 0.1 mm long. **Rachis and secondary rachises** sulcate above, densely set with dark, reddish brown, subulate scales similar to those on the stipe, almost obscuring the rachis when young. **Sori** submarginal, partly covered by the involute margins (Figure 5B).

*M. caffrorum* var. ferruginea is separated from var. *caffrorum* by its thick mat of dark, reddish brown scales that clothe the rachis when young and by the glabrous to subglabrous lamina which, in old pressed fronds, turns a metallic grey. In addition, it appears to be restricted to high altitudes of between 1 700 and 2 300 m (Figure 6).

**TRANSVAAL.** — 2530 (Lydenburg): Lydenburg District, Die Berg (-AA), Burrows 3677 (BOL, PRE, Herb. Burrows); Lydenburg, Coromandel Farm (-AD), Burrows 3679 (BOL, J, PRE).

**O.F.S.** — 2828 (Bethlehem): Golden Gate National Park (-CB), Roberts 3125, 3277 (PRE).

**NATAL.** — 2828 (Bethlehem): Mont aux Sources (-DD), Mogg 5303 (PRE). 2829 (Harrismith): Ntongane, Mnweni area (-CC), Esterhuysen 14523 (BOL); Lambonja Valley, Cathedral Peak area, Esterhuysen 12894 (BOL, PRE). 2929 (Underberg): Giant’s Cup Trail, Cobham State Forest (-CB), Nicholas & Vd. Berg 13223 (PRE); Cobham Forest Reserve, Underberg District (-CB), Hilliard & Burtt 15935 (BOL); Tributary of Mkhomazi River, Underberg District (-CB), Hilliard & Burtt 15731 (BOL); Bamboo Mountain, Polela District (-CB), Doidge R8 (PRE). 3029 (Kokstad): Mt Currie, Kokstad (-AD), McLoughlin 777 (BOL, PRE).

**LESOTHO.** — 2828 (Bethlehem): Leribe (-CC), Dieterlen 475, 841 p.p. (K, MPU).

**CAPE.** — 3227 (Stutterheim): Gxulu Mt, Keiskamma Hoek District (-CA), Story 3502 (PRE).

**BOTSWANA.** — 2227 (Palapye): ± K km N of Martin’s Drift on the Palapye Road (-DD), Burrows 3705 (PRE, Herb. Burrows). 2425 (Gaberone): 3 miles north of Gaberone (-DB), Mott 314 (BOL, PRE, UBLS). Grid ref. unknown: Content Farm, Gaberone District, Kelaole A13 (PRE).

5. Marsilea farinosa Launert subsp. arrecta J.E. Burrows, subsp. nov. Differs from subsp. *farinosa* (Launert 1968, 1983) in that the pedicels are longer and arise from both the base of the stipe and the axils of the stipe, and the sporocarps are held at ± 180° to the pedicels. (Figure 7B).

**TYPE.** — Transvaal, (2328) Baltimore: 40 km S of Groblersburg on Potgietersrus road (-AA), Burrows 3597 (BOL, holotype; J, K, PRE, Herb. Burrows, isotype).

Differs from subsp. *farinosa* (Launert 1968, 1983) in that the pedicels are longer and arise from both the base of the stipe and the axis of the stipe, and the sporocarps are held at ± 180° to the pedicels. (Figure 7B).

**BOTSWANA.** — 2227 (Palapye): ± 10 km N of Martin’s Drift on the Palapye Road (-DD), Burrows 3705 (PRE, Herb. Burrows). 2425 (Gaberone): 3 miles north of Gaberone (-DB), Mot 314 (BOL, PRE, UBLS). Grid ref. unknown: Content Farm, Gaberone District, Kelaole A13 (PRE).

6. Hymenophyllum splendidum V.d. Bosch in Nederlandsch Kruidkundig Archief 5: 192 (1863). Type: Fernando Po [Bioko], Mann s.n. (K, holotype; L, isotype).
FIGURE 5.—Ophioglossum convexum, Burrows 3683: A1, various aspects of plants, × 1.5; A2, sterile lamina, view from above and cross-section, × 1.5; A3, rhizome, × 1.5. Mohria caffrorum var. ferruginea, Burrows 3677: B1, plant, × 0.7; B2, pinna, × 1.5; B3, rachis, × 3.5.
Hymenophyllum ciliatum Swartz var. splendidum (Vd. Bosch) C. Chr.: 368 (1906). Sphaerocionium splendidum (Vd. Bosch) Copeland: 31 (1938).

Hymenophyllum plumieri Hooker & Grev.: t. 123 (1829). Icon: Holttum: fig. 359 (1966).

Vittaria plantaginea (Swartz) Greene: 103 (1900). Type: Mascarene Islands.

Polypodium rigescens, described by Bory de Saint-Vincent, was given the binomial name Polypodium rigescens. However, the correct name for this fern is Polypodium rigescens (Bory ex Willd.) Alston: 26 (1956). Type: Reunion, Herb. Burrows, 3577 (J, PRE, Herb. Burrows).

8. Actiniopteris semiflabellata Pichi-Sermolli in Webbia 17: 24 (1962). Type: Ethiopia, Tertale, Pozzi di El Banno, Corradi 26 (Herb. Pichi-Sermolli, holo.: FI, iso.).

The plant of this fern was first collected by M. Müller of the Windhoek Herbarium in the Naukluft Mountains in 1979 and determined as A. radicata (Swartz) Link. Upon closer examination, it became apparent that the collection was A. semiflabellata, based upon the homomorphic fronds (although the fertile fronds are somewhat larger than the sterile fronds), the two types of rhizome scales (one concolorous, the other with a dark central stripe) and, most characteristically, the dried fronds which are only slightly inclined to one side, whereas in the other three African species the fan of the dried frond is bent at 90° or more from the vertical.

A. semiflabellata has, up to now, only been recorded as far south as Tanzania, Burundi and Zaïre, extending northwards to north Africa and south Asia. This find in such an isolated situation, therefore, represents an interesting and puzzling extension for the species, although the arid habitat of the Naukluft Mountains is very similar to that in which it occurs throughout much of its range.

9. Grammitis rigescens (Bory ex Willd.) J.E. Burrows, comb. nov.

Polypodium rigidum Bory ex Willd. in Species plantarum 4: 183 (1889). Cenocopteris rigidus (Bory ex Willd.) J. Sm.: 184 (1875). Xiphopteris rigidus (Bory ex Willd.) Alston: 26 (1956). Type: Réunion, Borde de St. Vincent s.n., in Herb. Willdenow no. 19668 (B, holo.; FI, iso.).

Grammitis flabelliformis sensu Morton: 57 (1967). Xiphopteris flabelliformis sensu Schelpe: 217 (1967).

Pichi-Sermolli (1983) has clearly shown that, in terms of Art. 8 of the Code of Botanical Nomenclature, Morton's application of the name Grammitis flabelliformis (Poir.) Morton (loc. cit.) is unacceptable, and that the plants from Réunion belong to Polypondium rigidum, described by Willdenow in 1810, while Poiret's Polypondium flabelliforme applies to the central American taxon.

In accordance with current generic concepts in Grammitidaceae (Morton 1967; Proctor 1985; Stolze 1981), the recognition of Xiphopteris at generic level is not upheld, particularly in view of the poor value of degree of lamina dissection as a distinguishing criterion.
FIGURE 7.—Asplenium selungweense, Burrows 3026: A1, frond and rhizome, x 0.6; A2, pinnule, x 1. Marsilea farinosa subsp. arrecta, Burrows 3597: B1, plant, x 0.6; B2, sporocarp, x 2; B3, B4, points of pedicel attachment, x 2.
11. Asplenium sebungweense J.E. Burrows, sp. nov.

Rhizome repens, ± 5 mm diametro, frondibus 4–10 mm distantibus, interdum aspectu caespitosis. Squamae rhizomae 2,5–4 mm longae, atrobrunneae linearlanceolatae clathratae subintegrae; apex arista longa. Stipes laminae aequans vel eo longiore, ad 260 mm longus, castaneus vel fere ater, squamis atrobrunneis clathratis linearlanceolatis ad 2 mm longis modice obscuetus, glabrescens. Lamina 150–250 × 100–140 mm, ovatitriangularis, bipinnata vel profunde tripinnatifida, pinnae basales longissimae. Pinnae ovatae vel triangulares. Pinnae obcuneatae vel obovatae, 4–14 mm lateae, pinnae proximales profunde pinnatifidae; margines distales profunde irregulariterque serrati et incisi, atrovirides, pagina supera glabra, pagina infera pallidior et glabrescent. Rachis proximali ater, distali viridescens, squamis et pilis dispersis nigrescentibus obtectus. Sori numerosi, lineares, secus venas positas; indusium lineatum, integrum, 3–9 × 0,2 mm.

TYPE.—Zimbabwe, tributary of Busi River, 12 km NE of Lusulu, Grid Ref. NL. 976095, Craig, Mahlangu & Burrows 8 (PRE, holot.; SRGH, isotyp.). Icon: Tardieu-Blot: pl. XXXIII (1964); Jacobsen: fig. 270 (1983).

In the course of examining material of Asplenium from south and central Africa, it became obvious that A. parablastophorum Braithwaite from south-eastern Zimbabwe was identical to A. buettneri Hieron. from neighbouring Mozambique and tropical Africa, and accordingly the former is hereby sunk into A. buettneri.

Distribution: Ghana, Togo, Nigeria, Gabon, Cameroon, Zaïre, Tanzania, Zambia, Malawi, Mozambique and Zimbabwe.

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12. Asplenium uhligii Hieron. in Botanische Jahrbücher 46: 374 (1912). Type: Tanzania, Kilimanjaro, Uhlig Hfl (B, holo.; P, isotyp.).

Icon: Tardieu-Blot: pl. XXVII, fig. 4 (1964).

A. uhligii is a high altitude fern occurring in deeply shaded recesses among boulders, growing in mats of Hymenophyllum tunbridgense (L.) Sm. together with Grammitis rigescens (Bory ex Willd.) J.E. Burrows. Although smaller than the typical form from central Africa, the thin, creeping rhizome and the short, ovate, shiny brown rhizome scales which lack any central cell wall thickening, are consistent and distinguish it from the superficially similar A. aethiopicum (Burn. f.) Becherer and A. lincki Kuhn.

Distribution: Togo, Nigeria, Cameroon, Zaïre, Uganda, Kenya and Tanzania.

13. Thelypteris oppositiformis (C. Chr.) Ching in Bulletin of the Fan Memorial Institute of Biology. Botany 10: 253 (1941). Type: Madagascar, Perrier 7582 (P, holo.).

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Amauropelta oppositiformis (C. Chr.) Holm.: 135 (1974).

Dryopteris tsaratananensis C. Chr.: 45 (1932). Thelypteris tsaratananensis (C. Chr.) Ching: 255 (1941). Type: Madagascar, M. Tsaratanana, Perrier 10455 (P, holo.). Thelypteris strigosa sensu Schelpe: 193 (1970).

Distribution: Zimbabwe, Malawi, Tanzania, Uganda, Kenya, Ethiopia, Sudan, Cameroon, Nigeria.

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